

The globalization of (domestic) cannabis cultivation¹

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1. Introduction

Cannabis cultivation is spreading around the world, a trend that has accelerated at an impressive pace over the past 25 years. Beginning in the 1980s in some countries and the 1990s in others, gradually smaller quantities of cannabis were being intercepted in many of the major ports and airports of the industrialized world. At the same time, the police and the media in dozens of different countries were reporting the discovery of more and more cannabis plants over more and more cultivation sites – first in outdoor, then in indoor settings. Researchers slowly but surely became interested in the phenomenon, aiming to describe, and potentially explain, the rapid switch from importation to domestic production in their own countries.

As we start the second decade of the 21st century, the new cannabis industry continues to fascinate both casual and meticulous observers of the drug scene. At least two characteristics make this fundamental change in cannabis markets particularly interesting from an empirical point of view. Firstly, the trend is *drug specific*. For the majority of its history, the cultivation of cannabis did not stand out, at least compared to the cultivation of other illegal plants. Cannabis plantations, like coca bush or opium poppy plantations, were typically large in size, grown by local farmers in a handful of developing (producing) countries, processed and then exported to industrial (consuming) nations. While cocaine and heroin are still produced in a handful of developing countries, cannabis is now cultivated the world over. This brings us to the second point: cannabis cultivation is increasingly *universal*. From Europe to the Americas and Oceania, import substitution in the cannabis market has been noticed in almost every developed country around the world, with a notable aversion for discrimination. In this paper I would like to provide a brief review of what is already known on cannabis cultivation and its modern history.

¹ This paper is a shortened version of two chapters taken from the book: Decorte, T., Potter, G.R. and Bouchard, M. 2011. *World Wide Weed. Global trends in cannabis cultivation and its control*. Farnham: Ashgate. These two chapters were co-authored by my co-editors, Prof. Dr. Gary Potter and Prof. Dr. Martin Bouchard. The ideas expressed in this paper are as much theirs as they are mine.

2. Cannabis: a plant and a drug

It is worth spending a few moments discussing some of the features of cannabis that make it so special as an illegal drug, and that help us to understand why contemporary patterns of cannabis cultivation are, as mentioned above, unique among drug production. We need to recognize firstly that cannabis is a drug, but we need also recognize that cannabis is a plant.

The term cannabis is used to cover a range of products derived from the cannabis plant and that go by many different names. There are two major forms of cannabis the drug – cannabis resin (commonly known as hash, or hashish) and herbal cannabis (often known as marijuana) – and a number of less common products such as cannabis oil and pollen. Herbal cannabis consists of dried material from the plant – usually the flowers or buds and leaves of the plant. Cannabis resin is the harvested resinous secretions of the plant. Cannabis oil, pollen and other variations involve more specific parts of the plant, or more complicated processes of harvesting and refining the plant and the psychoactive chemicals found within it (known collectively as cannabinoids). For the purposes of this paper we use the term cannabis to cover all forms of the drug (unless otherwise stated), recognizing that the herbal and resinous forms are by far the most common and that it is herbal cannabis that is most strongly associated with new patterns of production related to the globalization of cannabis cultivation.

A key characteristic that distinguishes cannabis from other drugs is that it is derived directly from the plant, with minimal processing required to produce a consumable and effective drug product. There is a clear distinction between cannabis and the non-plant based drugs such as amphetamine type substances (ATSs) which are wholly manmade. There is also a clear distinction between cannabis and the other common plant-based drugs: cocaine and heroin both involve a degree of processing to convert the parent plant (the coca bush and opium poppy respectively) into the commonly recognized end product. Coca and opium are the natural products of their parent plants, and there are other plant-based (and fungus-based) drugs that are as “natural” as cannabis, but the use of coca, opium and the others is not as wide-spread as cannabis. Cocaine and heroin are the widely used ‘problematic’ substances, the ones that, alongside cannabis and ATSs, are the focus of coordinated international drug control efforts and the annual United Nations World Drug Report. The production of these involves the processing and refining of the raw plant material. Most cannabis products – and all marijuana and hashish – are harvested direct from the plant and are more-or-less immediately ready for human consumption (and distribution through the illicit market).

Most experts agree that cannabis probably evolved in central Asia (Booth 2003, Abel 1980), but it now grows wild on every continent except Antarctica and is cultivated in most countries around the world (UNODC 2008). The spread of the plant around the globe is associated with human economic activity stemming from recognition of the various useful properties of the plant: cannabis was probably one of the earliest plants to be domesticated by man (Booth 2003). Throughout history, humanity has recognized many, many uses of the cannabis plant: as an industrial product, a medicine, a foodstuff, and even as an agent in reversing ecological damage (see Herer 2000 for a detailed overview of all of these claimed benefits). Cannabis is also a highly adaptable plant capable of growing in a range of climatic and agronomical

conditions: where cannabis has been cultivated by humans it has also established itself as a weed. It is grown as an agricultural product, hemp, across much of the world (with the US being a notable exception); it is cultivated as a drug crop in at least 172 countries and territories around the world (UNODC 2008). It is, of course, this cultivation as a drug crop that is of primary interest to us here.

3. The demand for cannabis

To gain a full understanding of contemporary cannabis cultivation it is helpful to start with a consideration of the demand for cannabis products. Demand is, after all, the ultimate driver of cultivation. There are at least three important things to say about cannabis *demand* that are of central importance for understanding cannabis *cultivation*.

First, cannabis is the most widely and universally used illegal drug in the world. The United Nations estimates that there were between 143 and 190 million users of cannabis around the world in the year 2007, representing between 3.3% and 4.4% of the adult population. Although cannabis use is a truly global phenomenon, reported consumption rates are particularly high in North America, Western Europe and Oceania (UNODC 2009). Considering this level of demand, it is perhaps less of a surprise to discover that cannabis cultivation now occurs at a significant level in so many developed nations. With such demand, there is a clear incentive to those who seek to make money through illegal enterprise. At the same time, with such a large user population, we should not be surprised that so many have tried to figure out ways of providing themselves and their friends with a steady, home-grown quality product while avoiding the traditional illicit market.

Second, cannabis is embedded within a particular culture. While drug use is often related to particular cultural landscapes with different patterns of drug use (like different genres of music, styles of clothing or wider lifestyle choices) being integral to different sub-cultural scenes, cannabis stands out from other illegal drugs in a number of ways. For one thing, cannabis, like alcohol, cuts across a wide range of (sub-)cultures in the contemporary world – a factor illustrated in part by the previous discussion on the prevalence of cannabis use. The roots of the contemporary spread of recreational cannabis use in the developed world are strongly associated with the counter-culture of the 1960s and 1970s, as epitomized by the stereotype of the “hippie” pot-smoker. However, modern patterns of use suggest that cannabis consumption is no longer limited to a particular sub-culture, but is instead widespread and even “normalized” in many industrialized countries (see e.g. Room et al. 2010, Parker et al. 2002, Shiner and Newburn 1997). Here cannabis, like alcohol, is a feature of contemporary culture *in general* whereas most other illegal drugs are associated with more limited sub-cultural pockets.

However, there are other, more pertinent (in relation to the current discussion) aspects of the cultural significance of cannabis. As well as cannabis being ubiquitous within and as part of broader cultural scenes, it is meaningful to talk specifically of cannabis culture – a (sub-)culture centered on the drug or plant itself. Evidence for this comes from the existence of numerous cannabis clubs, societies, campaign groups and festivals around the world and from the many thousands of books and magazines dedicated to cannabis, not to mention the millions of web pages. This “cannabis culture” is particularly relevant to the emergence and spread of cultivation in developed nations.

A sizeable proportion of the on- and off-line literature devoted to cannabis discusses the plant itself – and how to grow it. Most cannabis-themed magazines and internet sites carry adverts for cannabis seeds and cultivation equipment. Numerous websites are specifically devoted to cannabis cultivation, offering tips and advice to amateurs and more experienced growers alike. As well as providing basic information on how to grow cannabis they offer more advanced information on how to achieve desired results in terms of the quality, quantity and potency of cannabis produced. Sites like these often have a monthly “cream of the crop” competition where growers send in photos of their crops to be judged, on aesthetic grounds, by other members of the website community. This idea of judging the efforts of individual growers is found elsewhere in the world of cannabis culture, with the annual “High Times” Cannabis Cup in Amsterdam perhaps the best known of such competitions. Products at the Cannabis Cup are rated for quality of the drug produced as well as aesthetic properties of the plant, with prizes awarded for those responsible for growing the best crops.² All this further illustrates how cannabis differs from heroin or cocaine, or the opium poppy or coca bush. It would be hard to imagine anything comparable for these “harder” drugs: there is no “Heroin Cup” nor are there books or magazines with titles such as “Heroin Times” or “Cocaine Culture”.

An important point here is that cannabis culture is not *just* about the use of cannabis as a recreational drug. Aesthetics play an important part in the competitions just mentioned, and growers cite the pleasures inherent in the act of cultivation and the successful production of a good *plant* rather than just the production of the drug (Decorte 2008, Potter 2010a, 2010b, Weisheit 1991, 1992). The cultural significance of cannabis as a plant is further reaffirmed for many devotees through recognition of the uses of cannabis *beyond* its recreational drug properties. The well-documented medical and industrial uses of the plant, alongside more contentious claims around the ecological and spiritual benefits of cannabis cultivation, lead many cannabis users to see the plant in an almost ideological light – such reverence for the plant as well as for the drug provide further motivation to many cannabis growers in the industrialized world (Weisheit 1991, 1992, Decorte 2008, Potter 2010a, 2010b). Given the importance of the plant for many users, it is much less of a surprise to realize that many have found it important to extend the culture surrounding the final product to the actual process of growing it.

The third aspect of the demand for cannabis that is relevant to our understanding of cannabis cultivation is that there is a social tolerance surrounding cannabis use, certainly compared to other illegal drugs (and arguably compared to the legal drugs alcohol and, particularly, tobacco). The effects of cannabis are generally seen to be pleasant, even beneficial in some instances (such as for medical use), with less harmful health consequences compared to the majority of other drugs (see e.g. Nutt et al. 2010). Many countries have some degree of official tolerance to cannabis use – various examples of less punitive legal regimes for the drug are evident in many countries in Western Europe (with the Netherlands *de facto* legalization being the most established example) and an increasing number of states in the US. This tolerance is undoubtedly related to the fact that cannabis is widely used and increasingly normalized (in terms of cultural acceptance if not in terms of levels of use) with relatively few associated problems compared to other (legal and illegal) drugs. Although it varies from place to place such tolerance can make it easier for cultivation to flourish – growers have less to

² <http://cannabiscup.net> [accessed: 25 July 2010].

fear when their actions are less likely to be policed either formally (by the state) or informally (by neighbors reporting their activities).

In summary, cannabis cultivation is encouraged through there being high demand for the product, with users being both potential growers and potential customers to other growers. The fact that cannabis is a plant-based drug which, unlike cocaine or heroin, involves no processing of the plant to produce the final drug, and which has many other widely-recognized and clearly beneficial uses probably encourages both use of the drug and tolerance among non-users. This tolerance, especially when reflected in relatively liberal laws (or relatively liberal law enforcement), makes would-be growers all the more likely to grow.

4. A brief history of cannabis cultivation

Global patterns of cannabis cultivation have followed a fascinating development, from highly concentrated production in certain developing countries to quasi-perfectly decentralized production in almost every country around the world (UNODC 2008). It should be reiterated that here the focus is on the cultivation of cannabis as a drug plant, rather than as an industrial or agricultural crop, although it is impossible to completely separate out these different reasons for cultivating cannabis (see Potter 2010b). We offer here a brief description of – and explanation for – this historical evolution of cannabis cultivation, divided into three broad phases: 1) Historic and traditional production; 2) Cultivation in the developing world for the expanding markets in the developed world, and; 3) Production in the developed world, firstly in outdoor, then (and increasingly) in indoor settings. Taken together, we see a trend that truly fits the term “globalization”.

Historically cannabis has been grown for a variety of reasons; it is only since the middle of the last century that the plant’s drug properties have been the major driver in cultivation. Early uses of agricultural cannabis were largely centered on cannabis fibres, with archaeological evidence of hempen cord dating back to between 10,000 and 3,000 B.C. (Herer 2000, Booth 2003, Abel 1980). Throughout history cannabis has been one of the most useful – and important – plants known to man. Primarily used as a fibre crop for making cloth, paper and rope, it can also be used in construction (as an alternative to concrete), in a wide range of chemicals, dyes, fuels and cosmetics (as an alternative to petro-chemicals), and a whole host of other products (some sources cite over 25,000 known uses of the plant; see especially Herer 2000). Cannabis – hemp – originally spread across the world as an agricultural crop, moving from China to India to the Middle East and North Africa and then on into Europe, finally crossing the Atlantic to the Americas.

Focusing on cannabis as a drug crop, we can argue that there has been a historic spread of “traditional” cultivation and use that spans large chunks of the planet. The ancient Chinese and Indians, the Scythians, Greeks and Romans, the Arabians and others in the Middle-East, the Afghans and their neighbors in Central and Southern Asia, and, later, African and Caribbean peoples all have well established histories of cannabis use with their supplies of the drug drawn from their own cultivation activities, accompanied by some exportation as cannabis use begins to take-off in other, non-producing countries. There are a number of books that offer more detail on the long history of cannabis use and cultivation around the world (e.g. Abel 1980, du Toit 1980, Clarke 1998, Herer 2000, Booth 2003). Our job here is not to repeat these histories: it is

the more recent developments in cultivation patterns that are the main focus of this paper. For current purposes we need only recognize the existence of traditional patterns of cultivation to provide for traditional use across large areas of what is generally referred to as the developing world.

The widespread use of cannabis as a recreational drug did not extend into Europe until much later, and it is with the emergence of modern patterns of cannabis use in the developed world that we see a major and rapid shift in patterns of cannabis production. As demand for cannabis increased globally, fuelled by the developments of the “counter-culture” of the 1960s and 1970s, so cultivation in the developing world began to take on a new dimension. No longer were traditional producer nations just growing for themselves: exportation to the consumer markets of the industrialized world now became an attractive option. Not only do we see increased cultivation in many traditional growing regions, but we also see cultivation emerging in other developing world nations in response to global demands. In this way, countries such as Morocco and Mexico, major suppliers to, respectively, European and American consumers, become large-scale producers of cannabis despite not having the traditions of widespread cannabis cultivation found in Asia, the Middle-East or the Caribbean.

The explanations for this stage in the globalization of cannabis cultivation seem fairly straightforward. Demand for cannabis in the developed world began to expand rapidly from the 1960s onwards. At the same time, international efforts at drug control began to take a more coherent form with the 1961 United Nations Single Convention on Narcotic Drugs bringing together a number of earlier treaties and setting a clear framework for global anti-drug strategies. Stemming from this we see the beginnings of internationally organized eradication efforts directed at the three narcotic plants outlawed by the convention: cannabis, coca and opium.

Demand for cannabis provides an obvious economic incentive which may explain some of the spread of cultivation of the drug. The global ban on cannabis may, perversely, have further encouraged cultivation in the developing world with worldwide prohibition effectively creating “non-tariff-trade barriers” around drugs. Illegal goods can attract a premium through the very fact of being illegal, and bans on production and trade are more easily enforced in some countries than others. Eradication efforts are least effective in those countries or regions that are hard to access due to geographical remoteness, political unrest, or limited economic development and infrastructure. Those involved in cultivation have a tendency to respond to eradication efforts by planting more crops in the first place, by moving their operations to ever more remote wilderness areas, or by actively resisting (socially, politically or even militarily) attempts to destroy a particularly lucrative source of income. Drug cultivation is attractive to under-developed countries as a source of income. Cultivation of all the major drug crops has been strongly associated with developing world nations; cannabis, as a plant that can be grown easily in a wide range of conditions has become particularly widespread in such countries (for further insights into the difficulties of drug crop eradication see Farrell 1998, Vellinga 2004, Mansfield and Sage 1998).

The third phase in our conceptual evolution of contemporary cannabis cultivation has been the increase in cannabis cultivation across the developed world. This development has itself occurred in different phases, at different times in different countries. Outdoor cultivation has a longer history than indoor cultivation in developed countries. Although small scale cultivation probably has almost as long a history as cannabis use in the west, larger scale commercial cultivation only begins to appear

towards the end of the twentieth century. Warner (1986) argues that cannabis cultivation in the US was not officially recognized as a problem until 1982. Canada, New Zealand and Australia have also reported large scale outdoor cultivation since the 80s and 90s (Bouchard 2007, Wilkins et al. 2002, Willis 2008). Large scale outdoor cultivation in Western Europe is less common, but not unheard of (Jansen 2002, Potter 2010b). Indoor cultivation, employing artificial lighting, hydroponic and irrigation technologies and climate control techniques has a fairly long history itself, dating back to the 1970s (Bouchard and Dion 2009). Leggett points out that development of these technologies along with techniques of plant husbandry and selective breeding have ‘been revolutionized by breeders and cultivators working in Canada, the Netherlands and the United States’ (2006:13, see also Jansen 2002). More recently, significant levels of indoor cultivation have been reported in Canada (Bouchard 2008, Malm and Tita 2006, Plecas et al. 2005) and the UK (Hough et al. 2003, Potter and Dann 2005, Potter 2008, 2010b), and widespread cultivation (both indoor and outdoor) is increasingly reported elsewhere in Western Europe (Jansen 2002, Korf 2008, Decorte 2010a, EMCDDA 2009, UNODC 2008, 2009).

In some countries the levels of domestic cultivation have reached the stage where self-sufficiency in cannabis markets has largely been attained. Leggett tells us that ‘[a]lmost all the cannabis consumed in Australia and New Zealand is domestically produced...’ (2006:41, citing Abel 1997 and Alpers 2005), and Bouchard (2008) makes the same claim for Canada. Jansen argued back in 2002 that 75% of the cannabis consumed in the Netherlands and Switzerland was internally produced, and similar levels of self-sufficiency have been reported more recently in the UK (Potter 2010b, 2008).

The emergence of domestic cultivation has been explained largely in economic terms. Reuter et al. discussed “import substitution” in relation to the US cannabis market in 1988, and Jansen used the term to describe the cannabis situation in the Netherlands in 2002. Import substitution is a term used to describe the emergence of domestic production of commodities that have traditionally been imported. The basic idea is that import substitution will occur as and when it is economically viable to do so, subject to any practical or legal constraints on domestic production efforts. With high levels of demand there is clearly an economic incentive behind domestic cannabis cultivation, with numerous studies citing financial motivations as a major factor driving cannabis cultivators (see, for example, Hafley and Tewksbury 1996 and Weisheit 1992 in the US, Nguyen and Bouchard 2010 in Canada, Potter 2010b in the UK and Jansen 2002 for Switzerland and the Netherlands). However it has been also been noted that a significant number of cannabis growers in the industrialized world are also motivated by *non*-financial reasons (as discussed further, below), and Potter is keen to remind us that ‘while economic considerations (as relevant to an illicit-market economy) lead to a broad understanding of domestic cannabis cultivation in the west, the existence of a non-economic “ideological” side to cannabis cultivation confuses the issue’ (2010a: 148).

The earliest instances of domestic production in the developed western world were predominantly in rural and wilderness locations where geographical features (agronomical and climatic conditions, and also remoteness as a factor in avoiding law-enforcement) provided the opportunity for cultivation (Weisheit 1992, Potter et al. 1990, Hafley and Tewksbury 1996). With the development and spread of technological expertise, the opportunity for domestic cultivation in the form of indoor growing has

meant that geographical factors are no longer key constraints on where cannabis can be grown. Much of the commercial cultivation in Canada (Bouchard 2007, Malm and Tita 2006, Plecas et al. 2005) and the UK (Potter 2010b), for example, occurs in major urban centers.

More detailed discussions on the explanation for import substitution can be found elsewhere (Weisheit 1992, Jansen 2002, Potter 2008, 2010a, 2010b); the important points to note for current purposes are that cannabis cultivation has spread across both the developing and the developed worlds. Cannabis is a versatile plant, and with the development of indoor growing techniques it really can be grown almost anywhere, as long as there is electricity and water available. With high levels of demand for the drug there are clear economic incentives driving domestic cultivation. Unlike for coca or opium, cannabis cultivation can be profitable even on a small scale as the drug-product return per plant is much higher (Kilmer et al. 2010). There is also much evidence of non-economically driven domestic cultivation stemming not just from the high levels of demand but also from the particular cultural or ideological status that cannabis has for many of its users.

5. The contemporary cannabis grower

So where does this leave us? In the modern world all three patterns of cultivation described previously co-exist: the three phases of global cannabis cultivation outlined above should not be seen as replacing each other; each successive pattern of cultivation is found alongside those that preceded it. Cultivation along traditional lines for local traditional use still occurs across large parts of the developing world. Cultivation in the developing world for exportation to western consumer markets still occurs on a very large scale. Cultivation in the developed world is becoming increasingly significant in the global market. The coexistence of these different patterns of production is clearly illustrated by a list of ‘the major producing countries 2008’ taken from the World Drug Report 2009 (UNODC 2009: 91). Seven of the countries – Morocco, Mexico, Paraguay, Kazakhstan, South Africa, Colombia and Lebanon – represent the developing world, some with a long history of cannabis production and some that have become global players relatively recently. The other three nations in the table – Canada, the US and the Netherlands – demonstrate the increasing role of production in the industrialized world.

What this means is that contemporary cannabis cultivation takes many different forms with variations in approach identifiable not just across different countries, as outlined in the previous section, but also within different countries. Over the years a number of writers have produced typologies of cannabis cultivators within the countries they have studied. This section attempts to bring those typologies together and to add to them, to give us a framework for identifying and understanding the different approaches to cannabis cultivation found in the modern world.

A starting point would be to build on the previous section and recognize that cultivation of cannabis (and the way cultivation fits into the global cannabis market) varies on a global scale. A simple typology of modern cannabis cultivation might therefore be “old” or “traditional” cultivation, occurring in the developing world for exportation to the developed world and “new” cultivation occurring in the developed world, primarily for domestic production (although evidence of cultivation in the

developed world for exportation to other developed world countries also exists; Bouchard 2008, see also the discussion in Potter 2010a: 137-138).

As we have already observed, “new” cultivation can be divided into indoor and outdoor growing, although which form cultivation takes depends primarily on opportunity and is of limited further analytic use. We have also hinted already at a potentially more useful differentiation: the motivation behind cultivation. It is clear that economic incentives play a part for many cannabis growers, but we should be aware of the increasing body of work describing cannabis growers who are not motivated by making money. Not that profit/non-profit is a clear dichotomy: many authors recognize the interplay between financial and other motivational drivers, with some growers having purely financial concerns, others having no interest in profit whatsoever, and many (probably most) driven by a mixture of financial and non-financial interest.

Table 1 Typologies of contemporary developed-world cannabis growers.

Study	Types of cannabis grower identified
Weisheit 1991, 1992 (US)	<ol style="list-style-type: none"> 1. <i>Hustlers</i> – motivated by the challenge and the trappings of success. Usually large scale cultivators. 2. <i>Pragmatists</i> – motivated by economic necessity. Size of operation varies. 3. <i>Communal growers</i> – grow for own consumption as well as to sell. Motivated by “intangible rewards” as well as financial benefits. Economic necessity may push to grow larger crops.
Hafley and Tewksbury 1996 (US)	<p>Expanded on Weisheit’s typology with two additional categories:</p> <ol style="list-style-type: none"> 1. <i>Young punk</i> – young men (18-35 yrs) who usually occupy low level roles (e.g. mules). 2. <i>Entrepreneur</i> – grow for economic benefits. Develop new methods of growing and avoiding detection.
Bovenkerk and Hogewind 2002 (Netherlands)	<ol style="list-style-type: none"> 1. <i>Small home growers</i> – grow up to five plants (tolerated by Dutch guidelines). Produce for own use; sell surplus to friends and, sometimes, to coffeeshops. 2. <i>Large independent home growers</i> – produce primarily for sale to coffeeshops or wholesalers or an established clientele. Size depends on available space. 3. <i>Large industrial producers</i> – grow hundreds, thousands or even tens of thousands of plants in large agricultural areas or empty industrial buildings. Organizational structure shows clear division of labor. Probably export as well as supplying domestic markets. 4. <i>Organizers of industrial cultivation</i> – contracts with several individuals who provide locations for growing. Highly organized with clear divisions of labor. Links to other criminal activity.
Hough et al. 2003 (UK)	<ol style="list-style-type: none"> 1. <i>Sole use growers</i> – money-saving hobby. Personal consumption only. 2. <i>Medical growers</i> – perceived therapeutic value of cannabis for those with medical conditions. 3. <i>Social growers</i> – ensure a supply of good quality cannabis for

	<p>themselves and friends.</p> <ol style="list-style-type: none"> 4. <i>Social/commercial growers</i> – grow for friends, but may sell cannabis to supplement their incomes. 5. <i>Commercial growers</i> – grow to make money and will sell to any potential customer.
Potter and Dann 2005, Potter 2010 (UK)	<p>Not-for-profit:</p> <ol style="list-style-type: none"> 1. <i>Personal use</i> – personal consumption rather than financial motivation. Supply friends. Motivated by “pride, practicality and/or personal ideology and ethics”. 2. <i>Medical grower</i> – to benefit themselves or others with medical conditions. 3. <i>Activist growers</i> – political statement, promotion of cannabis. <p>For-profit:</p> <ol style="list-style-type: none"> 4. <i>One-off opportunists</i> – start with intention of personal use, but realize potential for profit. Grow for specific economic goal (e.g. pay off debt). 5. <i>Self-employed grower</i> – grow regularly for personal use, but selling surplus to friends. 6. <i>Corporate growers</i> – entrepreneurial approach, maybe along organized crime model. Large scale, financially motivated. May be involved in other criminal activity. <p>Group Enterprises:</p> <ol style="list-style-type: none"> 7. <i>Cooperatives</i> – joint efforts, mutual benefits, equal partners. Usually a group of friends with pooled resources, love for bud, left-wing ideology. 8. <i>Franchises</i> – experience for profit exchange. Large scale operatives can minimize risk by spreading their activities over a number of smaller grow-ops.
Nguyen and Bouchard 2010 (Canada)	<p>Focused strictly on young growers (13-17 years old) in Quebec, Canada</p> <ol style="list-style-type: none"> 1. <i>Entrepreneurs</i> – Few are heavy cannabis users, involved for tangible rewards on larger, commercial sites. 2. <i>Generalists</i> – Involved in a myriad of other crimes, grow cannabis to make money and finance own cannabis use. 3. <i>Hobbyists</i> – Almost strictly involved in cultivation of very small, mostly outdoor sites with few tangible rewards. 4. <i>Helpers</i> – Participation limited to a helping role at harvest stage, few actually use cannabis. Many females belong to that group.

Source: Adapted and expanded from Nguyen and Bouchard 2010.

Table 1 provides for an overview of existing typologies of contemporary developed-world cannabis growers. The interplay between financial and non-financial motivational factors is clear in all these studies. Weisheit (1991, 1992, later built on by Hafley and Tewksbury 1996) focuses specifically on those growers he defines as “commercial” – that is to say those seeking to make money (and growing a minimum of 20 plants at a time) – but recognizes the existence of many growers who do not fall into this category. Even for commercial growers, non-financial drivers play an important role, with “communal growers” (the largest group in Weisheit’s study) citing the numerous “intangible rewards” associated with cultivation. These intangible rewards

include “spiritual”, “social” and “intrinsic” benefits from growing cannabis: the enjoyment and satisfaction of growing a good plant, producing good cannabis from it, and being able to share this with friends. The UK studies (Hough et al. 2003, Potter and Dann 2005, Potter 2010b) similarly recognize those motivated by financial concerns, those motivated by non-financial concerns and those motivated by a combination of the two (see also Decorte 2010b). Bovenkerk and Hogewind (2002), working in the Netherlands (and, like Weisheit, concentrating primarily on commercial cultivation), recognized different organizational approaches to growing relating to growers’ preferred financial outcomes. Nguyen and Bouchard’s (2010) recent Canadian study provided similar findings from a sample of adolescents as opposed to adults, confirming the pattern of a complicated interplay of motivational drivers behind cannabis cultivation in the developed world.

The heterogeneity of the set of participants to the cannabis cultivation industry – including adolescents and otherwise law-abiding individuals – contribute to making cannabis cultivation a difficult object of policy intervention. Recognizing such diversity is central to understanding how the industry has spread and developed to reach countries and individuals who we would not have considered could be involved in drug production as traditionally defined.

6. Emerging trends in cannabis cultivation

On November 2, 2010 the citizens of California were asked to vote on Proposition 19 – the Regulate, Control, and Tax Cannabis (RCTC) proposition – which would have legalized the possession and cultivation of cannabis for citizens over 21 years old, and allow the state to regulate and tax the sale of cannabis in licensed establishments. Although it didn’t pass, the mere fact that such a proposition was seriously considered in a major US state is notable. The legalization of cannabis would, to say the least, considerably change the landscape of cannabis consumption and cultivation in the US, but also for other countries directly or indirectly affected by the change (e.g. Mexico, Canada).

As demonstrated in a recent volume on this very issue, discussion over possible change in cannabis policy is happening across the world (Room et al. 2010). Over the past decades, several countries have seen changes to the traditional approaches of criminal prohibition of cannabis use. In the Netherlands and several US states, less punitive cannabis use control regimes were implemented in the late 1970s. More recently, reforms have been implemented or proposed in an increasing number of countries in the European Union, Oceania and the Americas. In February 2009, a Latin American Commission on Drugs and Democracy, co-chaired by former presidents of Brazil, Mexico and Colombia, called for an examination of the decriminalization of possession of cannabis for personal use. Mexico, Argentina, Brazil and Ecuador are expected to take new decriminalizing steps (Jenkins 2009). Most of these reforms seem to be occurring within the bounds set by the international drug control treaties, but several authors have also discussed measures which would in one way or another move beyond the limits of the current international drug control regime (see Room et al. 2010 for a comprehensive review).

However, the global prohibitionist regime is probably not at immediate risk, and there are also some steps in the opposite direction. For example, Møller (2009) recently

showed how the Danish government cracked down on the Christiania cannabis market in Copenhagen after years under a regime of relative tolerance. In 2009 the British government increased the severity of penalties available for cannabis possession, reversing an easing of penalties that occurred in 2004. Room et al. (2010) describe the heterogeneity and complexity of the alternative cannabis control regimes that have evolved in different countries in recent years, ranging from “depenalization” (i.e. prohibition with cautioning or diversion), “decriminalization” (prohibition with civil penalties) to “de facto legalization” (e.g. prohibition with an expediency principle) or “de jure legalization”, and the differences in how they might be enforced locally or regionally. But while a number of countries have implemented reform measures aimed at controlling the *use* of cannabis, fewer have addressed the issue of cannabis *supply* activities.

Whatever way forward is chosen globally, or by any individual country, no sound policy decision should be taken without knowledge of the markets involved, including the role played by cannabis cultivation – the necessary first link in any cannabis supply chain. In other words, any projections of the impact of legislative changes need to be rooted in as detailed as possible knowledge of the present. In this concluding section, we identify a few important themes, and we make some comments on the reasons why cannabis cultivation has spread worldwide, although no such proposition can be more than tentative before we accumulate more research on cannabis cultivation (or, more specifically, research where causes can be isolated). We contribute by making a few suggestions on the way forward for research to be able to better understand the phenomenon at hand. We close with a discussion on the policy implications.

6.1. A few important themes

In traditional producer nations, such as Morocco for example (see the chapters by Afsahi and Klein in: Decorte et al., 2011), cannabis cultivation clearly provides some economic and social benefits. However there are problems attached, including criminality, environmental damage and the loss of traditional economic activities. Some of these problems appear to be made worse by policies of eradication and criminalization. It is also suggested that increased cultivation in the industrialized countries relates to reduced cultivation in traditional places. Whether successful eradication in traditional countries has contributed to increased cultivation in the developed world, or whether increased developed-world cultivation has led to less demand driving traditional cultivation and hence apparent eradication successes, or some combination of the two, is not clear. We suspect it is a bit of both. Reduced cultivation in traditional producer nations may be good in terms of reducing environmental damage, but also has a negative impact on local economies. Where there are alternatives (e.g. cocaine), less demand for cannabis may encourage other drug trafficking or other types of criminality.

Future research should focus on these issues in particular. The first step in that regard would be to encourage the development of systematic data collection and measures aimed at comparing the costs and benefits of various policy regimes, but also of various alternative economic activities. Most urgent, however, is the realization by local authorities and Western nations that policy responses to production in those countries should be considered in much different terms than elsewhere.

Moving beyond the traditional producer countries of the developing world we see that cultivation is widespread and spreading ever wider: it truly is a global phenomenon, and is also increasingly localized. In fact, the most important emerging trend is arguably one of *democratization* of the cannabis cultivation industry. First the democratization from traditional producing countries to industrial countries like the US and then to other countries like Belgium, Denmark and Finland, which appear to have experienced the emergence of domestic cannabis cultivation later than others (see the chapters by Dahl and Asmussen and by Hakkarainen and Perälä in: Decorte et al., 2011). But as well as across countries, we also see democratization across types of grower: to medical growers (Dahl and Asmussen, in Decorte et al., 2011), small cultivators seizing an opportunity to entirely avoid illegal market channels and produce a quality product for their own benefit (see chapters by Decorte and by Arana and Montañés Sánchez in: Decorte et al., 2011) and even to organized criminals who see in the cultivation industry an opportunity to make tangible monetary profits (see chapters by Bouchard and Nguyen and by Malm et al. in: Decorte et al., 2011).

Given the range of approaches, of growers, and of motivations, it is not easy (though it might be tempting, and it might be a step in the right direction) to draw a line between “good” and “bad” growing – one that recognizes the varying degrees of commercial intent and criminal involvement. Commercial growing can be small-scale, especially when non-commercial growers realize they can sell their surplus or are offered money when they try to give gifts (see, e.g., Potter 2010). Growers can progress through careers, becoming more (or less) commercial and more (or less) professional. Many will be content with cultivating very small amounts for their own consumption. The problem, at the moment, is that all growers are largely dealt with the same (in policy, if not necessarily in practice) so it is hard to concentrate efforts on “bad” growing. At the very least, a reflection on the opportunities for differential enforcement for different types of cannabis cultivation is warranted. Policy models where (very) small-scale cultivation is tolerated – what MacCoun and Reuter (2001) termed the “Alaska model” – exist, and have not been shown to increase harms where implemented.

There are a few case-studies on jurisdictions that have experimented with the toleration of small-scale cultivation. One argument for such decriminalization has been to remove the criminal (particularly the organized criminal) element from cannabis supply (see also Decorte 2010a). Although the Dutch model has long been seen as somewhat successful in this respect, recent concerns over the increased involvement of organized crime in cannabis cultivation have undermined this particular argument and led to increased official efforts to target the cultivation that had previously been tolerated (see the chapter by Korf, in: Decorte et al., 2011). Such concerns over the possibility of (organized) criminals managing to exploit official tolerance to cultivation were important in shaping the Western Australian Cannabis Infringement Notice scheme and contributed to a situation where the degree of official tolerance towards cultivation is so narrowly defined as to have failed to make any significant impact on the wider cannabis market (see the chapter by Lenton, in Decorte et al., 2011).

Across most of the world the dominant policy response to cannabis cultivation is eradication efforts. But cannabis is not an easy plant to eradicate for a number of reasons. It grows almost anywhere – indoors and out – and as such cultivation can be hard to detect in the first place. The plant is resistant to many biological and chemical agents (see Kalacska et al., in: Decorte et al., 2011) which make eradication difficult.

Even where significant quantities of the crop are destroyed it may not have much impact on the wider market, particularly when cultivators have had time to respond to eradication efforts (see Wilkins and Sweetsur, in Decorte et al., 2011). Those who grow cannabis can be seen to engage in adaptive responses to eradication efforts by employing tactics to minimize both the chances of detection (and, hence, eradication) and also the impact on their cultivation efforts if plantations are detected by the authorities (Farrell, 1998). Difficulties in drug-crop eradication efforts in traditional producer nations have been well documented; it seems that similar – and new – difficulties confront eradication efforts but also policies of official tolerance in the industrialized world.

To recap, we can summarize these emerging themes in three statements. Cannabis cultivation is spreading around the world with implications not just for those countries where it is an emerging phenomenon, but also those countries whose traditional position as major exporters is being undermined. Cultivation in the industrialized world is heterogeneous: whilst traditional (or even organized) criminals are often involved, attracted by the money, we must recognize the role of growers motivated by non-financial and even ideological or altruistic concerns. Responses to cultivation have limited success: we see that conservative, zero-tolerance eradication efforts and more liberal, harm-reduction decriminalization policies fail to satisfactorily tackle either the problem of cannabis cultivation itself or the related difficulties of criminal involvement in the cannabis trade.

6.2. A provisional explanation of the spread of cannabis cultivation

The aim of this paper is not just to identify the trends, but also to analyze and explain them. Here we draw on years of empirical research on cannabis cultivation around the world to establish the existence of a few solid patterns. The global spread of cultivation may be summarized in these three points:

- 1) Cultivation initially spread from the developing to the developed world, and continues to spread in both.
- 2) Although we clearly notice early and late bloomers, the development of the industry appears to occur similarly in each country, with a prevalence of small scale cultivation in an experimental phase, followed quickly by the growth of a commercial segment of the market where criminal elements co-exist with otherwise law-abiding citizens in a deeply heterogenous industry.
- 3) Law enforcement agencies are in reactive mode and have difficulty following the upward trend, let alone curbing it.

The grand question is, as always, “why”. We do not think that there is necessarily a single, simple explanation for the growth of the industry in every country. Rather, we feel that there are most likely a number of factors that are at play, and that their unique combination and interaction in any given setting may provide a likely explanation for the growth in the local cultivation industry. We also believe that the reasons for the rise of cannabis cultivation in the first phase for the first group of non-traditional cultivating countries (e.g. Canada, The Netherlands, the US) may be substantially distinct from the reasons explaining the rise in the later group (e.g. Scandinavia). For one thing, a crucial communication channel like the World Wide Web, a vital source of information,

equipment and even cannabis seeds for many growers (Potter 2008, 2010), was only widely adopted in the later phase. In other words, while it can be hypothesized that the Internet has contributed to the spread of cultivation in some countries, no such argument can be made for the reasons why the industry was booming in British Columbia or parts of the US as early as the mid 1980s (Bouchard 2007, Weisheit 1992). Yet, the phenomenon is sufficiently universal to warrant an effort at an explanation that may be general enough to be applied to most countries.

To be sure, we focus our proposition on the second phenomenon – the fact that cultivation is found almost everywhere (the spread, as opposed to the birth of cultivation). Yet we make an effort, where appropriate, to link our description to the first phase of the spread of cultivation. In a nutshell, we see the spread of cannabis cultivation as *a convergence of opportunity and sustained demand for the (local) product to go alongside an ever growing supply of motivated offenders and relative failure of policy to prevent the spread*. Each part of this proposition is important and needs to be briefly explained.

Opportunity. The simplest explanation for the spread of cannabis cultivation is that the knowledge and technology became available to everyone willing to make a trip to the local garden shop. Bouchard and Dion (2009) demonstrated that the first hydroponic shop in Quebec, Canada, opened as early as 1969, decades before one could order equipment from the Internet. Of course the knowledge to grow cannabis did not necessarily follow the availability of technology. Before the Internet, knowledge slowly spread from person to person, from group to group through underground communication channels (books, magazines, word-of-mouth) and pockets of hippie communities. Locations where such communities were found in larger concentrations would find some cannabis cultivation going on, but the quality and reputation of the product was poor compared to the imported product (Warner 1986). This all changed with the herbicide paraquat being spread by US authorities on Mexican cannabis plantations, creating incentives to look elsewhere, including local groups.

Development in varieties of cannabis produced paralleled the development in local production, which enhanced the reputation of domestically grown cannabis for early bloomers. In other words, late bloomer countries (and growers) have a higher likelihood of starting further along the learning curve. The important point is that cannabis cultivation became *possible* for anyone willing to invest some time in learning the fundamentals. The growth of the Internet obviously made the knowledge available to all, and speeded up the learning process, as well as increased exposure of the activity. Grow guides and grow shops were facilitators to the diffusion of the activity around the world. This does not mean that person to person knowledge transfer is ineffective, or unnecessary. Bouchard and Nguyen (in Decorte et al., 2011), for example, showed that first hand, person to person knowledge transfer and mentoring is more likely to lead to successful commercial cultivation than indirect sources, with Potter (2010) also demonstrating the role of experienced mentors in introducing new people to cultivation. The important point for our purposes is that the plant can be grown for profit anywhere, and the knowledge necessary to do so is just as ubiquitous.

Sustained demand. Surely, there would be no incentives to cultivate cannabis without the assurance that there is a market for it. After a decline in the 1980s, the worldwide trends in cannabis use have been either stable or on the rise, creating incentives for increased

production (UNODC 2008, 2009). In addition, the benefits of cannabis for medical purposes, or the improved quality and variety of the product have helped create new markets where they did not exist before. As one would expect, this growth in demand parallels almost perfectly the growth in production in developed countries. Both phenomena undeniably feed upon each other (Bouchard 2007).

Sustained supply of motivated offenders. As seen above, a remarkable feature of the cannabis market is its widespread consumption among all age ranges and social classes. A rarely underlined consequence of that feature is the stimulation of cannabis cultivation among otherwise conventional elements of the population. It is only natural that otherwise law-abiding citizens would find ways to obtain supply through other channels than the criminal market. A consequence of this is that cannabis cultivation is in some places as firmly rooted and widespread as cannabis use itself. In Quebec, for example, Bouchard (2007) estimated that close to 1% of the 15+ population was involved in cannabis cultivation. A recent self-report survey showed that these proportions are even higher in a few rural regions where the cultivation industry became one of the premier employers for a significant proportion of the population, including adolescents (Bouchard et al. 2009).

Avoiding contacts with drug dealers and other criminal elements is only one of the many motivations of cannabis growers (Weisheit 1992, Potter 2010, Decorte 2008, 2010b). Because the motivations are as varied as the populations of cannabis growers, it is no surprise that there has been no shortage of motivated individuals ready to try their luck at cannabis cultivation. In fact, the diversity of reasons why people grow cannabis goes way beyond the usual motivations for crime involvement. Some growers are involved for intangible reasons, like a love for growing (as well as using) the plant (see e.g. Hakkarainen and Perälä; Bouchard and Nguyen, in Decorte et al., 2011). The fact that cannabis has the potential to provide benefits for certain medical conditions attracts a segment of the population into the cultivation industry that may not otherwise be involved (Dahl and Asmussen, in Decorte et al., 2011). Avoiding the criminal market may not simply be a symbolic statement; as Decorte (2010) shows, it may also be a matter of taste, as many Belgian growers report becoming involved out of dissatisfaction with the quality of the commercial product they find in the market. Still other growers view their involvement as a social or political message (see Hakkarainen and Perälä; and Arana and Montañés Sánchez, in Decorte et al., 2011).

Then, of course, there are the commercial motivations of the rest of the growers. Undeniably, there is money to be made in this industry, although growers may become disappointed with the actual level of profits after all expenses have been covered (see for example the chapter by Bouchard and Nguyen, in Decorte et al., 2011). Money is a powerful motivation for many individuals who are involved, and it shall continue to be one as long as this remains an illegal, but in-demand, industry.

Relative failure of drug policy to prevent or stop the spread. This part of the proposition is not so much a statement on the “war on drugs” as it is simply an observation *post facto* that whatever policy was in place before the rise of the cannabis cultivation industry, it has not been preventing its development. The cultivation industry has been blooming in repressive and tolerant countries alike, without distinction. While this statement is perhaps generally true, it does not mean that there are no nuances to be made in the stories of specific countries and contexts. The industry may have developed

in a different form, sooner, or later in regime X than expected under regime Y. Yet, the universal nature of the current cultivation industry makes such finer analyses less imperative. The important point is that forces other than policies are at play, and at one point are likely to take over. Cannabis cultivation may be too easily done, the demand for the product, the knowledge and techniques too widespread to expect something different.

6.3. Research and policy implications

We have already made one key point here: research into the expansion and nature of cultivation in the developed world needs to consider not only the impact on those countries and their cannabis markets, but also the impact on traditional, developing-world, producer nations and on international patterns of cultivation and distribution of cannabis. However it is clear that it is the emergence and spread of cannabis in the developed world that is still relatively new and relatively poorly understood: more research is needed to understand this phenomenon.

Little is known on the subtle variations in regimes affecting the developed countries. This issue is important because drastic changes in policies are unlikely to occur. If it so happens that small changes in policy (e.g. the tolerance of small-scale cannabis cultivation) have an influence on cannabis market participants, then it becomes worth exploring those options and the nature of their consequences seriously. While the argument is made that tolerance of small-scale cannabis cultivation may remove the necessity for many users to obtain their supplies from illegal channels, how much of such transfer effectively occurs upon a change in policy remains unknown.

Several systems of cannabis supply regulation have been proposed in different countries, and research on their effectiveness would be of international interest. In the Netherlands, Canada and Switzerland for example, government sponsored committees have recommended provisions for state-regulated cannabis availability, including provision for licensed retail outlets. Both the proposed systems and the pragmatic, social and political reasons why they were not implemented may be worth studying (Room et al. 2010). There are also a few working examples of cannabis supply regulation worth looking at, such as the state-authorized bhang shops in Indian states Uttar Pradesh, Rajasthan, Madhya Pradesh, Uttarakhand and Orissa, and the “cannabis social clubs” which seem to have gained legal recognition and legitimacy in Catalonia and the Basque country. Other operating models for regulated cannabis availability are the state-sanctioned existing distribution systems for medical cannabis users, e.g. in Canada, the United States and the Netherlands. The fact that they are limited to the special sub-population of medical cannabis users does not make them uninteresting as research objects for questions related to regulation regimes for cannabis availability and supply to a broader population.

The reflections formulated in this paper also naturally lead to a discussion of policy options in the face of a still growing worldwide cannabis cultivation industry. There is a need for a serious reflection on the manner in which policy intervenes and handles participants in this industry. Seeing the cultivation industry as a one-dimensional phenomenon is a mistake. Examples of depictions of the cultivation industry as an “organized crime” phenomenon are just as common as images of an industry dominated by small-time growers and plant lovers strictly in it for “intangible rewards” (Weisheit 1991) and a cheap-yet-quality cannabis product. Instead, the

heterogeneity of participants in the industry is probably the most robust finding of research on cannabis cultivation. Such variability in involvement makes policy recommendations so important yet so delicate at the same time. Can policy truly reflect the heterogeneity of the industry and if so, how would that operate in practice?

One option that has been applied in different yet related contexts is to formally recognize the variations in the level of tolerance for one type of involvement compared to another. The Dutch regime which created a clear divide between cannabis and harder drugs by tolerating the sale and use of cannabis in licensed establishments is an example of this. In the context of cannabis cultivation (in other countries) this would mean recognizing a difference between small-scale cultivation for personal use and cultivation for commercial purposes. This kind of regime has been experimented with before in one form or another (as illustrated by the contributions by Lenton, Korf, and Arana and Montañés Sánchez in: Decorte et al., 2011). Formalized tolerance of small scale cultivation would presumably entail setting some kind of limit on the number of plants under cultivation and/or the total amount of cannabis produced. Supplying to others would either be strictly prohibited, or severely limited. Cultivation for medical purposes might be considered as a separate issue in that there are stronger arguments and more public sympathy towards medical use than recreational use. If medical cultivation was dealt with separately by policy then there would presumably need to be guidelines on who was allowed to grow how much on behalf of whom. There would also need to be decisions as to what medical conditions are recognized, and how a medical user gets permission to grow.

Tolerance of individual growers, whether strictly for medical use or for a wider concept of personal use, could separate out the more serious criminals and links to other crimes with an argument that legalized small-scale cultivation could undermine the wider illegal market (Decorte 2010a). However, criminals can be adept at utilizing individual small-scale cultivation efforts (whether or not officially tolerated) as part of a larger, organized criminal enterprise. But toleration of those who grow for personal use, medical or “ideological” reasons gives those with such motivations a way to source cannabis without recourse to the black market – and may encourage a greater respect for the law for such users (and those who sympathize with them). There might also be benefits for policing efforts with some clear indications of how best to target resources.

The issue of whether this model (the “Alaska model” of MacCoun and Reuter 2001) would indeed lead to more harms than benefits is important, and perhaps the one criterion against which to base such decisions. In the end, how one projects the consequences of this regime may depend on whether one believes this to be a small or drastic change in policy. Research into the effect of small changes in policy such as de facto decriminalization showed that it had little effect on the prevalence of use, one way or another (MacCoun and Reuter 2001, Room et al. 2010). There are reasons to believe that a similar situation can be expected for tolerance of small scale cannabis use, but again we lack any systematic research documenting the impact of such changes on the dynamics of the cannabis industry after they were made. We strongly believe that if any changes should be made to policy, they should be documented and analyzed by pre-post research designs with solid prevalence indicators at both the demand and supply levels. Any such changes should also not be drastic enough that one cannot revert back to the initial state in case of obvious increases in harms related to change in regime.

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Biography

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