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AN ANALYSIS OF LICIT OPIUM POPPY CULTIVATION: INDIA AND TURKEY

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Executive Summary

For most of the 20th Century, morphine and codeine have been used for the relief of pain, suppressing coughs, and treating diarrhoea. Indeed, in the last thirty years both opiates have been recommended by the World Health Organisation as essential therapeutic tools with a wide range of medical applications and, more recently, in the treatment of cancer-related pain. Consequently, over the last twenty years the demand for opiate raw materials has increased significantly.

However, mirroring this increase in the demand for opiates for legitimate medical and scientific needs has been an increasing concern over the illegal use of opiates, from smoking and eating opium in the 19th Century to smoking and injecting heroin in the late part of the 20th Century. The challenge for the international community has been to establish a regulatory system that ensures that the legitimate medical and scientific needs for opiates are met, whilst preventing diversion to illicit markets.

The *Report* seeks to assess the scale and nature of any potential diversion from the licit trade through a comparative analysis of the different processes and controls applied in two source countries, India and Turkey. It compares the different regulatory and control mechanisms that are applied in each of these countries and identifies lessons learned and ‘*best practice*’ in the cultivation, production and regulatory mechanisms for licit opium poppy.

The *Report* consists of five main sections and a detailed Annex. The first section analyses the current trends in cultivation and production amongst the main producer nations of opiate raw materials. It highlights how recent developments in the international trade in opiates have impacted on the ‘*traditional supplier countries*’ of India and Turkey. The second section documents the regulation and control mechanisms in Turkey and India. It describes the chronology of events in the cultivation, and production of opium and the different control mechanisms that are in place at each stage of the process in each country.

The third section analyses the ‘*risk points*’ in the cultivation and production process in Turkey and India and highlights how the risk factor differs due to the nature of the product, raw opium or poppy straw, and the structural mechanisms for regulation and control. The fourth section analyses the evidence of the extent of diversion, and its ultimate destination both in terms of domestic consumption and international trafficking.

The detailed Annex seeks to inform the current discussions regarding illicit opium production, drawing on the extensive literature that has been written on licit opium poppy producing nations over the last 60 years. Given that this body of work has not been synthesised previously, and that there is a growing debate, within the UK and other countries, regarding the potential yield of illicit opium poppy, this Annex provides an overview of the salient issues that are still of relevance to policy makers and analysts today.

The *Report* concludes that diversion from licit cultivation can only be minimised if the national authorities can guarantee that they have the necessary resources, institutional capacity and control mechanisms in place to ensure that they are the sole purchaser of opiate raw materials. It suggests that this is not the case in India and that there is evidence of systematic leakage from its licit opium industry. The *Report* suggests that the same, however, cannot be said of Turkey.

The *Report* concludes that the reasons for this difference are mainly attributed to inherent problems associated with the production of raw opium. However, some of the institutional mechanisms for regulation and control at the local level are also highlighted as being deficient.

The *Report* suggests that by reducing its utility, the poppy straw method reduces the demand for the product. The high cost of conversion, the sheer scale of the industrial plant and materials required, and consequently, the risk of detection, all combine to reduce the potential for diversion. Clearly, from the control perspective the poppy straw method currently has significant advantages over the production of raw opium.

The *Report* makes a number of recommendations:

- o It suggests that a detailed Business Plan for the phased transition to the poppy straw method should be produced for the licit opium industry in India, building on the work that has already been undertaken in India on the efficacy of converting to poppy straw production.
- o It recommends that local mechanisms for the supervision and control of opium poppy cultivation in India need to be reviewed, suggesting that the current system of using village representatives elected by fellow licensees is insufficient to prevent diversion .
- o It suggests that given the current drought in India, that the results of the Joint Opium Yield Survey conducted by the Government of India and the United States Government will need to be closely examined to ensure that the data can be extrapolated across the states and over time. It suggests that consideration should be given to repeating this Survey in the 2001/2002 growing season to ensure that the data is applicable for more than one season.
- o Of particular importance, the report recommends that a freight profiling exercise on shipments from, or transiting, Sri Lanka should be conducted to assess the potential threat trafficking via this country poses to the UK.
- o The *Report* also recommends that there is a need to review the increasing number of anomalies that seem to be occurring amongst those countries ‘producing’ opiate raw materials. The use of seized opium for the production of alkaloids would not seem to conform to the principals of the Single Convention. Moreover, greater consideration needs to be given to what the status of ‘*traditional supplier countries*’ actually entails in the context of genetically improved varieties of opium poppy and shifting patterns in the supply of, and demand for, opiate raw materials in recent years. It suggests that increasing instability in the demand for opiate raw materials from ‘*traditional supplier countries*’, and in particular India, may well be lead to increasing levels of diversion.

1. Introduction

For more than a century, morphine and codeine, two of the major alkaloids contained in opium, have been used in the relief of pain, suppressing coughs, and treating diarrhoea. Concerns over the addictive properties of these natural opiates prompted attempts to develop semi-synthetic and synthetic opioids¹ with similar beneficial qualities but without the deleterious effects. So far, success has not been achieved. As such, both morphine and codeine continue to be recommended as essential therapeutic tools with a wide range of medical applications.

Indeed, both morphine and codeine have featured on World Health Organisation's (WHO) Model List of Essential Drugs since its inception in 1977, whilst morphine is included in the WHO's New Emergency Health Kit. Moreover, in more recent years, under the encouragement of the International Narcotics Control Board (INCB) and the WHO, opiates, and in particular morphine, have become widely recognised as essential elements in the treatment of cancer-related pain. This has led to an increase in the global consumption of morphine in the last fifteen years.²

To ensure that there is a sufficient supply of opiates for legitimate medical needs, opium poppy has been cultivated on a licit basis in a number of countries. Whilst any country is at liberty to cultivate, produce and trade in licit opium, they are required to do so in accordance with the Single Convention on Narcotics Drugs of 1961 and under the supervision and guidance of the INCB. Currently, there are eighteen countries that do so.³ Four of these countries cultivate opium poppy for the production of raw opium.⁴ A further fourteen cultivate it for the production of Concentrate of Poppy Straw (CPS)⁵, poppy straw, poppy seeds, and alkaloids such as thebaine.⁶

Australia, France, India, Spain and Turkey, are the five major exporters of opiates, of which India is the sole exporter of raw opium. In 1999, India exported 580 (metric tonnes) mt of opium to countries as diverse as the United States, Japan, the United Kingdom, Hungary and France.⁷ In the same year, 345.1 mt of CPS were exported, the majority of which was

¹ According to the INCB, the term '*opioid*' refers to a natural, semi-synthetic or synthetic substance with chemical structure and pharmacological effects similar to those of morphine.

² See International Narcotics Control Board (2000) Report 1999. United Nations: New York.

³ The Islamic Republic of Iran and some of the Central Asian Republics are anomalous in that instead of cultivating opium poppy, they use the opium that they seize. Whilst previously, these countries had been satisfied with using seized opium for their domestic opiate needs, in recent years they have sought to sell seized opiates, or products derived from them internationally. This has caused some concerns amongst '*traditional*' producers, such as India and Turkey, as well as the INCB.

⁴ These countries are China, the Democratic Republic of Korea, India and Japan.

⁵ '*Poppy Straw means all parts (except the seeds) of the opium poppy, after mowing*'. See the Single Convention on Narcotic Drugs 1961. United Nations: New York. '*Once the alkaloids present in poppy straw are extracted, the resulting material is subject to an evaporation process to eliminate liquid solvents used in the extraction. The dried residue is known as Concentrate of Poppy Straw and has a morphine content of between 40 and 80%*'. See International Narcotics Control Board (1999) Narcotics Drugs: Estimated World Requirements for 2000 – Statistics for 1998. United Nations: Vienna.

⁶ These countries are Australia, Austria, Czech Republic, Estonia, France, Germany, Hungary, Netherlands, Poland, Romania, Slovakia, Spain, The Former Yugoslav Republic of Macedonia and Turkey.

⁷ 1999 is the last year for which actual figures are available. Figures for 2000 and 2001 are estimates. See International Narcotics Control Board (2000) Narcotics Drugs: Estimated World Requirements for 2001 – Statistics for 1999. United Nations: Vienna.

produced in Australia and Turkey. In Australia alone, the opium trade was worth an estimated US\$130 million in 1999.

As such, in 1999, 141,715 hectares (ha) of licit opium were cultivated, producing the morphine equivalent of 400.8 mt. Based on the United States Government's (USG) estimates of illicit cultivation and production for the same year, this is the equivalent of approximately 37% of total illicit opium poppy cultivation and 8% of total illicit opium production.⁸

Clearly, given the sheer scale of the cultivation and trade in opiates and the number of countries involved, there are some concerns over the potential for diversion into illicit channels. There is certainly evidence of licit opium leaking into domestic markets in India.⁹ However, the scale of diversion into the international market, if any, in India and other licit producers remains unknown. For policy makers, the assessment of the overall threat that diversion from licit production poses to the United Kingdom is made problematic by the absence of such information.

Primarily, this *Report* seeks to assess the scale and nature of any potential diversion from the licit trade, drawing on India and Turkey as case studies (See Terms of Reference Annex A). The *Report* provides a comparative analysis of the different processes and controls applied in these two source countries, and identifies lessons learned and '*best practice*' in the cultivation, production and regulatory mechanisms for licit opium poppy. Recommendations to address the problem of diversion are also provided.

As a secondary objective, this *Report* also seeks to inform the current discussions regarding illicit opium production, drawing on the extensive literature that has been written on licit opium poppy producing nations over the last 60 years. Much of this literature provides valuable '*benchmark*' material for informing some of the more contemporary discussions in the illicit drugs field.

Given that this body of work has not been synthesised previously, and that there is a growing debate, within the UK and other countries, regarding the potential yield of illicit opium poppy, this *Report* provides an overview of the salient issues that are still of relevance to policy makers and analysts currently. Indeed, it is important to note that there is much that can be learnt from the extensive literature that has been written about licit opium poppy cultivation when analysing the trends in illicit opium poppy cultivation in source countries such as Afghanistan, Myanmar and Laos.¹⁰ This work is attached as an Annex (see Annex B: Licit Opium Poppy Cultivation).

⁸ The US Department of State's estimates of total opium cultivation and production represent the only single source of global data on illicit drug production. In 1998, the USG estimated that 217,100 ha of opium poppy were cultivated illegally, producing 3,462 mt of opium. The discordance between the ratio of licit and illicit cultivation and licit and illicit production is due to the relatively low opium yields that the USG use when calculating total illicit opium production. In 1998, the yield factor was approximately 16 kg/ha. See US Department of State (1999) International Narcotics Control Strategy Report 1998. US Printing Office: Washington, D.C.

⁹ See data from the UNDCP/Interpol/ World Customs Organisation '*Significant Seizures Database*' where a number of seizures of raw opium from the factory in Nimach have been reported in 1999. See also US General Audit Office (1997) Drug Control: US Heroin Control Efforts in Southwest Asia and the Former Soviet Union. Briefing Report to the Chairman, Caucus on International Narcotics Control, U.S. Senate. GAO/NSIAD-97-148BR. US Government Printing Office: Washington, D.C.

¹⁰ The absence of consistent and comparable data on illicit drug crop production continues to hamper policy development and resource allocation for countries cultivating illicit opium. For instance, the USG estimates of opium production in Afghanistan and other source countries are based on yields that are relatively static both

2. Methodology

Morphine can be extracted from both opium and '*poppy straw*'. Opium is the coagulated juice of the opium poppy and is extracted by incising the plant capsule. Whilst the alkaloid content of opium varies considerably, the majority of opium contains between 10-15% morphine. The morphine is extracted through a relatively simple process that can be undertaken using basic equipment.

According to the Single Convention of 1961, '*Poppy straw means all parts (except the seeds) of the opium poppy after mowing*'. Morphine is at its most concentrated in the un-incised capsule and the top 10 centimetres of the stalk. The morphine content in this part of the plant varies considerably too, ranging from 0.2% to 1.25%. Extracting morphine from poppy straw is a complex process that requires industrial plant and, if it is to be profitable, considerable quantities of opium poppy capsules.

To assess whether these two approaches have particular advantages and disadvantages in preventing diversion, this *Report* focuses on one country that uses opium and another that uses poppy straw for the extraction of opiates. India is the world's largest producer of raw opium, producing 1,075 mt of opium in 1999, or 118.3 mt in morphine equivalent. It is the only country to export raw opium. Turkey, having banned opium production in 1971, began to cultivate opium poppy for the production of poppy straw in 1974. Today, it is the largest producer of poppy straw in the world, producing 31,332 mt in 1999 or 97.1 mt in morphine equivalent. Both countries are recognised as '*traditional supplier countries*' by the United Nations and by some member states, including the US and Japan.

To maximise the limited time available for field visits, Turkey was visited just after the planting season for opium poppy in November 2000, whilst a mission to India was conducted during the harvest, in April 2001. During these visits discussions were held with a range of different stakeholders, including licensed opium poppy farmers; national, provincial and local authorities responsible for the licensing and control of licit opium poppy cultivation and the interdiction of illicit traffic in narcotics and precursor chemicals; bilateral parties with an interest in narcotics issues; multilateral institutions, such as ODCCP; and non-government and parastatal organisations involved in demand reduction initiatives.

A mission was also undertaken to the Headquarters of the United Nations Office of Drug Control and Crime Prevention (ODCCP) where key informants from the INCB and the United Nations Drug Control Programme (UNDCP) were interviewed and secondary data was obtained.

Given the amount of literature that has been produced on licit opium poppy cultivation during the last century, an extensive review of secondary sources was also undertaken, including

across regions and time despite considerable changes in the climatic, environmental and agricultural factors that determine opium yields. See USG (2000) Southwest Asia: Opium Cultivation & Production Estimates. The yield factor used by the USG until 1999 was 32 kg per hectare despite UNDCP reporting considerable fluctuations in opium yields between 1994 and 1999. Indeed, an unusually wet spring in the southern region of Afghanistan in 1998 culminated in considerable crop damage and opium yields falling by up to 50%. The result was the national average 48 kg/ha in 1997 to 33 kg/ha in 1998. In 2000, the USG increased the yield factor to 57 kg/ha in a drought year when UNDCP reported that yields had fallen from an average of 50.4 kg/ha in 1999 to an average of 35.7 kg/ha in 2000. See Afghanistan Annual Opium Poppy Survey 1997;1998;1999 and 2000. UNDCP: Islamabad.

government publications from source countries; articles from academic and development journals; and ‘grey literature’ produced by the United Nations, such as annual reports, project documents and evaluation reports.

3. The International Framework and the Major Producers

The Single Convention

The bedrock of the international drug control system for the production and trade in licit opiate raw materials is the Single Convention on Narcotic Drugs of 1961. This convention sets the minimum criteria required by national authorities for the control of the cultivation, production and trade in licit opium and its derivatives undertaken under the supervision and guidance of the INCB.¹¹

Prior to the Single Convention there were a variety of protocols, conventions and agreements aimed at controlling the production, trade and consumption of narcotics drugs and establishing the mechanism for international control.¹² The Single Convention eventually integrated these disparate treaties under one international narcotics control system and broadened their coverage to include other drugs such as coca leaf and cannabis.

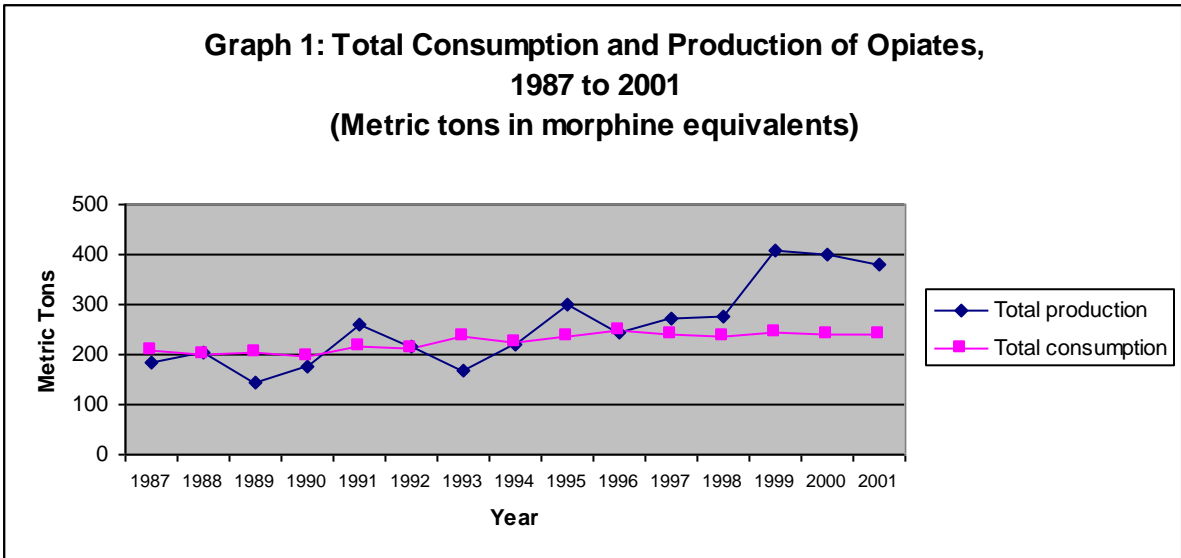
The fundamentals of the Convention relate to ensuring that a balance is kept between the worldwide demands for narcotics drugs for legitimate medical needs and the worldwide supply. For this reason the Convention lays out a series of regulatory mechanisms required to ensure that the INCB is fully furnished with the statistical data that it requires to maintain this balance.

Demand

Over the last twenty years the demand for opiate raw materials has increased from around 200 mt of morphine equivalents in the 1980s to 245.3 mt of morphine equivalents in 1999 (see Graph 1). However, in the last five years the global consumption of opiates has remained relatively stable, fluctuating between 238 and 247 mt in morphine equivalents per annum. Moreover, during this time there has also been a shift in the consumption of the different alkaloids contained within the opiates.

¹¹ Attempts to control the production, trade and consumption of opium began in Shanghai in 1909 at the International Opium Commission. However, it was not until the International Opium Convention of 1925 that an international system of supervision of the international trade in narcotic drugs was established under the auspices of the Permanent Central Board of the League of Nations. Moreover, limitations on the supply of narcotics raw materials were not agreed until 1931 with the Convention for Limiting the Manufacture and Regulating the Distribution of Narcotics Drugs. This convention established the foundations for the current regulatory system, requiring each government to provide annual estimates of its needs for narcotic drugs for medical and scientific purposes. For more details of the history of the international drug control treaties see Bayer (1999) ‘*Evolution of drug control, 1945-1995*’ in United Nations Bulletin on Narcotics, Vol. 51, Nos. 1 & 2. United Nations: Vienna.

¹² For instance: the International Opium Conventions of 1912; and 1925; the Agreement concerning the Control of Opium Smoking of 1931; Protocol amending the Agreements, Conventions and Protocols on Narcotic Drugs of 1946; Protocol bringing under International Control Drugs Outside of the Scope of the 1931 Convention for Limiting the Manufacture and Regulating the Distribution of Narcotics Drugs of 1948; and the Protocol for Limiting and Regulating the Cultivation of the Poppy Plant, the Production of, International and Wholesale Trade in, and Use of Opium of 1953.



For instance, between 1984 and 1998, morphine consumption increased steadily from an average of 2.2 mt per annum prior to 1984 to 20.5 mt in 1998. However, by 1999, morphine consumption fell for the first time in 15 years, mainly as a consequence of the increasing shift to thebaine-based analgesics such as oxycodone in the US. This trend in the US has led the INCB to predict that morphine consumption will remain relatively static in the next few years.

However, the consumption of morphine is highly concentrated with the 20 countries with the highest per capita gross national product accounting for approximately 75% of global morphine consumption. This differs markedly with the consumption of morphine in the developing world. Indeed, the INCB reports that several States and territories that have provided estimates did not plan for any medical or scientific need for morphine. Furthermore, many States continue to report very low levels of morphine consumption.

It is thought that the low consumption of morphine may be an indication that the authorities of these States do not consider morphine among the essential analgesic drugs or that insufficient amounts of morphine are being given for pain relief. Problems with the prescribing and dispensing of morphine by health professionals are also thought to have constrained consumption in developing countries. As such, the INCB suggests that there is a demand for opiate raw materials that has as yet not been realised.

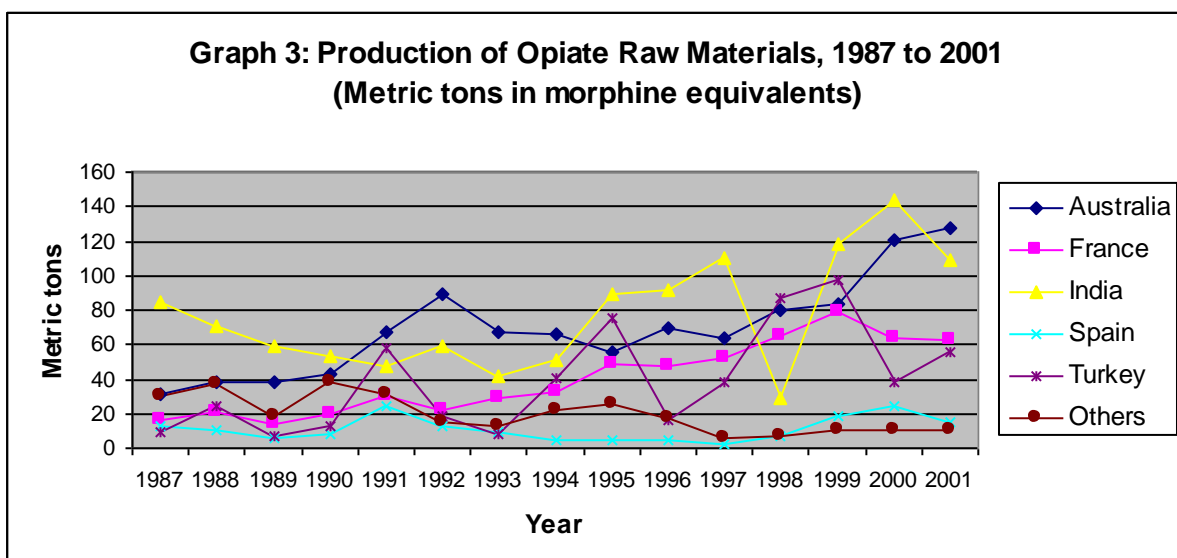
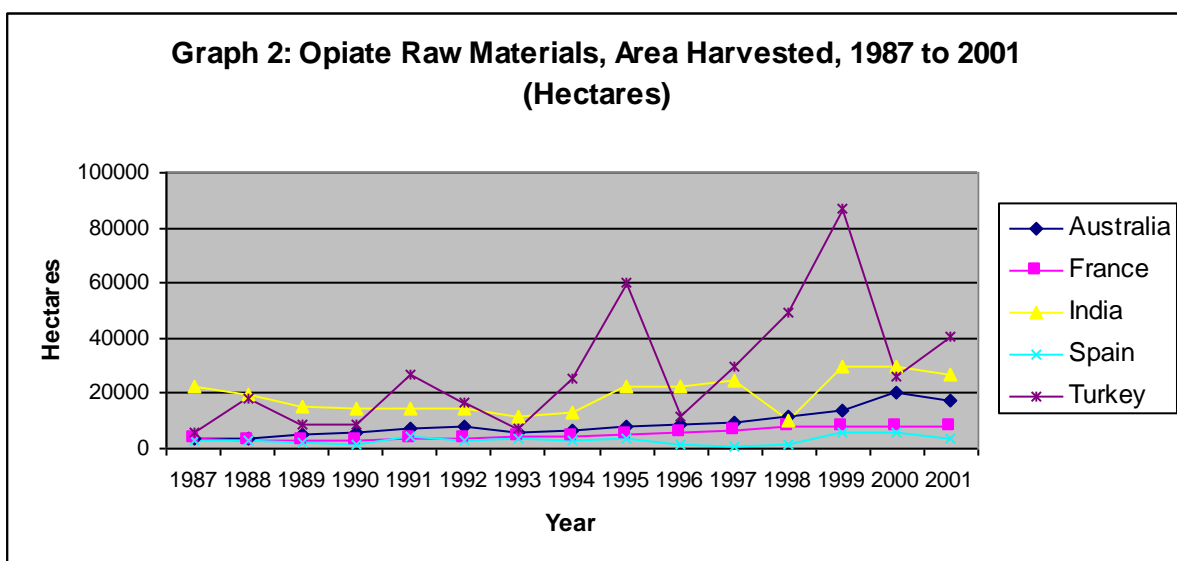
The bulk of opiates are currently consumed in the form of codeine. Until 1990, the global consumption of codeine was relatively stable at around 160 mt of morphine equivalents per annum. Since the increase in consumption of codeine witnessed in 1993, with a rise to 180 mt of morphine equivalents, this level of consumption has been maintained on an annual basis. By 1999, codeine consumption constituted 77% of global opiate consumption, approximately 189.3 mt in morphine equivalents. The US, the UK, France, India Canada and Germany represent the major consumers of codeine.

Supply

To satisfy this demand for opiates there are currently 18 countries that cultivate opium poppy on a licit basis. Of these only four countries produce raw opium, China, the Democratic

Republic of Korea, India and Japan. Of these, only India exports raw opium, the other three producing opium only for their domestic needs. The other 14 countries cultivate licit opium poppy for the production of poppy straw, seeds for culinary purposes or for the manufacture of oil. These countries are Australia, Austria, Czech Republic, Estonia, France, Germany, Hungary, Netherlands, Poland, Romania, Slovakia, Spain, The Former Yugoslav Republic of Macedonia and Turkey.

However, 5 countries dominate the export market for opiate raw materials: Australia, France, India, Spain, and Turkey (see Graph 2 and Graph 3). The proportion each county has contributed to the total supply of opiate raw materials has shifted over the last ten years with Australia¹³ and France witnessing a steady increase in their market share, whilst India and Turkey have experienced wide fluctuations in both the area harvested and production due to varying climatic conditions and, in the case of India in 1998, industrial action.



¹³ Australia began pilot production of opium poppy in 1964. The first year of commercial production was in 1970. Whilst the joint decision by Commonwealth and State governments restricted the cultivation of opium poppy to Tasmania in 1972, in 2001 there were reports of cultivation being undertaken on a pilot basis in New South Wales.

Although there is a growing market for licit opiates, particularly with the increasing demand for thebaine-based products such as oxycodone in the U.S., many argue that Australia's gains have been at the expense of, what the United Nations Committee on Narcotics Drugs refers to as, the '*traditional supplier countries*' of India and Turkey.

The differences in the national licit opium industries could not be more acute. The authorities in India and Turkey are quick to distinguish between traditional, small-scale cultivation in their countries, and the large-scale, commercial nature of opium poppy cultivation in Australia, France and Spain. Indeed, in all three countries the average area of land cultivated with opium poppy per licensee is around 100 hectares. This compares with 0.2 hectares of opium poppy in India in 2000, and 0.4 hectares of opium poppy in Turkey.

Moreover, in Turkey and India, opium poppy is still largely cultivated, as it always has been,¹⁴ in a labour intensive way. In India it is estimated that, perhaps, as many as 1 million people are employed in the harvesting of approximately 25,000 to 30,000 hectares of opium poppy each year. In Australia, less than 1,000 people are involved in growing approximately 20,000 hectares of the crop.

Indeed, in Australia the cultivation is a largely mechanised process using combines for the harvest, the most labour intensive period in the cropping cycle. In Turkey, the only dramatic change in agricultural techniques has been the introduction of the poppy straw method and the prohibition of lancing in the early 1970's due to US and Western European concerns over diversion. Despite this change, the harvest of the capsules, and the extraction of the seed are still done manually.

The risk disease, pests and, ultimately, poor yields and low alkaloid content, has also been reduced in Australia, France and Spain, with the provision of improved seed and well-resourced agricultural extension. The development of new genetic breeds of opium poppy has provided increased alkaloid content.

These developments have led to Australia becoming '*the most efficient producer and extractor of poppy straw*', producing the equivalent of 10 kg of morphine per hectare, compared to 8.1 kg/ha in France, 4.7 kg/ha in Spain and 1.3 kg/ha in Turkey. Combined with production costs for morphine, almost one fifth of that of Turkey and approximately one third of that of India, Australia is in an increasingly competitive position in relation to the '*traditional supplier countries*'.¹⁵

India's market position *vis a vis* Australia has also been exacerbated by the development of thebaine rich strains of opium poppy. Prior to the 1998/99 growing season, thebaine could not be extracted on a cost-effective basis from CPS which gave India, as the sole exporter of

¹⁴ According to the Turkish Grain Board opium poppy has been cultivated in Turkey since 3000 B.C. Within this context opium poppy is a relatively new plant to India, with the first recorded instances of cultivation dating back to the 15th Century. See Chopra et al (1955) '*Quasi-medical Use of Opium in India and its Effects*' in United Nations Bulletin on Narcotics, Vol. 1, No.1. United Nations: Vienna.

¹⁵ The production costs for the equivalent of 1 kg of morphine in 1999 was US\$56 in Australia, US\$159.77 in India and US\$250 in Turkey.

raw opium, an advantage with the US pharmaceutical companies who are the major manufacturers of thebaine based analgesics.¹⁶

Whilst India remains the primary supplier of licit opiates to the U.S, and Turkey second, their dominance would seem to be increasingly a consequence of the '80/20 Rule' rather than due to any comparative advantage they may have as '*traditional supplier countries*.' This rule dates back to 1981 and was designed to limit the number of nations involved in the licit opium trade and assure a flow of reasonably priced opium to meet U.S. medical needs. It stipulates that '*at least 80% of licit opium imported into the United States must have as its original source India and Turkey; not more than 20% can have as its original source Australia, Hungary, Poland, France and the former Yugoslavia*'.¹⁷

However, the '80/20 Rule' has been under review since 1999. Despite increasing pressure from US pharmaceutical companies to dilute their commitment to a 60/40 division of the trade, or exclude thebaine altogether, the USG has not yet decided on a change in policy. For Turkey and India, the review has created a great deal of uncertainty, as Japan is the only other country that has committed to purchase its opium from the '*traditional supplier countries*'. The INCB has raised its concerns over the possible impact a change in the '80/20 Rule' will have on diversion.¹⁸

A further threat to the '*traditional supplier countries*' licit opium industries is Iran's entry into the export market for opiates. By 1998, the Iranian's had used 158 mt of seized opium for the production of alkaloids mainly for its internal needs, the equivalent of 15% of the annual level of opium produced from licit cultivation. However, much to the consternation of the authorities in both India and Turkey, Iran has begun to export the opiates it produces from the opium it seizes due to its proximity to Afghanistan. Of particular concern, is the financial advantage that GOI and GOT believe Iran derives from using seized opium which mitigates against the costs incurred as a result of the regulatory and control mechanisms for opium cultivation and production required by the Single Convention.

The Government of Iran argues that whilst it does not incur the cost of licit production, it does carry the burden of financing the considerable border fortifications and human resources that it has deployed on its border with Afghanistan. Of course, the cost of interdiction is also borne by many other nations who seek to prevent illicit drug trafficking across their territory, particularly those with the increasing levels of domestic drug use that Iran has been witnessing. The INCB has warned against the continuing use of seized opiates, suggesting that ultimately it will have an impact on the current balance between licit supply and demand

¹⁶ See US Department of State (1996) International Narcotics Control Strategy Report 1996. US Printing Office: Washington D.C. Page 239. The thebaine content of raw opium is around 1%, whilst poppy straw traditionally contains only 0.1%. The new thebaine rich variety contains almost 1%.

¹⁷ US General Audit Office (1997) Drug Control: US Heroin Control Efforts in Southwest Asia and the Former Soviet Union. Briefing Report to the Chairman, Caucus on International Narcotics Control, U.S. Senate. GAO/NSIAD-97-148BR. US Government Printing Office: Washington, D.C. Page 45.

¹⁸ '*The Board [INCB] would like to emphasize that the 80/20 rule has greatly contributed to global efforts to maintain a lasting balance between the supply of and demand the demand for opiates used for medical and scientific purposes, as required under the provisions of the 1961 Convention. As the U.S. is the largest importer of opiate raw materials in the world, the proposed amendment may destabilise the world licit market for opiate raw materials.*' International Narcotics Control Board (2000) Report 1999. United Nations: Vienna.

due to the inherently unpredictable nature of seeking to satisfying contractual commitments based on seized raw materials.¹⁹

These developments suggest that the international supply of opiate raw materials is currently in a state of flux, particularly for the ‘*traditional supplier countries*’. Increasing demand for opiate raw materials has led to the introduction of new technologies and new entrants on the supply side of the equation. It seems clear that with these changes, were market forces to be allowed to reach their natural equilibrium, India and Turkey would no longer dominate the licit trade in opiate raw materials.

However, it is perhaps important to recognise that, were market forces to truly operate unregulated, it is unlikely that those licensed to cultivate opium poppy would sell their produce on what is currently referred to as the ‘*licit market*’. After all, it is only the regulations and controls that the producer nations implement, in accordance with the Single Convention, that ensure a sufficient supply of opiates for legitimate medical and scientific needs. Were these not in place licensees would sell their produce to the black market

As such, there would seem to be a growing conflict between the highly regulated and controlled nature of the market for the supply of opiate raw materials, and the increasingly *laissez faire* model for their purchase on the international market. Ultimately, this may have consequences for the financing of the regulatory and control mechanisms that are currently in place in Turkey and India, mechanisms that many analysts and law enforcement professionals already consider under-resourced.

4. Control Mechanisms: Turkey and India, the Case Studies

Those countries that cultivate opium poppy for the production of opium are charged with keeping the INCB informed of the area cultivated, the amount of opium produced, the quantity of derivatives manufactured, the quantities imported and exported, and the level of stocks maintained. The Single Convention also dictates the controls required to ensure that licit opium does not enter into illicit traffic. For those countries cultivating opium poppy for the production of poppy straw, further requirements include preventing opium from being extracted from the opium poppies and adequately controlling the manufacture of drugs from poppy straw.

It is the responsibility of the national authorities to ensure that the appropriate mechanisms are in place to ensure that there is no diversion from the licit to the illicit markets. The INCB’s task is to monitor these mechanisms to ensure that they comply with international ‘*best practice*’ and to advise how systems can be improved where they are found lacking. Any concerns regarding the efficacy of existing control mechanisms are not made public but reported to the relevant national authorities.

¹⁹ ‘*The General Assembly, in its resolution 33/168, invited Governments to increase their joint efforts to eradicate illicit cultivation of narcotic plants in order to ensure a continuing equilibrium between licit supply and licit demand, and to avoid unforeseen imbalances caused by sales of seized and confiscated drugs.*’¹⁹ See International Narcotics Control Board (2001) Report 2000. United Nations: New York.

The Convention is very clear in stressing the need for States to establish a government agency responsible for establishing and policing a licensing system for licit opium poppy cultivation, that acts as the sole purchaser of the crop, and maintains the exclusive right for importing, exporting, wholesale trading and maintaining stocks of opium and its derivatives.

This section compares the control mechanisms of two countries, Turkey and India. It documents the institutions responsible for the regulation and supervision of licit opium cultivation and the chronology of the control system from the approval of licenses up to the point of the export of the opiates produced.

4.1. Turkey

The lead agency

In Turkey, the Grain Marketing Board (TMO) is the government agency with these responsibilities. It is part of the Ministry of Agriculture and one of the largest state companies in Turkey. It is also responsible for the regulation and trade of barley, wheat and legumes. Only 10% of its total revenue is derived from opium poppy.

The first task of the TMO in the opium poppy growing season is to allocate the licenses for cultivation once the Council of Ministers has determined the total area to be cultivated and the provinces and districts that will be permitted to cultivate opium poppy. In some years as many as 87,000 hectares of opium poppy are approved by the Council of Ministers and an estimated 150,000 licenses are issued.²⁰ To limit the scope for diversion the number of provinces permitted to cultivate opium poppy have been reduced considerably over the years. Currently, only 5 provinces are licensed to cultivate opium poppy compared to 13 in 1933, following the Limitation Law, and 42 provinces prior to 1933.

The vanguard of the licit opium poppy control system is the local office of the TMO, known as the *Ajans*. Each *Ajans* employs 2 mobile teams, each containing 3 people, who are predominantly agriculturalists. The work of the mobile teams is monitored both by the *Ajans* supervisor and a 'controller' at the district level office of the TMO.

The licensing process

To apply for a licence to cultivate opium poppy, farmers must apply to their *Ajans*, between the 1st July and the 30th October. This application not only includes details of the area of land that the applicant wishes to cultivate with opium but the exact its exact location. The applicant is also required to state the planting season of the crop, the type of seeds to be used and the irrigation source, if any. To co-opt civil society into the control mechanisms, applications are required to be guaranteed by the village leader, known as the *muhtar* (see Annex C).

The applicant has to be over 18 years of age, be a farmer, and have no criminal record. They are not permitted to cultivate more than three separate areas of land with opium poppy and, so as to ease subsequent monitoring, the TMO gives preference to land that is more accessible. The license to cultivate opium poppy is given by the TMO by 1st November (see Annex D)

²⁰ See International Narcotics Control Board (2000) Report 1999. United Nations: New York.

Cultivation and controls

The appearance of the plant in spring represents the beginning of an intensive period of monitoring for the *Ajans*. From 1st March until the 31st May it is reported that each field is visited up to 6 times by the TMO. Each monitoring visit is documented and signatures are required by the head of the *Ajans* team, the licensee and community representatives, to confirm that the visit has taken place and that the parties agree, where possible (see Annex E).

The first field visit is charged with physically measuring the fields to ensure that it complies with the license given. The *muhtar*, is also required to be present during the measurement of the fields and sign to confirm. Two further witnesses are also required. If there is a difference between the approved area of cultivation and the physical measurement, or there is a disagreement over the measurements, then a further measurement is undertaken by a second mobile team within the *Ajans*.

At this point any excess planting or planting undertaken without a license is eradicated and those responsible are referred to the courts. The penalty for illegal planting is from 1 to 5 years imprisonment. The Turkish Authorities report that there is are very few cases of households cultivating opium poppy in excess of their permit, or without a license.

Later in the season a further visit is made to estimate the total production of poppy straw from the licensees land. Again, the interested parties are required to provide signatures to prove that the visit was made and where possible to conform agreement of the estimate. If agreement cannot be reached then a second team visits to provide its estimate.

The harvest

During the period in which the capsules are ready for lancing, the TMO and the Gendarmerie are particularly vigilant. Indeed, a final monitoring mission is undertaken prior to the harvest of the capsules to ensure that none of the capsules have been lanced. After this visit written permission to harvest the crop is given (see Annex F)

The harvest of poppy straw is undertaken by hand. Once harvested, the capsules are crushed and the seed is extracted. The poppy straw is then bagged and transported to the *Ajans* for weighing. The weight is checked against the original estimate provided by the mobile team. Where the estimate is deficient or in excess of the estimate by then an explanation is sought from each of the parties involved. Where the district office of the TMO is not satisfied with the explanations of the licensee, the case is recommended to the courts.

Once the poppy straw has been received by the *Ajans* they are stored at the warehouse under seal. The warehouse is guarded and is only opened when there is a request for capsules from the Alkaloid Factory at Bolvadin. Generally, the poppy straw is transported to Bolvadin using TMO trucks, although some private trucks are used.

When poppy straw is required at Bolvadin, a truck is despatched to collect them at the *Ajans*. The capsules are removed from the *Ajans* warehouse and the record of the outgoing amount of capsules is taken and the stock is updated. The truck is loaded with an agreed quantity of poppy straw and a special protocol is completed, documenting the amount that is being transported. The truck is weighed and sealed before departing from the *Ajans*. On arrival at the factory at Bolvadin the seals are checked and the truck is weighed once more.

The opium and alkaloid factory

The Bolvadin factory is the only opium and alkaloid factory in Turkey. It is operational for ten months of the year, stopping only in July and August for maintenance. During these ten months it can process up to 23,000 mt of poppy straw depending on the annual harvest. The extraction plant can produce approximately 70 mt per annum of Anhydrous Morphine Alkaloid (AMA), pure morphine, and 5 mt of derivatives. A limited stock of AMA of only 2 mt is held in a secure building isolated from the rest of the plant. The derivatives factory works to order, so stocks are not kept.

The process requires very few employees, approximately 90, and has stringent security arrangements. The background of staff is checked prior to their employment at the factory. There is a perimeter wall to the entire property, including the 80 ha agricultural research station, known as the '*Poppy Improvement Unit*'. Security gates mark the perimeter of the extraction and derivatives units where passes are issued on both entry and on exit. The authorities report that to date there have been no thefts or attempts at theft have been made since it's opening in 1981.

The transport arrangements for the movement of AMA and derivatives, consists of 2 security cars provided by the Security Office of the Ministry of the Interior. For export orders, these cars are subsequently met at the Ankara border by representatives of the Ankara Security Office and accompanied directly to the plane.

The trade in opiates, both domestic and international, is regulated by the Directorate General for Medicine and Pharmacy at the Ministry of Health. It is also responsible for regulating and controlling the trade in precursor chemicals.²¹ The regulations require that any pharmaceutical company, either domestic or foreign, that wishes to purchase opiates, or precursor chemicals is registered with the Directorate. On the request of the company, and after checks on its authenticity, the Directorate will issue the company with a permit to obtain a specific amount of a specific product from the TMO.

For the international trade in opiates this permits represents an import certificate. The Directorate also issues a permit to the TMO to allow the export of the goods. Copies of the permit are sent to the Provincial Directorate so that they can confirm that the amounts exported are consistent with the amount approved. At the point of exit from the country, Customs officials check import and export certificates and the quantity of the good to be despatched. Without an import and export permits, the goods will not be allowed to leave the country.

The Ministry of Health conducts periodic inspections of domestic companies. If there are any concerns the General Directorate of Security will conduct investigations at the request of the Ministry of Health. The final report is issued to the Ministry of Health for its decision as to how to proceed.

²¹ In 1999, Turkey imported approximately 200 mt of Acetic Anhydride for use in its pharmaceutical and manufacturing industries. Currently there are 8-12 foreign companies that are registered with the Directorate for exporting Acetic Anhydride to Turkey. These are mainly of US, Dutch and German origin.

4.2. India

The lead agency

In 2000, the GOI licensed 35,271 hectares of opium poppy in the three states of Madhya Pradesh, Rajasthan and Uttar Pradesh, constituting 159,884 licenses.²² In any given year the GOI may issue between 75,000 and 160,000 licenses that all require monitoring.²³ The total area of land to be cultivated with opium poppy each year is calculated on the basis of the existing stocks of opium and the orders from both domestic and foreign pharmaceutical companies. The amount of land each licensee will be permitted to cultivate with opium poppy is also calculated by the GOI. In both the 1999/2000 growing season and 2000/2001, only 0.2 hectares of opium poppy per license was permitted.

The GOI also sets the Minimum Qualifying Yield (MQY) at the beginning of each cropping season. The MQY is a key aspect of the control mechanism in India, stipulating the kilogrammes per hectare (kg/ha) each licensee is required to produce if they are to be eligible for a license the following year. Theoretically, the MQY is set at a level that leaves little excess opium for the licensee to divert into illegal channels

The lead agency for the regulation and control of the licit opium industry in India is the Central Bureau for Narcotics. The CBN is located within the Ministry of Finance and is led by the Commissioner for Narcotics based in Gwalior. This post is supported by a Deputy Narcotics Commissioner (DNC), based in Ghazipur, and three Assistant Narcotics Commissioners (ANCs), one for each of the licensed states in which opium poppy is grown.²⁴

The CBN has approximately 2,000 employees, the majority of which are based in Madhya Pradesh, Rajasthan and Uttar Pradesh. These individuals are responsible for the day-to-day operations of the regulatory mechanisms for licit opium poppy in India. Perhaps the most important position is that of the District Opium Officers (DOOs) as it is they who are responsible for the approval of licenses each year, supervision of the opium poppy crop and the collection of the opium after the harvest. Typically the DOO supervises 2 Inspectors, 8 sub inspectors and 12 *sapoys*.

The licensing process

Each farmer that wishes to cultivate opium is required to apply for a license from the DOO in the district in which they reside. Each application specifies the amount of land to be cultivated with opium and its location. As in Turkey, the land is required to be accessible so as to ease the monitoring process. Typically, the water needs of the opium poppy crop, ensures that it is grown in prime agricultural land in close proximity to the households irrigation source.

The DOO reviews the applicant's criminal record and compliance with previous years MQY to ensure that they are eligible for a license. Even though the great majority applicants will have received licenses in the past this represents a considerable amount of work.²⁵ For

²² Illegal cultivation is also reported in the Dera Dhun area of Uttar Pradesh, Jammu and Kashmir and some of the North Eastern States, including Arunachal Pradesh, Manipur, Mizoram and Nagaland. See US Department of State (2001) International Narcotics Control Strategy Report, 2001. US Printing Office: Washington D.C.

²³ A further, 1 million people are thought to be involved in the harvest of the opium due to the labour intensive nature of the crop.

²⁴ The ANCs are based in Nimach in Madhya Pradesh, Kota in Rajasthan and Lucknow in Uttar Pradesh.

²⁵ Due to diminishing stocks and the poor harvest in 1998, instructions were received by the CBN to give

instance, in Madhya Pradesh a DOO may receive as many as 10,000 applications from approximately 235 villages. Those applicants that are rejected can appeal to the Deputy Narcotics Commissioner and ultimately the Narcotics Commissioner himself.

Once approved, at around the end of September, the DOO issues a *Miniature license* to the applicant. This license contains details of the area to be cultivated and includes a photograph of the licensee. The CBN also issues a *Joint license* to an appointed village representative, known as the *lambardar*, which documents the details of all the licensees in the village. This *Joint License* not only represents the record of the area cultivated and the yields but the implementation of the monitoring process at the different stages in the opium poppy season. This record is maintained by the *lambardar* and monitored by the CBN. As such the *lambardar* is a key element within the regulatory system for licit opium poppy cultivation in India.

Cultivation and controls

As in Turkey, opium poppy is typically cultivated in late October/early November depending on the autumn rains. Once planted the licensee is required to display a board by the side of their opium poppy field documenting the details of their license.

In December the CBN begins its field measurements. These are undertaken by the 20 district staff of the CBN and are undertaken over a six-week period. All measurements are made with a tape. Each measurement is attested by 2 independent witnesses, the village *lambardar*, and the licensee and recorded in the *Joint License*. Subsequently, the DOO measures a random sample of fields to test the authenticity and accuracy of the measurements provided by his staff. If a licensee is found to have cultivated an area in excess of the amount licensed, the excess is destroyed and the individual is barred from receiving a license in the future.

Damage to the opium crop due to adverse weather conditions or disease cause licensees particular concern. Where they fear that the damage is extensive enough so as to prevent them achieving the MQY, licensees will request the DOO and his officers to inspect the fields and destroy the crop if necessary. In some years, such as in 1997/98, where excess rain led to extensive crop damage, and licensees went on a strike, 33.29% of the licensed crop was destroyed at the request of licensees.²⁶ Clearly whilst costly, the short-term losses incurred are considered far preferable to the long-term costs of not obtaining an annual license in subsequent years.

The harvest

The harvest represents the critical time for control. To cater for the heavy workload during this period the CBN has, in the past, obtained support from other central authorities, including the Central Excise and Customs. However, it is the *lambardar*, the *de facto* representative of the CBN, which shoulders much of the responsibility of the control system during the harvest period.

licenses to individuals who had no previous history of cultivating opium on their land in both the 1997/98 and 1999/2000 growing seasons. As a result in Madhya Pradesh in 1999, 1,200 licenses were allocated to new applicants in each of the 8 divisions, a total of 9,600 new licenses. Priority was given to those villages where there was a history of good yields and good 'character'. DOO's were required to check that the new applicant did not have a criminal record and that they could certify that they owned the land on which the opium poppy was to be cultivated.

²⁶ International Narcotics Control Board (2000) Study on Alternative Methodologies for the Supply of and Demand for Opiates for Medical and Scientific Needs, November 2000.

After each day of lancing, the licensee reports to the village *lambardar* to weigh and document the amount of opium harvested. The *lambardar* documents the daily yield in the *Joint License*. It is reported that the district CBN officials make random inspections to ensure that the *Joint License* represents an accurate reflection of the yields being produced.

To prevent thefts from the field the men of the licensee's household guard the opium fields over night. Should a theft occur it is reported to the police and the CBN. In Mandsaur, only four such cases had been reported two weeks into the harvest.

Once harvested the raw opium is stored in metal containers by the licensee in their home.²⁷ The storage period can be for up to one month. However, the CBN reports that inspections are sometimes made to prevent diversion during this stage. In 1997, 11 mt of opium that was harvested but not declared to the government was seized from licensees.²⁸ To deter diversion, offenses relating to the theft of opium by licensees compare with other trafficking offenses, and convictions can result in sentences of ten to twenty years of imprisonment and fines of up to US\$6,000.

The byproducts of raw opium, the seeds and the poppy straw, are also harvested and sold. In 2000, opium poppy seeds were sold for around 90 Rupees/kg directly to the private market and as such generated more income than opium sold to the GOI.²⁹ The poppy straw, once harvested, is sold separately to the State authorities for approximately 350 Rupees per 100kg. Some respondents indicated that the State authorities sell the poppy straw to contractors who subsequently sell it under license to producers of traditional *ayurvedic* medicines. However, it was not possible to obtain a clear account of how, perhaps, as much as 28,000 mt of poppy straw is finally used, or disposed of.

During the month of April the CBN begins the process of procuring the opium. This is done through the establishment of weighment centres. These centres are mobile and each village is notified of the time and location of the weighment centre that they are required to attend through public notices and the media. The DOO is the senior officer in charge at the weighment centre.

On the day that the licensees from any particular village are requested to attend the weighment centre they are accompanied by the village *lambardar*. Each licensee's opium is weighed, graded according to its moisture content, and the details recorded along with the name of the licensee, their father's name, the license number and the date of the first lancing.

²⁷ Previously unglazed earthen pots were used to store opium. These were used for their low cost and because they absorbed the moisture in the opium, raising its consistency prior to its sale to the CBN. However, these pots were found to absorb approximately 8.5% of the potential morphine from the opium during storage. See Ramanathan et al (1965) 'Absorption of morphine from opium by porous earthen pots' in the United Nations Bulletin on Narcotics. Vol.1, No. 1, pages 1-9.

²⁸ See US Department of State (1998) International Narcotics Control Board. US Government Printing Press: Washington D.C. page 236.

²⁹ The CBN estimated that the net return on opium poppy per hectare was the equivalent of US\$2,072 compared to US\$ 167 for wheat and US\$ 1,100 for potato. However, of the total returns on opium poppy 64% were derived from the sale of seeds. A report by Mallinckrodt indicated that the returns on garlic were higher than those for opium poppy in the 1994/1995 growing season and that chilli had accrued higher profits a few years prior. See Lloyd Nystom et al (1995) Survey of opium production: Practice, economics and security in India, April 27 – May 11 1995. Report by Mallinckrodt Chemical Inc, St Louis, Missouri.

This represents the Procurement Weight Record (PWR). On any one day a weighment centre may procure the opium of as many as 300 licensees.

A payment of 90% of the final value of the opium is made to the licensee at the weighment centre. The final payment is made after the laboratory at either Nimach or Ghazipur confirms that no adulterants have been added to the opium.³⁰

In order to encourage licensees to sell any surplus opium that they may produce over the MQY, the GOI purchases opium on a sliding scale. For instance, in 2000, for the first 44kg/ha a licensee would receive US\$13 per kg. However, for more than 44 kg/ha and up to 52 kg/ha a licensee would receive US\$14 per kg. The amount received increases with the yield until a final payment of US\$29 for each kg sold over 100 kg/ha (see Table 1). Of course, as to be expected, the price on the black market can be between 7,500 and 10,000 Rupees per kg, the equivalent of between US\$155 and US\$206 per kg at the same exchange rate.

Yield per Hectare	Indian Rupees	Equivalent in US dollars per Kg
Less than 44 kg/ha	630R	\$13
More than 44 kg/ha and up to 52 kg/ha	650R	\$14
More than 52 kg/ha and up to 60 kg/ha	800R	\$17
More than 60 kg/ha and up to 80 kg/ha	1100R	\$23
More than 80 kg/ha and up to 100 kg/ha	1200R	\$25

Once the opium is procured it is placed into a plastic container with opium of the same grade received from other licensees. Each container holds 35 kg of opium. The container is allocated a unique number and is then sealed with both a plastic and metal tag. These containers are then delivered to the Opium and Alkaloid Factories in Nimach and Ghazipur by truck or by train and under armed guard

The Opium and Alkaloid Factory

Nimach is one of two opium and Alkaloid factories in India. It was constructed in 1935 and is guarded by 92 officers from the Central Industrial Police Force and has recently installed CCTV with the majority of the 15 cameras located in the alkaloid plant. It employs 500 people and has sufficient storage space for approximately 600 mt of opium.

The Opium and Alkaloid factories are responsible for the storing, drying, and processing of opium. Once received at the factory, each container of opium is weighed to ensure that has not been any theft of opium from the point of the container departing the weighment centre to its arrival at the factory. The containers are then stored in the factory stores until the opium is required for drying, or in the case of the lower quality opium, it is required for processing at the alkaloid plant. At Nimach, the use of the large storage vats, containing as much as 30 mt of opium, have been abandoned after the inventory of Indian stocks in 1994 revealed a considerable shortfall in stocks.³¹

³⁰ Biscuits, sugar and molasses are adulterants that have been discovered in the past.

³¹ 'After cleaning the opium vats and storage bags, the GOI determined amounts lost in handling, storage and manufacture during the past 13 years and wrote off a large part of the discrepancy that had developed between accounting stocks and physical inventories. The original discrepancy was close to 800 mt, prompting the GOI's inability to fulfil US pharmaceutical's 1994 opium contracts. The USG does not believe that the GOI has fully

Generally, international pharmaceutical companies, such as Mallinckrodt and Namco, prefer to purchase dry opium from India and process it themselves. Once the opium is required for an export order the seals on the containers are broken and a sample is taken of the opium from each container to ensure it has not been adulterated. Reportedly the opium is tested at the factory lab. The opium of grades 1, 2 and 3 are then mixed together into a homogenous blend.

At Nimach, the opium can be dried in the sun or using vacuum driers. Sun drying is undertaken in the open using 700 wooden trays lined with aluminum.³² Each tray holds 35 kg of opium that is stirred and turned manually for 3 weeks until it is dried to 90% solids. Due to concerns over potential theft, or damage due to rains, all the trays are locked in the factory store at 4 p.m. each day and brought out each morning at 7 am, leading to considerable duplication in handling.

Vacuum drying is a far quicker and cleaner process requiring only 7 hours for 700 kg of opium. Moreover, reports suggest it is more effective process as sun drying can result in morphine losses of up to 13%.³³ At Nimach there are now three vacuum driers but their introduction has raised concerns over employment levels within the factory.

Once dried, the opium is cut into bricks of 5 kg and packed in wooden boxes of 12. Each box is lined and then nailed shut and sewn into a gunny bag. Each box is allocated a unique number and the details of the purchaser are stamped on the bag. Once complete, the load, which can be anything from 17 mt to 25 mt, is transported to Mumbai by trucks or train under armed guard for shipping to the importer. There may be 4 such shipments each month.

The alkaloid plant established in 1976, is the largest in the country with the capacity to produce 7 mt of codeine compared to 1 mt at Ghazipur. The factory also produces semi-refined morphine, morphine,³⁴ narcotine, papervine and thebaine.³⁵ In total the plant processes 80-120 mt of opium per annum, primarily for the domestic pharmaceutical industry, which is prohibited from processing opiates. As with the export of opium, the alkaloids are transported under armed guard.

5. The Scope for Diversion

There would seem to be a number of potential '*risk points*' at which diversion from licit production could take place. The first risk point relates to excess or illegal cultivation of opium poppy; the second risk point relates to the harvesting of opium poppy; and the third risk point relates to the processing of poppy straw into morphine.

accounted for the discrepancy. See US Department of State (1995) International Narcotics Control Strategy Report 1995. US Government Printing Office: Washington D.C. page 214.

³² Previously the wooden trays had no lining, resulting in a loss of opium due to absorption by the wood.

³³ See V.A. Shelvelev et al (1958) '*Mechanical Drying of Opium*' in the United Nations Bulletin on Narcotics. Vol. 1, No. 1, pages 1-3.

³⁴ At Nimach, 12 kg of opium are required to produce 1 kg of morphine. However, this is opium of Grade 4 and 5 and therefore of a high moisture content. Moreover, it is estimated that only 80% of the total morphine content of the opium can be extracted using the methodology and equipment at Nimach.

³⁵ For thebaine extraction, the conversion rate is 120:1 at Nimach. The same issues of the quality of the opium issued and the efficiency of the extraction process apply.

5.1. First 'Risk Point': Cultivation

Turkey

Whilst the Turkish authorities have reduced the numbers of provinces in which opium poppy is cultivated, it remains a crop that is largely produced by small-scale cultivators. Currently average household cultivation is reported to be approximately 0.4 hectares, the equivalent of one quarter of the total household land amongst the majority of opium poppy cultivating families.

The small-scale nature of cultivation presents a problem for monitoring licensee compliance. Indeed, the Turkish authorities have stressed the cost and logistical implications of maintaining the current system of control. Estimates in 1999 suggested that the total cost of the existing system is US\$6 million. In 1998/1999, this would have been the equivalent of US\$68.81 per hectare, more than twice the cost of supervising and protecting the licit opium crop in Australia, which cost the equivalent of US\$30 per hectare in 1997/1998.³⁶ By 1999/2000, when cultivation in Turkey had fallen to 25,787 ha from 87,193 ha, if the total cost of the controls remained static, the cost per hectare would have risen to the equivalent of US\$232.67.

Moreover, currently there would certainly seem to be staff constraints for such a large number of plots of opium poppy. According to the TMO an estimated 250,000 '*fields*' are cultivated with opium poppy, each of which requires 6 monitoring missions. Therefore a total of 1.5 million '*fields*' have to be visited in a 3-month period.³⁷

With a complement of staff of 1,750 '*experts*', approximately 13 '*fields*' would need to be visited, and on some occasions measured, each day. Indeed, the Bolvadin *Ajans* reported that it was responsible for monitoring 1,700 licenses, representing 7,000 to 7,500 hectares of opium poppy. With two teams of three, each staff member would need to visit approximately 283 licensees, perhaps representing as much as 1,250 hectares of opium up to 6 times in a 3 month period. This would seem rather problematic.

However, monitoring may be assisted by the fact that there is a high degree of consistency amongst applicants, with most of those farmers who have obtained licenses in the past applying for permission to plant opium poppy year after year. Where there are new applicants, these tend to be from the next generation in families where opium poppy has been cultivated before. This helps to strengthen informal links between TMO staff and cultivators, and within the communities themselves.

Indeed, some informants suggested that the social networks that exist in the rural communities in which opium poppy is cultivated makes illicit cultivation problematic. As opposed to areas of illicit cultivation in other source countries, many of the licit cultivating areas in Turkey are areas in which the state is very much present in the form of physical and

³⁶ See Department of Justice Annual Report 1997-1998.

http://www.justice.tas.gov.au/legpol/annual_report_9798/output7.htm

³⁷ The TMO do not define a '*field*' in this report. Therefore it is unclear whether a '*field*' is each plot cultivated by a licensee, who can cultivate up to three, or the total area cultivated by a licensee. See TMO (1999) Information on Licit Cultivation and Opium Alkaloids Plant for the Visit of UNDCP Delegation to Turkey, 31 October – 7 November 1999.

social infrastructure, as well as representatives of law enforcement organisations and civil government. The requirement of the *muhtar* to act as guarantor for licenses, as well as two community witnesses, also co-opts civil society into the monitoring process and makes them accountable for any attempts at diversion.

For many the threat of imprisonment, and losing their license to cultivate opium poppy, and thereby the loss of the annual income derived from the sale of poppy seeds and the poppy straw over a long term period, may be sufficiently harsh to prevent excess cultivation. The reported incidences of excess cultivation are certainly low, perhaps suggesting that informal and formal mechanisms for monitoring licit cultivation are sufficiently comprehensive. For instance, at the Bolvadin *ajans* it was reported that there had been no cases of excess cultivation for at least nine years. Consequently, it would seem that once licensed, it is not common for farmers to cultivate opium poppy in excess of the approved amount, or that there is a systematic failure in the system of controls. The latter explanation seems unlikely given the various actors involved. Therefore the only choice for those wishing to cultivate opium poppy for illicit purposes would be to cultivate outside the licensing system altogether. This, however, would not represent diversion from licit cultivation.

India

Opium poppy cultivation in India is typically undertaken on even smaller areas of land than in Turkey. As in Turkey, attempts to improve the economies of scale of regulation and production by increasing the amount of land each licensee is permitted to cultivate with opium, and thereby reduce the number of licenses given, are constrained by the socio-economic and political implications of such a move as well as the impact fluctuating yields have had on overall opium stocks.³⁸

The resources for measuring the fields themselves are clearly constrained,³⁹ although not as constrained as in Turkey, due to the lower levels of cultivation and the fewer number of monitoring visits required. With 20 staff per division in Madhya Pradesh and an average of 1,100 hectares under license, each staff member is required to measure 1.8 ha of opium poppy per day, the equivalent of 9 licenses in 2000/2001, for a period of 60 days.

The measuring process itself includes verification from a variety of different stakeholders including CBN officials, independent witnesses, the *lambardar* and other licensees. Moreover, the DOO is required to check a sample of these measurements. This is all designed to make the measurement process more accountable and make excess cultivation by licensees more detectable. The penalty for cultivating in excess of 5% of the area licensed is the destruction of the excess and the loss of license for the future.

Whilst there are concerns over excess cultivation, the GOI reported that only a few cases are detected. Indeed, in India cultivating an area in excess of the amount of opium poppy

³⁸ For instance, in 1960/61 there were 201,441 licenses issued, by 1963/64, 77,747 licenses were approved. However, by 2000, due to the particularly poor harvest in 1998 and the depletion of stocks 159,000 licenses were issued. See D.N. Kohli (1966) 'The Story of Narcotics Control in India' in The United Nations Bulletin on Narcotics, Vol. 1, No.1, pages 1-9.

³⁹ In 1997, the USG reported that 'the government agency responsible for monitoring the licit crop is understaffed and cannot provide effective oversight over all the licit opium crop'. US General Audit Office (1997) Drug Control: US Heroin Control Efforts in Southwest Asia and the Former Soviet Union. Briefing Report to the Chairman, Caucus on International Narcotics Control, U.S. Senate. GAO/NSIAD-97-148BR. US Government Printing Office: Washington, D.C. Page 5.

licensed would not seem to be a particularly effective means of diverting opium into the illegal market in the long run. The less risky option is at the point of harvest when uncertainty over yields, the utility and value of the final commodity, and inadequate mechanisms of control, provide the ideal opportunity for diversion by licensees.

5.2. Second 'Risk Point': Harvest

The risks of diversion at the point of harvest differ substantially for India and Turkey due to the different agricultural commodities that they are producing. There would seem to be inherent problems with the production of raw opium due to its utility, its low weight-high value, and the sheer number of people involved in its harvesting. The same cannot be said for poppy straw.

Turkey

It is important to recognise that the sale of poppy straw to the state tends to be a by-product of seed production in Turkey.⁴⁰ Indeed, a higher household income is derived from seed production than capsule production. As such, it is the prevailing market price of the different types of seeds that is the most important determinant of the variety of opium poppy cultivated.⁴¹

The TMO determines the price that they are willing to pay, as the sole purchaser, for a given weight of poppy straw at the beginning of the opium poppy season. The price is calculated based on the costs of production and a level of profit that is deemed appropriate for the farmers. As such, the price paid for the poppy straw mainly fluctuates in accordance with the change in costs of agricultural inputs.

In the 1999/2000 growing season, the TMO set the price at the equivalent of US\$1 per kg. Given that the average level of cultivation is only 0.4 of a hectare and yields were on average 600 kg/ha, the sale of poppy straw for its alkaloid content would generate only US\$240. If lanced the same area of land might produce 12 kg of opium, based on an average yield of 30 kg/ha. In Turkey, this amount of opium would possibly have a street value of the equivalent of US\$8,520.⁴²

However the risks of being detected would seem to be quite high. As, aside from the TMO's monitoring visit to verify fields have not been lanced, it is at the point at which the capsules are ready for lancing that the TMO and Gendarmerie are most vigilant. Indeed, the authorities report that aerial surveillance is undertaken at this point. Yet, harvesting opium poppy via the lancing method is particularly labour intensive. Moreover, the incision of the capsules is best undertaken on a clear day, preferably in the afternoon if yields are to be maximised. To prevent opium being lost, households have to work in a systematic way, working their way backwards through the field. None of these factors make the harvest of significant amounts of opium a discrete exercise.

⁴⁰ U.S. Department of State (1999) International Narcotics Control Strategy Report 1999. US Government Printing Office: Washington, D.C.

⁴¹ Blue seeds are typically used in baking and sold on the international market, whilst yellow seeds are generally used for oil production due to their high oil content.

⁴² It was not possible to obtain prices for opium either in Turkey or at UNDCP. This price is based on a heroin price of US\$7.1 per Kg in 1999 cited by UNDCP and a conversion factor of 10:1.

A less risky endeavour would be to attempt to conceal the actual amount of poppy straw harvested from the authorities, and divert these to illicit channels. However, it is important to recognise that the staff of the *ajans* are not just charged with preventing illicit cultivation but they also act as local extension workers. Both during their monitoring visits and any subsequent visits, the *ajans* teams provide up-to-date advice on the improved agricultural techniques developed at the Agricultural Research station at Bolvadin.

Particularly important, the agricultural background of these teams, not only ensures that farmers receive adequate agricultural extension, but it also ensures that the TMO is fully aware of the extent of crop damage and the potential for reduced yields. As such, the mobile teams would capture a significant shortfall in the harvest during their estimate of each licensee's total production. A deficiency in the harvest and a whole investigate process ensues. The question remains whether this is financially worthwhile for the licensee and whether a market for the capsules actually exists.

India

The harvest represents the point of greatest risk for diversion in India and the primary problem lies with the uncertainty over the actual opium yield obtained. However, structural problems with village level control mechanisms also provide scope for diversion.

The MQY is the mainstay of the control system as it seeks to compel licensees to sell all their opium to the state. It does this by being set at a level that is believed to be commensurate with actual yields. If the MQY is too low then there is potential for licensees to sell their surplus production on the black market; if it is too high then the supply of opium is threatened as licensees may opt to have their crop destroyed for fear of being barred from cultivation in the future.

However, setting an appropriate MQY is not an easy task as opium yields fluctuate considerably, even within a small district or region, due to changes in climatic and environmental conditions, and differences in agricultural practices (see Annex B for a comparative analysis the different factors that influence opium yields). Moreover, it is often human nature to only report the minimum required for fear of raising expectations or having the minimum standard increased. This tendency is merely exacerbated by the differentials between the prices paid by the GOI and on the illicit market. Political pressure from licensees has also constrained the level of increase in the MQY.⁴³

However, to try and prevent diversion the MQY has increased during the 1990's, from 34 kg/ha in 1991 to 52 kg/ha in 2000 for Madyah Pradesh and Rajasthan (see Table 2).⁴⁴ Official statistics, on the other hand suggest that average yields have increased from only 35.4 kg/ha in 1995 to 36.9 kg/ha in 1999.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Rajasthan/Madyah	34	33.5	37	40	43	46	48	48	52	52

⁴³ In 1998, licensees went on strike and delayed planting in order to increase the farmgate process paid by the GOI and reduce the MQY. Combined with bad weather in 1998, this action led to the lowest level of opium production in India for 20 years.

⁴⁴ The MQY for Uttar Pradesh is lower than that for Madyah Pradesh and Rajasthan due to poorer growing conditions.

Pradesh										
Uttar Pradesh	32	31.5	35	38	43	46	40	40	42	44

Despite these increases in yields there is a resounding view that the actual yields obtained in India are systematically higher than the current MQY. Indeed, key informants have suggested that average yields of between 60 to 65 kg/ha are attainable in India. Moreover, whilst most of the farmers interviewed reported, rather warily, that they only produced the MQY of 52 kg/ha in 2000, the village *lambardars* reported yields of between 80-100 kg/ha. However, the moisture content of these yields is unknown, making estimates of the total yield at 70% solids, the standard measure in India, difficult to ascertain.

The debate over the actual yields obtained in India, has been further fuelled by reports of average yields of 50 kg/ha in Afghanistan⁴⁵ and even higher yields in China.⁴⁶ The USG has commented that ‘farmers can easily exceed the minimum opium yield required to retain a government license’.⁴⁷ Indeed, increasing concerns over the actual yields in India has resulted in the USG and GOI undertaking a joint yield survey for the first time in 2000/2001.⁴⁸ This work is based on the US Department of Agriculture’s yield experiments in Thailand in 1992, where the volume of the opium poppy capsule was positively correlated with the final yield of the plant.⁴⁹

The results of this work in India will not be available until Autumn 2001. Moreover, some analysts have suggested that the drought in Madyah Pradesh, combined with both rain and overcast days during the harvest, will prevent the extrapolation of the findings to subsequent years. Others have suggested that the preference in India for cultivating a large number of plants per unit area and maximizing the number of capsules per plant will affect the integrity of the final data.

Moreover, it is worth noting that the MQY is set at the beginning of each cropping season and is based on the previous years yields and political considerations.⁵⁰ However, as it is set prior to the cropping season it cannot take into consideration the different climatic factors that have a significant impact on the ultimate yield of opium poppy. For licensees, when these

⁴⁵ GOI officials have suggested that these yields are not possible in Afghanistan due to the quantities of fertiliser that are required to obtain the equivalent yields in India. Many GOI officials indicated that they did not believe fertiliser was used at all in Afghanistan, however, manure, Diammonium Phosphate and Nitrogen are used on a systematic basis in both the southern and eastern regions of the country. Moreover, there was a lack of recognition of the difference in soil conditions, cropping patterns and intensity of cultivation in Afghanistan and what impact that this would have on fertiliser needs.

⁴⁶ After India, China is the second largest producer of raw opium. However, it only produces opium for its own domestic needs and does not export it. The reported yields in China range from 44.6 kg/ha to 63.1 kg/ha between 1985 and 1998. See International Narcotics Control Board (2000) Study on Alternative Methodologies for the Supply of and Demand for Opiates for Medical and Scientific Needs, November 2000. Page 22.

⁴⁷ US General Audit Office (1997) Drug Control: US Heroin Control Efforts in Southwest Asia and the Former Soviet Union. Briefing Report to the Chairman, Caucus on International Narcotics Control, U.S. Senate. GAO/NSIAD-97-148BR. US Government Printing Office: Washington, D.C. Page 5

⁴⁸ The USG has been attempting to undertake a joint yield survey with the GOI since 1995. See US Department of State (1995) International Narcotics Control Strategy Report 1995. US Government Printing Office: Washington D.C. Page 226). The survey is being conducted in 60 fields across all 3 states.

⁴⁹ See United States Department for Agriculture (1992) Thailand Opium Yield Project 1991-1992. USDA: Beltsville, M.D.

⁵⁰ Some analysts have suggested that the MQY is lower than actual opium yields due to the political pressure exerted on the authorities by local and regional politicians who have been lobbied by their constituents, the licensees. The industrial action in 1998 illustrates that licensees are willing to undertake collective action when their interests, in this case low farmgate prices and a high MQY, are threatened.

factors act to the detriment of the crop, and they believe they will not reach the MQY, they will request the CBN to destroy their crop so that they will not lose their license the following year. Yet, when there is the appropriate amount of moisture at each of the stages in the plants growing cycle, no frost during the winter months, and the harvesting period has warm clear days and cold nights, the MQY is not reviewed to take account of the increase in the expected yield. In these years the scope for diversion is thought to be considerable.

The moisture content of opium complicates the issues of yields even further, as opium is purchased by the GOI based on a standard quality of 70 degrees, which represents 70% opium and 30% moisture. However, discussions with GOI officials suggest that the MQY is not based on the quality of opium but purely on the quantity produced. Yet, the quality of opium produced by each licensee is determined by a number of different factors, including the climate, the variety of opium poppy grown and access to irrigation. As such, the moisture content of opium can vary from 15% to 40% at the point of harvest, with the initial lancing producing the opium with the least moisture.

Indeed, key informants suggested that the majority of licensees in Madhya Pradesh cultivate varieties of opium poppy that obtain high yields per hectare but produce poor quality opium. This provides licensees with the necessary opium to satisfy the MQY as well as a surplus to sell illegally. Respondents suggested that one such variety, known colloquially as *lakhpati*, which translates to ‘much money’, is particularly popular within the area and that attempts to encourage licensees to cultivate varieties that produced opium with a higher sold content but lower yields had not proven successful.

The varying moisture content of opium also presents an opportunity for diversion with some licensees removing some opium from their final yield for sale on the black market and adding water to the remains to ensure that it complies with the MQY. Whilst this may be detected at the factory it is not clear how systematic the tests are. Indeed, concerns over the uncertain moisture content at the point of purchase led the USG to comment that ‘*without accurate moisture measurement at the time GOI officials collect opium, the amount of opium available for sale is unknown for several months and it is impossible to determine whether losses are due evaporation or theft*’.⁵¹ To address this at the point of procurement the CBN has introduced more sophisticated tests for moisture content. However, the original moisture content of the crop at the point of harvest is still unknown, providing scope for diversion.

Many respondents felt that diversion was so systematic that they did not distinguish between farmers and traffickers. In particular the *lambardar* was singled out as playing a key role in the diversion process. The position of *lambardar* would certainly seem to be key to the regulatory mechanism during the harvest period. It is, after all, the *lambardar* that is responsible for the documenting the yields each day.

The shortage of human resources requires that representatives of the village play a role in monitoring compliance with the law.⁵² As such, the position of *lambardar* is essentially

⁵¹ U.S. Department of State (1995) International Narcotics Control Strategy Report 1995. US Printing Office: Washington D.C. Page 223.

⁵² The USG commented in 1997 that ‘*the government agency responsible for monitoring the licit crop is understaffed and cannot provide effective oversight over all the licit opium crop*’. US General Audit Office (1997) Drug Control: US Heroin Control Efforts in Southwest Asia and the Former Soviet Union. Briefing Report to the Chairman, Caucus on International Narcotics Control, U.S. Senate. GAO/NSIAD-97-148BR. US Government Printing Office: Washington, D.C. Page 5.

representative of the CNB by default. However, as opposed to Turkey where the *muhtar* is a representative of the entire village and has other civil functions, the *lambardar* only represents licensees and has no other responsibilities aside from those related to licit opium poppy cultivation.

Since 1999, the position of *lambardar* has been an elected one due to concerns over possible corruption. Prior to this it was the farmer with the highest yield in the village. However, some officials reported that farmers have taken contributions from other farmer's crops to ensure that they obtained the highest yield. This indicates that the position of *lambardar* is not only much sought after by the individual but that others will collude to assist the 'right' individual obtaining the post.

Whilst the post of *lambardar* is reported to bring *kudos*, it also pays the equivalent of 1.5% of the villages' final crop. For a village of 250 licensees all of whom achieved yields in excess of the MQY of 60kg/ha, this would be the equivalent of US\$650 at the GOI price of the equivalent of approximately US\$ 14 per kg. Were the *lambardar* to overlook the excess, and all the opium to be diverted, the *lambardar* would be entitled to a commission on the total value of the crop on the illegal market, the equivalent of approximately US\$62,000 at current black market prices of US\$155 per kg. At the same rate of commission the *lambardar* would be entitled to the equivalent of US\$ 930 for the excess cultivation alone, and would still receive 1.5% commission on the licit crop sold to the GOI.

Whilst the election of the *lambardar* will reduce the potential for licensees to collude, it will not prevent the selection of a dishonest *lambardar* in those villages where the majority of licensees are involved in the diversion of opium. Given that a number of senior GOI officials have indicated that diversion is an 'economic necessity' for licensees it seems unlikely that the post of *lambardar* can be relied upon to as an effective control mechanism, certainly as long as the GOI is uncertain about the actual yields of opium obtained. .

5.3. Third 'Risk Point': Processing

Turkey

There is little scope for diversion from the licit processing in Turkey. The alkaloid plant at Bolvadin is isolated and secure. Stocks are retained in a separate building and derivatives are produced only to order. The processing of diverted opium poppy straw would appear to be equally problematic.

Ultimately, the Turkish authorities do not believe that a market for poppy straw exists, suggesting that for many individuals the risks far outweighed the benefits of trading in, or processing poppy straw. Indeed, some analysts have suggested that the relative abundance of opium, morphine and heroin that is transiting the country from South West Asia means there is little commercial sense in attempting to extract morphine from poppy straw produced in Turkey given its low alkaloid content, the logistical arrangements required to transport and process large amounts of poppy straw and the other raw materials required, the costs of the plant required for extraction, and the obvious risks associated with such an endeavour.

With reference to illicit cultivation, it is estimated that 800 kg of poppy straw of morphine content of 0.25% would be required to produce 1 kg of morphine. With an average yield of 600 kg per hectare in Turkey, and a morphine content of 0.4%, this translates to 0.83 of a hectare. Whilst it might be possible to conceal some cultivation under the current system it would not be possible to conceal the quantities that would be required to produce commercial quantities of morphine nor the processing facilities.

Indeed, the process of converting poppy straw into morphine itself is not a simple process.⁵³ It is not that it requires chemical expertise, which after all can always be purchased, but that it requires complex and costly industrial plant and significant space for the raw materials. For instance, Kussner (1961) estimated that to produce only 10 kg of morphine base, 80 mt of poppy straw with a morphine content of 0.25%, and 2000 m³ of water would be required. Moreover, the chemical process itself emits a string odour that is easily detectable especially in hot season when it produces an *'unbearable stench'*.⁵⁴

For these reasons a number of countries producing morphine and other alkaloids from poppy straw, report that diversion is impractical, costly and too high risk.⁵⁵ Indeed, after 30 years using the poppy straw method the Hungarians reported that *'no attempts to manufacture morphine illicitly in our country have come to knowledge'*.⁵⁶

Similarly, neither the Turkish authorities, the INCB, nor the USG have reported any cases of Turkish poppy straw being processed into morphine. This differs considerably to that of producing morphine from opium *'only about 9kg of opium, with a volume of 9 litres, are required to produce 1kg of morphine, the raw morphine being precipitated after the opium has been dissolved in a concentrated aqueous solution and purified.'*⁵⁷

⁵³ The process for extracting morphine from poppy capsules is known as the Kabay process after the Hungarian scientist who devised it in 1925. Although the process has been improved so as to achieve higher rates of recovery rates for morphine, the basic principles remain the same: *'The poppy capsules (with stalks not more than 10 cm) are thrashed, dried and then treated with an extracting liquid which consists of a solution of sodium bisulphite in water. The resultant aqueous extract is concentrated in vacuo using the 'counter-current principle' method until it attains a syrupy consistency. The pasty substance thus obtained, which has a morphine content of 1% to 2 %, is then treated with alcohol or other organic solvent. The solution which, besides morphine contains a lesser amount of other extractable material than the aqueous extract-is then distilled, yielding an extract having a morphine content of 2%-4%. From this mixture of alkaloids in alkaline medium the morphine base can be precipitated by treating the mixture with ammonium sulphate in the presence of benzene. The product will have a morphine content of over 50%, and, by means of repeated precipitation or crystallisation, it is possible to obtain from it the pure morphine base and morphine salts or semi synthetic derivatives'*. For more details see Bayer, I. (1961) *'Manufacture of alkaloids from the poppy plant in Hungary'* in the *United Nations Bulletin on Narcotics*, Vol. 1, No. 1, p:21-28.

⁵⁴ See Kussner, W. (1961) *'Poppy straw: A problem of international narcotics control'* in the *United Nations Bulletin on Narcotics*, Vol. 1, No. 1, p:1-6.

⁵⁵ *'As large quantities of poppy straw are required for manufacture, it is impossible, in practice to conceal the raw material. As, moreover, manufacture cannot take place in small laboratories, but only in large factory premises, secret manufacture is practically impossible.'* Memoranda concerning the process employed by the Alkaloida Co. Ltd. Factory at Budszentmihaly to extract morphine from the dry poppy plant – Document O.C. 1546 (1) reproduced as Annex 3 to League of Nations document O.C 1562 (1), official No. C.256.M.105, 1934.XI, para. 11.

⁵⁶ See Bayer, I. (1961) *'Manufacture of alkaloids from the poppy plant in Hungary'* in the *United Nations Bulletin on Narcotics*, Vol. 1, No. 1, p:21-28.

⁵⁷ Kussner, W. (1961) *'Poppy straw: A problem of international narcotics control'* in the *United Nations Bulletin on Narcotics*, Vol. 1, No. 1, p: 1-6.

India

The Opium and Alkaloid Factory clearly offers some opportunities for diversion. Nimach was established in 1935, and as such was not designed to deal with the realities of the growing demand for illicit drugs in the 21st Century. Moreover, raw opium is difficult to handle due to its viscous nature. As such, wastage is common and accounting for all the opium delivered to the factory is inherently problematic.

However, it is clear that there have been considerable improvements in the controls at the Opium Factory. The use of large open vats to store opium has stopped, reducing the chance for discrepancy between the documented and actual stocks. The recent installation of CCTV will possibly act as a deterrent to more random acts of theft.

Whilst the plant does not produce large amounts of semi-refined or refined morphine the concentration of CCTV coverage on the alkaloid plant makes strategic sense.⁵⁸ Despite this there are security concerns. Semi-refined and refined alkaloids are left uncovered and unweighed in the plant pending packaging. Poor cleanliness in the grounds provides potential cover for concealment.

The low perimeter wire mesh fence does not offer adequate protection. The alkaloids plant's proximity to other facilities frequented regularly by workers from other parts of the factory represents a security concern. Currently, a stockpile of the residue from the extraction process, which can contain up to 20% morphine, that has built up over the last twenty years is reported to be stored in a locked area pending a decision on incineration.

There is the potential in India for diversion at the processing stage. However, the question remains over whether this is the major risk point in the production process. Again, this would seem unlikely given the lower risks associated with diverting opium at the point of harvest. And there is certainly a growing body of evidence to suggest that this is happening and that heroin is being produced illicitly in and around the towns of both Nimach and Ghazipur.

6. Evidence of Diversion

This section analyses the available data on drug use and seizures in India and Turkey based on the assumption that these can act as indicators of diversion in those countries producing licit opiate raw materials. Details of drug prices, purities and consumption patterns can provide an insight into the availability of opiates in the domestic arena. Moreover, seizure data provides evidence of the routings of drugs both domestically and on an international basis. Combined this data can provide a clearer picture of the different end markets for diverted licit opium.

6.1. Domestic Channels: Consumption in Turkey and India

Turkey

In Turkey, there is little evidence to suggest that opium produced under license is finding its way into illicit channels. Indeed, although the official statistics available are largely limited to those who have either been arrested (see Table 3) or those who have sought treatment from

⁵⁸ In 2000, Nimach produced 113 kg of semi-refined morphine and 113 kg of refined morphine.

the government hospitals,⁵⁹ there is currently little evidence to suggest that there is a problem with opiates in Turkey at all.

Indeed, whilst the official statistics suggest that there is an increasing problem of illicit drug use in Turkey it is still nominal in relation to Western European countries.⁶⁰ For instance, research conducted in 1995 by the European School Survey Project on Alcohol and Other Drugs (EPSAD) in Istanbul in 1995 indicated that prevalence rates amongst students were low except for tobacco, where use was the equivalent of the European average. Only 1% of respondents had tried other illicit drugs except cannabis.⁶¹ A further study, undertaken by the Alcohol and Drug Research and Treatment Centre (AMATEM) in 1996-97 in Istanbul, found that only 3% of the 1,550 randomly selected respondents had used illicit drugs, 66% of which had used cannabis.⁶²

Year	Number of people charged with drug abuse
1992	802
1993	1068
1994	2189
1995	1721
1996	2570
1997	2314
1998	2544
1999	2682

Source: Turkish Drug Report 1999

Indeed, according to government statistics it is hashish that is the most commonly used illicit drug and that opiates use is limited to Istanbul. Indeed, some reports suggest that despite Turkey's status as a traditional cultivator, there is little history of opium use even amongst opium poppy cultivators.⁶³ Indeed, the authorities argue that, where opium is used, it is mainly restricted to the Iranian community in Turkey.

Nor is there any evidence of a significant heroin problem. Indeed. More recent data from AMATEM suggests that alcohol is the more prevalent drug problem in Turkey today, or certainly the one that more people are seeking treatment for. For instance, in 1999, alcohol was the most common problem amongst those patients seeking treatment at AMATEM's six hospitals. In the Samsun hospital 97% of the patients were alcohol related compared to 73.2% in Istanbul. These more recent statistics, as with those produced by the Ministry of Interior, do not document opium use.

⁵⁹ As such, only those with more acute drug problems are captured by the current statistics.

⁶⁰ The recognition of the absence of quality data on illicit drug consumption and anecdotal reports of a growing problem has prompted ODCCP to shift the balance of its drug control strategy in Turkey from one that was solely based on law enforcement, to one that now combines both law enforcement and demand reduction initiatives.

⁶¹ European School Survey Project on Alcohol and Other Drugs (1995) Alcohol and Other Drug Use Among Students in 26 European Countries.

⁶² AMATEM (1997) Drug Abuse in Istanbul: Rapid Assessment Study 1996-97. Unpublished report funded by UNDCP AD/TUR/95/894-95.

⁶³ In 1974, 961 respondents were interviewed in 25 villages in which opium poppy was cultivated. This study found that opium had been used for a range of purposes, including coughs (8.3%); diarrhoea (3.5%); abdominal pain (4.5%); common cold (13%); toothache (2.6%); and veterinary medicine (6%). Only 0.3% of respondents reported that they knew of addicts within the area. However, further investigation revealed that many of the respondents were referring to the same people. Therefore the addiction rate was estimated to be even lower. It is interesting to note that this research was conducted at the time when Turkey was seeking to reintroduce opium poppy cultivation after its prohibition in 1971. For more details see Akcasu, A. (1976) 'A survey of the factors preventing opium use by poppy growing peasants in Turkey' in the United Nations Bulletin on Narcotics Vol. 1, No. 1, p13-17.

India

Clearly, the situation in India differs greatly as there is a growing body of evidence to suggest that there is both traditional use of opium in licit cultivating areas, such as Rajasthan, as well as a growing problem of heroin consumption across the major urban areas in India.

Whilst the figure of 3 million drug addicts⁶⁴ and 1 million heroin addicts are the most commonly cited, estimates of the number of drug users, their socio-economic profile, the extent of their drug use and the types of drugs used in India is currently rather sparse. Currently, the statistics that are currently available largely focus on localised patterns of use and have been derived by service providers, such as detoxification and rehabilitation centers.

To overcome this problem and have a clearer understanding of the processes which influence individuals in their drug consumption, the Government of India and UNDCP are currently seeking to provide a more accurate account of the drug problem in India from both a quantitative and qualitative basis. This work will not be completed until July 2001. To fill this information gap discussions with those responsible for the fieldwork for this study and Non Governmental Organisations (NGOs) involved in the provision of services for problem drugs users, as well as users themselves, were held during the mission.

Most service providers reported that the majority of people seeking treatment were using heroin base, known as '*brown sugar*'. For instance in Nimach, 90% of the 1,500 people that the Red Cross had treated were addicted to heroin base. In Delhi, where there is a more diverse selection of drugs used, including an increasing incidence of buprenorphine,⁶⁵ only 70% of those seeking treatment were using heroin base.

Reports suggest that heroin base is available in most urban areas across India except the North Eastern States where Heroin No. 4 or '*white heroin*' is more readily available due to the proximity to Myanmar. Prices for '*brown sugar*' ranged from 50 – 100 Rupees, but both cost and quality of the product were found to differ according to the patron-client relationships that exist between buyer and dealer.

Most respondents suggested that street level purity for heroin base was around 3-4%, the bulk of which was thought to be of Indian origin. Indeed, a number of respondents suggested that heroin base produced in Barabanki in Uttar Pradesh and in Mandsaur in Madyah Pradesh were renowned for their quality and could therefore be sold at a premium. Moreover, it was a widely held view that most of the heroin base consumed in India was produced from opium grown legally in the three states of Madyah Pradesh, Rajasthan, and Uttar Pradesh rather than from opium cultivated illegally. Ironically, this was believed to be consumed as opium in accordance with local traditions within the areas in which it was cultivated.

The average daily consumption of heroin base users was thought to range from 0.3g to 0.5g. Whilst a rather crude calculation, this would suggest that anything from 109.5 to 182.5 mt of heroin would be required to meet the demands of an estimated 1 million regular heroin users

⁶⁴ This figure is reportedly based on the assumption that the 300,000 people requesting assistance represents only 10% of the total number of problem drug users in India. Most analysts consider it a very crude estimate and believe that because the total number of drug users and the distribution by drug type is derived from those requesting assistance it is skewed heavily towards those using opiates.

⁶⁵ Buprenorphine is a thebaine based product and has been used in the treatment of addiction to opiates. In India it is available from chemists and is relatively cheap. It is often used in a cocktail of drugs including Avil, antihistamines.

on a yearly basis. At a conversion rate of 10 to 1, which is generous given the conversion rates achieved at Nimach, this is the equivalent of 1,095 mt to 1,825 mt of opium.

These figures are all the more startling when viewed within the context of the official figures for licit opium production of 1,075 mt in 1999, the second highest reported level of production in 20 years. Were this demand to be met purely by opium diverted from the licit industry, each licensee would need to obtain yields of between 74.5 kg/ha and 99.5 kg/ha. This would seem like an unlikely scenario, possibly highlighting either the continued significance of imported heroin in India, much higher rates of illegal cultivation than are currently estimated,⁶⁶ the inaccuracy of current estimates of heroin addiction in India, or a combination of all three explanations. Unfortunately, until the GOI and UNDCP complete their research, assessing the efficacy of any of these statements remains problematic.

6.2 Seizure Data: Turkey and India

Turkey

There would seem to be a broad consensus that diversion from Turkey's licit opium production is at worst, negligible. Indeed according to UNDCP *'from the date that the system was put into practice in 1974 until now, no seizures of opium derived from Turkish poppies have been reported either in the country or abroad.'*⁶⁷ The USG supports this statement suggesting that there is no evidence that licit production moves into illicit channels.⁶⁸

There is certainly very little data on either seizures or patterns of domestic consumption to contradict this view. Indeed, despite cultivating approximately 87,000 hectares of opium poppy in 1999, there were no reported cases of illicit opium poppy cultivation or seizures of poppy straw in Turkey.

Moreover, opium seizures were relatively low given the incidence of opium poppy cultivation with only 318 kg seized, according to official statistics. Heroin and morphine seizures, at 36,051 kg and 10,013 kg in 1999 respectively, were of course more significant given Turkey's reputation as an important conduit and processing centre for illicit opiates from South West Asia.⁶⁹

⁶⁶ The USG estimates that approximately 3,100 ha of opium poppy were cultivated illegally in India in the 1999/2000 growing season. See US Department of State (2001) *International Narcotics Control Strategy Report 2001*. US Government Printing Office: Washington D.C.

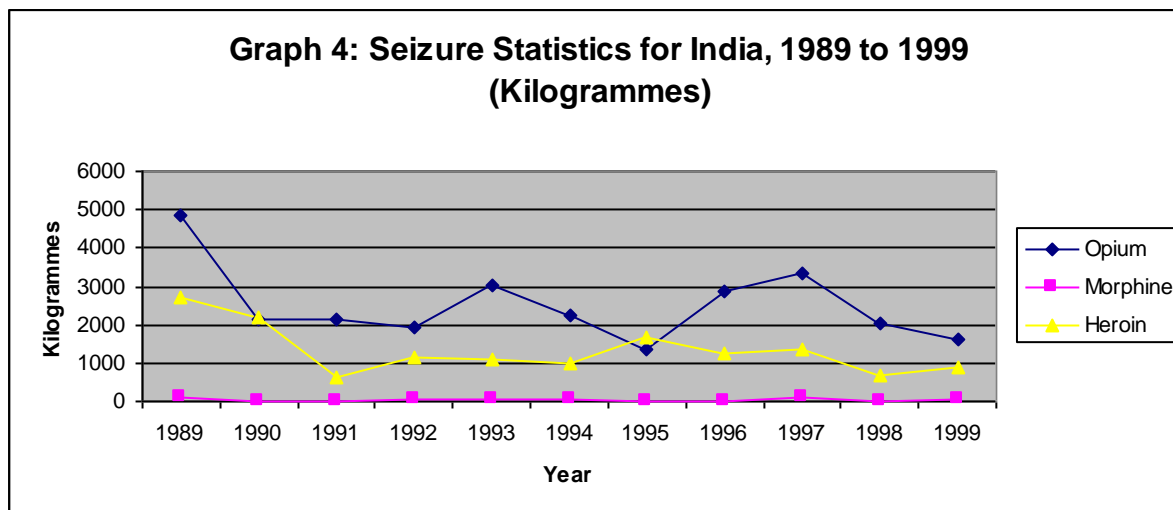
⁶⁷ UNDCP (2000) *Creation of the Turkish International Academy Against Drugs and Organised Crime*. Project Document AD/TUR/00/F05, p:2.

⁶⁸ *'Opium cultivation in Turkey is limited to the highly controlled licit, pharmaceutical opium crop. There is no evidence of diversion of licit crops, and illicit cultivation remains completely dormant'*. See US Department of State. (1998) *International Narcotics Control Strategy Report 1998*. US Government Printing Office: Washington, D.C. *'There is no appreciable cultivation of illicit narcotics in Turkey. We are not aware of any diversion from Turkey's licit opium production program'*. See US Department of State. (1999) *International Narcotics Control Strategy Report 1999*. US Government Printing Office: Washington, D.C.

⁶⁹ A closer analysis of the UNDCP/Interpol/World Customs Union *'Significant Seizures Database'* reveals that the average amount of opium seized per case amounted to 15.5 kg compared to 24 kg of morphine base per case and 32.5 kg of heroin.

India

The aggregate seizures statistics fail to capture the scale and nature of the illicit trade in opiates in India (see Graph 4). For instance, in 1999, 1,635 kg of opium, 36 kg of morphine and 861 kg of heroin were seized in India. If all this were of Indian origin, this would represent the equivalent of 1% of the total amount of licit opium produced in 1999.



However, a review of the Significant Seizures Database, maintained by UNDCP, Interpol and the World Customs Union, reveals that 81% of the quantity of opium seized in India from January 1999 until August 2000 was seized in Madyah Pradesh, Rajasthan and Uttar Pradesh. Even if Rajasthan were to be eliminated from this calculation, on the basis that it is a border state and possibly some of the opium seized could be of Pakistan origin, Madyah Pradesh and Uttar Pradesh combined, constitute 61% of the total quantity of opium seized over this period. This represents a particularly high concentration of seizures around the licit producing states.

The nature of the seizures range from those made in residences to those made in transit either via road, rail, or air. Where documented the average seizure of opium made at residences was approximately 6.35 kg compared with 13.15 kg for those made in transit by road. However, if the larger quantities seized at residences were removed, on the basis that these are possibly the cumulative results of diversion from a number of separate households, the most frequently seized amount was approximately 1.8 kg of opium. If every licensee were to retain only 1.8 kg of opium to sell on the black market, this would amount to 288 mt of opium being diverted each year, almost 30% of the licit opium crop in 1999.

Indeed, senior GOI officials report that 15%-20% of the licit crop might be diverted to the illicit market, whilst other more candid officials suggest 30% is a more accurate reflection of reality. The US has reported that 'in 1999, as much as 300 mt of opium gum might have been diverted to the black market' in 1999.⁷⁰ This is almost 30% of the licit crop and a yield of approximately 47 kg/ha in 1999. This would be only 3 kg/ha in excess of the MQY in Uttar Pradesh and 5 kg/ha less than the MQY for Madyah Pradesh and Rajasthan. These yields would clearly be attainable.

⁷⁰ US Department of State (2001) International Narcotics Control Strategy Report 2001. US Government Printing Office: Washington D.C.

Closer analysis of the data also reveals significant seizures of base morphine in Lucknow, Nimach and Mandsaur. Indeed, key informants with a history of problem drug use reported that heroin from Barabanki and Mandsaur was well known for its 'quality'. Moreover, informants interviewed in Nimach, commented that heroin was being processed locally, and that both opium and Acetic Anhydride (AA) were readily available within the area.⁷¹ A seizure of 70 litres of AA and 32 kg of heroin in Delhi in December 1999 provides further evidence of the links between Mandsaur and Delhi and the different roles that these locations play in the heroin processing business in India.⁷²

The USG suggest that '*[India] is a key heroin transshipment area due to its location between South East Asia and South West Asia*'. Perhaps more troubling is the USG view that '*India is a modest but apparently growing producer of heroin for the international market*'.⁷³

There are certainly a growing number of seizures to suggest that there is a vibrant trade in heroin between India and Sri Lanka. For instance, in the last 18 months the GOI alone has seized 337 kg of heroin on route to Sri Lanka, of which over 200 kg was thought to be of Indian origin.⁷⁴ Indeed, reports suggest that many of these seizures have been traced back to the licit opium producing areas of Madyah Pradesh and Uttar Pradesh.

Intelligence suggests that the actual amount of heroin being trafficked to Sri Lanka is far more substantial.⁷⁵ Much of it being transported by fishing boats from the south eastern India near Tuti Corin to the coast just north of Colombo.

This raises fundamental questions over the final destination of the heroin being shipped to Sri Lanka from India. It is clear that the Sri Lankan authorities are not seizing significant amounts of heroin departing the country, but of course goods departing the country are never as much a priority for law enforcement agencies.⁷⁶ Nor is there a substantial heroin problem in the country, with estimates of the total number of heroin users ranging from 30,000 to 100,000. This would tend to suggest that there is a surplus of heroin that is either being stored in the country or transshipped

Perhaps, of particular significance is the purity of the heroin seized in Sri Lanka, ranging

⁷¹ India manufactures approximately 40,000 mt of AA annually. Whilst considerable efforts have been made to prevent diversion according to the DEA '*a substantial portion of diverted worldwide AA supplies originated in India*' US General Audit Office (1997) Drug Control: US Heroin Control Efforts in Southwest Asia and the Former Soviet Union. Briefing Report to the Chairman, Caucus on International Narcotics Control, U.S. Senate. GAO/NSIAD-97-148BR. US Government Printing Office: Washington, D.C. Page 17. Indeed, a number of significant seizures of AA have been traced back to India in recent months including 9 mt in Dubai en route to Afghanistan via Turkmenistan, and 3 mt seized in Turkmenistan itself.

⁷² An initial seizure of 18 kg of heroin was made in Bangalore in December 1999. Further investigations revealed a heroin laboratory with another 32 kg of heroin and 70 litres of AA. It was later revealed that the laboratory had been processing heroin for 15 years from morphine base originating in Mandsaur. Mandsaur's importance in the processing of heroin is attributed to the ready supply of opium within the area and its proximity to good transport connections with both Delhi and Mumbai. Indeed, a number of respondents commented on the frequent visits of traffickers from Delhi, Mumbai, Chennai and other large cities to the area.

⁷³ See US Department of State (2001) International Narcotics Control Strategy Report 2001. US Government Printing Service: Washington DC.

⁷⁴ See US Department of State (2001) International Narcotics Control Strategy Report 2001. US Government Printing Service: Washington DC.

⁷⁵ Based on discussions with UK DLO, US DEA, and GOI Officials.

⁷⁶ This could be further exacerbated by Colombo's status as a free port.

from 40% to 60%.⁷⁷ Moreover, reports from the Sri Lankan authorities indicate that there is little difference between the purity of heroin seized at the point of entry and that confiscated from users. With little evidence of adulterants and such high levels of purity at the retail level, it is unclear whether the product being sold in Sri Lanka is primarily for the domestic market. Respondents have suggested that a similar phenomenon is also occurring in Bangladesh, citing the discovery of heroin in Calcutta on route to Bangladesh with purities of between 60-80%.

However, as yet there have been very few seizures made in Western Europe or the US that can be traced back to India, Sri Lanka or Bangladesh. Of course, as with the debate over the role of Central Asia as a conduit for heroin from Afghanistan to Europe, the absence of intelligence closer to source continues to hamper our understanding of *upstream* traffic, however, the potential is clear.

7. Conclusions

There are clearly inherent problems associated with the control of raw opium. It is a valuable commodity with a ready demand. The prices offered on the black market easily outstrip those being offered by governments. Widely fluctuating yields render any attempts to establish a minimum level of production problematic. Insufficient resources for supervision, and inappropriate control mechanisms, provide ample opportunities for diversion. Within this context the government cannot ensure it is the sole purchaser.

Moreover, opium can be converted relatively easily into morphine base, morphine or heroin base using locally available products. Once its bulk has been reduced it can easily be transported to a growing domestic market, or to other countries within the region, and potentially beyond into Western Europe.

It is clear that diversion from the licit crop in India is occurring on a systematic basis. Seizure data supports this claim with a disproportionate quantity of opium being confiscated in the licit producing states of Madhya Pradesh, Rajasthan and Uttar Pradesh. Details of individual cases highlight the role of areas such as Nimach and Mandasaur in diversion from licit production to illicit channels.

The thriving cottage industry producing morphine and heroin base in the licensed states, in areas such as Barabanki, in Uttar Pradesh and Mandasaur in Madhya Pradesh is further evidence of the extent of the leakage that is taking place. The availability of what is regarded as domestically produced heroin base in the major urban areas across India, and the growing numbers of individuals seeking support from detoxification and rehabilitation centres for heroin addiction, also highlights the extent and consequences of the diversion from licit sources. There is even a growing body of evidence linking heroin shipments to Sri Lanka with production in Madhya Pradesh.

Indeed, it is worth noting that if 300 mt of opium were being diverted from the licit crop, India would currently represent the 3rd largest source of illicit opium in the world after

⁷⁷ Discussion with UK DLO (Delhi).

Afghanistan and Myanmar. Were 100 mt diverted, India would be the fourth largest producer after Laos.

Diversion from licit cultivation can only be minimised if the national authorities can guarantee that they have the necessary resources, institutional capacity and control mechanisms in place to ensure that they are the sole purchaser of opiate raw materials. However, this presents a major problem for many developing countries where resource constraints and corruption can be common. For this reason any attempts to introduce licit cultivation into other resource poor countries, such as Afghanistan or Myanmar, where opium cultivation has been cultivated illegally, will remain inherently problematic. Moreover, such a strategy would send the wrong signals to other countries in which illicit cultivation occurs.

By reducing its utility, the poppy straw method reduces the demand for the product. The high cost of conversion, the sheer scale of the industrial plant and materials required, and consequently, the risk of detection, all combine to reduce the potential for diversion. Indeed, even using the poppy straw method the control mechanism hinges on allocating sufficient resources and personnel to monitor the licensed fields at the point at which the crop is ready for lancing.

Clearly, from the control perspective the poppy straw method currently has significant advantages over the production of raw opium. However, there are costs associated with a shift to this approach. Of primary concern to governments are the socio-economic impact on the licensees themselves and the political consequences of such a policy change. The Turkish experience highlights that farmers can shift from opium production to poppy straw despite the perceived political costs. However, financial assistance was required.

Indeed, in Turkey, some of the costs of transition from raw opium to poppy straw were borne by the USG and UN due to concerns over the use of Turkish opium in the production of heroin in Marseille, France in the 1970's.⁷⁸ Despite the potential for India's domestic population to absorb the current levels of diversion a case could be made for similar assistance.

Moreover, the Turkish shift was also assisted by the country's market position in the licit opium trade at the time, and the security that commitment from the USG and, subsequently, the '80/20 Rule' offered. Changing patterns of trade, the development of thebaine rich varieties of opium poppy, and uncertainty over the future of the '80/20 Rule' do not provide for such a secure environment for the transition from opium to poppy straw production for India.

Nevertheless this transition needs to occur if diversion from the licit opium crop in India is not to continue unabated. Whilst currently, much of this would seem to be consumed locally, it is only a question of time before Indian criminal groups involved in the shipment of acetic anhydride to the gulf, methaqualone to the south and eastern coast of Africa, and increasingly heroin base to Sri Lanka and Bangladesh, begin to explore the possibilities of increasing their profit margins by exporting heroin to Western Europe. That is of course, assuming they are not doing so already.

⁷⁸ It was not possible to get a breakdown of the total costs of conversion but from 1975 to 1990 UNDCP provided US\$ 8 million in support for the TMO's control of the licit opium poppy industry.

8. Recommendations

- A detailed Business Plan for the phased transition to the poppy straw method should be produced for India's licit opium industry. This should build on the work that has already been undertaken in India on the efficacy of converting to poppy straw production.
- Local mechanisms for the supervision and control of opium poppy cultivation in India need to be reviewed. The current system of using village representatives, elected only by fellow licensees is insufficient to prevent diversion. Consideration should be given to the use of individuals with broad based support and a broader range of civic responsibilities, as in Turkey.
- Given the current drought in India, the results of the Joint Opium Yield Survey between GOI and USG will need to be closely examined to ensure that the data can be extrapolated both across the three states and over time. Consideration should be given to repeating this work in the 2001/2002 growing season to ensure that the data is applicable for more than one season. This work will also provide useful data for the analysis of yields of illicit opium poppy cultivation in Afghanistan.
- The UK Government should review the findings of the GOI/UNDCP Survey on drug use in India when it is available in July 2001. This paper will provide a clear insight into the scale and nature of opiate use in India and possible interventions.
- A freight profiling exercise on shipments from, or transiting, Sri Lanka should be conducted to assess the potential threat posed to the UK.
- There is a need to review the increasing number of anomalies that seem to be occurring amongst those countries 'producing' opiate raw materials. The use of seized opium for the production of alkaloids would not seem to conform to the principals of the Single Convention. Moreover, greater consideration needs to be given to what the status of '*traditional supplier countries*' actually entails in the context of genetically improved varieties of opium poppy and shifting patterns in the supply of, and demand for, opiate raw materials in recent years. It is worth noting that increasing instability in the demand for opiate raw materials from '*traditional supplier countries*', and in particular India, may well be lead to increasing levels of diversion.

ANNEX A

TERMS OF REFERENCE

Purpose

- Study the processes of, and controls on, licit poppy cultivation and opium production in India and Turkey to identify best practice and make recommendations about how this might be replicated.

Objectives

- Analyse and compare the processes of licit cultivation and production and the methods of control to prevent diversion to the illicit market in India and Turkey (with reference, where appropriate to methods used by other licit opium producer countries);
- Assess the scope for diversion, trafficking patterns and end markets for diverted licit opium (including local consumption and regional/international trafficking);
- Identify areas of best practice in preventing diversion and how these may be replicated;
- Identify areas, if any, where the UK could provide Assistance (this should include an assessment of existing and planned assistance by other donors).

Approach

- A literature review of approaches to licit opium production (not just confined to Turkey and India);
- Visits to licit production areas in Turkey and India;
- Interviews with officials from relevant national and international governmental, private and non governmental organisations; and
- Discussions with relevant UK officials/organisations as appropriate.

Outputs

- A report including recommendations that address the purpose and objectives of the Terms of Reference. A draft of the report must be submitted to, and approved by, the Drugs and International Crime Department of the Foreign and Commonwealth Office before it is finalised.

ANNEX B

THE CULTIVATION OF OPIUM POPPY

Key Issues

- Opium yields fluctuate considerably, even within a small district or region due to changes in climatic and environmental conditions, and differences in agricultural practices;
- Opium can have a morphine content of between 4 and 21 per cent;
- Opium poppy is vulnerable to a number of climatic excesses including, cold, wind and moisture;
- Opium poppy is susceptible to both insufficient and excess moisture. For maximum yields, opium poppy requires the right amount of moisture at the appropriate point in its growing cycle, as well as high temperatures after the plant has flowered;
- Research indicates that opium yields could be almost doubled with the appropriate combination of fertilisers;
- To maximise yields opium poppy is weeded and thinned up to three times. This is a laborious and arduous task that is often undertaken by women and children in most of the opium producing countries;
- During the harvest period warm days and cold nights can increase opium poppy yields by 25%;
- The harvesting of opium poppy is a labour intensive task that requires skilled labourers. The use of an unskilled workforce can reduce yields significantly;
- Labour is the major constraint on opium poppy cultivation. Weeding, thinning and particularly the harvest of the plant, are all labour intensive periods in the life cycle of opium poppy;
- To spread the labour inputs a number of common strategies are adopted across a range of licit opium poppy producing countries, including staggered planting, the use of family labour and the cultivation of different varieties of opium poppy with varying rates of maturation.

B1.1. Learning from the Licit

A considerable amount of literature is available regarding licit opium poppy cultivation, much of which is based on extensive field research by agronomists, botanists and agriculturalists, covering a range of different source countries. This literature not only provides the basis for comparative analysis across those countries that produce opium legally but for those source countries where opium poppy is grown illegally.

Whilst there is divergence in the socio-political, market and, clearly the, legal environment in which licit and illicit opium cultivation occur, there are many similarities in climatic conditions, and agricultural practice that provide invaluable information for a more detailed analysis of illicit opium poppy cultivation. Indeed, the ongoing debates regarding the potential yields of opium for countries such as Afghanistan, Myanmar and Laos, where problems of access have constrained methodological rigour, can learn much from the in-depth research that has already been conducted on licit cultivation in Hungary, Turkey, and the Former Soviet Union.

This Annex seeks to draw out some of the salient points of the research on what have been identified as the optimum conditions for licit poppy cultivation to assist policy makers and analysts to identify what is realistic when assessing information regarding both licit and illicit opium poppy cultivation and production.

B1.2. Opium Yields and Morphine Content

It is clear that opium yields fluctuate considerably, even within a small district or region due to changes in climatic and environmental conditions, and differences in agricultural practices. Indeed, the literature documents yields of between 8.8 kg/ha and 16.9 kg/ha in the same district in the Former Soviet Union in 1955, whilst within the opium cultivating provinces of India, average yields ranged from 39.4 kg/ha in Uttar Pradesh to 57.4 kg/ha in Madhya

Pradesh in 1994.⁷⁹ Internationally the variance in yields is even more acute with reports of 2 kg/ha in Laos and Vietnam and 105 kg/ha in India (see Table B1).

Similar trends can be seen in the yields in capsules and seeds, as well as the morphine content of opium and poppy capsules. In Turkey, the opium derived from the western region of the country was found to be particularly diverse, ranging from 1.4% to 25.7%.⁸⁰ However, on an international basis the INCB reports that '*opium generally has a morphine content of between 4% and 21%*'.⁸¹

Variations in yields have often been attributed to different survey methodologies as well as the conflicting agendas of the agencies involved in producing the figures. However, yields can fluctuate widely, primarily depending on the prevailing environmental conditions during the different stages in the growth cycle of the opium poppy plant, but also due to the agricultural techniques that are used to cultivate it. Therefore to assess the efficacy of estimates of both illicit and illicit opium production it is first necessary to have a clear understanding of the different factors that influence the formation of opium, and how these factors might vary over both regions and time.

B1.3. Environmental Factors

There would seem to be a broad consensus in the literature on licit cultivation that climate and soil conditions are the major determinants of the final opium yield and its morphine content. Indeed, the difference in the morphine content of opium in favourable and unfavourable soil and climatic conditions is thought to vary by five or six times.⁸²

Soil conditions

In terms of soil conditions, research conducted in the Former Yugoslavia reported that, although opium poppy does not need particularly good soil, the yield improves markedly if it is cultivated in '*crumbly, light soil that is manured, exposed to the sun and protected from the winds*'.⁸³ This and other work indicates that heavy and clayey soils, or waterlogged soils are not considered suitable for opium poppy.⁸⁴

Indeed, it is suggested that waterlogged soils produce unduly thin opium. A finding that would seem to be supported by fieldwork in Afghanistan that found that opium obtained from areas with high ground water, such as the Helmand canal area, produced a thinner opium than that obtained from higher, karez irrigated areas, and was subsequently sold at a lower price in the local bazaars.⁸⁵

⁷⁹ See Central Bureau for Narcotics (1995) '*India Crop Cutting Experiments 1993-1995*'. In Afghanistan, yields of 7.4 kg/ha were reported in Faizabad district of Badakhshan and 101.9 kg/ha in Dehrawud, Oruzgan in 1999.

⁸⁰ UN Technical Section (1950) '*The cultivation of the opium poppy in Turkey*' in the United Nations Bulletin on Narcotics Vol. 1, No. 1, p:13-25.

⁸¹ See INCB (1999) Narcotic Drugs: Estimated Requirements for 2000 – Statistics for 1998. United Nations: New York.

⁸² See Bernath, J. and Tetenyi, P. (1982) '*Production characteristics of *Papaver somniferum* L. cultivars of different origin and vegetation cycles*' in the United Nations Bulletin on Narcotics Vol. 1, No. 1, p:113-127.

⁸³ See Vladimir Kusvie '*Cultivation of the opium poppy and opium production in Yugoslavia*' in the United Nations Bulletin on Narcotics, Vol.1, No. 1, p 5-13.

⁸⁴ United Nations (1953) '*The Opium Poppy*' in the United Nations Bulletin on Narcotics, Vol. V, No. 3, p: 9-12; and Asthana, S.N. (1954) '*The cultivation of opium Poppy in India*' in United Nations Bulletin on Narcotics, Vol. 1, No. 1, p1-10.

⁸⁵ See Strategic Study 5: The Role of Opium Poppy in the Livelihood Strategies of Itinerant Harvesters in Helmand Province, Afghanistan. UNDCP: Islamabad.

Table B1: Productivity of licit and illicit opium poppy documented from 1932 to 2000

Country	Year	Opium			Capsule		Seed
		Average Yield (Kg)	Average Morphine Content (%)	Average Moisture (%)	Average Yield (Kg/ha)	Average Morphine Content (%)	Average Yield (Kg/ha)
Afghanistan ⁸⁶	1932	19.3	10-16	-	-	-	-
Afghanistan ⁸⁷	2000	35.7	-	-	-	-	-
Laos/Vietnam ⁸⁸	1949	2-3	-	-	-	-	-
Laos ⁸⁹	1997	7.5	-	-	-	-	-
Hungary ⁹⁰	1960	-	-	-	390	0.3-0.4	428
India ⁹¹	1940	11.1-34.7	8-11	-	-	-	-
India ⁹²	1994	43	-	30	700-800	-	900-1000
India ⁹³	1995	53.39	9.7	30-31	-	-	550-1150
Iran ⁹⁴	1946	22.3	10-12	-	-	-	-
Pakistan ⁹⁵	1947	10	-	-	-	-	-
Former Soviet Union ⁹⁶	1956	10	5.5-13.5	-	-	-	-
Former Soviet Union ⁹⁷	1969	30-35	7-8	45	-	-	250
Turkey ⁹⁸	1946	9	8-16	-	500-1000	-	500
Turkey ⁹⁹	2000	-	-	-	600-700	0.4	-
Former Yugoslavia ¹⁰⁰	1959	4-15	15.9-17.2	25-35	-	0.47-1.05	300-400

⁸⁶ UN Technical Section (1949) 'Opium production throughout the world' in United Nations Bulletin on Narcotics, Vol. 1, No. 1, p:6-38.

⁸⁷ UNDCP (2000) Afghanistan Annual Opium Poppy Survey. UNDCP: Islamabad.

⁸⁸ UN Technical Section (1949) 'Opium production throughout the world' in United Nations Bulletin on Narcotics, Vol. 1, No. 1, p:6-38.

⁸⁹ USG (2000) Southeast Asia: Opium Cultivation and Production.

⁹⁰ Bayer, I. (1961) 'Manufacture of alkaloids from the poppy plant in Hungary' in the United Nations Bulletin on Narcotics, Vol. 1, No. 1, p:21-28.

⁹¹ UN Technical Section (1949) 'Opium production throughout the world' in United Nations Bulletin on Narcotics, Vol. 1, No. 1, p:6-38.

⁹² Cited in Lloyd Nystom et al (1995) Survey of opium production: Practice, economics and security in India, April 27 – May 11 1995. Report by Mallinckrodt Chemical Inc, St Louis, Missouri.

⁹³ Lloyd Nystom et al (1995) Survey of opium production: Practice, economics and security in India, April 27 – May 11 1995. Report by Mallinckrodt Chemical Inc, St Louis, Missouri.

⁹⁴ See UN Technical Section (1949) 'Opium production throughout the world' in United Nations Bulletin on Narcotics, Vol. 1, No. 1, p:6-38.

⁹⁵ See UN Technical Section (1949) 'Opium production throughout the world' in United Nations Bulletin on Narcotics, Vol. 1, No. 1, p:6-38.

⁹⁶ See Ilinskaya, T.N. and MG Yosifova (1956) 'Influence of the conditions under which the poppy is grown on the alkaloid content of the opium obtained' in the United Nations Bulletin on Narcotics Vol. 1, No. 1, p:38-41.

⁹⁷ G. Shuljgin (1969) 'Cultivation of the opium poppy and the oil poppy in the Soviet Union' in the United Nations Bulletin on Narcotics. Vol. No. 1: p1-8.

⁹⁸ UN Technical Section (1950) 'The cultivation of the opium poppy in Turkey' in the United Nations Bulletin on Narcotics Vol. 1, No. 1, p:13-25.

⁹⁹ Fieldwork for Mission.

¹⁰⁰ Vladimir Kusvie (1960) 'Cultivation of the opium poppy and opium production in Yugoslavia' United Nations Bulletin on Narcotics Vol.1, No.1, p:5-13.

Climate

The literature would certainly suggest that opium poppy is vulnerable to a number of climatic excesses including, cold, wind and moisture. For example, frost can completely destroy the young plant if the fields are not covered with snow;¹⁰¹ strong winds can uproot the plant and, after incision, may lead to a loss of latex; excess moisture during the spring can result in the development of fungi that constrain the production of opium; and rain at the flowering stage can reduce the morphine content of the latex.

Yet, whilst extreme cold and strong winds clearly damage the crop, opium poppy is far more susceptible to more subtle changes in the patterns of rainfall. Indeed, for maximum yields, opium poppy requires the right amount of moisture at the appropriate point in its growing cycle, as well as high temperatures after the plant has flowered.

Too much water, or too little, during sowing, germination, rapid vegetative growth, flowering and harvest can result in considerable fluctuations in the productivity of the plant, affecting its final profitability.¹⁰² This would tend to suggest that despite assertions that opium poppy is relatively more drought resistant than wheat and other grains crops, it might not be cultivated in drought conditions unless other factors are favourable, including the prevailing prices of food crops and opium, access to cheap labour and the availability of non-farm income opportunities.¹⁰³

Indeed, drought conditions in Madhya Pradesh in the 2000/2001 growing season led to only 50% of the 10,000 hectares actually licensed being cultivated with opium poppy. In some parts of the State and neighbouring Rajasthan, where the water shortage was even more pronounced, only a quarter of the land licensed was planted with opium poppy.¹⁰⁴ Throughout both states opium poppy was planted in the prime agricultural land adjacent to the household water source.¹⁰⁵

Sufficient moisture is required during sowing and early stages of plant growth. In particular, rainfall is required just prior to, and after, planting to allow the land to be tilled, sown and facilitate germination.¹⁰⁶ Whilst theoretically land can be irrigated to make up for any shortage in autumn rains, opium poppy tends to be grown in relatively dry areas where there

¹⁰¹ For this reason, in areas where frosts are frequent, opium poppy is cultivated only as a spring crop.

¹⁰² 'At the beginning plants need a great deal of moisture in order to take root and develop properly, but at the end of their period of growth they need hot and dry weather; in such weather the alkaloid content increases' See Vladimir Kusvie (1960) 'Cultivation of the opium poppy and opium production in Yugoslavia' United Nations Bulletin on Narcotics Vol.1, No.1, p:5-13.

¹⁰³ 'The poppy crop in Tasmania [in 1995] was considerably reduced by a short-term drought at the critical time of maximum plant development. The crop in Spain has been reported to be a complete failure, again due to drought.' See Lloyd Nystom et al (1995) Survey of opium production: Practice, economics and security in India, April 27 – May 11 1995. Report by Mallinckrodt Chemical Inc, St Louis, Missouri.

¹⁰⁴ Discussions with the agricultural faculty in Mandasaur, who have been conducting research into opium poppy cultivation for almost 25 years, underlined the fact that opium poppy is not a drought resistant crop. It requires 8-14 irrigations depending on the quality of soil it is planted in. As such it requires more water than wheat, which is irrigated up to 7 times.

¹⁰⁵ In Afghanistan, 95% of opium poppy is cultivated on irrigated land.

¹⁰⁶ 'Sowing takes place after the first autumn rains moisten the earth. If these rains fall too late, the plant is insufficiently developed by the winter, and is therefore sensitive to the cold and may be destroyed even by a mild winter'. See Vladimir Kusvie 'Cultivation of the opium poppy and opium production in Yugoslavia' in the United Nations Bulletin on Narcotics Vol.1, No. 1, p.

is insufficient summer rainfall for irrigation, therefore a shortfall in autumn rains will often result in reduced levels of opium poppy cultivation

The critical period when opium poppy requires a lot of water is in the rapid vegetative growth phase, from the appearance of the stem through to capsule development. During this period opium poppy requires soil moisture of between 70 and 80 per cent saturation and moderate temperatures. In years where there are insufficient spring rains, irrigation water is provided where it is available.¹⁰⁷ However, too much rain during this particular stage in the growing cycle and opium poppy will be attacked by a number of diseases, including *Perneospora arborescens*.¹⁰⁸

Adequate irrigation at the budding and flowering stage is also seen as particularly important to opium production.¹⁰⁹ As rain may damage the crop at this critical stage, there is a clear preference for irrigation. Rain during the harvest presents a real problem for farmers, washing away the latex and reducing the quality of the opium produced. Indeed, between the end of flowering and the period of technical ripeness hot dry weather is reported to lead to the formation of large quantities of opium.¹¹⁰ Moreover, during the harvest itself, the highest yields are obtained on clear, sunny days.

B1.4. Improved Agricultural Techniques

Although climatic and soil conditions are considered the major determinants of opium yields and its morphine content, improved agricultural techniques can also contribute to increasing the productivity of opium poppy. These techniques include the varieties of opium poppy cultivated; the application of fertiliser, fungicides and pesticides; weeding and thinning; and the timing of the harvest and the number and quality of incisions made.

Varieties of opium poppy

The literature suggests that there is a large variation in the morphine content of opium and its capsules from one variety to another.¹¹¹ Indeed, In India and in Afghanistan different varieties of opium poppy have been found to produce different qualities of opium. Different varieties of opium poppy have also been found to be vulnerable to different pests and diseases.

As opium poppy is a self-pollinating and cross-pollinating plant it has the capacity to adapt to specific local conditions. As such, defining the different varieties of opium poppy that exist remains problematic. At the broadest level there are winter and spring cultivars of opium

¹⁰⁷ Key informants have suggested that the continued drought in Afghanistan has not only hampered the sowing of opium poppy in some regions of the country, but also threatened the ultimate productivity of the plant due to the predicted shortfall in irrigation water during the spring months, when it is most required.

¹⁰⁸ In the 1997/98 opium poppy season in Afghanistan, yields in the south of the country were reduced considerably due to a fungus that occurred after particularly heavy spring rains. In some areas, plants were completely destroyed. For the southern region as a whole, yields were reported to be 50% less than in 1997. See Afghanistan Annual Opium Poppy Survey 1998. UNDCP: Islamabad.

¹⁰⁹ Shuljgin (1969) suggests that the average quantity of water used for irrigation in the Soviet Union is 800 m³ per hectare. See 'Cultivation of the opium poppy and the oil poppy in the Soviet Union' in the United Nations Bulletin on Narcotics. Vol. No. 1: p1-8.

¹¹⁰ G. Shuljgin (1969) 'Cultivation of the opium poppy and the oil poppy in the Soviet Union' in the United Nations Bulletin on Narcotics. Vol. No. 1: p1-8.

¹¹¹ Genetics and Plant Breeding Section, National Botanical Research Institute. (1993) *Short Notes: Variation in Morphine Content in Opium Poppy (Papaver Somniferum L.) Straw and its Impact on Selection*. Lucknow.

poppy, the former requiring approximately 120 days to mature, the latter 105 days. On the whole, winter cultivars have been found to have a higher number of capsules and larger capsule size. As such, winter cultivars tend to have higher yields than those varieties cultivated in the spring.¹¹² However, experiments in Hungary with a range of different varieties of opium poppy have indicated that the opium from spring cultivars tends to have higher morphine content.¹¹³

In a number of countries, new varieties of opium poppy have been developed that have succeeded in increasing the yields of opium and its alkaloid content.¹¹⁴ Many of these varieties are also less susceptible to drought, cold and diseases. Indeed, in India, only developed varieties of opium poppy are cultivated.¹¹⁵ In Turkey, there is ongoing work by the Soil Products Office to improve the yield of opium poppy capsules and their morphine content. This work is being supported by the US Department of Agriculture. Due to the poor genetic stock of many of the seeds that farmers use in Turkey, there are also plans to improve the supply of seeds for new varieties of opium poppy.

However, it is important to note that despite the development of improved varieties of opium poppy, households will not necessarily adopt them. Indeed, applied research has illustrated that a significant number of households will knowingly cultivate varieties of opium poppy that produce opium that is considered to be of poor quality, and consequently receive a lower price.¹¹⁶ For instance, in India in 1995, farmers were found to cultivate a variety of opium, known as *Lakhpatti*, which had higher yields but a lower quality, so that they could comply with the increase in the Minimum Qualifying Yield (MQY).¹¹⁷ Household resources, such as land, water and labour; household needs, including credit and opium for consumption; and the degree of risk households are willing to take; will all influence the final selection of the varieties of opium poppy to be cultivated. Small-scale subsistence farmers are rarely profit maximisers.

The application of fertiliser, insecticide and pesticides

Opium poppy has also been found to respond well to the application of organic and chemical fertilisers. Indeed, research in the Former Soviet Union and Yugoslavia indicates that opium yields could be almost doubled with the appropriate combination of fertilisers.

Phosphates fertilisers have been found to have the greatest impact increasing opium yields by 23%-94%. Indeed, the application of phosphates was found to increase the number and size

¹¹² In India, short maturation genotypes have been developed that have equivalent yields. See Shukla S., Khanna K., and Singh S. (1994) 'Effect of Sowing Dates of Early Genotype in Opium Poppy and its Impact on Intensive Farming' in *Recent Horticulture*, Vol. 1, No. 1, p:88-90.

¹¹³ See Bernath, J. and Tetenyi, P. (1982) 'Production characteristics of *Papaver somniferum* L. cultivars of different origin and vegetation cycles' in the *United Nations Bulletin on Narcotics* Vol. 1, No. 1, p:113-127. UN Technical Section (1950) 'The cultivation of the opium poppy in Turkey' in the *United Nations Bulletin on Narcotics* Vol. 1, No. 1, p:13-25.

¹¹⁴ Shukla, S., Khanna, K., and Singh, S. (1995) *Alkaloid Spectrum of a Cross Between Papaver Somniferum and P. Setigerum*. Genetics and Plant Breeding Section, National Botanical Research Institute: Lucknow.

¹¹⁵ See Lloyd Nystom et al (1995) *Survey of opium production: Practice, economics and security in India, April 27 – May 11 1995*. Report by Mallinckrodt Chemical Inc, St Louis, Missouri.

¹¹⁶ For a more detailed account of the motivations and factors that influence households in their choice of varieties of opium poppy to cultivate see 'Annex E' in UNDCP (1999) *Afghanistan Annual Opium Poppy Survey 1999*. UNDCP: Islamabad.

¹¹⁷ See Lloyd Nystom et al (1995) *Survey of opium production: Practice, economics and security in India, April 27 – May 11 1995*. Report by Mallinckrodt Chemical Inc, St Louis, Missouri.

of capsules, as well increase the number of lactic vessels in the capsules, thereby increasing both the amount and flow of latex. The application of nitrogen during the rosette and budding stages of the plant was also found to be particularly effective in increasing opium yields.¹¹⁸ Recognising these benefits, farmers in the Former Soviet Union and India have used a similar combination of fertilisers, applying phosphates during sowing, and nitrogen from the rosette stage.¹¹⁹

As opium poppy is vulnerable to a range of different pests and diseases the use of fungicides and pesticides is also recommended to prevent crop damage. Indeed, a review of farmers in India, found that 73% applied insecticide and 88% applied fungicide to their opium poppy.¹²⁰ Insecticides and fungicides are rarely used on opium poppy in Afghanistan, Myanmar and Laos.¹²¹

Thinning and weeding

Thinning is an integral element of the husbandry of opium poppy. If the plants are grown too close together then capsule growth is restricted, affecting the yield of the plant and the ease of harvesting. If the plants are grown too far apart then they will not support each other during wind and rain.

Opium poppy tends to be thinned twice, the first time after the appearance of the first two pairs of leaves, the second time once 5-6 pairs of leaves have appeared.¹²² The recommended distance between plants differs across the literature, ranging from 1-25 cm. Whilst there seems to be a broad agreement in much of the literature that a distance of 5–10 cm achieves the optimum results,¹²³ the recommended plant density in India is 300,000 –350,000 plants per hectare.¹²⁴ This may partly account for the significantly higher yields that are generally obtained in licit cultivation in India.

Some literature also recommends the thinning of secondary capsules, so as to allow the remaining capsules to grow larger, thereby increasing the opium yields, and reducing the

¹¹⁸ V.V. Sheberstov (1956) *The part played by fertilisers in increasing opium poppy yields* in the United Nations Bulletin Vol. 1, No. 1, p: 42-47.

¹¹⁹ *It is usual in practice to apply 60-90 kg P₂O₅ per hectare at the ploughing stage, and another 6 kg/ha in the form of granulated superphosphate at sowing time along with the seed. At the rosette stage the plants are fed with nitrogenous fertilizers at the rate of 40-60 kg of nitrogen per hectare.* G. Shuljgin (1969) *Cultivation of the opium poppy and the oil poppy in the Soviet Union* in the United Nations Bulletin on Narcotics. Vol. No. 1: p1-8. See also Vladimir Kusvie *Cultivation of the opium poppy and opium production in Yugoslavia* in the United Nations Bulletin on Narcotics Vol.1, No. 1, p 5-13. It is interesting to note that despite the absence of a government agricultural extension service, farmers in Afghanistan also tend to use this same combination and similar quantities of fertilisers. However, in South East Asia where illicit opium is grown in very remote, upland areas, chemical fertiliser is very rarely used.

¹²⁰ A review of farmers in India, found that 73% applied insecticide and 88% applied fungicide to their opium poppy. See Lloyd Nystom et al (1995). Insecticides and fungicides are rarely used on opium poppy in Afghanistan.

¹²¹ Based on fieldwork of author.

¹²² G. Shuljgin (1969) *Cultivation of the opium poppy and the oil poppy in the Soviet Union* in the United Nations Bulletin on Narcotics. Vol. No. 1: p1-8.

¹²³ *Experiments have shown that 70,000-80,000 plants per hectare give 26.9 kg of opium; 100,000-110,000 give 31.04 kg; and 121,000-130,000 give 35.16 kg; the corresponding figures for morphine are 3.66 kg, 4 kg and 5.17 kg per hectare.* G. Shuljgin (1969) *Cultivation of the opium poppy and the oil poppy in the Soviet Union* in the United Nations Bulletin on Narcotics, Vol. 1, No. 1, p:1-8.

¹²⁴ Cited in Lloyd Nystom et al (1995) Survey of opium production: Practice, economics and security in India, April 27 – May 11 1995. Report by Mallinckrodt Chemical Inc, St Louis, Missouri.

labour inputs during the harvest.¹²⁵ In fact, this practice was widely undertaken in Turkey prior to its shift to poppy straw.

As young opium poppy seedlings grow slowly and are easily choked by weeds, weeding is also undertaken when the plants are thinned.¹²⁶ Subsequent weeding reduces the competition for moisture and nutrients and improves plant growth. Weak and diseased opium poppy plants are also removed during the weeding stage. In some countries, such as Turkey, other varieties of opium poppy are removed to prevent cross-pollination.

In countries where opium poppy is sown by broadcasting the seed, opium can require weeding up to three times. However, where it is sowing had been mechanised and the seeds are sown in straight lines from a tractor, such as in some areas in Turkey, opium poppy is weeded only twice. It is worth noting that weeding and thinning is a laborious and arduous task that is often undertaken by women and children in most of the opium producing countries, both licit and illicit.

The harvest

Much of the research suggests that the incision or lancing of the capsules is a skilled task.¹²⁷ Capsules that are ready for lancing have to be identified individually by touch. This requires experience.¹²⁸

The exact timing and depth of the incision are important determinants of the final yield. For example, in India, research has suggested that opium extracted at 12 noon and 4 pm generally had a higher concentration of morphine, codeine, thebaine and narcotine.¹²⁹ In Turkey, it is recommended that higher yields can be obtained by lancing in the evening in warm districts; whilst in cool districts the optimum time is in the morning. These findings would seem to be supported by experience in Afghanistan where opium poppy tends to be lanced in the afternoon in the eastern province of Nangarhar and the morning in the cooler districts of Badakhshan in the north of the country.

Incising itself is an acquired skill. The cut must be a shallow one but it must also be deep enough to allow the drops of latex to flow down outside. If incisions are too deep, too

¹²⁵ 'As incision and harvesting account for most of the work, the grower prefers plants with a small number of well developed capsules to plants with a large number of small capsules.' See UN Technical Section (1950) 'The cultivation of the opium poppy in Turkey' in the United Nations Bulletin on Narcotics Vol. 1, No. 1, p:13-25.

¹²⁶ G. Shuljgin (1969) 'Cultivation of the opium poppy and the oil poppy in the Soviet Union' in the United Nations Bulletin on Narcotics. Vol. No. 1: p1-8.

¹²⁷ 'It should be borne in mind that the incision of the capsules and collection of the opium are operations requiring many specially trained workers in the relatively short period suitable for the harvest. A shortage of specialised labour at harvest time is yet another risk to which the cultivation of the opium poppy is exposed.' See Vladimir Kusvie 'Cultivation of the opium poppy and opium production in Yugoslavia' in the United Nations Bulletin on Narcotics Vol.1, No. 1, p:5-13.

¹²⁸ 'Two days' delay in starting to incise technically ripe capsules results in a loss of 7%, and six days' delay of 30%, of the latex.' See G. Shuljgin (1969) 'Cultivation of the opium poppy and the oil poppy in the Soviet Union' in the United Nations Bulletin on Narcotics. Vol. No. 1: p1-8.

¹²⁹ See Shukla, S., Khanna K. and Singh, S. (1996) 'Diurnal Variation of Major Alkaloids in *Papaver somniferum*' in Annales Rei Botanicae, Vol. 36, No. 1.

shallow, too early, or too late, the final yield of the plant can be significantly reduced.¹³⁰ Indeed, in India, key informants suggested that the use of unskilled labour during the harvest could result in significant shortfalls in yields of up to 90%.

The number of incisions will also impact on the final yield. Countries such as Yugoslavia and Hungary tended to lance the capsule only once, whilst in India, as in Afghanistan opium poppy is lanced until the latex stops flowing.

However, there are questions over the cost effectiveness of these latter incisions. For instance, in South Korea, India and the Former Soviet Union, research has illustrated that the opium derived from the first two incisions have a considerably higher morphine content.¹³¹ This would seem to be supported by initial tests in Afghanistan, as well as the views of farmgate opium traders within the country.¹³² In the Former Soviet Union, research has indicated that the quality of the yield derived from the fourth and fifth incisions do not justify the extra labour costs.¹³³

Indeed, in all the literature reviewed, labour was identified as the major constraint on opium poppy cultivation.¹³⁴ Weeding, thinning and particularly the harvest of the plant, are all labour intensive periods in the life cycle of opium poppy. Estimates for Yugoslavia, suggest '30 days of teamwork and 260 manpower days' are required per hectare of opium poppy, remembering that in Yugoslavia capsules were only lanced once. As such, labour costs were found to constitute from 80 to 90% of the total production costs of opium poppy.¹³⁵

¹³⁰ UN Technical Section (1950) 'The cultivation of the opium poppy in Turkey' in the United Nations Bulletin on Narcotics Vol. 1, No. 1, p:13-25. See also UN Technical Section (1949) 'Opium production throughout the world' in United Nations Bulletin on Narcotics, Vol. 1, No. 1, p:6-38.

¹³¹ In these experiments the morphine content of the opium obtained from the first incision was on average approximately 16.5%, whilst the opium obtained from the third incision was 3-5% less. See Chang Ki Lee and Hyung Kook Kim (1970) 'Investigation into the geographical differences in alkaloid content of Korean Opium' in the United Nations Bulletin on Narcotics Vol. 1, No. 1, p: 41-46. These findings are supported by work in the Former Yugoslavia, which suggests that 'It has been proved that two, three or more incisions yield more opium, but each subsequent incision produces opium with a lower morphine content'. See Vladimir Kusvie 'Cultivation of the opium poppy and opium production in Yugoslavia' in the United Nations Bulletin on Narcotics Vol.1, No. 1, p. and Asthana, S.N. (1954) 'The cultivation of opium Poppy in India' in United Nations Bulletin on Narcotics, Vol. 1, No. 1, p:1-10.

¹³² See Strategic Study 2: The Dynamics of the Farmgate Trade in Opium in Afghanistan. UNDCP: Islamabad.

¹³³ G. Shuljgin (1969) 'Cultivation of the opium poppy and the oil poppy in the Soviet Union' in the United Nations Bulletin on Narcotics. Vol. No. 1: p1-8. However, it is interesting to note that in Afghanistan some varieties of opium poppy are lanced up to 8 times. Whilst this may partly explain the high yields obtained in Afghanistan it also highlights the exceptionally low cost of labour.

¹³⁴ Kusvie (1960) provides an interesting account of the impact post war industrialisation had on opium poppy cultivation in The Former Yugoslavia. 'In some villages this has led to a decrease in the skilled labour which is essential at the time of the cutting of the capsules and collection of the opium, so that over considerable areas the capsules remain un-incised and no opium was obtained, or the incisions were made by unskilled labour, which resulted in a decreased yield.' In India in 1995, 'The concentration of poppy growing caused higher costs mainly due to higher labour prices for harvesting...Many farmers expressed disinterest in continuing to grow poppies due to higher labour costs and low profit' Nystom et al (1995). A similar phenomenon was experienced in southern Afghanistan in 1999. See Strategic Study 4: The Role of Opium in the Livelihood Strategies of Itinerant Harvesters Working in Helmand Province, Afghanistan. UNDCP: Islamabad. In China a drop in production in 1999 was attributed to 'the shortage of manpower for lancing, which is a labour expensive and expensive process' See International Narcotics Control Board (2000) Narcotic Drugs. United Nations: Vienna. Page 80.

¹³⁵ Kusvie, V. (1960) 'Cultivation of the opium poppy and opium poppy production in Yugoslavia' in the United Nations Bulletin on Narcotics, Vol. 1, No. 1, p:5-13.

In Turkey, research conducted in 1948 indicated that a ‘good labourer’ required 72 hours to harvest 1kg of opium whilst ‘women and children need two to three times as long to do the same amount of work’.¹³⁶ As such, a yield of 30 kg per hectare would require the equivalent of between 180 to 540 person days, depending on the composition of the workforce. Recognising that in Turkey as in most source countries, including Afghanistan,¹³⁷ opium poppy is predominantly grown using family labour, and particularly women,¹³⁸ an estimate of 360 person days per hectare would not seem implausible.¹³⁹

However, given that the Soil Products Office purchased opium at \$12.50 per kg of opium in 1948, the hourly wage rate would equate to the equivalent of 17 cents for a good labourer.¹⁴⁰ Taking into account the costs of agricultural inputs, as well as labour costs during the thinning and weeding stage, these margins do not make opium poppy a particularly profitable endeavour even where only family labour is used. It is precisely for this reason that much of the literature suggests that opium poppy is typically cultivated on small plots of land where cheap labour is abundant.¹⁴¹ Indeed, to spread the labour inputs a number of common strategies are adopted across a range of licit opium poppy producing countries.

The most common strategy is to cultivate opium poppy at a level that is generally commensurate with family labour supply. Indeed, opium poppy is very rarely mono-cropped, with most households cultivating opium poppy as part of a wider cropping system. For instance, research conducted in Turkey, suggested that opium poppy was rarely grown on larger farms, but tended to be cultivated by households with landholdings of between 5 and 10 hectares of land of which 0.1 to 0.3 hectares would be dedicated to opium poppy.¹⁴² Currently, only 0.4 hectares of household land are cultivated with opium poppy, approximately 25% of total household land. In India, despite permission to cultivate to cultivate up to 0.5 hectares of opium poppy in 1995, most farmers cultivated only 2.5 hectares due to labour constraints.¹⁴³

¹³⁶ UN Technical Section (1950) ‘*The cultivation of the opium poppy in Turkey*’ in the United Nations Bulletin on Narcotics Vol. 1, No. 1, p:13-25.

¹³⁷ See Strategic Study 6: The Role of Women in Opium Poppy Cultivation in Afghanistan. UNDCP: Islamabad.

¹³⁸ ‘*Women are actively involved in harvesting opium. Since there is no one at home to take care of the children, all of them even the newly born babies are carried to the poppy fields*’. See Akcasu, A. (1976) ‘*A survey of the factors preventing opium use by poppy growing peasants in Turkey*’ in the United Nations Bulletin on Narcotics Vol. 1, No. 1, p13-17.

¹³⁹ In Afghanistan, opium poppy is reported to require 350 person days per hectare. Cited in Strategic Study 4: Access to Labour: The Role of Opium in the Livelihood Strategies of Itinerant Harvesters Working in Helmand Province, Afghanistan. UNDCP: Islamabad. This is in keeping with other literature on the subject. For more details see Mansfield, D. (2000) ‘*Alternative Development: The Modern Thrust of Supply Side Policy*’ in the United Nations Bulletin on Narcotics, Vol. LI, Nos., 1&2, p: 19-43.

¹⁴⁰ When the equivalent calculation is done for Afghanistan with a price of \$30 per kg, an hourly wage rate of 41 cents is derived. However, in southern Afghanistan, itinerant harvesters are paid in a share of the final crop. In 1999, daily wages were found to range from the equivalent of US\$2.50 to US\$7.80, plus three meals per day, depending on the prevailing market price in the districts were they worked. As such, at the higher rates of daily wage, many landowners would have incurred a loss if they required hired labour during the harvest period. For more details see Strategic Study 4: Access to Labour: The Role of Opium in the Livelihood Strategies of Itinerant Harvesters Working in Helmand Province, Afghanistan. UNDCP: Islamabad.

¹⁴¹ UN Technical Section (1950) ‘*The cultivation of the opium poppy in Turkey*’ in the United Nations Bulletin on Narcotics Vol. 1, No. 1, p:13-25.

¹⁴² See David Wishart (1974) ‘*The Opium Poppy: The Forbidden Crop*’ in The Journal of Geography, January.

¹⁴³ Lloyd Nystom et al (1995) Survey of opium production: Practice, economics and security in India, April 27 – May 11 1995. Report by Mallinckrodt Chemical Inc, St Louis, Missouri

Staggered planting is also a common phenomenon in Turkey, the Former Soviet Union and India.¹⁴⁴ In Turkey, households were found to allocate three areas of land to opium poppy, sowing one area at the beginning of autumn, the second at the end of autumn and the last area at the beginning of spring. In India, household land was divided into three or four, and sown at intervals of three to four days. Staggered planting not only serves to spread the demand on labour but it also reduces the impact of crop damage.

Households have also been found to cultivate varieties of opium poppy that require fewer incisions, even though the quality of the opium produced was of a poorer quality. In Afghanistan, this strategy was particularly prevalent amongst the resource poor who could not afford to hire labour.

All these strategies aimed at reducing labour tend to suggest that, whilst improved agricultural techniques have the potential to increase yields, households recognise the costs and risks of adopting them. For instance, there are clearly costs associated with allocating more labour to a crop, be they the financial costs that are incurred when hiring labour, or the opportunity costs of using family labour. And whilst new varieties of opium poppy, and the application of fertilisers, fungicides and pesticides all have the potential to increase opium yields, they are often expensive in the more remote areas in which opium poppy is cultivated. Given opium poppy's vulnerability to climatic excesses in countries where climatic excesses are the rule and not the exception, it is no wonder that households are somewhat cautious about investing too heavily in its cultivation.

¹⁴⁴ According to Kohli (1966) In India, the field is divided into three or four parts and sown at intervals of three to four days. See Kohli, DN (1966) '*The story of narcotics control in India*' in the United Nations Bulletin on Narcotics, Vol. 1. No. 1, p:3-12. See also G. Shuljgin (1969) '*Cultivation of the opium poppy and the oil poppy in the Soviet Union*' in the United Nations Bulletin on Narcotics, Vol. No. 1: p1-8. UN Technical Section (1950) '*The cultivation of the opium poppy in Turkey*' in the United Nations Bulletin on Narcotics Vol. 1, No. 1, p:13-25.

ANNEX C

APPLICATION FOR LICENSE TO CULTIVATE OPIUM POPPY (Translated from Turkish)

The Form for the producer, who will plant opium and produce capsule according to Law No. 3298

To: The Directorate of Agricultural Productions Office:

Date of Issue

.../.../.....

I would request to have permission for opium plating in my field of which its site, sketch and qualifications are registered

(Signature of producer, stamp or fingerprint)

1. The Producer
Name and Surname:
Fathers Name:
Place and Date of Birth:

2. Planting Field

Province	Township	Sub district	Village + District
.....
	I Field	II Field	III Field
Site:	.....	.....	.....
East:	.....	.....	.....
West:	.....	.....	.....
South:	.....	.....	.....
North:	.....	.....	.....
The site which can be watered:	Sole () Barren()	Sole () Barren ()	Sole () Barren ()
The site which Can't be watered:	Sole () Barren()	Sole () Barren ()	Sole () Barren ()
Square meter of field:	.....	.....	.....
Planting Season:	Winter () Summer ()	Winter () Summer ()	Winter () Summer ()
Colour of seed:	.....	.....	.....
Total Planting Field:	.....	.....	.....
	<u>Basic Field sketch</u>	<u>Basic Field Sketch</u>	<u>Basic Field Sketch</u>

I do conform above registered declaration and I have no criminal record

Official Stamp of Village or District Autonomous Signature

ANNEX D

PERMISSION TO CULTIVATE OPIUM POPPY
(Translated from Turkish)

Permission for Opium Cultivation and Capsule Production (According to Law No. 3298)

It is authorised that you are allowed to have opium planting and capsule production in your field number..... of which site, sketch and qualification are given.

However, according to the Law No. 3298, we have to take judicial action against yourself in the case of the measuring and control of the land is not the same as it is declared in your application or in the case of the lands which you apply for planting are more than

1.m² 2.m² 3.m²

Signature of producer,
stamp or fingerprint

Name of the Officer
Signature

Agricultural Production Officer
Signature

ANNEX E

TMO MONITORING FORM
(Translated from Turkish)

Measurement by Control Committee

1st Field	2nd Field	3rd Field	
Width ....x Length = m ²	Width ....x Length = m ²	Width ....x Length = m ²	
Chief of Control Committee	Member	Member	Muhtar

Measurement by Objector Committee

1st Field	2nd Field	3rd Field	
Width ....x Length = m ²	Width ....x Length = m ²	Width ....x Length = m ²	
Chief of Objector Committee	Member	Member	Muhtar

Capsule Estimate of Conjecture Committee

1st Field..... +	2nd Field.....	+	3rd Field..... =kg
Chief of Conjecture Committee	Member	Member	Muhtar

Capsule Estimate of Objector Committee

1st Field..... +	2nd Field.....	+	3rd Field..... =kg
Chief of Conjecture Committee	Member	Member	Muhtar

Quantity of Capsule delivered to relevant Institution

Quantity of deficiency and reasons

View of the producer
.....
.....

Agricultural Production Office
.....

View of the Control Committee for deficiency (if there is any)
.....
.....

President of Control Committee	Member	Member
.....

Comments by General Directorate
.....
.....
.....

**General Directorate of
Agricultural Production**

ANNEX F

HARVEST PERMIT
(Translated from Turkish)

As the opium planted in your village/ district reaches its ripen period, of which land measuring and control has been completed, has been authorised to be harvested from the date of .../...../.....

For your information

Agricultural Production Officer
Directorate of