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INTERNATIONAL ANTI-DRUGS POLICIES, COOPERATION AND INTERDEPENDENCE: A GAME THEORY'S APPROACH

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ACRONYMS

ACI	Andean Counter Drug Initiative
AD	Alternative Development
CND	Commission of Narcotics Drugs
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
EU	European Union
IPE	International Political Economy
ONDCP	Office of National Drug Control Policy
NGO	Non Governmental Organizations
SMCLE	Social Marginal Cost of Law Enforcement
TNI	Transnational Institute
TSMC	Total Social Marginal Cost
UN	United Nations
UNGASS	United Nations General Assembly
UNODC	United Nations Office on Drugs and Crime
US	United States
WOLA	Washington Office on Latin America

"Interdependence affects world politics and the behavior of the states; but governmental actions also influence patterns of interdependence"

Robert O. Keohane and Joseph S. Nye

"Many modelers use game theory because it allows them to think like an economist when price theory does not apply."

Robert Gibbons

ABSTRACT

This paper examines the implications of anti-drug policies in two types of countries: drug consumers and producers. Based on empirical information of consumer and producer countries and an examination of policy approaches, the analysis depicts an original game where actors are able to find cooperative equilibrium in their strategies under the logic of interdependence. Assuming one country is willing to influence another's policy, the model concludes symmetric decisions might reduce the size of the illegal market reaching Cournot-Nash equilibrium. The resultant equilibrium implies that both countries share responsibility in defining anti-drug policies and that it is possible to find an optimal budget share devoted to financing said policies. The paper also explores policy dynamics of countries with *power,* their ability to influence anti-drug policy agendas, and their effect on curbing illegal drug production and consumption trends.

1 INTRODUCTION

Since the global expansion of the illegal drug market in the 1970's; international policies to fight against narcotics have been designed using two traditional approaches to control the drug market's size; targetting reduction of drug demand and supply (UNODC, 2006). However, the low success of anti-drug policies has created high cost for governments and society. One feasible outcome has been the expansion of the international drug market and the unsuccessful war against drugs.

In the current debate the governments and the international community have promoted the supply reduction of illegal drugs through policies focused on controlling inputs for final drug production. Nevertheless, such approaches have tended to be more repressive; sustained under the principle of zero tolerance. On the other hand, the governments in consumers countries have designed policies to decrease domestic illegal demand through prevention and treatment campaigns towards curbing drug consumption; thus progressively reducing the role of law enforcement. These approaches have presupposed that governments and the international drug control system have flexible mechanisms to regulate the world illegal market.

The *General Assembly* of United Nations - UNGASS (1998) established the guiding principles to reduce drugs demand and supply. Through a political declaration the countries have promised to:

> "recognize that actions against the world drug problem is a common and shared responsibility requiring an integrated and balanced approach in full conformity with purposes and principles of the Charter of the United Nations and international law, and particularly with full respect for sovereignty and territorial integrity of States, non-intervention in the internal affairs of States and all human rights and fundamental freedoms. Convinced that the world drug problem must be addressed in a multilateral setting, we can upon States which have not already done so to become party to and implement fully the three international drug control conventions. Also, we renew our commitment to adopting and reinforcing comprehensive national legislation and strategies to give effect to the provisions of those conventions ensuring through periodic reviews that the strategies are effective". (United Nations, 1998: 3).

Although it is pertinent to the multilateral spirit of anti-drug approaches, the demand policies have focused resources on education campaigns to curb consumption targeting the most vulnerable demographic groups, but with less emphasis on law enforcement. In contrast, the supply policies have concentrated their efforts to control the illegal drugs production through repressive measures, such as elimination of illicit crops, interdiction, and through the use of law enforcement. Both approaches have not demonstrated to be as balanced and symmetric as the United Nations originally intended. International cooperation within multilateral organizations (UN) has been distinguished by an ambivalent discourse characterized by repression versus protection and has simply reproduced the divisive character of North - South relations. Similarly, negotiations have not produced balanced anti-drug policies that target both demand and supply problems equally (TNI, 2005).

Anti-drug policy approaches also are supported under interdependence rhetoric[1]. However, relations between countries do not necessarily create results with mutual benefits. Even though, the current anti-drug policy discourse promotes equilibrium with mutual and reciprocal benefits, Keohane and Nye (1977) point out interdependence as an analytical concept:

> "Rhetoricians of interdependence often claim that since the survival of the human race is threatened by environmental as well as military dangers, conflict of interest among states and peoples no longer exist. This conclusion would only follow if three conditions were met: an international economic system on which everyone depended or our basic life-supporting ecological system were in danger; all countries were significantly vulnerable to such a catastrophe; and there were only one solution to the problem (leaving no room for conflict about how to solve it and who should bear the cost).....Our perspective implies that interdependent relationship will always involve costs, since interdependence restricts autonomy; but it is impossible to specify *a priori* whether the benefits of a relationship will exceed the costs. This will depend on the values of the actors as well as on the nature of the relationship. Nothing guarantees that relationship that we designate as "interdependent" will be characterized by mutual benefits." (Koehane and Nye, 1977: 8-9)

In addition, there is a strong influence from countries that monopolize the anti-drug policy discourse over those which have less global power. The international drug control

[1] Interdependence in international politics is refered to situations characterized by mutual and reciprocal effects among countries or actors in different countries.

system, directed by the UN is influenced by decisions of large consumer countries, and this has strongly influenced anti-drug policy discourse to reflect the populist policies and goals of these nations[2]. Therefore, the governments of consumers countries influence producer countries (those countries with less power to define global policy agendas) to adopt the "best" policy according to the former's interests. In this context, there is an asymmetry in the actors' decisions that does not allow for the design of balanced policy or the most efficient policy. Devoid of powerful influence[3] over the producers, each actor (mainly governments) chooses the best policy according to their social cost, which is not necessarily the most optimal to solve the problem.

In that context, the aim of this paper is to shed new light on how the producer and consumer countries may reach a cooperative or non-cooperative equilibrium that reflects their optimal policy preferences taking into account social cost criteria. Similarly, it identifies the main interest of the actors (countries) to define anti-drug policies and highlights how country decisions influence the actions of other respective nations.

The paper is organized as follow. The first section is this brief introduction. Second section outlines the research objectives. The third part describes some stylized facts and characteristics of the international illegal market. The fourth section explains the different anti-drug policy approaches and analyzes the impact and pattern of international aid on drug suppliers. The fifth section presents a game theory approach that explains the behavior of the actors who define and adopt international anti-drug policies. Similarly, this section finds some equilibrium levels that show the effect of policies on drug consumption and production. The sixth section finds an optimal parameter that defines the optimal share of resources allocated from drug consumer countries to suppliers to reduce production. This optimal share is estimated to some producer countries. Finally, the seventh section presents the main conclusions.

[2] An illustrative example of that, it is US pressure on UN (United Nations Office on Drugs and Crime) to withdraw support if it does not maintain opposition to harm reduction policy. Meanwhile the European Union and other countries have defended this approach as alternative to reverse HIV/AIDS.
[3] Capacity of country A to affects the country B's policy decision.

2 OBJECTIVES OF THE RESEARCH

The central goal of the research is to shed new light on how producer and consumer countries may reach a cooperative or non-cooperative equilibrium that reflects their optimal anti-drug policy, taking into account social cost criteria. These results are useful to examine whether implemented anti-drug policies in producer countries have been effective or ineffective in curbing drug production. Similarly, it identifies the main interests of the actors (countries) in defining optimal anti-drug policies and highlights how country decisions influence the actions of other nations.

In this sense, the theoretical goal is to explore, through an innovative model of applied game theory, the effect of anti-drug policies implemented from consumer countries on producer countries and how the cooperative equilibrium is found when interdependences exists in policymaking. The policy objective is contribute to the discussion process on global anti-drug policy development aiming for effective policy approaches for both parties.

3 STYLIZED FACTS OF THE INTERNATIONAL MARKET

This chapter highlights main trends in drug production and consumption. The data information shows that marijuana and synthetic supplies are increasing around the world. In contrast, cocaine maintains the same availability on average. Opium crops are reducing, but potential production has grown over time[4]. In the same way, drug consumption has increased in the US and EU, mainly in cannabis, cocaine, heroin and ecstasy. US consumption has shifted from 1994, while cocaine consumption has increased; amphetamine demand has decreased over time (National Institute on Drugs Abuse, 2005).

Although drug production and consumption are old practices in the most ancient societies, drug control systems emerged only in the last century as a more complex

[4] The maximum amount of drugs might be produced directly from the illicit plantations.

expression of multilateralism[5]; when opium trafficking gained popularity as an uncontrollable problem stretching to China borders [6] (Boekhout van Solinge, 2002).

Most of today's illegal drugs, such as cannabis, opium and coca, were legal at the start of the last century [7]. In some countries, opium was produced under state supervision and sold at state-owned outlets. Coca was legal as well, and served as the basis for 'cocaine-containing drinks', especially in the US with the advent of the "Coca-Cola Company" and its cola products like "Coke". It also had medicinal applications, for instance as a local anesthetic. However, the three best known drugs – cannabis, coca and opium – came under an international proscribed over time. Amphetamines were prohibited much later – not until the 1960s and 1970s in many European countries.

The drug market was consolidated after the Second World War, when international trade appeared as an alternative to improve world welfare and reduce inequalities. In the end of the 1960's, the drug market took on new life when western society's demand for drugs rose due to factors like *i)* the 1960's cultural *shock*; and the resultant *ii)* illegal market expansion[8]. The traditional production procedures changed progressively towards a trend of industrialization in production and in parallel with the rise of prohibitionist tendencies around the world.

In recent times, the international drug market has expanded its power. Cannabis is the biggest market in the world. The principal supplier is Morocco. In 2004, this country produced around 120,500 hectares (2,760 metric tons from cannabis resin). However, the extent of the global crop supply is not precisely known, because cannabis can grow in many environments and microclimates, including indoors. In spite of lack of information, cannabis herb is being cultivated in more than 170 countries and estimates point out that in 2004

[5] Multilateralism implies concerted association with several countries to achieve a specific target.
[6] The history of the international prohibition on drugs begins with the meeting of the Shanghai Opium Commission in 1909, attended by representatives from 13 countries. It aimed to arrive at a stricter international policy on drugs.
[7] They were used both medicinally and recreationally.
[8] One the main features of the market an incipient industrial organization of the drug production.

production was 45,000 metrics tons[9]. From 1992 to 2004 production has doubled in size, this shows an expansionary trend of the cannabis supply.

Regarding other illicit drugs, over 90% of the world opium supply originates in Afghanistan, Myanmar and Laos. Between 1990 and 2001, Myanmar produced more than half of the poppy crops, but this trend has changed lately. From 2004 Afghanistan is harvesting almost 70% of poppy crops.

Colombia, Peru and Bolivia are the largest principal producers of the coca leaf (Angrist and Kugler, 2004). Between 1990 and 1995, Peru cultivated 55% of coca bush. Nowadays, Colombia cultivates and produces more than half of coca crops and cocaine. Though opium production is not a completely integrated industry, coca leaf producing countries, in Latin America, seem to have that feature[10].

The Andean region's countries and some Asian countries have reacted to the anti-drug policies impact by simply relocating crop production[11]. Still, anti-drug policies have negatively affected Andean and Asian producers. Meanwhile, production survives through a geographical movement of crops across the Andean region as result of law enforcement policies; the strong eradication campaign in Myanmar has relocated to Afghanistan, now the largest producer of opium.

Between 1990 and 2005, the harvested area of opium was estimated at 226,000 hectares on average, and the volume of production reached 4,400 metric tons (UNODC, 2006). Since 1993, global opium cultivation declined an average of 3% per year. The last six year reduction of illicit opium crops was a result of a strong poppy crop eradication campaign[12] carried out by Myanmar and the Laos governments (Jelsma, Kramer and

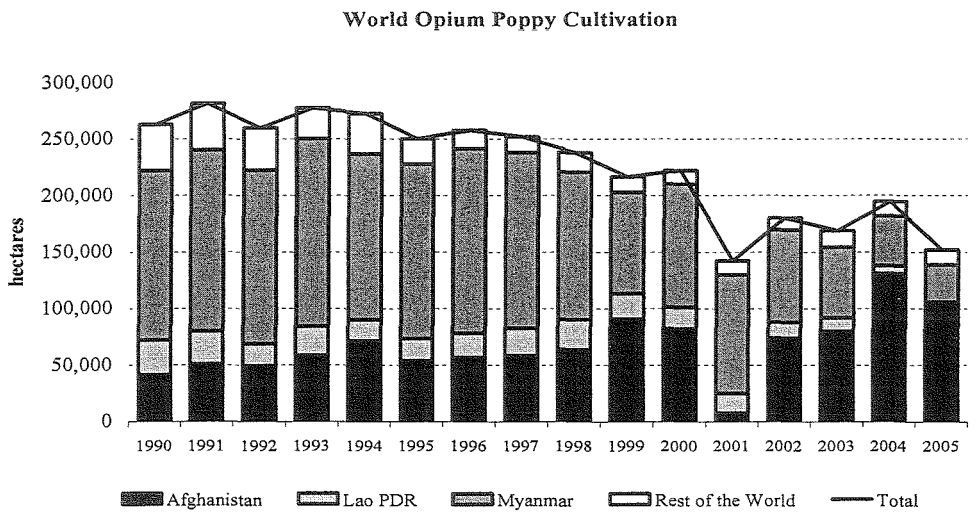
[9] Although UN has reported 82 at least suppliers' countries, many producers' countries do not provide information about cultivated areas.
[10] The integrated industry implies that the crops and production are located in the same place or region.
[11] Specifically, law enforcement policy.
[12] Eradication measures imply destruction of the illicit crops through chemical substances sprayed in the harvests or rooting out the illicit plantations. In Myanmar case, the government has increased eradication progressively to reach 900% in 2005. The most success of illicit crops reduction is due to eradication and "voluntary" abandonment of poppy cultivation.

Versvest, 2005) (Graph 1). However, between 2003 and 2004, aggregate opium crops grew 17% due to an increase of opium crops in Afghanistan. In 2005, opium crops returned back to 150,000 hectares cultivated. Afghanistan's government adopted measures to cut back opium cultivation, and total area under poppy crop cultivation decreased by 22% (Graph 1).

The global production of opium[13] has had a dissimilar trend in contrast to total cultivation. The changes of the global production have been varied with a marked decline in 2001. Several yields peaks in 1994, 1999 and 2004 reveal that cultivation and production are not linked (Graph 2). However, there is evidence which probes the relationship between both variables due to cultivation belongs to drugs' production process (Vargas, 2004).

Contrasting with opium cultivation, more than half of global production has been supplied by Afghanistan (Graph 2). This means that Afghanistan is more involved in the heroin production process than any other producer country. Also notable is the proliferation of opium processing laboratories in the Russian Federation, Republic of Moldova and Afghanistan. This suggests that the heroin production stage is controlled by collusion between certain Afghan mafias or warlords and organized crime links with bordering partners.

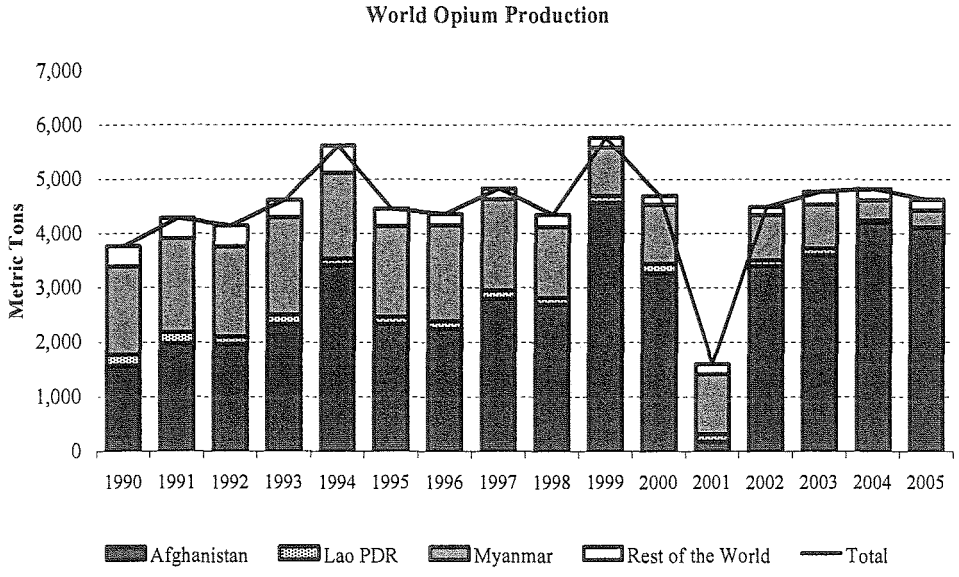
Graph 1



Source: 2006, World Drug Report - UNOCD

[13] The global production is associated with opium latex.

Graph 2



Source: 2006, World Drug Report - UNOCD

Principal producer countries of cocaine cultivated an average of 175,000 hectares of coca bush and processed more than 750 metric tons of cocaine chlorohydrate per year. Since the 1990's, coca bush production has maintained stable levels, in spite of interregional changes. The most principal producer countries have relocated the coca crops to the Andean region. A reduction of coca crops in Colombia, as a result of eradication measures, has raised cultivation in other producer countries such as Peru and Bolivia. In 2004, the area under coca bush cultivation in Colombia fell to 7%, while the cultivation area rose in Bolivia and Peru, 17.4% and 13.8%, respectively. This suggests that production is stable and since market demand is so strong, these historically coca producing countries simply interchange the business when eradication strikes. Thus, targeting the suppliers is clearly not producing the desired effect for consuming countries like the US.

This relocation indeed demonstrates that application of repressive anti-drug policies have created a 'balloon effect' in the Andean region (Rusel and Arcel, 2006). In 2005, spraying and manual eradication reduced the Colombian crop areas by 6,000 hectares, but this decline was more than offset by 10,200 new hectares in Bolivia and Peru. Therefore, the

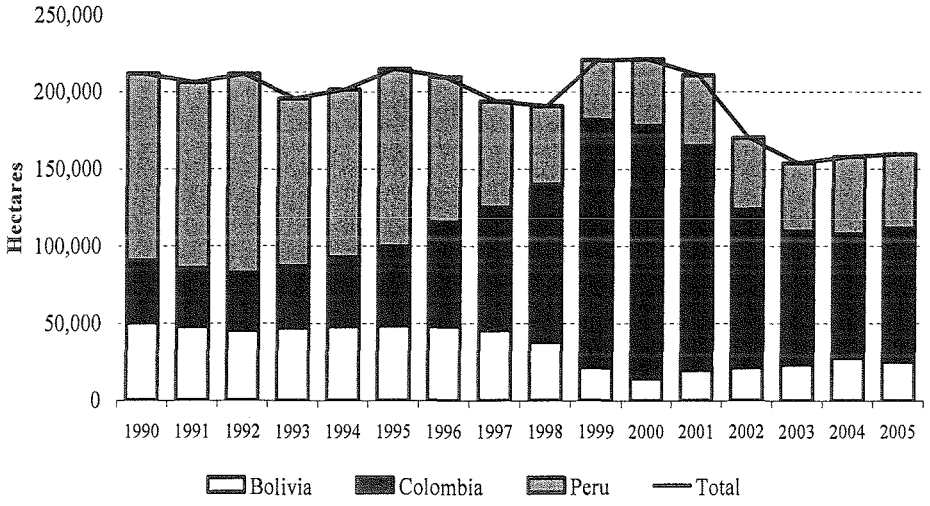
policy has achieved its goal to reduce coca crops in each producer country, but it has failed to reduce coca crop production in the whole region.

The statistics provided by the US State Department for the Andean region also reveal the same tendency of coca crops. However, there are some differences. For example, in 2005 the US State Department estimated that area under coca crops grew to 25% (Graph 4); meanwhile the UNODC points out that it was about 1%[14].

Curiously, coca crops has similar trend to the potential production whose data is provided by UNODC. These differences in the data have created a debate regarding anti-drug policy effectiveness. The US government argues that it is necessary to devote more resources to reducing illicit crops, while the Colombian government states the efficacy of law enforcement policy on crops.

Graph 3

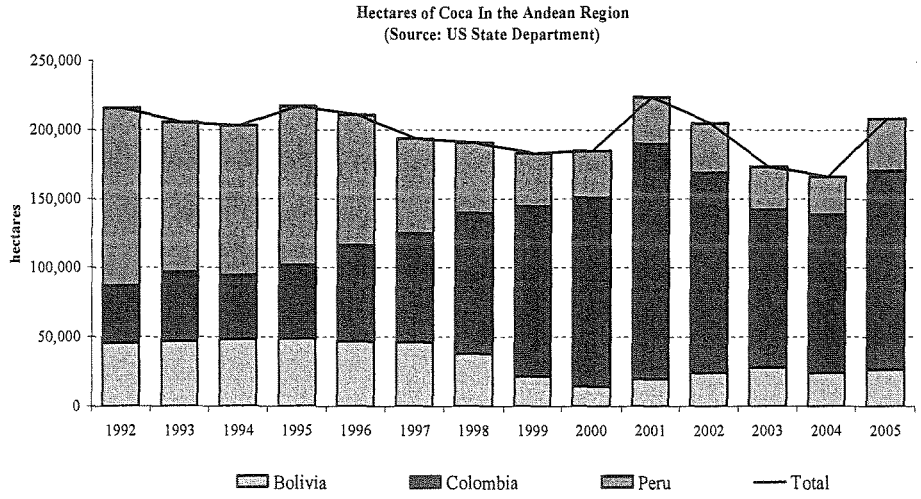
Cultivation of Coca Bush in the Andean Region



Source: 2006, World Drug Report - UNOCD

[14] To look these changes it is possible to compare Graph 3 with Graph 4.

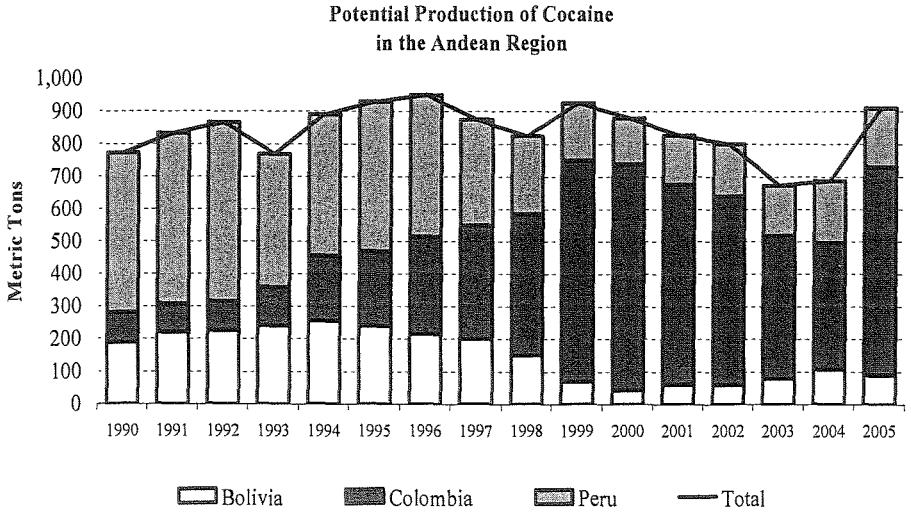
Graph 4



Source: International Narcotics Control. Strategy Report. US State Department

In terms of potential production of cocaine, Colombia is considered the biggest producer. In 2005, it produced 640 metric tons, 220 more than 2004 (UNODC, 2005 and 2006). Although, the potential production has similar features to the area under coca cultivation, the peak in 2005 is remarkable. This is one of the highest levels in last 15 years (Graph 5). This can be explained by developments in improvement of illicit crops production techniques, which raise the crop's productivity per area under cultivation.

Graph 5

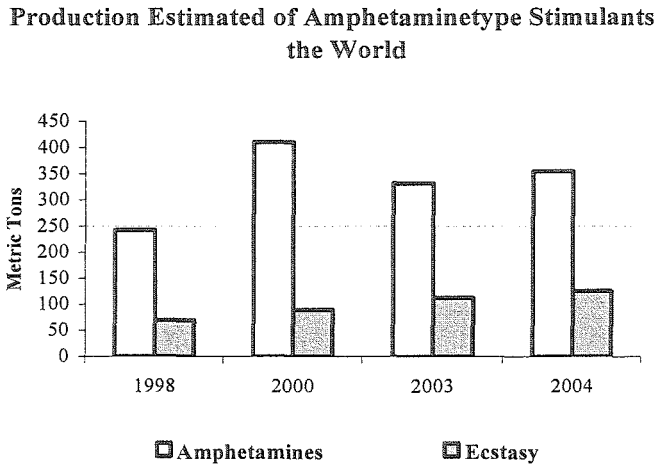


Source: 2006, World Drug Report - UNOCD

The production of synthetic drugs is not new. From the second half of the 1990s, production has increased its share in the market. While in 1998, production was estimated in 312 metric tons, it has increased at least 50% from 2004 (Graph 6). Amphetamines maintain the status of the highest produced. Ecstasy represents less from 28% of the total amphetamine-type stimulants -ATS produced all over the world[15].

Between 2000 and 2003, amphetamine production fell due to the dismantling of clandestine laboratories. This implied that a lot of producers located in US, East Asia, South Asia and Europe had reduced synthetic drugs availability[16]. Nevertheless, ecstasy has compensated part of amphetamines supply's reduction. In the same time period, ecstasy production increased by 25%. Still, the upward trend of amphetamines production recovered partially in 2004 as a result of more clandestine laboratories popping up (Ibid, 2005 and 2006). Although, the conclusions are not definitive, prosecution of drug producers allows for an increase of synthetic drugs available using substitutes. This may be the case with ecstasy and amphetamines.

Graph 6



Source: 2006, World Drug Report - UNOCD

[15] It is worthy to note that synthetic drugs are less straight forward to estimate than the potential production of illicit crops. This is due to crops being estimated through ground surveys or analysis provided by satellite pictures. To calculate synthetic drug production uses more indirect methods of estimation.

[16] Most of the amphetamine production takes place in Europe; meanwhile the highest amount of ecstasy is produced in Europe and North America.

Regarding demand, today there is not an obvious and unanimous trend implying that producer countries are only suppliers. During the time, the suppliers have begun to play the roles of both drug producers and consumers. However, it is plausible to acknowledge that some countries are greater drug consumers than others, and some of them may be greater drug producers than consumers. This approach allows inferring that the drug market is not a local problem, particular to one geographical region or pattern of regions. Furthermore, the drug market contains a universal dimension because of production located in different parts of the world and drug consumption stretching over many different countries.

The UNODC has pointed out that 200 million people, around 5% of the world population age 15 – 64, have used drugs at least once in last 12 months. Meanwhile, 15 million are consumers of licit psychoactive substances; 160 million people are habitual consumers of cannabis; the number of opiate users is estimated to be around 16 million, and cocaine is used by almost 14 million people. In this context, international authorities have identified that the principal problem drugs at the global level continue to be the opiates (particularly heroin) followed by cocaine.

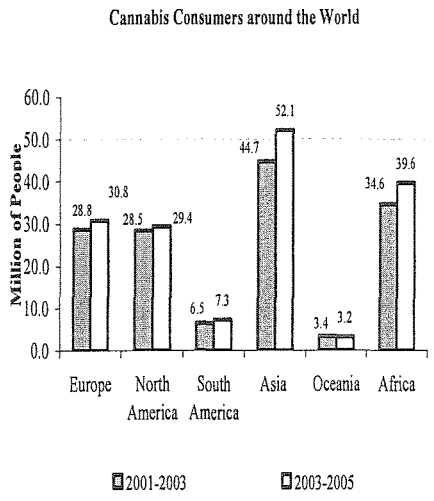
Similarly, prevalence[17] of the principal drug consumers has increased. Between 2001 and 2003, Europe is prevalence of opium uses was closed to 0.7%. These levels have been stable up to 2005. Meanwhile in South America and Asia the prevalence of use has gone down from 0.45% and 0.32%, respectively, to around 0.3% between 2003 and 2005 (Appendix 1, table 1a).

The use of cocaine in North America has maintained on the same level (2.3%) between the both periods. However, between 2003 and 2005, it increased in Europe from 0.62% to 0.7%. In Asia the prevalence of use has increased around 0.1%; and it is worthy note, the prevalence of use in South America has declined 0.14% from 0.84% to 0.7%. European usuage levels are virtually equal now.

[17] This is defined as the percentage of population between the ages of 15 and 65 years old that are habitual consumers of heroin or cocaine.

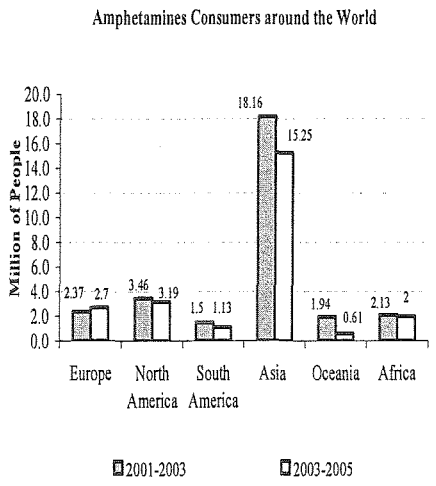
Graphs 7, 8, 9 and 10 show drug consumer trends globally. Cannabis is most consumed illicit drug. Amphetamines are in second place, followed by opium and cocaine. Asia is the greatest cannabis, opium, and amphetamines consumer. Europe is the second biggest market for opium around the world. Similarly, North America is the highest consumer of cocaine, followed by Europe and South America.

Graph 7



Source: 2004-2006. World Drug Report. UNODC

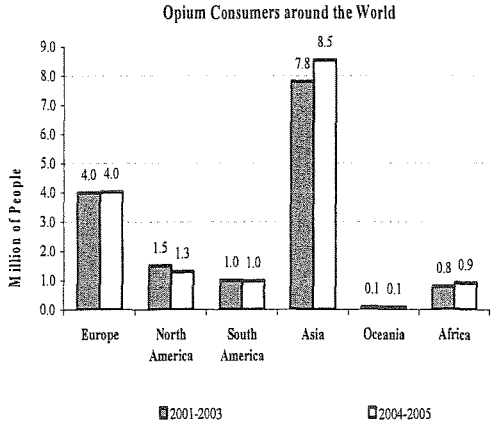
Graph 8



Source: 2004-2006. World Drug Report. UNODC

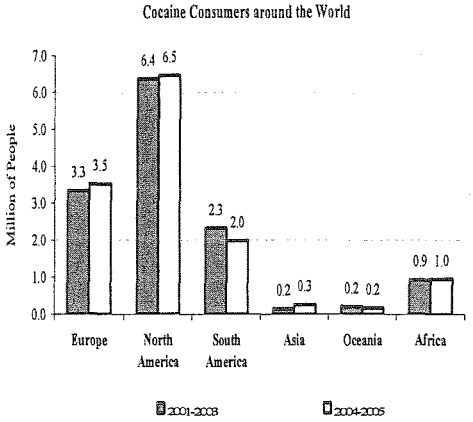
Between 2001-03 and 2003-05, Asia increased its marijuana use by 16.5% while Europe and North America have 7% and 3.1% more consumers, respectively. Globally, amphetamine consumption has been reduced, not counting Europe where use increased by 14% (Graph 8). Asia has increased opium use by 9%, while North America's reduced its use by 1.3%. During the same period, North America increased cocaine use by 1.5% and Europe increased consumers by 200,000 people. The trend in South America and Oceania is remarkable.

Graph 9



Source: 2003- 2006, World Drug Report - UNOCD

Graph 10



Source: 2003- 2006, World Drug Report - UNOCD

Although the Asian region is the greatest consumer of drugs globally [18], only North America and Europe have more than 80 million consumers. According to National Institute on Drug Abuse (2005), for young American adults the lifetime prevalence[19] for cocaine consumption has increased since 1994 (Graph 11, 12 and 13). Even though, there was a reduction of cocaine prevalence between 2004 and 2005, that trend did not offset the strong growth in prevalence since 1994. From 1994 to 2005, cocaine consumption has grown by an annual average rate of 12.5%. Heroin prevalence has decreased to 1% and marijuana use decreased by 7%.

Regarding synthetic drugs, the trends of lifetime prevalence in the US show that ecstasy consumption has increased over time (Graph 14). From 1994, the prevalence grew by an annual average rate of 5%, but amphetamine use decreased by 10% over the same time period. Therefore, conclusive results show that cocaine and ecstasy consumption have increased since the first half of the 1990's. In this case, it is possible to claim that ecstasy may be a substitute drug to amphetamines but it is not to drugs like cocaine, at least in the US market.

Graph 16 reports the average lifetime prevalence from different illicit drugs in Europe. The United Kingdom, Ireland, The Netherlands and Spain are the principal consumers of cocaine, ecstasy and amphetamines. Even though, there is not data available

[18] In 2005, there were more than 73 million of consumers in Asian region.
[19] The share of people who have used drugs once or more in a particular time interval.

concerning heroin consumption, countries like Denmark, Italy, Luxembourg, Spain and The United Kingdom have the highest estimates in the prevalence of young adult drug use between 1999 and 2003. According to data available by European Monitoring Centre for Drugs and Drug Addiction – EMCDDA (2005), from 1995 to 2001, Spain has increased prevalence levels. Measured by annual average rates, prevalence has grown to 13.6% for cocaine, by 10% in amphetamines and by 35.8% in ecstasy. Similarly, the lifetime prevalence of cannabis has increased to 17% (Graph 17 and 18).

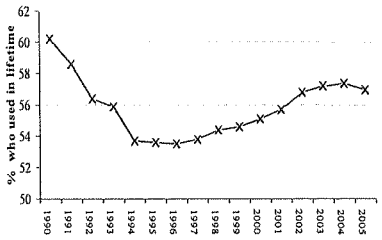
The United Kingdom also has increased the lifetime prevalence of drug use since 1994. The UK increased its cocaine consumption levels by an average annual rate of 25%, ecstasy consumption by 25%, amphetamine consumption by 7.4% and cannabis by 5.5% (Graph 19 and 20). In Appendix 1b, it is possible look at other consumption trends in Italy, The Netherlands and Finland. Most of these show an increasing consumption rate, thus feeding into growing global demand.

To summarize, drug consumption in US and Europe has grown over time. Particularly in the US, cocaine, heroin and ecstasy consumption exhibit growing trends. However, amphetamine consumption shows a marked reduction and cannabis consumption has not increased back to its early 1990s levels. In the same way, some European countries, such as the UK, Spain and Italy have increased their drugs consumption over time. Cannabis is the most popularly consumed illicit drug. However, the fast growth of cocaine and ecstasy use in Spain and the UK is should also be noted.

The following chapter analyzes some issues in the policy discourse and the principal measures adopted by countries to reduce observable growing trends in drug demand and supply. In addition, the section explores the relationship between the anti-drug policies and the different approaches used to design policies. Finally, it examines international cooperation in the formulation of anti-drug policies, particularly law enforcement and alternative developments in the US and European Union as important elements in reducing illegal drug supplies.

Graph 11

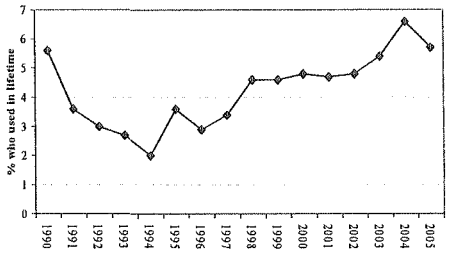
Trends in Lifetime prevalence of Marijuana in US
Young Adults (Age 19-28)



Source: Monitoring the Future National Survey Results on Drug Use, 1975-2005
National Institutes of Health U.S. Department of Health and Human Services

Graph 12

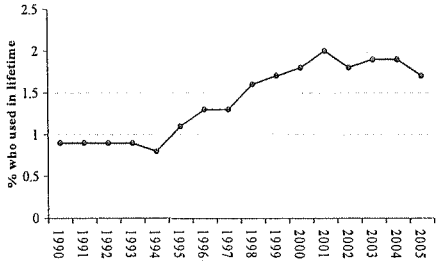
Trends in Lifetime prevalence of Cocaine in US
Young Adults (Age 19-28)



Source: Monitoring the Future National Survey Results on Drug Use, 1975-2005
National Institutes of Health U.S. Department of Health and Human Services

Graph 13

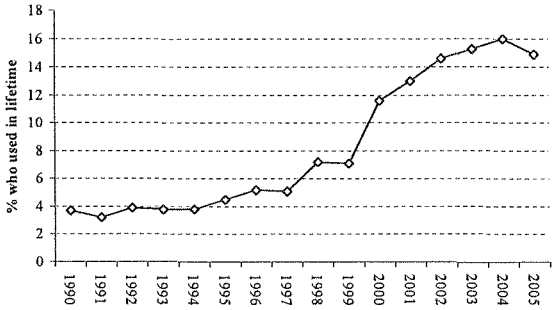
Trends in Lifetime Prevalence of Heroin in US
Young Adults (Age 19 -28)



Source: Monitoring the Future National Survey Results on Drug Use, 1975-2005
National Institutes of Health U.S. Department of Health and Human Services

Graph 14

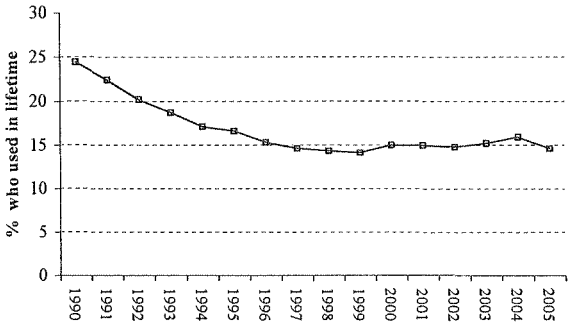
Trends in Lifetime Prevalence of Ecstasy in US
Young Adults (Age 19 -28)



Source: Monitoring the Future National Survey Results on Drug Use, 1975-2005
National Institutes of Health U.S. Department of Health and Human Services

Graph 15

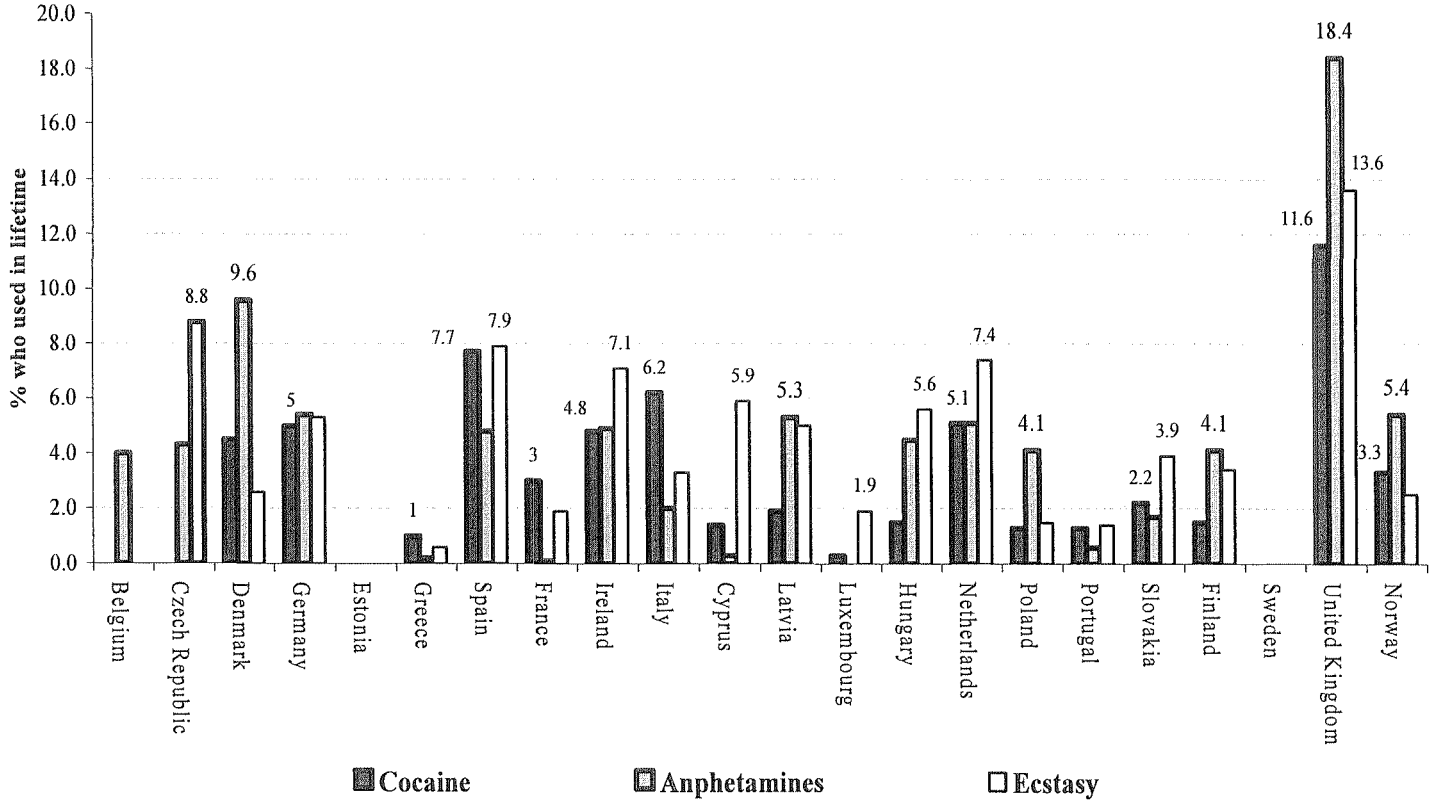
Trends in Lifetime Prevalence of Anphetamines in US
Young Adults (Age 19 -28)



Source: Monitoring the Future National Survey Results on Drug Use, 1975-2005
National Institutes of Health U.S. Department of Health and Human Services

Graph 16

Lifetime prevalence of drug use among young adults (15 to 34 years old)
Average 2000 - 2003

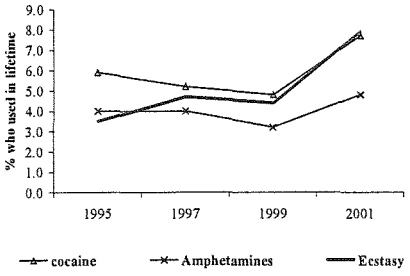


Source: Annual report 2005: the state of the drugs problem in Europe

Spain

Graph 17

Limetime prevalence of drug use among young adults (15 to 34 years old) in Spain



Source: Annual report 2005: the state of the drugs problem in Europe

Graph 18

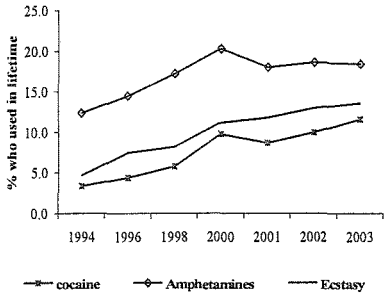
Limetime prevalence of Marijuana among young adults (15 to 34 years old) in Spain

Source: Annual report 2005: the state of the drugs problem in Europe

United Kingdom

Graph 19

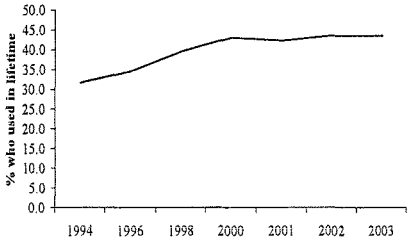
Limetime prevalence of drug use among young adults (15 to 34 years old) in United Kingdom



Source: Annual report 2005: the State of the Drugs Problem in Europe

Graph 18

Limetime prevalence of Marijuana among young adults (15 to 34 years old) in United Kingdom

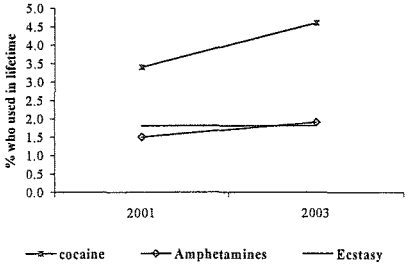


Source: Annual report 2005: the State of the Drugs Problem in Europe

Italy

Graph 19

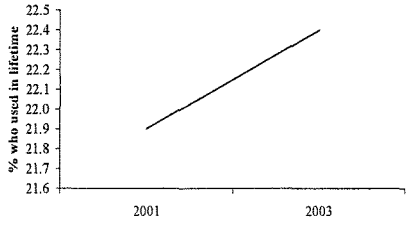
Limetime prevalence of drug use among young adults (15 to 34 years old) in Italy



Source: Annual report 2005: the State of the Drugs Problem in Europe

Graph 20

Limetime prevalence of Marijuana among young adults (15 to 34 years old) in Italy



Source: Annual report 2005: the State of the Drugs Problem in Europe

5 THE ANTI-DRUG POLICIES APPROACHES

The multilateral drug control system –created by UN– is a powerful institutional mechanism to regulate the world's illicit drug market. Its legal framework was created by three international drug conventions[20] that try to define anti-drug policy goals. Nevertheless, the approach to drug control has been modified over time. The scope started from the multilateral regulation of illicit production and trade, geared towards reaching international cooperation goals to eliminate the multiple causes of drugs production (UNODC, 2004).

According to UN conventions, illicit drugs are a multidimensional issue of which success will be reached only through active agreements and commitments between producer and consumer countries. Further steps towards resolving the drug control equation imply adoption of appropriated approaches with practical applications. Recently, the international anti-drug policy discourse has identified some approaches that highlight the degree of complexity among actors involved in the illicit drugs industry.

In the first place, the holistic approach is based on the conceptual view that a drug problem has a negative impact on the functioning of societies as a whole. This approach highlights that those producer countries with governance weaknesses must be accompanied through development programs to reduce social troubles (such as civil war) and other causal factors that trigger drug production. Such an approach emphasizes building a socio-economic agenda to minimize major drug production impetus. But it must be agreed to and joined by the various actors of the civil society, such as farmers, small producers and non-governmental organizations.

[20] i) The Single Convention on Narcotic Drugs of 1961; ii) the Convention on Psychotropic Substances of 1971 and iii) the United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988. These Conventions (signed and ratified by most member states) call for the prohibition of the production, distribution and possession of a wide range of psychoactive substances, such as cannabis, cocaine and heroin.

The last approach can be complemented by a more synergistic conception, where countries would have to apply an integrated and balanced approach to the drug problem. Such an approach is based on a comprehensive strategy built with factual data and statistics provided by developing countries. This calls for quality knowledge and data on the structure and dynamics of the drug market at global and regional levels. Finally, a more dynamic approach considers issues of drug diffusion like "drug epidemics". Therefore, the approach must emphasize closely monitoring the prevalence, incidence and evolution of illicit drugs. This will happen by gaining an understanding of how drug epidemics evolve and how feedback mechanism can act to change their development. In theory, it would also help to have better balanced and timed interventions.

Although the approaches try to have a deep comprehension about drug production and consumption, so as improve diagnostics, the original aim has been to develop the institutional ability to regulate the illegal market. However, the current policy discourse has a bias towards zero-tolerance on the supply side and harm reduction for drug demand (United Nations, 2002). Such conception has conditioned international cooperation flows to reduce drugs production and control trafficking. This analysis will be present in the rest of the chapter.

4.1 Balance and Unbalance Approach: A Debate Not Resolved

The policies to control drug demand and supply have evolved toward a multilateral drug control regime, even though there is not an international institution explicitly focused on applying anti-drug policies or to directly intervene over the global drug market. The international community, through the UN, built a particular consensus based on clear objectives such as the reduction of the illicit market size. This agreement has proposed the adoption of a balanced approach where policies to reduce drug demand would have the same treatment as those devoted to reducing supply.

The Commission of Narcotics Drugs – CND within the UN constitutes the central policy-making body related to drug matters. It analyses the global drug situation and designs proposals to strengthen the international drug control system. In 1991, the UN General

Assembly established the Fund of the United Nations International Drug Control Programme – UNDCP and expanded the mandate of the CND to enable it to function as the governing body of UNDCP. UNDCP is a part of the United Nations Office on Drugs and Crime – UNODC.

The CND meets at least once per year. In these meetings, relevant drug topics that need attention through commitments and obligations from the members are defined [21]. The aim of these meetings is to address these anti-drug policies in different places in the world and encourage assessments of implemented measures.

In the General Assembly in 1998, the UN and the country members decided to apply national, regional and international strategies to reduce illicit demand, production and trafficking in drugs. The political declaration was agreed upon under an auspice of shared responsibility and aim at preventing the use of drugs and reducing the adverse consequences of drug abuse. Equally, the policy has been emphatic in supply reduction as an integral part of a balanced drug control strategy under the principles enshrined in the Action Plan on International Cooperation on the Eradication of Illicit Drug Crops and on Alternative Development (UNODC, 2005).

In that context, the UN has pointed out that the fight against the world drug problem must be addressed in a multilateral setting, requiring an integrated and balanced approach, and must be carried out

> "...in full conformity with the purposes and principles of the Charter of the United Nations and international law, and particularly with full respect for the sovereignty and territorial integrity of States, the principle of non-intervention in internal affairs of States and all human rights and fundamental freedoms". (United Nations, 1998: 13).

In the same way, the UN argues that

[21] The CND is constituted by 53 countries members. i) eleven for African States; ii) eleven for Asian States; iii) ten for Latin American and Caribbean States; iv) seven for Eastern European States; v) fourteen for Western European and other States; vi) one seat to rotate between the Asian, and the Latin American and Caribbean States every four years.

> "...all States to take further actions to promote effective cooperation at the international and regional levels in the efforts to combat the world drug problem so as to contribute to a climate conducive to achieving that end, on the basis of the principles of equal rights and mutual respect" (Ibid, 1998: 14).

However, there is an opposite stance inside other international organizations, which look at anti-drug policies with a different view. Most of them [22] have declared that there are serious inconsistencies in the approaches. In the first place, the demand approach has tended to normalize the discourse in favor of health care and treatment to consumers and addicts, whilst policies to control the drug supply have encouraged repressive measures as the best way to reduce production and trafficking.

In other words, according to the NGO's discourse the anti-drug policies implemented to attack drug demand manage to institutionalize every normative restriction to qualify drug consumption as a public health problem and encourage its decriminalization. In this context, policies administered by most of the consumer countries generally are defined around these three components: (i) prevention and (ii) treatment and (iii) rehabilitation. Hence, the harm reduction approach allows to consumer countries to provide institutional tools to reduce and alleviate the consumption problem (TNI, 2005).

In contrast, anti-drug policies [23] to counter the rest of the growing drug supply have improved their instruments to repress drug production. They have tended to impose a *zero tolerance* discourse where anti-drug policies have implemented law enforcement with a high military component. This implies asymmetrical approaches where drug producers may not have access to the same treatment that consumers have. Thus, governments are not able to propose solutions that institutionalize producers' protection beyond the pure application of a repressive approach.

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[22] Transnational Institute – TNI, Washington Office for Latin America – WOLA, Australian Drug Foundation, The Bleckley Foundation, International Harm Reduction Association, etc.

[23] The policy for drug supply reduction consists in (i) law enforcement and (ii) alternative development. However, the practice of law enforcement tends to predominate over the alternative development. Therefore, it is possible infer that content of the anti-drug policy for reducing supply itself has unbalance approach.

According to the Transnational Institute - TNI (2002) the anti-drug policies applied especially in the US tend to focus on repressive approaches in producers countries to reduce supply.

> "...on the production side, quite to the contrary, we've seen an escalation these past five years of repressive approaches. Intensification of chemical spraying of crops in Colombia, an attempt to develop mycroherbicides to start a biological front in the War on Drugs, increasing military involvement in drug control efforts especially in Latin America under US leadership, the setting of the 2008 deadline at the United Nations General Assembly Special Session (UNGASS) on drugs, and a blurring of lines between Alternative Development approaches and repression" (Jelsma, 2002: 2).

However, despite the ineffective results, this approach continues to receive strong political and financial support through the UN drug control system. Similarly, WOLA (2004) pointed out that the supply reduction model does not work and this approach has sparked conflict, fueled human rights violations and undermines democracy in producer countries. Therefore, this approach is weak and will not reduce the illicit crops in the long term.

Another inconsistency is related to the following issue under dispute. Many countries acknowledge that a social Harm Reduction approach is the best way to reduce drug consumption, because it does not seem to lead to increased drug use. But others criticize this approach through the belief in an approach focused on the disruption of the market. This conception is common in the anti-drug policy supported by the UN. An appropriate illustration is the US support to continue and strengthen the 'zero-tolerance' approach towards reducing drug consumption (that clearly failed to impact on HIV epidemics). In recent times, the US position achieved a strong influence in UN discourse against social Harm Reduction[24].

[24] In particular, the US has exerted pressure on the UNODC Executive Director, Antonio Costa, to keep a strong position against the Harm Reduction approach. The Beckley Foundation says: "it will leave the UNODC clearly out of step on this issue with the rest of the UN system, and will discourage those governments (in Eastern Europe, Asia and South America) who are currently considering their responses to existing or potential epidemics, from introducing the very measures that are most likely to protect their citizens". International Drug Policy Consortium, 2006: 2).

Table 2

Anti Drug Policy Strategies - Supply Control

Opium					
Control of Supply - Producers (Counter narcotic instrument)	Opium Poppy Cultivation (2005)	Control Policies	Other kind of measures	International Support and Cooperation	Provinces
Afghanistan	104,000 ha	Law Enforcement Opium Eradication Program and Persuasion Campaign Alternative Livelihood Programmes and Material Support (less intensity)	Religiuos Fatwa	UN US - EU UK	Nangarhar, Hilmand, Badakhshan and Uruzgan (72%)
Lao - PDR	1,800 ha	Law Enforcement Policy of Food Security Opium Eradication	-	UN - EU	Phongsaly, Oudomxay and Luang Prabang
Myanmar (Burma)	32,800 ha	Law Enforcement Opium Eradication Food Security and Assistance	-	UN	Shan States (92%)
Colombia	2,000 ha	Law Enforcement Coca Eradication Interdiction Alternative Development		US UN - EU	Cauca, Valle del Cauca, Narino and Choco

Source: 2006 - World Drug Report. UNOCD

Coca Bush					
Control of Supply - Producers (Counter narcotic instrument)	Opium Poppy Cultivation (2005)	Control Policies	Other kind of measures	International Support and Cooperation	Provinces
Colombia	86,000 ha	Law Enforcement Coca Eradication Interdiction Alternative Development	-	US UN	Caqueta, Guaviare, Putumayo, Narino, Santander del Norte, Magdalena
Peru	48,200 ha	Alternative Development	-	US UN - EU	Alto Huallaga, Apurimac-Ene and La Convención - Lares
Bolivia	25,400 ha	Manual Eradication Alternative Development	-	UN - EU US (before President Evo Morales)	Chapare, Carrasco and Tiraque

Source: 2006 - World Drug Report. UNOCD

Cannabis Cultivation					
Control of Supply - Producers (Counter narcotic instrument)	Cannabis Cultivation (2004)	Control Policies	Other kind of measures	International Support and Cooperation	Provinces
Morocco	120,500 ha	Law Enforcement Cannabis Eradication	-	UN	Al Hoceima, Taounate and Larache

Source: 2006 - World Drug Report. UNOCD

In that sense, though international discourse has promoted the necessity to adopt a balanced approach, it tends to maintain an opposite position. The progressive criminalization of different ways in producing and trafficking illegal drugs leads to increased internal conflict and social problems in producers' countries. In the same way, countries supporting policies devoted to reducing drug supply are investing enormous amount of resources with few results. This case will be illustrated with the US anti-drug policy discussion in the next chapter.

4.2 The Sword of Damocles: Donors and Recipients

The making of anti-drug policy is legitimated by predominant discourse defended by the UN. Therefore, producer and consumer countries have some degree of influence in policy discourse. In that sense, policy speech reflects interdependence between consumers and producers. Interdependence occurs when actions from one country affects others and vice versa. However, some countries have the power to influence the discourse more than others. Hence power or influential capability is a fundamental issue in this analysis[25].

Keohane and Nye (1977) point out that asymmetrical interdependence can be a source of power when it is expressed as control over resources or the potential to affect outcomes. However, transference of resources or affected outcomes does not guarantee a reduction of asymmetries leading to similar patterns of control over results. In regards to drug policy discourse, it is possible distinguish two categories that affect outcomes. First, some countries that strongly influence setting the global anti-drug policy agenda condition UN policy[26]. Second, interdependence is expressed through international aid devoted to reduce drug supplies in the main producer countries.

Countries restricted by international aid to reduce drug supplies are affected by external policies that reshape internal anti-drug policies. In this case, this country has

[25] Power is the ability of an actor (or country) to get others to do something they otherwise would not do. In the same way, power is related with control over results.
[26] Particularly, the US interfere in some agreements.

vulnerability[27]. They may suffer a cost imposed from the outside, paraphrasing Koehane and Nye. Otherwise, if one country is able to autonomously define its policy, it will have a *sensitivity* to external policy, but will not be vulnerable. In other words, those countries that receive international aid are more vulnerable to policy changes than those nonrecipients.

The story of Damocles, courtesan's Dionysius, who wants to taste power is replicable to the relationship between donors and recipients. Producer countries demand international aid to fight drugs, but the recipient role makes them more vulnerable to external policy changes and demands. This poses a further cost component on these countries when they are forced to alter policies at the will of donor countries. Although anti-drug policies imply cooperation and reciprocity between countries, according to UN speech, certain countries have influence in global anti-drug policy discourse, while others assume the policies as given. In other words, countries with more control and influence in anti-drug policies discourse define the policies of the recipient or "weaker" countries.

In this sense, international anti-drug policy is based on external transfers of resources that link the consumer countries to the producers. Due to consumer countries having resources to influence international policy; they are mostly allowed to intervene in the process of making policies and setting agendas. According to Krasner (1985) if one country (or region) wants to keep power and control as much as wealth, it must have influence over the rules of the game, principles and norms of international regimes. Krasner only discusses the ability of the Third World to reach more favorable player interest. However, this perspective may be applicable to producer countries.

According to Fryer (1993) anti-drug policy has been historically based on a "containment model". In other words, policymakers assume that the best way to reduce domestic drug consumption is to reduce the supply of drugs entering consumer countries from international locations. If the drug supply can be "contained" and eliminated, the model assumes that US consumption will decrease.

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[27] According to Koehane and Nye (1977) *vulnerability* can be defined as an actor's liability to suffer cost imposed from outside before policies are altered to try change the situation, meanwhile *sensivity* means liability to costly effects imposed from outside before policies are altered to try the change the situation.

In contrast, the traditional approach of the US in drug control was highlighted by former President George H.W. Bush. He affirmed:

> "The logic is simple...the cheapest and safest way to eradicate narcotics is to destroy them at their source...we need to wipe out crops wherever they are grown and take out labs wherever they exist" (Sharpe, 1992: 8).

His declaration has demonstrated that the US views the drug problem as fundamentally beginning with the drug producing nations or with the suppliers. It also reveals that the policy 'costs' of such programs are measured relative to the US[28].

4.2.1 The US budget to Anti-Drug Initiatives

US dominance in defining the global trends in combating illegal drug production and trafficking is prominent [29]. The power of US anti-drug policy is reflected in the elevated amount of resources invested in drug producer countries. Although the international debate on drug policy suffers from stagnation, evidently there is a strong bias towards zero-tolerance towards production but not so strongly on curbing consumption demand. This tendency is demonstrated through the share of resources from the US federal budget invested in the fight against drugs in the late 1990's and currently.

The first goal of US international narcotics control policy is to stop the flow of foreign drugs into the US. A number of approaches have been proposed to reshape US international narcotics control policy and implement it more effectively. The US government touts its international policy to control drugs[30] as 'national security interest'[31]. The US

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[28] Highlighting the lack of producer country dynamics on the part of US politik: During the 1980s and 90s, some US policymakers and analysts not only viewed "eradication at the source" as the most cost-effective and efficient way to combat illicit drug consumption, but also believed eradication efforts could lead to the complete elimination of coca production and cocaine consumption (Van Wert, 1988).

[29] Historically, US government through diplomats, law enforcement officers or health-care officials has had power and influence on the policy discourse of the international drug control system. Sinha (2001) and Boekhout van Solinge (2002) point out that the evolution of the international drug control system has been considerably influenced and shaped by numerous elements not directly related to drug control, including: racism, fear, economic interests, domestic and international politics, global trade, domestic protectionism, war, arms control initiatives, the Cold War, development aid, and various corporate agendas.

[30] According to the US congress: "The federal anti-drug initiative has two major elements: (1) reduction of demand and (2) reduction of supply. Reduction of demand is sought through education to prevent dependence, through treatment to cure addiction and through measures to increase prices and risk of apprehension at the

government defines national security as territorial integrity, sovereignty, and international freedom of action. Therefore, any military, economic, political, scientific, technological (Perl, 2006) threat obstructing US freedom of action is an element of national security and from the government's view has to be subordinate to those security needs. In that sense, this policy stance explains the high amount of resources devoted to control of US borders, at ports of entry, on the high seas, and along major foreign transshipment routes and production sites. From 1994, the US invested more resources to reduce the supply of illegal drugs than it did to reallocate resources to control demand: on average of 55% of the federal anti-drug control budget has been addressed to reducing supply in producers' countries (Perl, 2005).

Graph 8 and 9 show the proportion of the US budget resources invested to reduce the drug supply More than half of the resources approved by the US congress for drug control are allocated to affect the anti-drug policy in producer countries. This implies that the US is investing almost US$5 billion per year to reducing supply. But it is remarkable that resources to fight against drugs are growing progressively over time. In 1995, the US federal budget to control drug supply represented 47% of total US drugs control funding and in 2005 it corresponded to 62% (Graph 8).

Graph 9 shows the same shares that Graph 8 shows, but it divides the US federal budget to control drug demand in those invested to stopping drugs and healing. In 2000, the federal budget to both programs was US$ 4.1 billion. The same budget was allocated to them in 2006. However, in 2000 the US federal budget assignated US$ 6 billion to disrupting the supply market. In 2006, the budget for the same policy expanded by US$2 billion. Therefore, most of anti – drug policy resources are used to reduce drug supplies in the US. This is explained by the fact that anti-drug policies are part of the US national security strategy.

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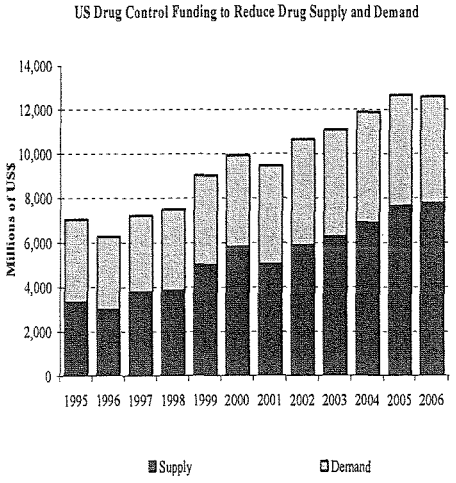
consumer level. Reduction of supply is sought by programs aimed at destabilizing the operations of illicit drug cartels at all levels and severing their links to political power, and by seizing their products, businesses, and financial assets". (Perl, 2003: 5)

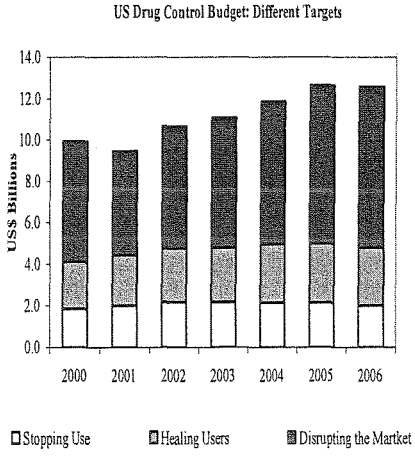
[31] In 1986, National Security Decision Directive 221 and the Anti- Drug Abuse Act declared drugs a national security problem in US.

Graph 8



Source: International Narcotics Control. Strategy Report. US State Department

Graph 9



Source: International Narcotics Control. Strategy Report. US State Department

The US government has provided support for drug crop eradication programs in the Andes since the 1980s and for alternative development – AD since at least the 70s. Since 2000, the centerpiece of the U.S. anti-drug policy has been the Andean Counter drug Initiative ACI, with Colombia as the major recipient. Looking at the US federal budget data, it is possible to identify a relationship between US aid allocated to drug producer countries and changes in the area under illicit crops. Most of the principal producers of illicit drugs have reacted positively to the US aid in law enforcement (Veillete and Navarrete-Frias, 2005). The international cooperation mainly in the law enforcement[32] has affected the drug production in the Andean Region. Bolivia and Peru received resources to implement alternative development projects, but more than half of the total resources to reduce the drug supply were allocated to eradicate illicit crops (Graphs 10c, 11c and 12c).

The main aims of the US cooperation in Colombia is eliminate the cultivation of illicit crops, strengthen Colombia's capabilities to disrupt major drug-trafficking organizations; destroy the cocaine and heroin processing industries and stop the diversion of licit chemicals into illicit channels; implement alternative development projects.

[32] Law enforcement consists of judicial measures (including prosecution, adjudication, and sentencing) that have some capacity to reduce the quantities of illicit drugs produced and consumed.

Graphs 10, 11 and 12 show relationship between US aid and the area cultivated. The first case is Colombia. The relationship between US aid and the area is not as evident when it used data provided by UNODC. Remarkably, area data provided by the US Department of State seems more appropriated to look at the impact of the US cooperation (graph 10b). Evidently, an increase in US aid has reduced the coca area cultivated. When the US increased external aid to finance law enforcement there was a reduction of coca hectares. Although, when UNODC data is used the area changes do not reflect anti-drug policy effects.

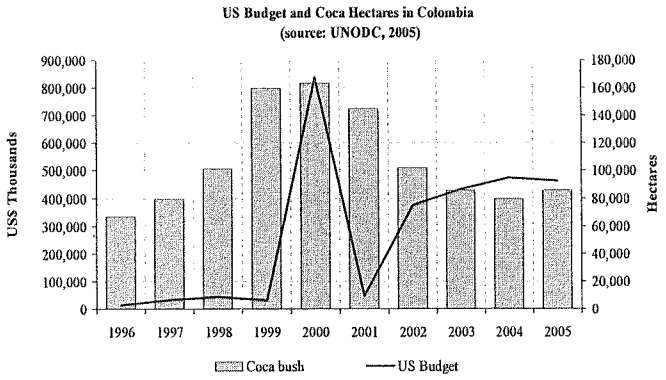
In 2000, the US government assigned US$1.3 billion for economic aid and counter drug assistance to Colombia and regional neighbors as part of an Andean Region Initiative – ARI. The ARI proposal focused on economic and social programs that would be roughly equal to the drug control and law enforcement components that had been the primary focus of 'Plan Colombia'. Similarly, more than half of the aid was targeted to Colombians neighbor countries that experienced spillover effects from Colombia's civil conflict and national drug problem. This explains the highest peak of US federal budget allocations targeted towards Colombia and Bolivia (Graph 10b and 12b).

Graph 10c shows law enforcement is the most important external anti-drug policy in Colombia. More than 60% of the US-Colombia federal budget aid is targeted to eradicate illicit crops and interdiction. Projects of alternative development[33] represented 30% of this budget between 2002 and 2006; but they are being reduced over time. According to the data, US assistance received by Colombia is thus predominantly for law enforcement.

[33] According to UN alternative development is conceived as a process to prevent and eliminate the illicit crops through designed rural development measures. This approach tries to build a comprehensive and permanent solution to the problem of illicit drugs.

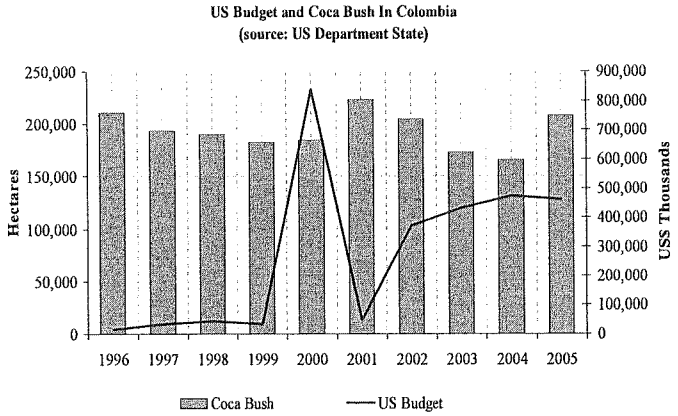
Colombia

Graph 10a



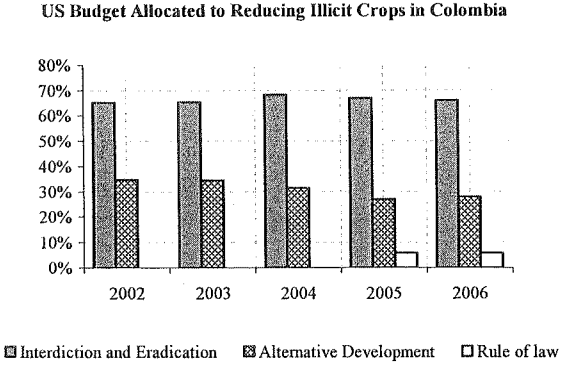
Source: International Narcotics Control. Strategy Report. US State Department
2005, World Drug Report - UNOCD

Graph 10b



Source: International Narcotics Control. Strategy Report. US State Department

Graph 10c



Source: International Narcotics Control. Strategy Report. US State Department

The principal aim of US assistance in Peru has been reducing and eliminating coca crops, as well as interdicting trafficking of cocaine and the cocaine base. Similarly, the US rewards economic reforms that eliminate the illicit coca crop economy. Upon analyzing the US-Peru aid budget and area data, it is possible to conclude that there is an indirect relationship between both variables. An increase of US budget may imply a reduction of coca hectares in Peru[34] (Graph 11a and 11b). Notably, in the Peruvian case US data also shows better policy target achievements and results than data provided by UNODC (Graph 11b).

The portion of the US budget targeted to alternative development projects in Peru was more than 50% of the total in 2003 and 2004 (Graph 11c). However from 2005, the portion assigned to alternative development decreased, and it was allocated to eradication and interdiction, putting these at 53%. Therefore, from 2005 onwards the US has dedicated more efforts towards law enforcement. This is a common denominator through US anti-drug policy in the Andean Region.

The major objectives leading US assistance to Bolivia has been disrupting the transportation and export of illegal coca leaf and precursor chemicals, helping develop and maintain strong anti-drug and anti-crime policies and programs within the government of Bolivia.

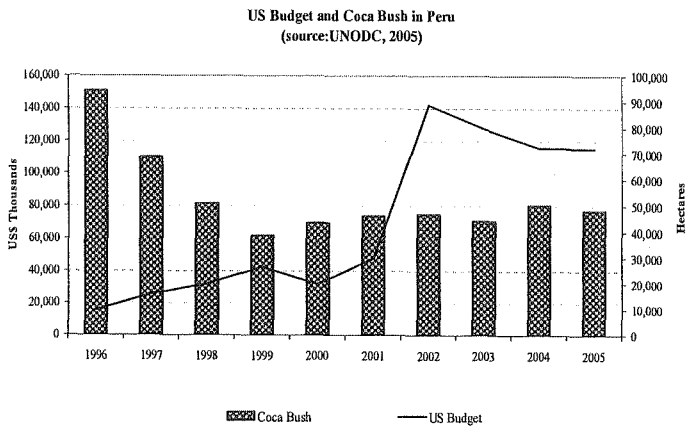
The Bolivian case is similar to Peru's. Since the beginning of 'Plan Dignidad'[35] in 1998, anti-drug policy focused on increasing forced eradication. However, this policy was eliminated later and the Bolivian government proclaimed that only manual and mechanical methods can be used to eradicate coca crops.

[34] Coca crops have decreased in Peru from its peak in 1995. Some observers have pointed out the reduction was due to several factors other than the eradication operations, including the following: i) the appearance of a soil fungus, Fusarium oxysporum in the Huallaga Valley; ii) the decline of Colombia's dependence on Bolivian and Peruvian coca; and iii) the successful dismantling of Colombia's drug cartels that were the principal buyers of Peruvian coca.

[35] The Plan Dignidad was a strategy financed by US and consisted of the interaction among alternative development, eradication, and law enforcement measures. The strategy's total cost in five years (1998-2003) was projected to be $952 million: $108 million for eradication; $700 million for alternative development; $129 million for interdiction; and, $15 million for prevention and rehabilitation.

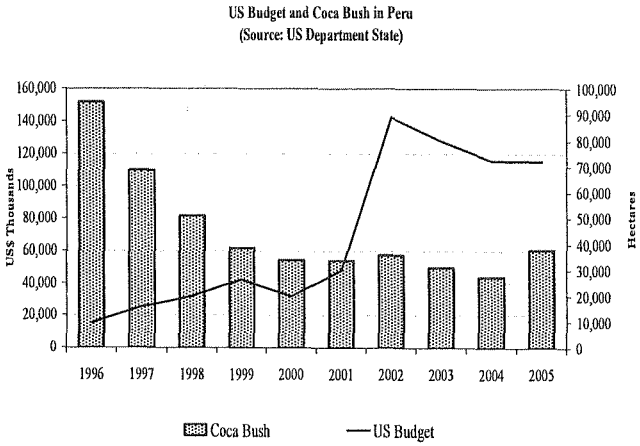
Peru

Graph 11a



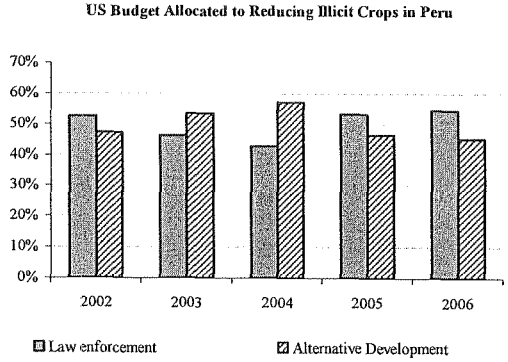
Source: International Narcotics Control. Strategy Report. US State Department
2005, World Drug Report - UNOCD

Graph 11b



Source: International Narcotics Control. Strategy Report. US State Department

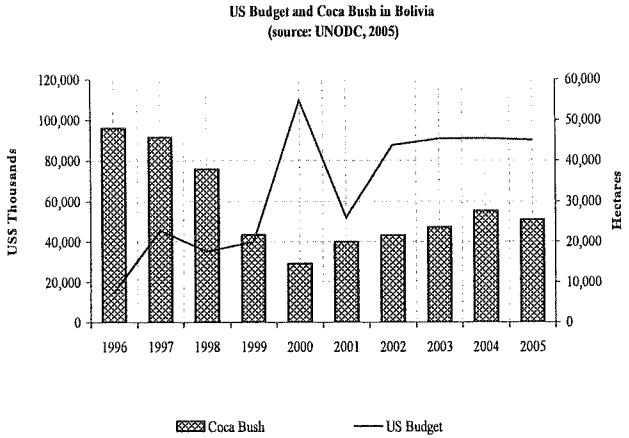
Graph 11c



Source: International Narcotics Control. Strategy Report. US State Department

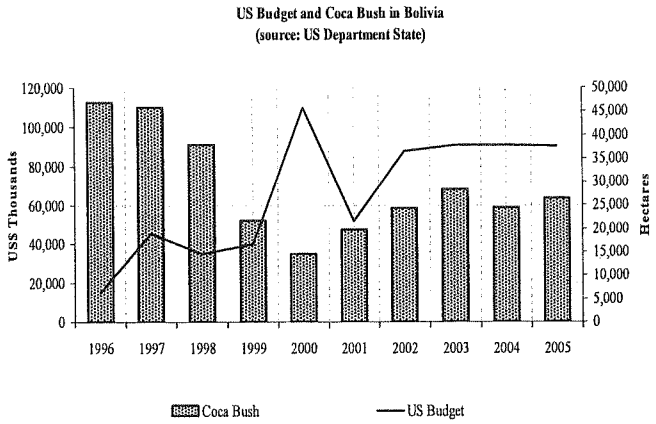
Bolivia

Graph 12a



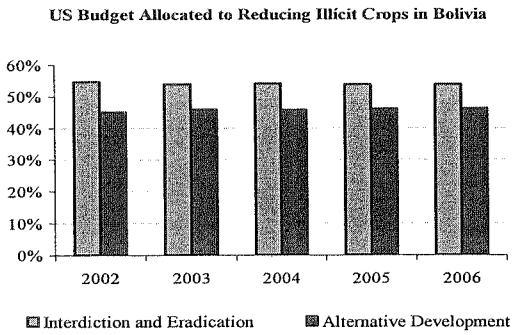
Source: International Narcotics Control. Strategy Report. US State Department
2005, World Drug Report - UNOCD

Graph 12b



Source: International Narcotics Control. Strategy Report. US State Department

Graph 12c



Source: International Narcotics Control. Strategy Report. US State Department

From 1997 onwards, coca crops suffered a reduction as a consequence of major US counter narcotics assistance inflows. Nevertheless, in 2001 coca crops began to increase again. Similarly, US assistance to counter narcotics in Bolivia has targeted law enforcement more than alternative development projects[36]. Therefore, anti–drug policy is characterized by a high component of law enforcement, the driver for reducing drug supply[37].

The principal objectives of US assistance in Afghanistan are (i) minimize poppy crops by implementing alternative livelihoods and 'cash-for-work' programs with major donors, the UN and the International Financial Institutions in poppy-growing areas; (ii) strengthen Afghan law enforcement institutions in order to interdict shipments and destroy opium markets, stockpiles, and distribution networks; and (iii) strengthen regional cooperation on drug interdiction through Drug Enforcement Administration's -DEA Operation Containment and UNODC programs.

US assistance to counter narcotics in Afghanistan has not showed a relevant correlation or desired effects of reduction. Despite this, in 2005 US assistance increased more than 162%[38] and the area under poppy crops grew 122% (Graph 13). This explained due to US and Afghan officials implemented a new strategy to provide viable economic and to disrupt corruption and narco-terrorist linkages[39] but favourable opium prices improved the producer profits. Nevertheless, favorable weather and higher crop yields ensured that opium output remained nearly at 4,100 metric tons. In 2006, US aid has decreased and poppy crops increased to more than 160,000 hectares.

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[36]Between 2002 and 2006, the alternative development projects demanded more than 40% of the US cooperation budget.

[37] When the coca area begins to increase rapidly, US prefers to allocate its aid towards law enforcement. Otherwise, when there is significant reduction in coca crops, US will prefer assigning its aid for alternative development projects.

[38] The US assistance grew in US$ 102 millions.

[39] At the same time, The Bush Administration has begun a 'five pillar' inter-agency initiative to reinvigorate US support for the implementation of Afghanistan's national counter narcotics strategy.

US assistance in Laos has focused in increase drug enforcement efforts to combat production and trafficking of heroin, opium, and methamphetamine; build Laos' capacity to reduce opium production and narcotics refining; and strengthen Laos' capacity to effectively reduce drug demand, particularly of methamphetamines.

Laos shows a similar trend as in previously mentioned countries. US assistance to Laos decreased since 2002. Curiously, there is a positive correlation between poppy area trend and US federal budget allocated to reduce poppy crops, particularly since 2002 (Graph 14). Although US assistance has increased from the second half of the 1990s over time, poppy crops have decreased from 1998 to reach less to 2,000 hectares in 2005.

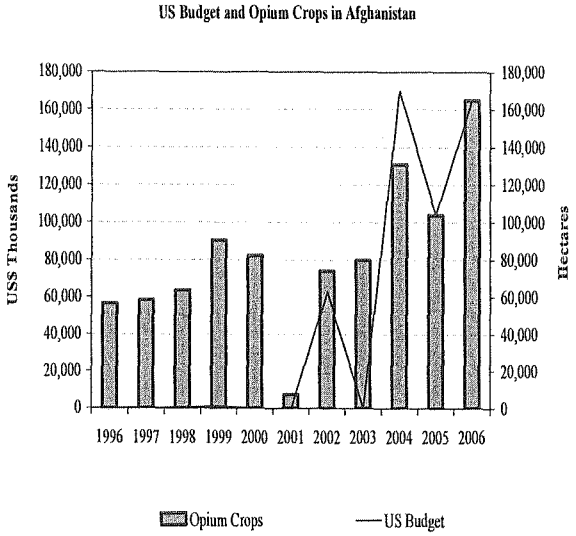
The simple analysis above highlights the effect of US assistance for anti – drug policy in popular producer countries. In some cases, US aid has achieved important reduction of illicit crops, especially in the Andean Region. Here the predominant policy is law enforcement. In Afghanistan and Laos, US assistance targeted towards reducing poppy crops does not yield a strong correlation with change in areas cultivated. Only in 2005, US aid could have perhaps had substantial effect on poppy crop yielded in Afghanistan. From 2002 and on, US aid also contributed to reduce opium crops in Laos.

4.2.2 The EU budget to Anti-Drug Initiatives

According to Boekhout van Solinge (2002) the EU emerged in the arena of international drugs control only in recent years. But it is now beginning to have influence on anti-drug policy as defined by the UN Commission on Narcotic Drugs – CND due to EU countries now contributing an increasingly large proportion of the UNDCP budget (70%).

Afghanistan

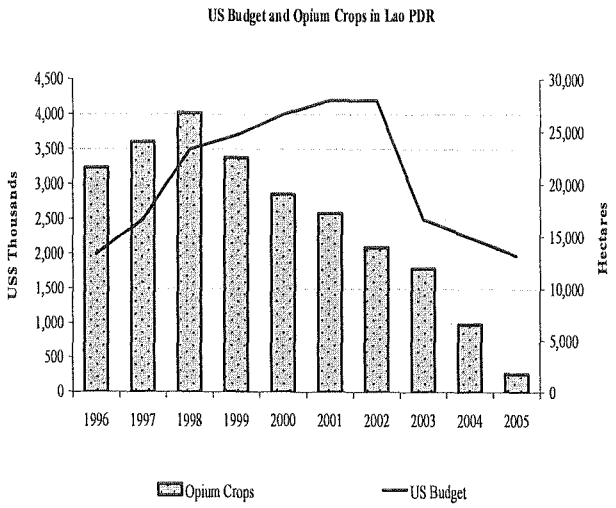
Graph 13



Source: International Narcotics Control. Strategy Report. US State Department
2005, World Drug Report - UNOCD

Laos

Graph 14



Source: International Narcotics Control. Strategy Report. US State Department
2005, World Drug Report - UNOCD

The EU assistance to drug producer countries has been addressed to specific projects but immerse in programs of considerable magnitude targeted to developing countries[40]. A common denominator of EU assistance is investment in alternative development projects. EU anti-drug policy is not focused on law enforcement in supplier countries, as is the US. Instead, EU law enforcement is devoted to disrupting the market inside borders; to say the policy tries to control internal retailers and dealers to reduce trafficking and drugs consumption.

The Country Strategy Paper published by the EU defines the policy and areas where the European Commission can contribute to stability and poverty reduction by supporting the process of recovery and development[41]. The EU has different policy agendas for each developing country where it established some bilateral or regional agreement. Most of the programs promoted by the EU are also part of general policy packages that the EU has developed to wholly assist developing countries. These programs have tenets like helping developing countries strengthen democracy, rule of law, fight against poverty, and encourage the respect of human rights and fundamental freedoms.

The majority of EU assistance to drug producer countries is allocated to alternative development projects, rural development, human rights and food security. It is of note, EU aid is not devoted to law enforcement in the Andean region, and a small portion of the EU budget in law enforcement is assigned to Afghanistan to eradicate illicit crops. Due to the European Commission, not having consolidated statistics and historical data from all EU member countries, it is not feasible to observe the relationship between the EU budget and illicit crops. However, some statistics allow show that the Andean region received European aid in US$574 millions between 1998 and 2005 (Table 4).

[40] The alternative development programs belong to EU policy agenda addressed toward developing countries. Anti-drug strategies are always linked with social and economic agendas in recipient nations.
[41] The general goal of the EU cooperation is "to encourage sustainable economic and social development in developing countries, particularly the most disadvantaged; the harmonious and progressive insertion of the developing countries into the world economy and the fight against poverty" (European Commission, 2002: 5)

Table 4

The EU Assistance in Drugs Control

Supplier Country	Donor	Program	US$ Millions	Period
Bolivia	Belgium	AD	4.7	2002-2004
	European Comision	AD	37.5	1998-2003
Peru	EU	AD	35.0	2000-2003
Colombia	European Comision	AD	206.9	2004
	Germany		98.4	
	Sweden		77.1	
	Spain		62.4	
	Netherlands		49.3	
Andean region	EU	AD	3.2	2005
Afghanistan	EU	Social Protection, Human Rigths, Civil Society and Media	28.8	2002-2004
		Rural Development & Food Security	216.3	
		Aditional Initiative to Combat Drugs	12.5	
Laos	EU	Support to Rural Development	6.3	2002-2004

Source: Country Strategy Paper - European Comission

Similarly, Afghanistan and Laos have received aid from the EU valued at US$264 millions between 2002 and 2004. The largest portion of the EU budget targeted to Afghanistan has been oriented towards rural development projects and food security (82%). However, the majority of the Afghan budget depends on international cooperation resources for national reconstruction; Therefore, EU programs have a target focused on improving the Afghan quality of life and basic infrastructure.

To summarize, the EU has invested aid in drug producer countries mainly for alternative development projects. The Andean region has plainly benefited from this type of anti-drug policy. Similarly, Afghanistan and Laos received aid with similar aims; however the Afghan goal is biased more towards post conflict reconstruction and institutional strengthening. Although EU statistics are not consistent, due to it aggregated status, the information on European assistance is still misleading, but they give some guidelines on how investment is allocated to drug producer countries.

4.2.3 Social and Economic Costs of Drug Use

The social and economic costs of drug use and production are important criteria for developing anti-drug policies. Although there are not surveys that estimate the social costs in drug production, this section describes the economic cost of drug consumption in the US. An important feature of the social and economic cost of drug use is that law enforcement –the criminal justice policy to control drug consumption- implies high costs to society.

In 2002, the US economic cost of drug use was estimated at US$180.9 billion; while the costs in 1992 were US$107.6 billion. This amount represented the use of resources to address health and crime consequences as well as the loss of potential productivity from disability, death and withdrawal from the legitimate workforce.

In this context, the costs of drug use increased an average of 5.3% per year from 1992 through 2002. Table 5 also shows figures for 1992 through 2002 overall and for the three major components into which the report divides the costs. These three components are health care costs, productivity losses, and other costs.

Table 5

Estimated Societal Cost of Drug Abuse 1992-2002
Overall Cost (in billion of dollars)

Cost Category	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Health Care Cost	10.7	11.8	12.1	11.9	11.5	11.8	12.5	13	13.5	14.6	15.8
Productivity Losses	77.4	79.3	83.9	89.2	93.4	95.5	99.3	107.3	113.4	120	128.6
Other Costs	19.4	19.8	21.3	23.8	24.7	26.7	28.4	31.1	33.8	34.6	36.4
Total	107.5	110.9	117.3	124.9	129.6	134.0	140.2	151.4	160.7	169.2	180.8

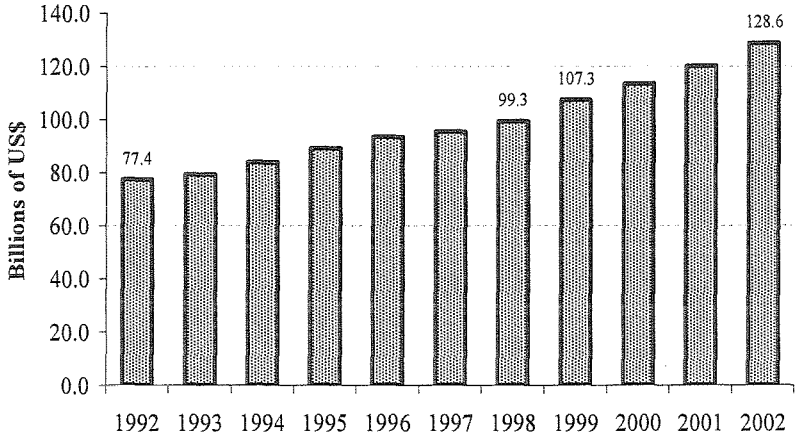
Source: The Economic Costs the United States 1992–2002
Executive Office of the President. Office of National Drug Control Policy

The largest share of costs is from lost potential productivity, followed by non-health 'other costs' and health-related costs. It is of note that the fastest increases in drug use costs have been in criminal justice efforts, particularly increased rates of incarceration for drug offenses and increased spending on law enforcement and adjudication. These costs are classified as 'other costs' in Table 5. The economic costs associated with health consequences and treatment and prevention initiatives show moderate increases.

Regarding to cost from productivity losses, this was the largest component of cost reaching a value at US$ 128.6 billion in 2002. The loss of productivity represents work in the labor market and in household production that was never performed, but could expect to be performed absent the impact of drug use (ONDCP, 2004). The Graph 15 draws the productivity related cost of drug consumption for each year between 1992 and 2002. In 1992 the estimated productivity loss was US$ 77.4 billion; in 1999 it was US$ 107.3 and in 2002 the cost rose to US$ 128.6 billion[42]. Between 1992 and 2002, productivity losses had a 5.2% annual increase.

Graph 15

Productivity Losses in the US
1992-2002



Source: The Economic Costs the United States 1992–2002
Executive Office of the President. Office of National Drug Control Policy

The greatest portion of productivity loss is from criminal activities being prosecuted, due to figures like 660,000 offenders imprisoned and others pursuing crime job to pay for their drug use. Together, there was a loss of about 1 million person years of effort that would have been available to the legitimate economy if these individuals had not been involved with drug-related crime (ONDCP, 2004). Similarly, there were an estimate 23,500 drug-

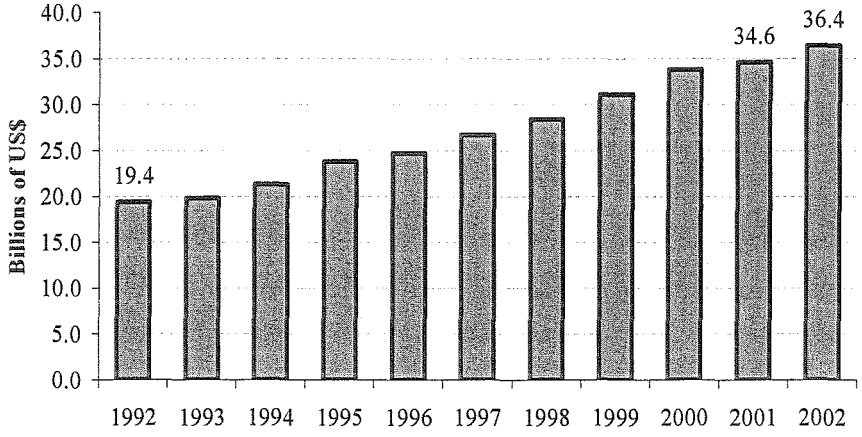
[42] According to ONDCP this rate of increase is higher than the combined increase in the population (about 1% annually) and in wage rates (about 3.1% annually) of 4.1% during this period, although it is identical to the 5.1% annual increase of total economic production (termed gross domestic product) in the US.

related deaths from all causes (e.g. overdose, poisoning, homicide, HIV and hepatitis B/C) in 2000.

Concerning costs related to other effects, this reached a value by US$ 36.4 billion in 2002. These are associated with the criminal justice system and crime victim costs. These also include a level of expenses for administration of the social welfare system. Graph 16 shows that trends in costs of the other effects of drug abuse rose at a 6.5% annual rate.

Graph 16

Cost of Other Effects in the US
1992-2002



Source: The Economic Costs the United States 1992–2002
Executive Office of the President. Office of National Drug Control Policy

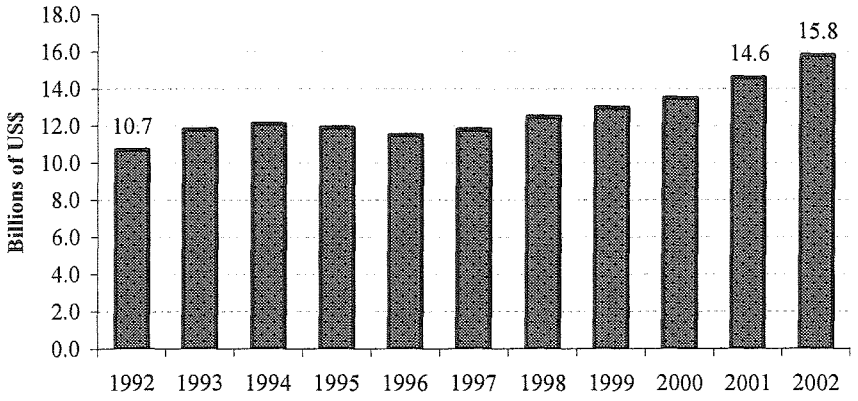
The largest component of these costs is for state and federal corrections valued at US$14.2 billion, where US$9.8 billion was spent on state and local police protection, followed by US$6.2 billion spent on federal supply reduction initiatives. It is of note that significant amounts of US criminal justice resources that are estimated to go towards drug abuse.

Finally, in 2002 the heath care costs were estimated at US$15.8 billion; while in 1992 they figured US$10.7. Graph 17 shows the health care related cost of drug abuse between 1992 and 2002. Health care costs increased 4.1% annually. The rate of increase in this component was moderated by decreases in spending for HIV/AIDS care. In 1992, the second

largest component of health care costs related to drug abuse was spending to care for HIV/AIDS patients[43].

Graph 17

Health Care Costs in the US
1992-2002



Source: The Economic Costs the United States 1992--2002
Executive Office of the President. Office of National Drug Control Policy

To summarize, according to The Office of National Drug Control Policy – ONDCP the total cost of drug consumption rose 5.3% annually between 1992 and 2002, growing from US$ 107.5 to US$ 180.9 billion. The most rapid growth in drug costs came from increases in criminal justice system activities, including productivity losses associated with growth in the population imprisoned due to drug abuse. Expenditures on health services and the costs of premature mortality grew at relatively slow rates, at least in part because of the development of more effective therapies for HIV. In this context, the social cost is a main criteria to decide what might be the most optimal policy for consumer countries. Minimizing the social costs of drug use should be the prime government target for consumer countries.

Unfortunately, there are not surveys related with social costs generated by drug production. However, these costs might be measures in lost of human and social capital

[43] Because of new treatments, the cost of caring for HIV/AIDS patients is estimated to have declined from US$ 3.5 to US$ 2.5 billion between 1992 and 1997, but is projected to have increased since that time due to increases in the number of HIV/AIDS patients.

produced by violence and criminality in the drug producer regions. The loss of productivity in the labor market for "work never performed" represents another cost to the society. Similarly, law enforcement applied to deterrence drug production and trafficking implies budget allocated to other uses with a high opportunity cost.

5 THE FRAMEWORK

5.1 Game Theory and International Politics

The application of game theory to international political economy – IPE –is not a new concept. This reappearance is associated with applications of game models to IPE, mainly in military political strategy analysis. Under game theory analysis international relations and policies are brought to contending 'interdependence' and 'realist'[44] positions where together there is a shared common framework. According to (Snidal, 1985)., the crucial point of the application of game theory is 'how it is understood politics among states' linking the goal seeking behavior of them in an interdependent international system.

Concepts of game theory analysis may provide a guide for building theory in IPE. The most of the essential concepts –strategic rationality, preference and payoffs– can describe many international relations problems. It is well known that the cornerstone of Realism is its treatment of states as rational actors (Ibid, 1985). This implies that states make logical calculations on available information to pursue well-defined goals[45]. The assumption of strategic rationality is fundamental piece of game theory understanding of international politics[46]. In the same way, each actor or state chooses a course of action based on preferences and expectations of how others will behave. A game theory view in international politics requires analyzing states' motivations and how their preferences are mapped into the payoff within a game model.

One common criticism of the game models is that they are very simple to capture the immense complexity of international politics (Stone, 2001). However, the value of a game representation is linked to it captures significant aspects of the international politics environment. Game theory also allows for wider interpretations, so that features not explicity entered into a model may be useful for understanding and interpreting it (Snidal, 1985). In

[44] Realists believe that states are power maximizers. For them the international system is based on anarchy, the use of force or coercion to resolve disputes is almost a certainty. Thus each state must always be prepared to defend itself. Thus politics is inevitably a conflictual exercise.
[45] Rationality in the contex of the Realist world is centered on the figth for power in an anarchic environment.
[46] In this context, individual actions and collective outcomes are interpreted in terms of states' strategic pursuit of self-interest.

this sense, game theory might be a flexible tool to incorporate many differing assumptions about world political economy and individual issues. Self-interest behavior among states is not presupposed as necessarily leading to cooperation or conflict. From this perspective, the game theory approach may provide clearer insights in analyzing such dynamics as setting anti-drug policy agendas and anti-drug policy creation and implementation relationships between stronger or weaker country players in the global political economy.

5.2 A Brief Literature Review

The international surveys associated with the drug market are wide and varied. Most of them are dedicated to demonstration features of the illegal market and effects of the measures to penalize the production and trade. Similarly, they attempt to replicate the legal measures taken against illicit markets and analyze the effects. In this context Becker and Grossman (2006), in a recent paper, consider the costs of reducing consumption of a good by making its production illegal and punishing detained illegal producers. They demonstrate with this survey that the inelastic demand or supply increases social cost making greater the enforcement efforts. Then, the optimal law enforcement policy depends strongly on the differences in the elasticities more than those between social and private values from consumption.

On the other hand, some international surveys examined and evaluated the effect of the anti-drug policies on the drug market. In this context, Jacobsson and Naranjo (2004) have developed models to explain how drug lords and producers react to two kind of anti-drug policies, reducing drugs demand and supply. They find that the first policy increases production cost and the second one has an impact on the drug lord through the control of distribution channels for illicit drugs. Similarly, Naranjo (2004) explains the possible effects of the anti-drug policies on the interaction between drug lords, rebel movements and a government. Naranjo remarks the interdiction is more effective than crop eradication to reducing the drugs supply. Adding to that approach, Poret (2005) discusses the problem of the optimal anti-drug law enforcement policy, revealing a model whose aim is the reduction of drug-related social cost incorporating relevant variables such as the social harm, the cost of law enforcement and the surplus of the agents involved in the production and trade.

From a different outlook and a macro perspective, Murshed (2004) constructs a model taking account North – South interactions and assumes restrictions to the illegal drug flows from South to North regions. This author considers two sceneries to implement policies. One of them involves reducing the drugs supply as a source, if this come adjunct by aid. He finds that drug supply restrictions increases the monopoly rents to drug lords and producers. Equally, this might benefit the North (donor) because the South can import security expenditure. This last fails to stimulate the domestic aggregate demand because the aid resources are not oriented towards poverty alleviation. Finally, Murshed finds that demand restriction as the first best policy is more effective to reducing the drug market size than the drug supply.

5.3 The Model

Game theory provides an appropriated theoretical structure to analyze the interactions of anti-drug policies between producer and consumer countries. This approach is a useful tool to understand the effects of decisions of one government over others through of the policy design process. In this sense, game theory models allow us to study the implications of a policy actor's rationality, country self-interest and equilibrium in situations where market interactions do not explain the agents' behaviors (Gibbons, 1997).

In a primary analysis, each country attempts to define policies according to its interests. A key assumption is that production, trade and consumption of currently illicit drugs discussed are all internationally forbidden. Then, the departure point is that there are only two countries: producers and consumers[47]. Both of them implement policies to attack the global illegal market according to their responsibility level. In others words, producers intend to fight against the drug supply and consumers try to reduce the drug demand. Therefore, governments of producer countries apply two kind of polices: (i) *law enforcement*[48] and (ii) *alternative development programs* to reduce the drug supply [49]; and

[47] This analysis can be reduced to two firms, agents or individuals.
[48] These kinds of measures attempt to eradicate the illicit crops, interdiction and punish the direct producers and traffickers.

consumer countries apply (i) *law enforcement* [50]; and (ii) *prevention measures*[51] to decrease the drug demand curve.

Consumer and producer countries have different agendas or interests in adopting a particular anti-drug policy. The first countries are inclined to choose policies to reduce supply more than demand. However, producers prefer to select policies to reduce demand rather than decrease supply. The motivation behind this behavior is that countries do not want to incur *social costs* to implement a particular policy when the problem is not necessarily local. In other words, they try to save efforts of assuming entirely the application of anti-drug policy due to the high social harm that it will produce.

Another concept category that must be included is the degree of influence of one country over others. Our analysis will assume that the decisions of one country affect the others. The country that defines the policy has the *power* to affect the decision of the other. In this way, the anti-drug policy can be vertically integrated around the world. Hence, it is possible to define the affecting countries as large countries (L) and affected countries as small countries (S)[52]. Thus, the L and S have different policy targets and interests. But these may change them if the countries have the influence and ability to change the initial conditions of the other's (Todd and Arce, 2003).

In this particular case and to simplify, the analysis assumes that L is a consumer country and S is a producer country. To introduce an initial game where L and S are involved it is important assume that each player chooses an action from a set of feasible actions. In a simple game, it will be the player's strategy (Gibbons, 1997). To reach *Nash* equilibrium, it is necessary to illustrate the interaction between two countries that try to define coordination in

[49] The first policy contends more repressive approach; meanwhile the second one is focused on protection of the illicit crops farmers.
[50] The law enforcement for reducing demand is devoted to condemnnig the trafficker, retailer and drug dealer in consumer countries.
[51] Prevention measures are associated with education campaigns to reducing drugs consumption.
[52] A country is L if this is able to define the best anti-drug policy for it and has power influence to deviate the best anti-drug policy of other's. Otherwise, a country is S if this assumes the policy imposed by other. Then, L can behave as leader and S as follower.

an optimal anti-drug policy. The game is static with complete information[53]. The simplest case to reach equilibrium in policy coordination is the solution that provides a game like the *prisoner's dilemma.*

The timing of this game is as follows: (i) L chooses an action a_1 from a set of feasible actions A_1 . Simultaneously, S selects an action a_2 from a set of possible actions A_2 . (ii) After the players choose their actions, they receive a payoff: $u_1(a_1, a_2)$ to L and $u_2(a_1, a_2)$ to S. Illustrating the game in terms of normal form to this anti-drug policy game and applying as optimal policy *law enforcement* to reducing drug supply it is possible define two kinds of strategies: cooperate (C) or not cooperate (NC) with the policy implementation.

Figure 1

		L C	*L* NC
S	C	4, 4	0, 3
	NC	3, 0	1, 1

In this hypothetical example, each country has its own agenda and the strategy selected responds to a particular interest. Assigning arbitrary pay off outcomes to each player, both countries reach stable *Nash* equilibrium in 1 square because there receive a higher payoff than 4 square. However, according to assigned values for each strategy, it seems the results are more beneficial when cooperation in the implementation of the policy occurs (Figure 1). Therefore, the dominant strategy is coordinating *law enforcement* between both countries: L and S will have a higher pay off functions if they do not.

This simple example illustrates how game theory might be used to explain a policy between two countries or regions that support a particular approach. The following step defines a game that allows us to model policy interactions between two actors.

[53] The static game with complete information is a simultaneous-move game with two or more players where there is no private information. In other words, the timing, feasible moves and payoffs of the game are all common knowledge. Similarly, there are dynamic games (solve by stages) with private or incomplete information. The static games with incomplete information are called *Bayesian games*. Therefore, each static *Bayesian game* has *Bayesian Nash equilibrium* that it is simply *Nash equilibrium* in *Bayesian Game*.

In order to identify how a producer and a consumer country reach a cooperative or non-cooperative equilibrium in the definition if an optimal anti-drug policy, this section presents a dynamic game with complete information. The game assumes the following: (i) two players make sequential movements in a simultaneous game and react to credible or non-credible threats. This game finds Cournot – Nash equilibrium after they apply the anti-drug policies; (ii) afterwards, it will be presented a dynamic designed in different stages and it will be solved using backward induction to find Nash equilibrium.

Initially, the game will be represented in extensive form to illustrate its dynamic [54]. In this context, we presume that the consumer country is represented by L, and it adopts a policy to reduce drug consumption or supply depends on its social cost. This policy might be designed under law enforcement principles. In the same way, producer country represented by S is interested in apply anti-drug policy to reduce supply or deterring drugs consumption through *law enforcement* depending on its social cost. In the first place, this section assumes that L is not able to influence the policy designed by S. Even though each player is willing to cooperate to define the best one, the policy objectives are different.

Before we continue the analysis, it is precise to define a *social cost function* that shapes the actor's expectations and decisions. It is well known that the illicit drug market creates high costs for society due to the harmful effects of social productivity and public health.

5.3.1 The Social Cost Function

According to Poret (2005) the social cost is an opposite notion to social welfare. This approach is traditionally defined as the sum of individual benefits obtained by committing their acts, minus the harms caused and less net cost of law enforcement (Polinsky and Shavell, 2000). From this view, the net social cost function might be expressed as the sum of social harms (H), the resources assignated to design and implement law enforcement policy

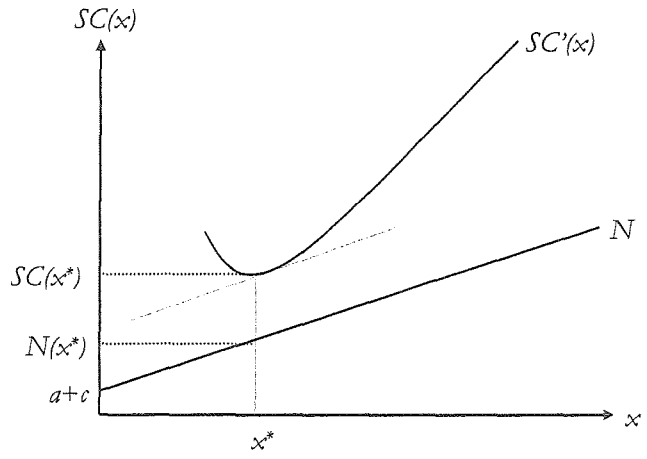
[54] The game is presented in tree decision way.

(D) and the amount of illegal drugs captured or destroyed (N)[55]. In this sense, the social cost is related with the amount of drug consumed or manufactured by the society (x).

$$(1) \qquad SC(x) = H(x) + Dx - N$$

Similarly, the social harms are a function associated with degree of morbidity and criminal activity. It is defined as a continuous function that includes costs related with health externalities produced by drugs consumption and the violence linked with the illegal market. Following Poret (2005), $H'(x)>0$. The derivate illustrates how the amount of consume affects negatively to the society through health, crime consequences and the loss of potential productivity.

Figure 2



Each country (L, S) has their own social cost function. In other words, L and S are inclined to minimize the social cost of reducing illegal drugs demand and supply. Hence, the aggregate social cost might be fragmented as to L as to S. In this context, we will break up x in two components, x_d: drug consumption in L, and x_s: drug production in S. We will suppose to simplify our analysis that x_d and x_s, are goods entirely different.

[55] $\frac{\partial^2 SC_i}{\partial x_i^2} > 0$. This implies that the social cost is convex function.

5.3.2 The Anti-drug Policy: Law Enforcement Case

The policy makers of the both countries must decide if it is better to adopt the law enforcement policies to deter demand or adopt measures to control supply. Hence, the social costs functions to *L* will be defined by the following equations:

$$(2) \qquad SC_d(x_d) = H(x_d) + D_d x_d - F$$

$$(3) \qquad SC_d(x_d) = H(x_d) + D_d x_d - [a + (b - D_d)x_d]$$

Then the social cost function to *S* will be examined by the next equations:

$$(4) \qquad SC_s(x_s) = H(x_s) + D_s x_s - E$$

$$(5) \qquad SC_s(x_s) = H(x_s) + D_s x_s - [c + (d - D_s)x_s]$$

In equations (2) and (4), *F* represents the amount of illegal drugs captured by police force in *L*, and *E* represents amount of the drugs destroyed in *S* by *the enforcement policy*. Both variables are linear functions of *x*. Assuming that γx_d^2 is a quadratic and arbitrary function to $H(x_d)$ and θx_s^2 the same to $H(x_s)$; then, minimizing the social cost functions to each country; it will be reached the first order conditions (*foc*);

$$(6) \qquad \frac{\partial H}{\partial x_d} + 2D_d - b = 0 \quad \text{where} \quad \gamma x_d + D_d = \frac{b}{2}$$

$$(7) \qquad \frac{\partial H}{\partial x_s} + 2D_s - d = 0 \quad \text{where} \quad \theta x_s + D_s = \frac{d}{2}$$

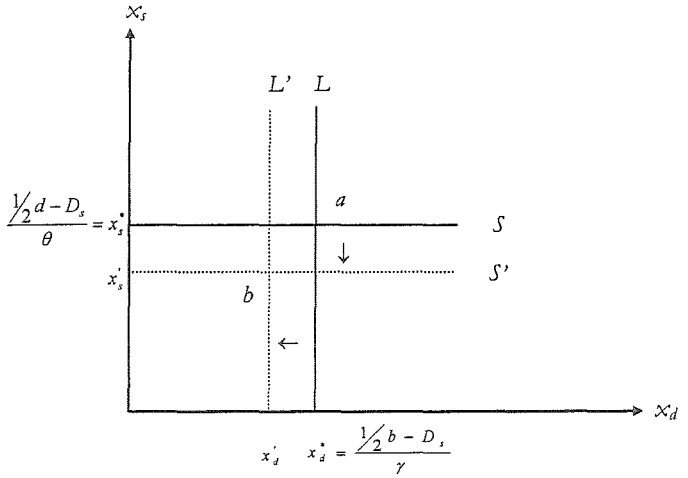
The *foc* point out the policy maker is task will be comparing the marginal social cost that creates drug consumption (production) with the policy effectiveness[56]. Whether the social marginal cost of law enforcement – SMCLE is higher than policy effectiveness; L or S will have to adopt an opposite policy to their natural interests[57]. In other words,

[56] Legalization of the drug market will imply that D_s and D_d =0. Then, law enforcement will be changed by another policies like prevention and educational campaigns to reduce drug demand and alternative development to decrease drug supply.

[57] *L* reduces drugs demand and *S* controls drugs supply.

when $D_d > \frac{b}{2} - \frac{\partial H}{\partial x_d}$, this is ($SC(x_d) > SC(x_d^*)$), L will prefer to reduce the drug supply instead of drug demand. Otherwise, it will prefer to reduce the drug demand. On the other hand, when $D_s > \frac{d}{2} - \frac{\partial H}{\partial x_s}$, this is ($SC(x_s) > SC(x_s^*)$), then S will choose to reducing the drug demand instead of drug supply. On the contrary, it will try to reduce the drug supply (figure 2)

Figure 3



The figure 3 shows the effect of the law enforcement policy on x_d and x_s. No cooperation in the anti-drug policies implies that L and S apply autonomously the policies. The direct outcome of the policy adoption will be less drug consumption and production[58].

5.3.3 Policy Interactions, Cooperation and Interdependence

Cooperation between L and S imply to apply anti-drug policies agreed to reduce the illegal market. The coalition of both players means that they have to share the anti-drug policy cost through budget assignated to as drug suppliers as consumer countries. Therefore, if both countries cooperate, there is interdependence in the policies to reduce x_d and x_s. Then, L and S may cooperate to reduce the size of illegal market, but there is a coordination failure when each country does not reach the cooperation expected or the optimal share of budget allocated to reduce x_i. In other words, there is cooperation but it is not optimal to reduce the size of illegal market.

[58] The Nash equilibrium changes from *a* to *b* due to an increase of D_s and D_d reduce drug production and consumption.

In order to model the policy interactions between two countries, this section supposes that variable D is affected from outside policy decisions. This is to say, the budget to finance the anti-drug policy can be deviated from L to S or vice versa to influence a particular policy. In this case, L will be interested to reduce drug supply and S will do it to decrease drug demand. Therefore, the analysis will suppose that $D_T = D_d^T + D_s^T$, where D_T are total budget of the anti-drug policy. Then:

$$(8) \qquad D_d^T = \alpha D_s + (1-\alpha)D_d \quad \text{and} \quad D_s^T = \beta D_d + (1-\beta)D_s$$

The equation (8) implies that there is share of resources (α) from *S*'s policy budget devoted to finance the *L*'s anti-drug policy. Similarly, a portion of resources (β) from *L*'s policy budget will be assignated to finance the *S*'s anti-drug policy. In real life, the last assumption is more plausible.

Replacing these restrictions (D_d^T and D_s^T) in the social cost functions (3) and (5); and minimizing these functions will be obtained the following *foc*[59]:

$$(9) \qquad \frac{\partial H}{\partial x_d} + 2\left(\alpha D_s + (1-\alpha)D_d\right) = b \text{ , where } x_d^* = \frac{b - \left[\alpha D_s + (1-\alpha)D_d\right]}{2\gamma}$$

$$(10) \qquad \frac{\partial H}{\partial x_s} + 2\left(\beta D_d + (1-\beta)D_s\right) = d \text{ , where } x_s^* = \frac{d - \left[\beta D_d + (1-\beta)D_s\right]}{2\theta}$$

The equations (9) and (10) show the inverse relationship between anti-drug policies and drug consumption and production. Similarly to (6) and (7), when L or S decides to increase D_i will lead to reduction in drug consumption and production. The Nash equilibrium is reached in similar way as it is described in appendix 2, figure 1b. This is a cooperative

[59] In the same way, $SMCLE_d > b = \alpha D_s + (1-\alpha)D_d > b - \frac{\partial H}{\partial x_d}$ implies that L prefers to reduce drugs supply than demand even though S there would be deviated resources to strengthen the anti-drug policy in L. On the other hand, with the condition $SMCLE_s > d = \beta D_d + (1-\beta)D_s > d - \frac{\partial H}{\partial x_s}$, S prefers to reduce drugs demand than supply although L there would be contributed to define the S's anti-drug policy. In other words, L observes how external policies have internalized in its marginal cost; therefore it decides to adopt a policy to reducing drug supply besides the efforts made by S. The same behavior can be replicated to S.

equilibrium since both countries define their anti-drug policies –based in law enforcement- deviating budget from the L and S to reduce the size of illegal market. The interaction and cooperative game are successful to reduce drug consumption and production[60] (figure 1b).

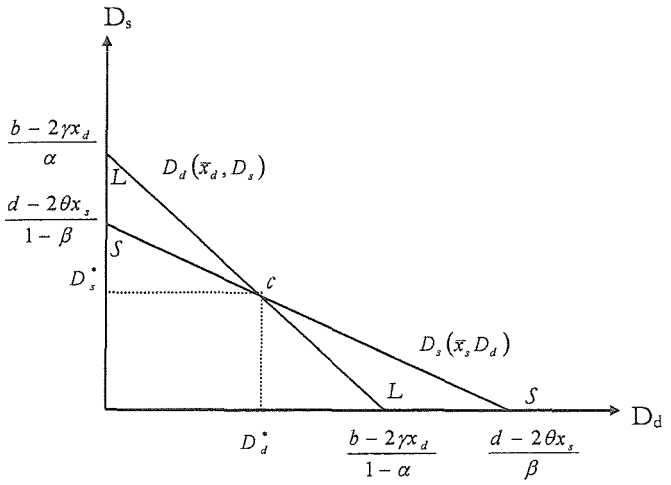
However, it is interesting look at how the anti-drug policies reach Nash equilibrium when have been found the optimal levels of x_d and x_s. In order to reach this, the functions (9) and (10) must be expressed as:

$$(11) \qquad D_d = \frac{b - 2\gamma x_d - \alpha D_s}{(1-\alpha)}$$

$$(12) \qquad D_s = \frac{d - 2\theta x_s - \beta D_d}{(1-\beta)}$$

The equations (11) show as an increase of drug consumption implies less budget to D_d. In the same way, larger resources to D_s imply less to D_d. The equation (12) explains that higher levels of drug production means less resources to finance D_s and greater demand for budget to D_d will imply less to D_s. The equations (11) and (12) represent the reaction functions of anti-drug policies. These may be illustrated in figure 4.

Figure 4



[60] The new equilibrium is reached in B' (see appendix 2, figure 1b).

Similar the *Cournot – Nash* equilibrium solution in an oligopoly model, it may be found a symmetric *Cournot* solution to D_d and D_s, and similarly their policy interaction. In this case;

$$(13) \qquad D_d^* = \frac{(1-\beta)[b-2\gamma x_d]+\alpha[2\theta x_s - d]}{1-\alpha-\beta}$$

$$(14) \qquad D_s^* = \frac{(1-\alpha)[d-2\theta x_s]+\beta[2\gamma x_d - b]}{1-\alpha-\beta}$$

The equations (13) and (14) are the optimal level of the law enforcement policies – given x_d and x_s – that minimize the social costs. The optimal policies show some intuitive relations. Firstable, in (13) the effectiveness of the budget devoted to reduce drug demand (D_d) will decrease due to increase of x_d will expand the marginal social harms of drug consumption over amount of drug taken over by application of law enforcement ($(1-\beta)[b-2\gamma x_d]>0$). On the other hand, the effectiveness of D_d (allocated in L) will rise because of an increase in x_s will expand the marginal social harms of drug production over quantities of drug production destroyed ($\alpha[2\theta x_s - d]>0$).

Secondly, in (14) the effectiveness of the budget targeted to reduce drug supply (D_s) will decrease in S due to increase of x_s will expand the marginal social harms of drug production over amount of drug captured or wiped out by application of law enforcement in S ($(1-\alpha)[d-2\theta x_s]>0$). Similarly, the effectiveness of D_s in S will rise because of an increase in x_d will expand the marginal social harms of drug consumption over amounts of drug captured ($\beta[2\gamma x_d - b]>0$).

In this simultaneous game *Nash* equilibrium is determined in (x_d^*, x_s^*). This means the levels of drug consumption and production are influenced by anti-drug policies. Therefore, a variation of the policy will change their equilibrium levels[61] (figure 1b). The figure 5 illustrates how reallocation of resources from L's policy affects S's policy. This is expressed through the reaction curves of the equations (13) and (14). Nash equilibrium is reached in *c*. The figure 6 shows the effect of the anti-drug policy in x_d and x_s. An increase of D_d or D_s, or

[61] The shift of the curves generates new equilibriums as in drugs consumption as in production. It is worthy note that a potential change in D_d can create variations in x_d and x_s; and similarly, possible changes in D_s have the same effect in the both variables.

both of them will reduce as drug consumption as production. The new Nash equilibrium is reached in *B'*.

Figure 5

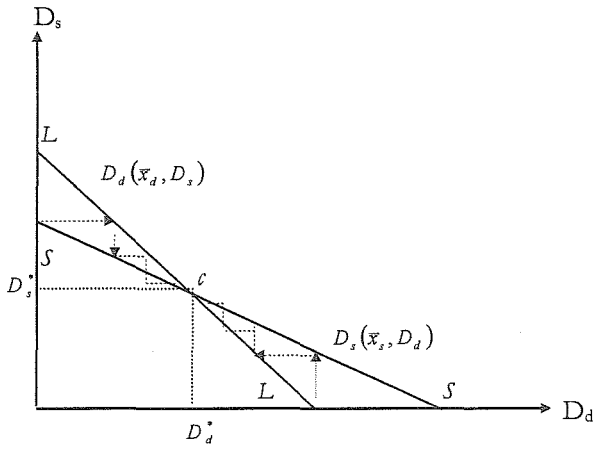


Figure 6

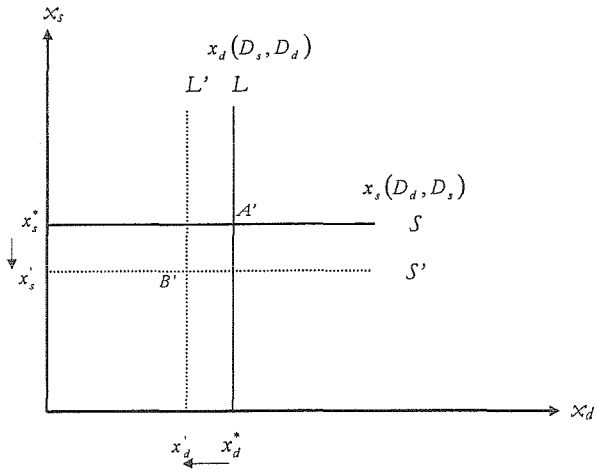
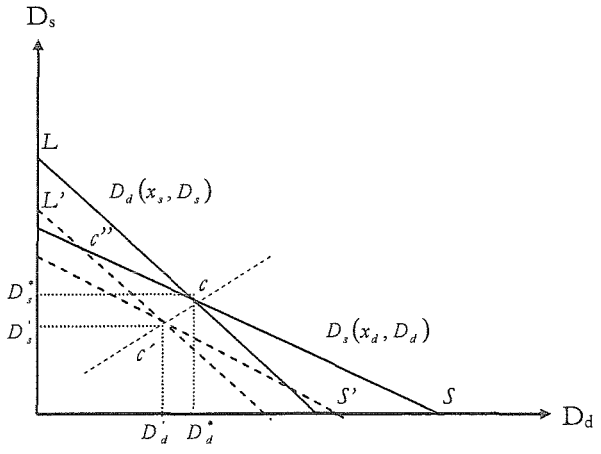


Figure 7



In the other hand, the figure 7 shows the effect of the x_d and x_s changes on law enforcement policies. An increase of x_d or x_s may shift downwards the curve reactions, reducing the anti-policy effectiveness. The moving equilibrium points from *c* to *c'* imply that when drug production and consumption increases the law enforcement policy loss effectiveness, while reductions of x_d and x_s mean high policy effectiveness. In other words, D_d and D_s are effective to reduce x_d and x_s. The last case is also represented in figure 6.

The positive variations in x_d and x_s increases total social marginal cost (TSMC) of L and S; and they lead to change the intercept of the reactions curves. For example, an increase in the social marginal cost because of raise in x_d (through shift L to leftward) will reduce D_d effectiveness and increase D_s's (L' curve in figure 7) if we compare with initial equilibrium level (c)[62]. This effect is due to increase in x_d raise the opportunity cost to apply D_d in L and it will reduce the opportunity cost to apply D_s. Similarly, an increase of x_s reduces D_s effectiveness and to increase D_d's in S. This last is explained because the opportunity cost to apply D_s is higher than D_d's.

5.3.4 Policy Interactions from Large to Small Country

The interaction in two countries is the general and symmetric case where each country is able to influence anti-drug policy of other's. However, this section assumes that the degree of influence originates only from one country. In this case, L is able to persuade S in choosing that policy. This means L has ability to reduce drug supply through S's anti-drug policy. The figure 8 faces the effect of D_s over S: a reduction of x_s and x_d. But the reduction of x_d is not of the same magnitude of x_s reduction. However, a reduction on x_s implies S's a marginal social cost decrease and an increase L's, leading to improve the D_s effectiveness.

Figure 8

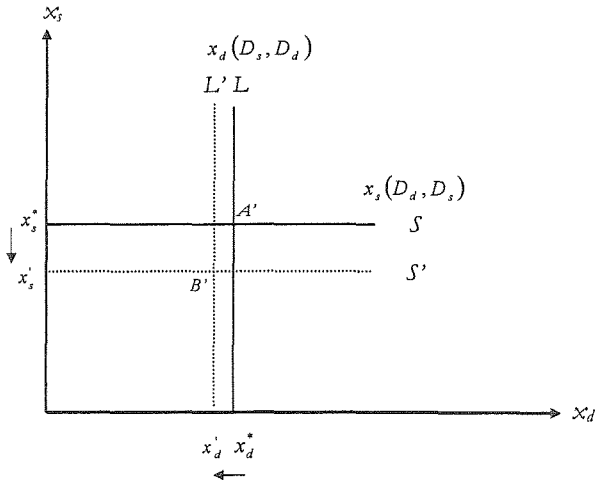
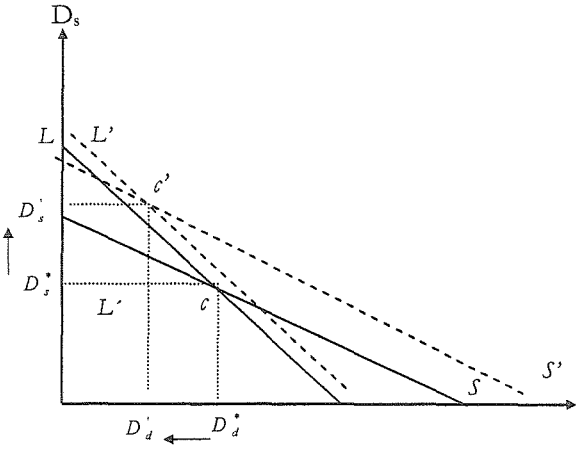


Figure 9



[62] The equilibrium points moves from c to c'' in figure 7.

If L has the power to influence S's anti-drug policy, then S will be typical drug producer country as it have been claimed in the last sections. Hence, L will have ability to affect the policy implemented by S. In this context, L transfer resources to reduce drugs supply in S. As consequence the policy intervention will lead to reduce x_s and x_d. But x_d reduction will not be of the same magnitude that x_s reduction.

The anti-drug policy to reduce x_s implies transference budget resources from D_d to D_s. Therefore, the new Nash equilibrium is reached in *c'* (figure 9). This new equilibrium means that D_d effectiveness is low in L with a high social marginal cost. In that case, anti-drug policy to reduce drug demand is not effective in L. The social marginal cost increase in L due to there few resources to reduce drug demand.

5.3.5 The Dynamic Game

The dynamic game used to find the equilibrium is not completely different from the results in the simultaneous game. Nevertheless, the advantage of the dynamic game is its representation. This allows understand how countries are playing and choosing the best anti-drug policy. The game will be represented in two stages. In the simple game L or S chooses two strategies: to reduce x_d ot to reduce x_s.

In this case, there are not policy interactions; therefore each policy is determined independently of other. Each player will select their strategies according to the SMCLE. This is say, if for L the social marginal costs to apply anti-drug policies to reduce drugs demand is higher than those adopted to reduce supply, then it will choose apply D_s; otherwise if SMCLE to decrease drug supply is superior to reduce demand, the L will choose reduce D_d.

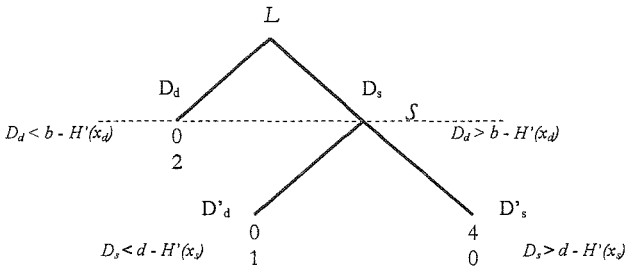
Each country chooses the more appropriated anti-drug policy according to their SMCLE. However, there is no influence in the policy selection between any countries. Therefore, L or S minimizes the social cost and find the strategy that incur in the minimal cost. For example, for L the strategy might be to reduce drug consumption. But if L has on SMCLE higher than the amount of drug captured by police authorities (b) and the marginal social harms produced by drug consumption ($\frac{\partial H}{\partial x_d}$), this country will prefer to select a policy

to reducing drug supply. The same rationality applies for S. When each player selects the best strategy according to SMCLE, the game has ended, because any country has possibility to affect other.

5.3.6 Policy Interactions in a Dynamic Game

Under the assumption of policy interactions one player is able to influence to the other player's policy. In this particular situation, L is inclined to adopt an anti-drug policy to reduce drug supply implemented by S. This behavior is illustrated in the game of extensive form depicted in the figure 10.

Figure 10



It is clear that, the S's strategy is to reduce drug production. If S is not exposed to any influence and its SMCLE is higher than the amount of drugs destroyed (d) and the marginal social harms, then it will choose D_d. Nevertheless, if L is able to influence S's policy: to say a share of resources from L is relocating to finance S's anti-drug policy. Then, the strategy to reducing supply will affect the S's decision. In that case, S will adopt the strategy of reducing the drug supply defined by L.

To find the game solution we may use *backward induction outcome*. In the first step, S's social cost is minimized. Then it is found the optimal level of x_s affected by L's anti-drug policy. Next, x^*_s is substituted in L's social cost function and finally, L's social cost is minimized. Therefore, the Nash equilibrium will be obtained; where:

$$(15) \quad \hat{x}_d = \frac{b - [\alpha D'_s + (1-\alpha) D'_d]}{2\gamma}; \quad (16) \quad \hat{x}_s = \frac{d - [\beta D'_d + (1-\beta) D'_s]}{2\theta}$$

It is of note that, $D_s^{'} > D_s$, $D_d^{'} < D_d$, $\hat{x}_d < x_d^*$ and $\hat{x}_s < x_s^*$. Proceeding solving the game through *backward induction*, it is obtained the same Nash equilibrium reached it in the figure 8. The results of the policy show the strategy applied by L in S generates a reduction in x_s and x_d. This last is less than proportional to x_s reduction, since to the strategy to reduce drug demand will have few resources to implement the anti-drug policy in L.

Similary, TSMC in S is reduced due to policy implementation, whereas TSMC in L faces a relative increase. This last implies that drug dealers can increase their profits in the streets because of expansion of the retails in L. Therefore, there is a trade off in the policy effectiveness when the *large country* influences the *small country* policy. More effectiveness to reducing production in S means little effectiveness in decreasing consumption in L. The Nash equilibrium to ant-drug policies are the same found them in equations (13) and (14).

The game theoretical model developed above found some equilibrium conditions on x_s and x_d that describe the optimal shares of the budget (α and β) that L and S must target to achieve the best anti-drug policy. The optimal shares that guarantee an effective policy to reduce drug consumption and production are the following conditions:

$$(17) \qquad \alpha = \frac{b - 2\gamma x_d + D_d}{D_d + D_s};$$

$$(18) \qquad \beta = \frac{d - 2\theta x_s + D_s}{D_d + D_s}$$

These were found from the optimal levels of x_d and x_s in the equations (9) and (10). In other words, the optimal shares of budget are defined as proportion of D_d and D_s in the total budget assignated to anti-drug policies, repectively. These coefficients allow knowing the impact of the anti-drug policy over drug consumption and production; and finding their optimal shares of the L's budget and S's. If the cooperation were symmetric, to say L and S contribute with same shares then $\alpha = \beta = 0.5$. However, it is not necessary the optimal cooperation. The optimal α or β is such that allows reduce the drug consumption and drug production.

6 Analysis of Data and Results

Data is chiefly provided by the United Nations Office on Drugs and Crime (UNODC) and the United States Department of State. The statistical information takes into account only two variables, hectares of illicit crops and the US budget allocated towards combating drug production. These variables have been amply described in the previous sections. The EU budget was not included in the empirical approach because of lack of annual historical series. The European Commission is improving its source of information to better future research regarding EU international assistance.

This section describes data and results using information on hectares of coca crops in the Andean region, hectares on cultivated opium in Laos and Afghanistan; and US aid targeted to these countries. The data period is ten years, from 1996 to 2005. The US budget allocated for drug producer countries was normalized to reflect each country's total population. Budget trends are shown in Graphs 19 through Graph 24.

6.1 Results

To begin, coca producers located in the Andean region exhibit a different trend than opium producers elsewhere. US budget allocations show optimal effects in Colombia and Peru, where produced coca crops decrease, but after a certain drop, coca crops tend to increase again (Graphs 18 and 19). In Colombia, if the US allocates US$10.6 more per head to reduce coca crops, cultivation might increase. Similarly, if the US assigns more than US$2 per head to reduce coca cultivation in Peru, coca crops might increase once again. In the Bolivian case, the correlation is completely negative; more US assistance implies coca crop reduction. Therefore, anti-drug policy is effective in Bolivia.

According to UNODC data, the Andean Region also shows a shift in the trend. If US aid allocates more than US$8 per head; the anti-drug policy will not be effective in reducing coca crops. US government data shows that the trend in the Andean Region is similar to that drawn with UN data. Allocating more than US$8.3 per capita to reduce drug production will cause increases in coca crops.

The opium producer countries' case is entirely opposite to the Andean Region. More US assistance equals more opium crops cultivated. This situation is evident in Afghanistan, which shows a positive relationship between US assistance and opium crop increases in production. In Laos, the trend has an inverted U-shape, where more assistance implies increases in opium cultivated areas. A US budget of more than US$0.14 equals reduced opium cultivation levels (Graph 22).

The information or data on assigned budgets in drug producer countries is few and not very reliable. The data found was insufficient to perform a relevant analysis. However, the information provided allows for trend analysis in Colombia and Peru. In the same way, results show the β for Colombia and Peru. The few observations for Colombia[63] and Peru[64] also show that there is a positive correlation between the Colombian government budget and coca crop production (Graphs 23 and 24). This situation is clearly seen in US government data also. However, the correlation for Peru is positive with UNODC data and negative with US government data.

The optimal β estimated for Colombia is 0.3. According to the data, it implies that an optimal share of the US budget is 30% of total resources, while Colombia must contribute with 70% of the budget. However, the results are not robust due to lack of information regarding drug producer country budgets. In the same way, the optimal β calculated for Peru is 0.06. This means that the optimal cooperation for the US is only 6% of the budget and the rest of the resources will be financed by Peru's government (Graphs 25 and 26).

The relationship between US assistance and area under illicit crop cultivation in the most important drug producer countries[65] is positive according to a simple Ordinary Least Squares - OLS estimation method. The panel data model was estimated through fixed and random effects[66]. The models are presented in the equations (19) and (20), respectively.

---

[63] For Colombia, the information found content only 4 observations; since 1999 to 2002.
[64] For Peru, the annual data found starts in 2000 and end in 2004.
[65] Afghanistan, Laos, Peru, Colombia and Bolivia.
[66] Fixed effects imply that the effects of a change in D_d are the same for all countries and periods, but that average levels are different between countries. The α_i captures the effects of those variables that are particular to the countries and that are constant over time. Similarly, random effects assumes that the intercepts of the

$$(19) \quad \ln x_{s_{it}} = \alpha_i + \beta_0 \ln D_{d_{it}} + \beta_1 \left(\ln D_{d_{it}}\right)^2 + \delta t_{it} + \varepsilon_{it}$$

$$(20) \quad \ln x_{s_{it}} = \alpha_i + \beta_0 \ln D_{d_{it}} + \beta_1 \left(\ln D_{d_{it}}\right)^2 + \mu + \delta t_{it} + \varepsilon_{it}$$

In the models all variables are known, less *t*. *t* is time and with a dummy variable (δ). In the random effects model the country effects α_i are treated as random. Therefore, the error term has two components: a time invariant component α_i and ε_i that is not related over time.

Table 6

Variables	Fixed Effects		Random Effects	
lnx $_s$	*Coefficient*	*t-statistics*	*Coefficient*	*t-statistics*
$\ln D_d$	1.393	2.82	1.344	2.86
$(\ln D_d)^2$	-0.340	-2.06	-0.328	-2.07
t_2	-0.182	-0.53	-0.176	-0.52
t_3	-0.234	-0.68	-0.226	-0.67
t_4	-0.336	-0.97	-0.328	-0.97
t_5	-0.497	-1.29	-0.488	-1.30
t_6	-0.901	-2.58	-0.892	-2.62
t_7	-0.875	-2.15	-0.851	-2.17
t_8	-0.675	-1.78	-0.660	-1.8
t_9	-1.025	-2.46	-1.000	-2.49
t_{10}	-1.182	-2.9	-1.157	-2.95
Intercept	10.402	36.55	10.419	19.3
R^2 within	0.342		0.342	
R^2 between	0.115		0.115	
R^2 overall	0.180		0.181	
No. of Obs	50			

Source: Author's calculations, base on the US government data

Table 6 shows the results of model based on panel data with fixed and random effects. In both models D_d is positive with high level of significance ($\ln D_d$). Although the causality relationship between x_s and D_d is not so clear, more allocated US aid for anti-drug policies in producer countries implies increases in cultivated areas. An increase of 1% of the US budget has an expansionary effect on hectares of illicit crop cultivation. However, the

countries are different but they can be treated as drawings from a distribution with mean μ and variance σ^2. These drawings must be independent of the explanatory variables, to say D_d (Verbek, 2001).

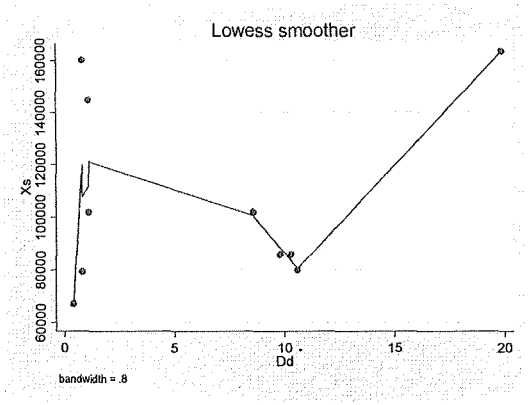
coefficients of the dummy variables in t show that the increase of US aid expands illicit crop area in a diminishing way. Therefore, the anti-drug policy has not been effective to reduce illicit crops in the world's main drug producing countries.

To summarize, the US budget allocated to the Andean Region shows the resources devoted to reduce drug production. Budget allocations greater than US$10.6 and US$2 per head might to reduce the coca crops cultivated in Colombia and Peru, respectively. Bolivia does not show the same trend because assistance has progressively reduced illicit crops. Furthermore, the final estimated US budget necessary to reduce coca crops in the Andean region is more than US$8 per head. Regarding the optimal share, the β estimated for Colombia is 0.3, while for Peru it is 0.06. This means that the optimal cooperation level for the US should be 30% targeted towards Colombia and only 6% towards Peru.

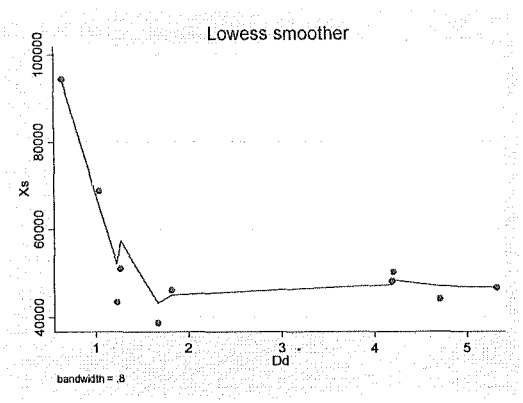
According to a model based on panel data with fixed and random effects, the relation between US assistance and areas under illicit crops cultivation, within the major drug producers, is positive. This implies that more investment in anti-drug policy to reduce drug production might increase illicit crops cultivated, producing the opposite intended effect of US policy.

Graph 18
Data provided by UNOCD

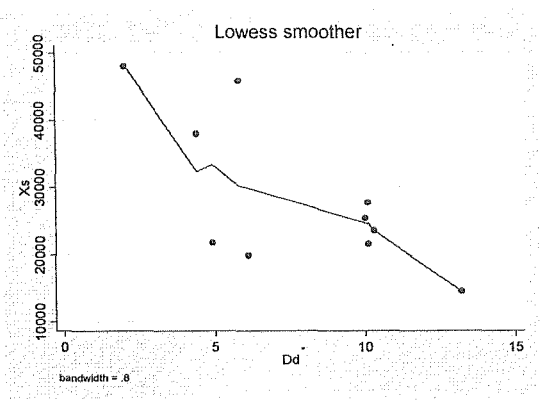
Colombia



Peru

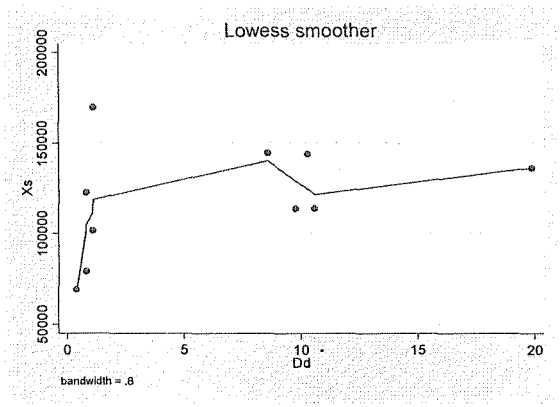


Bolivia

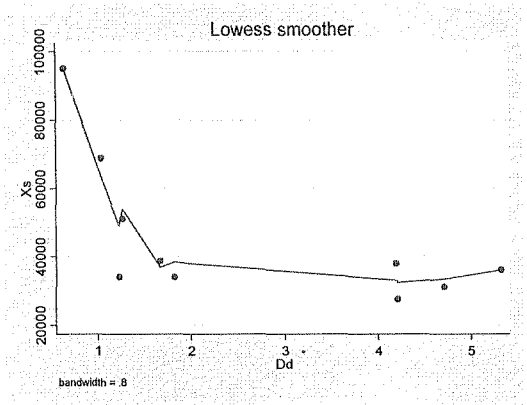


Graph 19
Data provided by the US Department of State

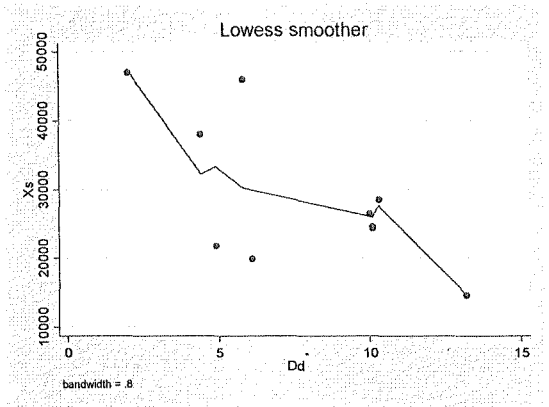
Colombia



Peru

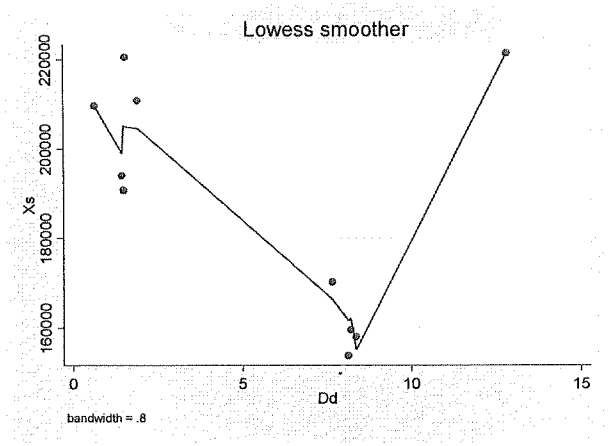


Bolivia

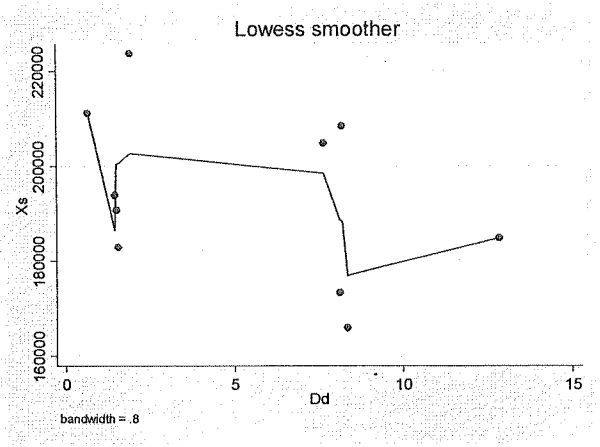


* D_d is normalized by total population

Graph 20
Total Andean Region
Data provided by UNODC

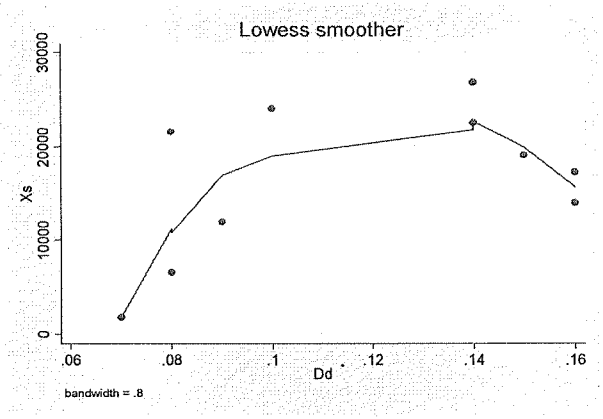


Graph 21
Total Andean Region
Data provided by the US Department of State

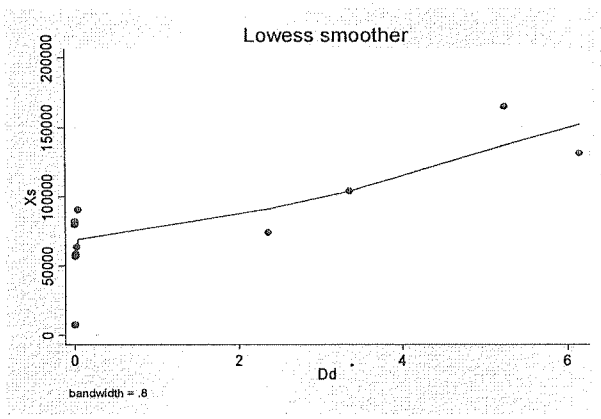


Graph 22
Data provided by UNOCD

Laos



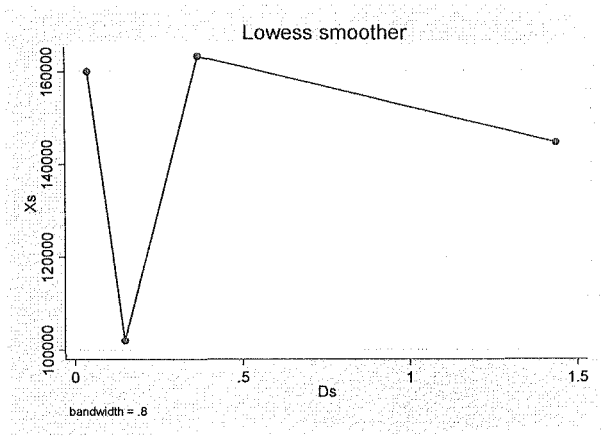
Afghanistan



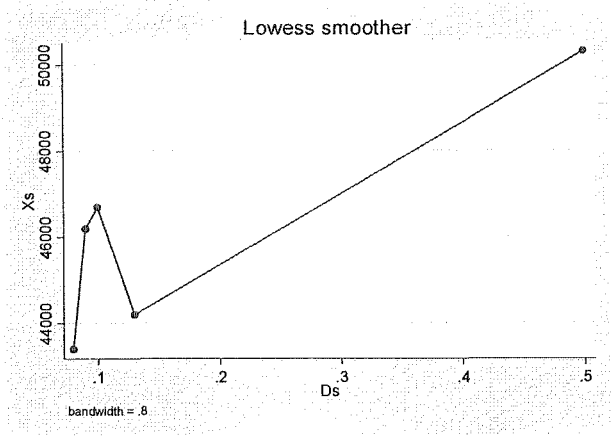
* D_d is normalized by total population

Graph 23
Data provided by by UNOCD

Colombia

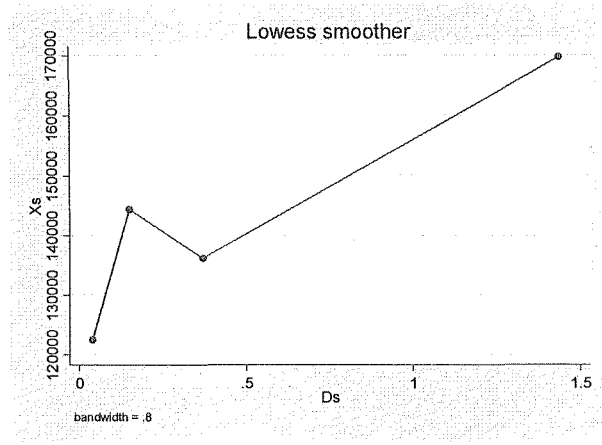


Peru

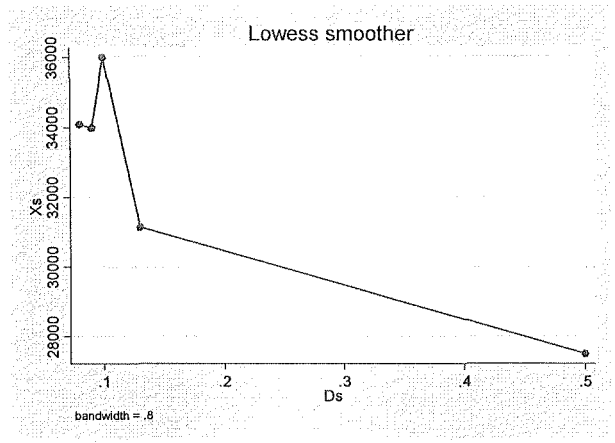


Graph 24
Data provided by the US Department of State

Colombia



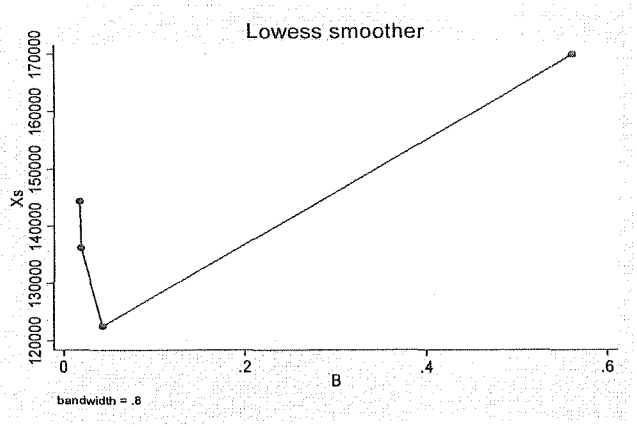
Peru



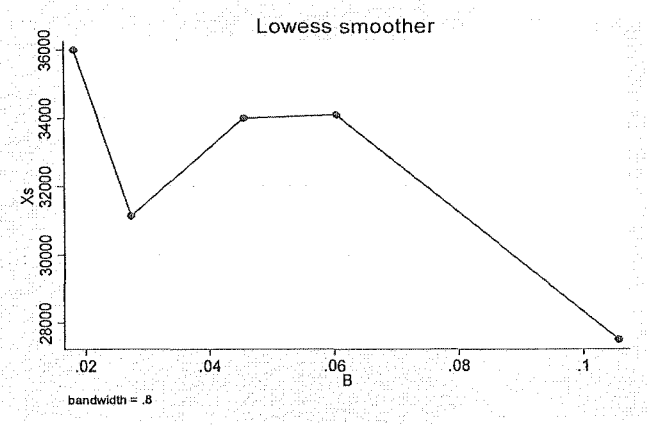
* D_s is is normalized by total population

Graph 25
Data provided by the US Department of State

Colombia

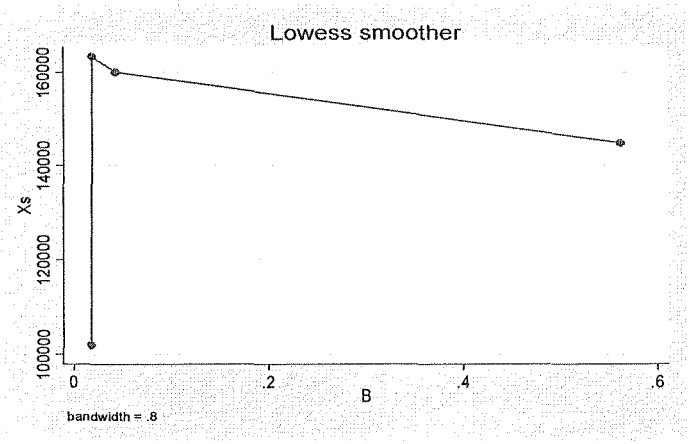


Peru

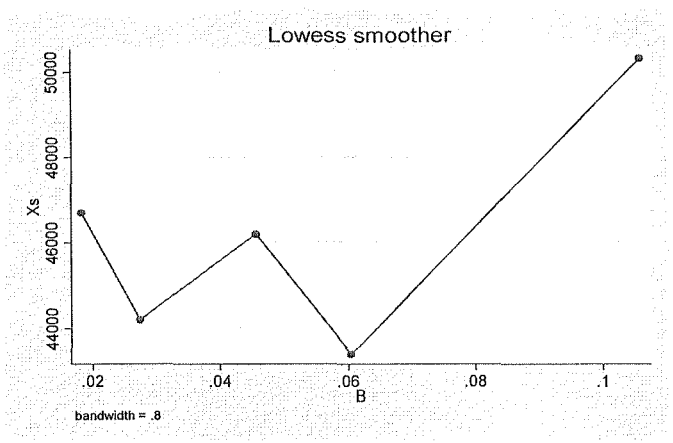


Graph 26
Data provided by the US Department of State

Colombia



Peru



7 CONCLUSIONS

This paper examines the implications of the anti-drug policies in two kinds of countries: illicit drug consumer and producer countries. Based on empirical information and the current policy approaches the analysis illustrates a game where the actors are able to find a cooperative equilibrium in their strategies under the logic of interdependence. Its findings point out that there is an optimal level of cooperation between consumer and producer countries. These conclusions are based on varying facts outlined in the following paragraphs.

In the international context the anti-drug strategies to reduce demand have focused resources on education campaigns to prevent consumption focusing on the most vulnerable population groups. In contrast, the supply policies have concentrated their efforts to control illegal drug production through repressive measures, such as elimination of illicit crops, interdiction, and the use of law enforcement. However, both approaches have not demonstrated to be balanced and symmetrical as desired by the international community.

The data information shows Cannabis is the biggest market in the world and Morocco as the principal supplier. Over 90 % of the world opium supply originates in Afghanistan, Myanmar and Laos; and Colombia, Peru and Bolivia are the largest principal producers of coca products. Although Marijuana and synthetic illegal drug supplies are increasing around the world, cocaine maintains the same availability on average.

Drug consumption has increased in the US and EU, mainly in cannabis, cocaine, heroin and ecstasy. US cocaine consumption has increased since 1994, while amphetamine demand has decreased over time. Amphetamine consumption has shown a marked reduction, and cannabis consumption has not increased to its higher levels in the early 1990's.

Regarding US aid to control narcotics, the data shows that efforts have achieved an important reduction in illicit crop production, especially in the Andean Region[67]. Here the

[67] Peru and Bolivia decreased its illicit crops but Colombia compensated for this reduction.

predominant policy focus is on law enforcement. US assistance targeted to reduce poppy crops in Afghanistan and Laos does not exhibit a strong correlation with reduced areas cultivated. On the contrary, more US aid seems to imply an increase of illicit crops produced.

In the US, the total social cost of drug consumption rose 5.3% annually between 1992 and 2002, growing from US$ 107.5 to US$ 180.9 billion. The most rapid growth in drug costs came from increases in criminal justice system activities, including productivity losses associated with growth in the population imprisoned due to drug abuse.

According to these facts, cooperation between countries should focus on applying anti-drug policies which mutually agree towards a reduction of the illegal market. The coalition of both players means that they have to share anti-drug policy costs through the development of budgets or assistance programs taking into account goals and results in producer as well as consumer countries. Therefore, if both countries cooperate, there is interdependence in the policies, thus promoting optimal policies to reduce consumption and production. However, a coordination failure will do each country a disfavor and the optimal share of the budget to reduce the illegal market will not be achieved.

The optimal share of the US budget estimated for Colombia is 30%, while for Peru it is 6%. Although it may be interesting to estimate the optimal shares for the rest of the countries there is not enough reliable information drug producer countries' budgets. In the same way, that a model of panel data including fixed and random effects states the relation between US assistance and area under illicit crop cultivation in the most important drug producers is positive, this implies that more investment in anti-drug policy to reduce drug production might simply increase illicit crops cultivated.

These results define some recommendations for anti-drug policymakers. Firstly, it is essential to evaluate the policy approaches using a mutual approach to reach more symmetrical policies for both consuming and producing actors. This means that consuming countries must allocate less investment in law enforcement and more in alternative development projects.

According to this analysis, it is important to estimate the optimal budget share for drug consumer and producer countries, to arrive at an efficient allocation of resources for meeting anti-drug policy targets. The latter is necessary, since results show that the majority of current consumer country resources dedicated to combating illegal drugs are simply not reaching policy targets.

BIBLIOGRAPHY

Angrist, J. and A. Kugler, (2005) "Coca, Conflict and Rural Income: Evidence from Colombia". *NBER Working Paper* no. 11219, 2005

Becker, Gary S., and Murphy, Kevin M. (1993). "A Simple Theory of Advertising as a Good or Bad." *Quarterly Journal of Economics*, 108, No. 4 (November): 941- 964.

Becker, Gary S., Murphy, Kevin M. and Grossman, M (2006) "The Market for Illegal Goods: The Case of Drugs". *Journal of Political Economy*, 2006, *114*(1), pp. 38-60.

Blickman, T and Bewley-Taylor, D. (2006) "The UNGASS Evaluation Process Evaluated". *International Drug Policy Consortium*. Briefing Paper. May 2006.

Boekhout van Solinge, T. (2002) *Drugs and Decision-making in the European Union.* Amsterdam: CEDRO/Mets en Schilt.© 2002 Tim Boekhout van Solinge.

Caulkins, Jonathan, P. (1995). "Estimating the Elasticities of Demand for Cocaine and Heroin with Data from 21 Cities from the Drug Use Forecasting (DUF) Program, 1987-1991". *ICPSR version. Santa Monica, CA: RAND*

European Monitoring Centre for Drugs and Drug Addiction – EMCDDA (2005). *Annual Report 2005*. Luxembourg: Office for Official Publications of the European Communities.

European Commission (2002) "Bolivia" *Country Strategy Paper*. External Relations. European Union.

European Commission (2002) "Colombia" *Country Strategy Paper*. External Relations. European Union.

European Commission (2002) "EC-Lao PDR 2002-2006" *Country Strategy Paper*. External Relations. European Union.

European Commission (2002) "Peru" *Country Strategy Paper*. External Relations. European Union.

European Commission (2003) "Afghanistan 2003-2006" *Country Strategy Paper*. External Relations. European Union.

Fryer, W (1993) "US Drug Control in the Americas: Time for a Change". *Working Paper.* 1993

Gibbons, R (1997). "An Introduction to Applicable Game Theory". *Journal of Economic Perspectives*. Vol. 11, No. 1 (Winter, 1997), pp. 127-149

International Drug Policy Consortium (2006). "The 2005 United Nations Commission on Narcotic Drugs". Position Paper 1. The Beckley Fundation.

Jacobsson and Naranjo (2004) "How do drug lord in final destination countries respond to anti-drug policies" *Working Papers.* Stockholm University.

Jelsma, M., Kramer, T. and Versvest, V. (2005) *Trouble in the Triangle. Opium and Conflict in Burma.* Transnational Institute (TNI). Printing House. Bangkok.

Jelsma, M (2002) "Revising and Integrating Policies at National and International Level How can Reform be Achieved?". Wilton Park Conference: Drug Policies and Their Impact UK, 27 March 2002

Koehane, R. and Nye, J (1977) *Power and Interdependence, World Politics in Transition.* Little, Brown and Company. Canada

Krasner, S (1985) *Structural Conflict: The Third World Against Global Liberalism.* University of California Press, Ltd. London, England.

Krugman, P (1984) "Import Protection as Export Promotion: International Competition in the Presence of Oligopoly and Economics of Scale" .

Murshed, S. M (2004) "Quantitative restrictions on the flow of narcotics: supply and demand restraints in a North – South model". Paper presented at the Conference on Defence, Security and Economic Development, TEI, Larissa, Greece, 18-19 June 2004).

Naranjo, A (2004) "Drugs lords, rebel movements and anti-drug policies in sources countries" *Working Papers.* Stockholm University

National Institute on Drug Abuse (2005). *Monitoring the Future: National Survey Results on Drug Use, 1975–2005.* National Institutes of Health U.S. Department of Health and Human Services.

Office of National Drug Control Policy – ONDCP (2004) *The Economic Costs of Drug Abuse in the United States 1992–2002.* Executive Office of the President Office of National Drug Control Policy. Washington 2004.

Perl, R (2003) "Drug Control: International Policy and Approaches". CRS Issue Brief for Congress Congressional Research Service. The Library of Congress. U.S. Department of State.

Perl, R (2005) "Drug Control: International Policy and Approaches". CRS Issue Brief for Congress Congressional Research Service. The Library of Congress. U.S. Department of State.

Perl, R (2006) "Drug Control: International Policy and Approaches". CRS Issue Brief for Congress Congressional Research Service. The Library of Congress. U.S. Department of State.

Polinsky M. and S. Shavell (2000), "The Economic Theory of Public Enforcement of Law", *Journal of Economic Literature*, 38 (1), 45-76.

Poret, S (2005) "An Optimal Anti-Drug Law Enforcement Policy". *Working Paper*. n° 2005-17. Insitut National de la Statistique et des Etudes Economiques.

UNODC (2004) "Afghanistan. Opium Survey 2004". United Nations Office on Drugs and Crime. United Nations Publications. Vienna, Austria

_____(2004) "Bolivia Coca Cultivation Survey". United Nations Office on Drugs and Crime. United Nations Publications. Vienna, Austria

_____ (2004) "Colombia Coca Cultivation Survey". United Nations Office on Drugs and Crime. United Nations Publications. Vienna, Austria

_____(2005) "Myanmar Opium Survey 2005". . United Nations Office on Drugs and Crime. United Nations Publications. Vienna, Austria

_____(2004) "Peru Coca Cultivation Survey". United Nations Office on Drugs and Crime. United Nations Publications. Vienna, Austria

_____(2004) "Coca Cultivation in the Andean Region ". United Nations Office on Drugs and Crime. United Nations Publications. Vienna, Austria

_____(2004) *The Word Drug Report 2004*. United Nations Office on Drugs and Crime. United Nations Publications. Vol. 1 and 2. Vienna, Austria.

_____(2005) *The Word Drug Report 2005*. United Nations Office on Drugs and Crime. United Nations Publications. Vol. 1 and 2. Vienna, Austria.

_____(2006) *The Word Drug Report 2006*. United Nations Office on Drugs and Crime. United Nations Publications. Vol. 1 and 2. Vienna, Austria.

United Nations (1998) "Special Session of the General Assembly Devoted to Countering the World Drug Problem". *United Nations Publications*. New York.

United Nations (2002) "Flexibility of Treaty Provisions as Regards Harm Reduction Approaches". *United Nations Publications*. Vienna, Austria

Rousel, S. M., and Arcel, M (2006) "The Drug-Laden Balloon: U.S. Military Assistance and Coca Production in the Central Andes". *Social Science Quarterly*. Vol. 87, No. 3, September 2006.

Saffer, Henry and Chaloupka, Frank J. (1999). "The Demand for Illicit Drugs," *Economic Inquiry*, 37, No. 3, (July): 401-411.

Sharpe, K E. (1992). "The Military, the Drug War and Democracy in Latin America: What Would Clausewitz Tell Us." Paper prepared for a conference on "Warriors in Peacetime," Inter- American Defense College. 11-12 December 1992.

Snidal, D (1985) "The Game Theory of International Politics". *World Politics*. Vol. 38, No. 1 (Oct., 1985), pp. 25-57

Stone, R.W. (2001) "The Use and Abuse of Game Theory in International Relations". *Journal of Conflict Resolution.* Vol. 45. No. 2. April 2001. 216-244.

Todd S. and Arce, D. (2003) "Terrorism and Game Theory". *Simulation & Gaming*. Vol. 34 (3) September 2003.

Transnational Institute – TNI (2002) "A Failed Balance. Alternative Development and Eradication". *Drugs & Conflict Debat.* Paper 4. March 2003.

Transnational Institute – TNI (2005) "The United Nations and Harm Reduction" *Drug Policy Briefing N° 12* – March 2005.

Van Ours, Jan C (1995). "The Price Elasticity of Hard Drugs: The Case of Opium in the Dutch East Indies, 1923-28". *Journal of Political Economy, 103, No. 2, (April): 261-279.*

Van Wert, (1988) James M. "The U.S. State Department's Narcotics Control Policy in the Americas." *Journal of Interamerican Studies and World Affairs*. Vol 30. Numbers 2 & 3. Summer/Fall 1988.

Vargas M., C (2004) "Cultivos ilícitos y erradicación forzosa en Colombia". *Cuadernos de Economía*, v. XXIII, n. 41, Bogotá, 2004, páginas 109-14.

Veillete, C., and Navarrete-Frias (2005) "Drug Crop Eradication and Alternative Development in the Andes". ". CRS Issue Brief for Congress Congressional Research Service. The Library of Congress. U.S. Department of State.

Verbek, M (2000). *A Guide to Modern Econometrics*. Jonh Wiley & Sons, Ltd. England.

Washington Office on Latin America – WOLA (2004). *Drugs and Democracy in Latin America: The Impact of U.S. Policy*. Colleta A. Youngers and Eileen Rosin, Editors.

Appendix 1

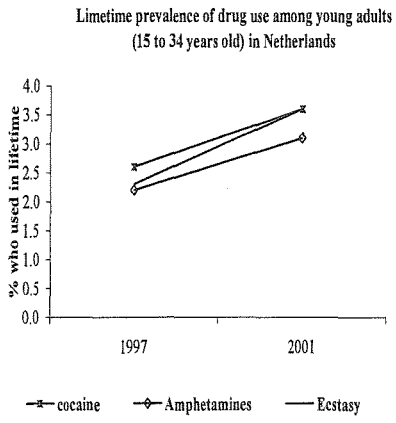
Table 1a

Anti Drug Policy Strategies - Demand Control

Regions	Prevalence of Opiate Abuse (2003 - 2005)		Prevalence of Cocaine abuse (2004 - 2005)		Control Policies
	Number of users	In % of population age 15-64	Number of users	In % of population age 15-64	
Europe	4,030,000	0.7	3,524,000	0.7	Prevention, harm reduction and treatment programs
West and Central Europe	1,565,000	0.5	3,333,000	1.1	
South East Europe	180,000	0.2	64,000	0.1	
Eastern Europe	2,285,000	1.6	127,000	0.1	
America	2,280,000	0.4	8,440,000	1.5	
North America	1,300,000	0.5	6,459,000	2.3	Prevention, harm reduction and law enforcement
South America	980,000	0.3	1,981,000	0.7	Prevention Programs and law enforcement
Asia	8,530,000	0.3	260,000	0.1	Prevention Programs
Oceania	90,000	0.4	175,000	0.9	Prevention Programs
Africa	910,000	0.2	959,000	0.2	Prevention Programs
Global	[illegible]	[illegible]	[illegible]	[illegible]	

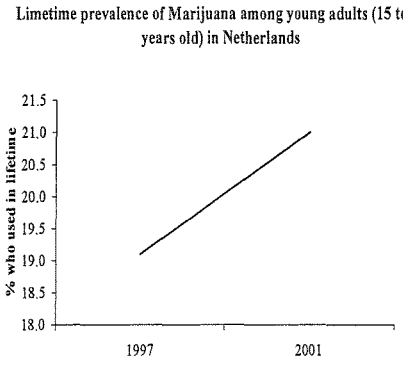
Source: 2006 - World Drug Report. UNOCD

Graph 1a



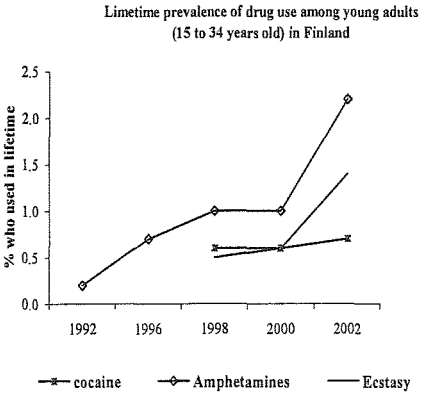
Source: Annual report 2005: the State of the Drugs Problem in Europe

Graph 2a



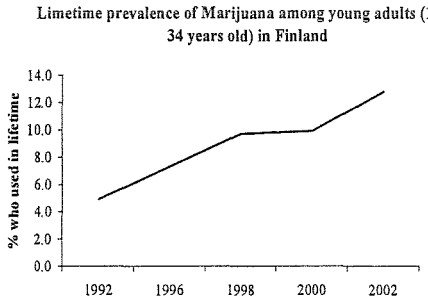
Source: Annual report 2005: the State of the Drugs Problem in Europe

Graph 3a



Source: Annual report 2005: the State of the Drugs Problem in Europe

Graph 4a



Source: Annual report 2005: the State of the Drugs Problem in Europe

Appendix 2

A1 Policy Interactions

Figure 1b