

Discussion Paper

Commercial Medical Cannabis Cultivation in the ALR

By

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Executive Summary:

The recent legalization of cannabis use and production at the federal level will lead to a rapid expansion of industrial greenhouse cultivation in British Columbia. Among numerous other controversies, the two key issues on the verge of developing into a regional crisis are

- The permanent destruction of fertile agricultural land by large scale greenhouse cannabis cultivation and
- The disruption caused by these operations to residential neighbourhoods due to a severe lack of regulation.

As this brand-new industry is catching up to satisfy the growing demand for recreational and medicinal marijuana, the landscape of our rural townships and residential neighbourhoods will be altered forever, if we don't act quickly.

This Discussion Paper is a call to action – to start a conversation among stakeholders about industrial cannabis cultivation in B.C.

It is not meant to stifle farming in this province nor should it be interpreted as opposition to marijuana production and use. It has been prepared out of concern for the future of our farmland and the quality of life in rural neighbourhoods.

The proposed paths to finding solutions for the impending crisis are

- The establishment of an immediate moratorium on the licensing of new greenhouse cannabis cultivation until the guidelines for the use of ALR lands have been revised and
- The development of a provincial regulatory framework that deals with the detrimental effects of industrial greenhouse cultivation on the environment and rural residential neighbourhoods.

Introduction:

As the use of cannabis-derived products for medicinal purposes is positioned to become a widely accepted practice in British Columbia, it moves into the mainstream of public consciousness and discourse. However, it may take some time before the stigma attached to marijuana has dissipated and the public will accept the cultivation and use of cannabis as “normal”.

In the meantime, the growing demand for cannabis products locally, nationally and internationally is already straining regulatory bodies, municipalities, energy infrastructures, human resources, and land availability. Intending to join the rush for huge cannabis profits while margins are high, an ever increasing number of greenhouse companies are racing to snap up fertile agricultural land.

While regulatory bodies still adhere to the ill-conceived notion that industrial greenhouse cultivation of cannabis is an agricultural crop and belongs in the Agricultural Land Reserve (ALR), our most fertile farmland continues to be paved over and is lost to future generations. It is time for policy makers to change their paradigm and acknowledge: Not all greenhouse production is agricultural by nature.

Presently (late October 2018), approximately 700 applications are making their way through the approval process while 125 licenses have been issued for medical cannabis cultivation nationally since legal commercial production began 5 years ago. Of the 125 Licensed Producers (LPs) in Canada, 70 LPs are publicly traded companies. The rest are privately held cannabis firms; 48 have started production during the first 10 months of 2018 alone.¹

When B.C.’s Agricultural Land Reserve (ALR) was established in 1973, it was meant to be “a provincial land-use zone where agriculture is the priority use. With an area of 4.6 million ha (13.37 million acres), the ALR comprises just 5% of BC’s total land base and is the area with the greatest agricultural capacity. As a finite and valuable resource, the province has decided to protect this land.”² The focus of the ALR has always been the protection of arable, fertile soil on private and crown (provincial and federal) lands in BC. It is important to remember that only 53% of the ALR are soil classification 1 to 4 lands while the rest are considered to be marginally suitable for the purpose of crop production. Not all ALR lands are arable. There are more bodies of water included in the ALR than

fertile Class 1 land.³ Our province, which is characterized mostly by mountains, rivers, forests and lakes, cannot afford to lose much more of its productive land base.

As land pressures and land-use conflicts grow, new commercial producers of cannabis have been in the crosshairs of public scrutiny. No community wants grow-ops near residential areas, and while traditionally greenhouses have always been located in the ALR, a strong case can be made that sophisticated industrial cannabis cultivation has no place on precious fertile soil.

Greenhouse Cannabis Production in the ALR:

At present, the Agricultural Land Commission (ALC) clearly identifies greenhouse as an agricultural activity permitted outright in the ALR.² Municipalities have no jurisdiction over this regulation.

When the ALR was established in 1973, the inclusion of greenhouse in the ALR was logical and made sense. Not anymore.

At that time, much of BC's flower and vegetable production was still soil-based and done in greenhouses and the field. Technologies such as photosynthetic high intensity lighting, CO² supplementation, the use of robotics, hydroponics, and computer control of the environment were still in their infancy. With the industrialization of greenhouse production during the past 40 years and the technological advances imported mostly from Europe, greenhouse production in BC's Lower Mainland advanced and became more sophisticated. By allowing computers to control the greenhouse environment, taking plants out of the soil and moving crops into soil-less media, the growers were removing environmental variables (e.g. fluctuating climatic factors, soil-borne diseases and nutrient imbalances) while optimizing temperature, humidity, CO², and light and taking complete control of the plants' macro and micro-nutrient uptake. Suddenly, greenhouse growers were able to induce vegetative and generative growth at will, control the rate of plant development, grow crops of higher quality, and schedule crop cycles more accurately. The nutritional guessing game, so prevalent in soil-based production, was taken out of the equation. There is no going back: the majority of greenhouse crops have forever been taken out of the ground.

At present, vast greenhouse production facilities covering hundreds of ha are located in the ALR. Instead of using native soil, the ground is paved over and hydroponic systems are installed. Greenhouse floor space has more than doubled since 2001⁴, not least due to

B.C.'s favourable climate, extensive technological infrastructure, and broad-based horticultural expertise. In 2011 (last available figures) the total greenhouse space used by B.C. vegetable and flower growers was 557 ha (1,377 acres).⁴ This is roughly the same size as the City of White Rock, a relatively small area compared to all ALR lands in the South Coast Region (148,000 ha or 366,000 acres).

New greenhouse structures increasingly compete with agricultural commodities such as hay, grapes, berries, and root and leaf vegetables for the best light and soil conditions in the Lower Mainland.

Greenhouse production in BC will continue to expand at a rapid pace. The legalization of cannabis for recreational and medicinal purposes will prompt a new surge in the establishment of commercial greenhouse facilities particularly in the Lower Mainland. Canada's cannabis industry expects 40% of Canada's marijuana production to be located in BC, generating 15,000 new jobs. In their 2017 publication "Into the Light", Dan Sutton and Alexander Close of Tantalus Labs paint a picture of the commercial marijuana potential for expansion: "In the fourth quarter of 2015/16, Canadian LPs produced just over 4,000 kg of dried medical cannabis. This represents only 2.5% of the estimated quarterly Canadian cannabis demand in 2018..."⁵ According to the industry magazine "Grow Opportunity", by 2021 half a million patients will be using medical marijuana, increasing the annual demand to 150,000 kg of cannabis flower.⁶

Most of the current demand is still satisfied by illicitly run grow-ops using completely enclosed growth chambers and bunkers.⁵ It is expected that the demand for quality cannabis will gradually be taken over by LPs in sophisticated new greenhouse structures. With potential profit margins close to 50%⁷, commercial cannabis production is attracting wealthy investors who wish to benefit from a first mover advantage. Money appears to be no obstacle.

Health Canada, the federal agency overseeing the licensing and compliance of new producers under the *Access to Cannabis for Medical Purposes Regulation* (ACMPR) have set strict standards for the physical plant design, facility hygiene, operating procedures, qualifications of key personnel, quality control, professional ethics, odour mitigation, and liquid waste disposal. A new greenhouse business meeting all of the mandatory requirements will not only look like a fortress with a cleared perimeter, security lights, surveillance cameras, physical barriers, motion detectors, and electronic access management systems, it will also feature, among other high-tech equipment, computerized HVAC systems for temperature and humidity control, carbon filtration, automated

nutrient injection systems, CO² enrichment, high intensity grow lights, black-out curtains, and air lock chambers. Workers and visitors must be clothed in white coveralls to prevent crop contamination. The cultivation of high-quality, safe cannabis for medical use cannot be done in native soil. It has to occur in a pest and disease-free environment either hydroponically in troughs or in pots filled with sterile soilless medium.

Given the required physical security features, technical sophistication, and biological science employed in producing medical cannabis, this type of enterprise should no longer be associated with traditional agriculture.

A fitting definition for medical cannabis cultivation is

Industrial Greenhouse Horticulture.

It can operate successfully on any type of soil and in any type of environment. It should not be located on ALR land, certainly not on highly productive Class 1 to 4 soils.

Definitions:

With respect to the above point, we have to define the word “industrial” and understand the differences between “agriculture” and “horticulture” more clearly.

How should the word “industrial” be interpreted in this context?

The word “industrial” is a descriptive term relating to “a department or branch of a craft, art, business, or manufacture especially; one that employs a large personnel and capital especially in manufacturing.” The word “industrial” implies an intense and diligent pursuit of creating something of value. (Merriam-Webster Dictionary)

The descriptive term “industrial” is fitting given the enormous capital outlay, the labour intensive nature of the medical cannabis business, and the extreme controls and precise management required in the cultivation of clean, high quality marijuana in greenhouses.

What is the difference between “horticulture” and “agriculture”?

While “horticulture” is a sub-group of agriculture and parallels exist between the disciplines (e.g. vegetable production), for the most part the two are very different. Merriam-Webster Dictionary defines “horticulture” as “the science and art of growing

fruits, vegetables, flowers or ornamental plants.” In contrast, Merriam-Webster describes “agriculture” as “the science, art, or practice of cultivating the soil, producing crops, and raising livestock...” Following are a few selected characteristics which apply to *horticulture* in general (horticultural services are excluded):

- “Horticulturists apply their knowledge, skills, and technologies ... to grow intensively produced plants for human food and non-food uses and for personal or social needs.” (Wikipedia)
- A horticulturist is in control of most input variables.
- Horticulture is relatively small in scale and often enclosed (e.g. greenhouse). The word horticulture is derived from the Latin word “hortus” = “garden” and the Greek word “cultura” = growing”¹⁰.
- The practice of horticulture is research-based and applies science and technology to a great extent.
- Horticulture makes extensive use of sterile growing media instead of natural soil.
- Horticulture is labour intensive.
- Horticultural products can broadly be grouped into foods, ornamentals, herbs and medicinal products. Foods play a relatively minor role.

In contrast, the following characteristics apply to *agriculture* in general (agricultural services are excluded):

- Agriculture includes the disciplines of animal husbandry, bee-keeping, fish farming, poultry and the study and practice of growing field crops, oil seeds, grains and fodder.
- Agricultural practice is large-scale and involves the cultivation of extensive pieces of land.
- Agriculture is not labour intensive.
- Agriculture uses natural soil for the production of crops. The word agriculture is derived from the Latin word “ager” = “field”¹¹.
- Agricultural practice is not as controlled as horticulture. It is more dependent on the elements (e.g. wind, temperature, water).
- Agricultural products can broadly be grouped into food, fibers, fuels, and raw materials. Foods play a major role.

As a sub-group of agriculture, the discipline of horticulture has scientific and industrial elements which are very different from traditional agriculture and should therefore, from a legislative and public policy perspective, be treated differently. Again, scientifically

advanced and highly industrial horticulture has no place on land that has been set aside for the protection of fertile soil.

Commercial Cannabis Production Near Residential Neighbourhoods:

With the start of legalization of cannabis for medical use several years ago and for recreational use as of October 17, 2018, it is reasonable to expect a proliferation of industrial cannabis cultivation in greenhouses, particularly in the South Coast Region of B.C. The sheer number of applications for grow licenses currently under review by Health Canada supports this assumption.

Unless new binding regulations are introduced quickly at the provincial level, the expanding cannabis industry will lead to a dramatic increase in conflicts between legal marijuana producers (LPs), environmental groups, law enforcement, municipalities, and nearby residents.

The race for profits in this young industry has often been compared to the “gold rush” days of the 19th century. The same kind of excitement can be felt among investors, retailers, and growers. As a society, however, we must be careful not to let the people who are caught up in the cannabis hype, dictate what kind of regulations should or should not be implemented. Cool heads that see as much opportunity in this industry as danger must develop sensible, common sense regulations for the benefit and protection of all British Columbians.

The flash points of conflict relate to those aspects of cannabis cultivation which have a detrimental impact on the lives of neighbours and harm the environment. The main items of concern are listed below (the following list of recommended remedies does not take into consideration any applicable municipal, provincial or Health Canada regulations already in existence):

- Light pollution from grow lights

In our northern climate it is unrealistic to expect production of high quality cannabis to take place in the absence of supplemental lighting. Still, growers do well to locate their greenhouses in locations with less cloud cover and where ambient seasonal light levels are high (e.g. the municipality of Delta experiences 200 more annual sunshine hours than Maple Ridge). Choosing a location with high light

levels will result in a better quality product, faster plant growth, greater yield per sqm, less usage of grow lights, lower electricity costs, and less light pollution.

Regulations should require a cannabis grower to install black-out curtains in his/her greenhouse. To prevent light pollution, the curtains' operation should be controlled by light sensors (except for photoperiod crop manipulation). The curtains close at dusk and open at dawn. They should be left closed when ambient light levels are insufficient for photosynthesis and justify the cost of operating lights.

- Disposal of liquid waste

The main forms of liquid waste in greenhouses relate to nutrient and pesticide solutions. The risks of aquifer contamination are great if liquid waste is allowed to leach into the ground water.

Regulations should require the greenhouse grower to cultivate cannabis plants hydroponically in closed systems where used nutrient solutions are re-captured, filtered, sterilized, and the nutrient levels are re-adjusted. Pesticide solutions only constitute a problem if excessive amounts are prepared for application and many liters remain in the spray tank after the job has been completed. This can be dealt with operationally by calculating the amount of pesticide solution needed, accurately.

- Light Pollution from Security Lighting

Light pollution from security lighting occurs when bright high-intensity lights are used around the operation's perimeter, illuminate the sky and spill onto neighbouring properties.

Regulations should require the greenhouse grower to use infrared surveillance cameras and motion sensors for interior and exterior intrusion detection.

- Retail Sales and Dispensaries

Retail sales and dispensaries at the site where cannabis is cultivated have the potential to increase traffic to and from the operation and exacerbate the risk of vandalism, theft, and break-and-enter.

Regulations should disallow retail sales and dispensaries at the production site.

- Odour

Cannabis, especially during generative growth and during bud development, emits a strong, pungent, skunk-like odour which can travel as far as 1,500 m (5,000 ft). This by-product of cannabis cultivation has the potential to cause detrimental health effects in people and animals and destroy the enjoyment neighbours derive from their properties. Often, in order to avoid the smell, nearby residents have to keep their windows shut and curtail their outdoor activities.

Regulations should require the greenhouse grower to maintain a closed-system environment. The expulsion of air from the interior of the greenhouse structure, regardless of moisture content, odour, or temperature, should be prevented unless the air has been treated by an HVAC system and scrubbed through carbon filtration, first. Another additional odour mitigation techniques involves the use of alpha-pinene, a volatile organic compound (VOC) derived from pine, rosemary and juniper. This oil attracts and neutralizes odour molecules from cannabis.⁸ Best would be a combination of the above techniques.

- Noise

Cannabis cultivation in greenhouses is equipment-intensive and can potentially disturb neighbours, in some instances 24 hours a day, 7 days a week. Fans, HVAC equipment, delivery trucks, processing equipment, and pesticide application can be noisy and result in restless sleep and/or loss of enjoyment during outdoor activities.

Regulations should require the greenhouse grower to keep noise to a minimum at all times. Continuing and persistent sound emanating from the greenhouse facility should not exceed 50 dB at the property line. To mitigate noise, trees and shrubs should be planted within the buffer zone and/or a sound-absorbing wall should be erected along the greenhouse perimeter.

Common Arguments...

...in favour of growing cannabis on ALR land:

- “Cannabis is a federally recognized agricultural crop and should be grown on agricultural land. It falls under the Right to Farm Act”
- “Greenhousing is an outright permissible land use activity in the ALR as recognized by the ALC.”

- “Cannabis cultivation is not very different from hydroponically grown tomatoes and cucumbers. Tomatoes, cucumbers, flowers, lettuce, and peppers are not grown in soil but are still permitted on ALR land.”
- “This is my land and how I use it is my business.”
- “On my land I want to have the option to do field production.”
- “Greenhouses are not permanent structures. They can be moved and removed at a later time without harming the soil.”
- “What if I am located in an industrial zone (as many people suggest) and want to change to tomatoes or flowers after 3 or 4 years?”
- “Cannabis stock plants are often grown in the field outside. This would be considered improper use of industrial land.”
- “Greenhouse production uses a mere 0.01% of farm land in B.C.⁹ We will not run out of fertile agricultural soil in this province because of greenhouse production.”

...in opposition to growing cannabis on fertile (Class 1 to 4) ALR land:

- “No aspect of high quality cannabis production is soil-based. Under no circumstances is fertile soil required for medical cannabis cultivation.”
- “By its very nature, cannabis cultivation is industrial. The capital outlay, strict security requirements, and extensive use of science and technology bear a greater resemblance to manufacturing than to an agricultural activity.”
- “Cannabis production facilities are uniquely designed for marijuana cultivation. It is unlikely the greenhouses will ever be used for anything else.”
- “Cannabis production facilities should be on industrial land. The ALR has many residential neighbourhoods which would be impacted by odour, light pollution, and traffic.”
- “Greenhouse production falls under “horticulture” which is very different from traditional agriculture.”
- “From this point forward Class 1 to 4 ALR land should be used for food production exclusively.”
- “The ALR includes 2.1 million (5.2 million acres) of land only suitable for a narrow range of crop production (soil classification 5, 6 and 7). This land should be used for industrial greenhouses.”

Use Class 5, 6 & 7 in addition to industrial land as preferred siting for commercial medical cannabis cultivation.

Even the ALC suggests that these soil classifications are suitable for closed system greenhouse cultivation: *“the recognition of ‘arable’ agricultural activities is also significant in that Class 6 & 7 lands may still be agriculturally productive, where topography and climate allows, and where the agricultural activities are dedicated to closed environmental systems (i.e. greenhouses).”*¹²

Summary:

For many decades cannabis production in Canada was driven underground by prohibition. Only 5 years ago the Canadian Government started to issue licenses for the commercial cultivation of cannabis for medical purposes. Licensees (LPs) are inspected regularly and must adhere to strict security, quality control, and operating procedures. On October 17th the licensing process was expanded to include the cultivation of cannabis for recreational use by adults. It is expected that less stringent regulations will apply to LPs of recreational cannabis.

Due to its clandestine nature, illegal cannabis production was hidden from the public eye. Located in basements, barns, attics, and garden sheds, producers went through great lengths not to be detected by neighbours, BC Hydro, and police. Almost always high intensity grow lights were used to substitute natural sun light. This resulted in high fire hazards and extremely high energy consumption. It is estimated that 2% of all Canadian energy usage can be contributed to illicit cannabis cultivation.⁵

As the legalization of cannabis use and production is now a reality in Canada, we expect a wave of LPs to enter the industry. Without a doubt, many new licensed producers are individuals who have grown cannabis for many years in hiding. They are proficient in their “craft” and now have the opportunity to grow their crops openly without fear of prosecution.

Perhaps some of the most difficult things to overcome for the general public as well as the new LPs are public perception, stigma, and secrecy. Also, having grown cannabis without natural light for so long, the idea of growing crops using natural light instead of growth chambers or bunkers is new and unfamiliar. It will be a difficult habit to break.

Cannabis production in greenhouses (instead of bunkers) requires the growers to tackle a steep learning curve as cultivating cannabis under natural light conditions is very different from closed environments.

Then there is the question of location. Cannabis producing greenhouses are not a good fit for the ALR. Granted, the ALR is huge. It would take many years before locating cannabis greenhouses on ALR land would lead to a noticeable shortage in fertile land. But just like throwing one plastic bottle into the ocean does not have a great impact on the environment, it does not make it right. Permanently covering fertile land with greenhouse crops that will not require soil may not have a significant impact on food security in the foreseeable future, but it still is wrong.

But where should the operations be located? Are enough industrial sites available to accommodate many new LPs? Should greenhouses be located on lower grade ALR land (Class 5 and above)? Can parcels of land be found that have unproductive soil, have plenty of water and are away from residential neighbourhoods, far enough as to not have detrimental impact on people's lives? Should soil classification be taken into consideration before building permits for closed system greenhouse operations are approved? These are still unanswered questions.

B.C. has a reputation around the world for its high quality cannabis. As it appears, our province is well positioned to become a bastion of marijuana cultivation, but as land use pressures and conflicts increase, an expected stream of new cannabis operations will be looking for suitable building sites in the most unsuitable places. We are just seeing the beginning of a new era in greenhouse production in our province.

Unless we are willing to shift away from a paradigm that equates industrial greenhouse horticulture with traditional soil-based agriculture and treat it as such, the conflicts will continue.

Recommendations:

1. Establish a moratorium on the construction of new cannabis greenhouse operations or the expansion of existing operations in B.C. The moratorium should be made effective immediately.
2. Under the auspices of the ALC, establish an advisory committee consisting of representatives from different stakeholder groups (e.g. cannabis industry, general public, municipalities, ALC, BC Min of Agriculture, B.C. Ministry of Environment, agricultural producers, educators, consultants to the cannabis industry, Health Canada) to review the suitability and appropriateness of commercial cannabis greenhouse cultivation in the ALR.
3. Under the auspices of the BC Ministry of Agriculture, establish an advisory committee consisting of representatives from different stakeholder groups (e.g. cannabis industry, general public, municipalities, ALC, BC Min of Agriculture, B.C. Ministry of Environment, educators, consultants to the cannabis industry, greenhouse equipment suppliers, Health Canada) to develop binding, province-wide regulations for cannabis greenhouse producers that complement the Access to Cannabis for Medical Purposes Regulations (ACMPR) developed by Health Canada. The focus of the regulations should be environmental protection and the mitigation of possible detrimental impacts on neighbouring residential properties.
4. The moratorium should not be lifted unless the review has been completed and the new provincial regulations are ready for implementation.

About the Author:

During the past 40 years Rhyan Dieter Thomas, B.Sc., MBA. has been involved in the B.C. greenhouse industry as a grower, researcher, educator, consultant and Dean of Horticulture at Kwantlen Polytechnic University. He resides in Glen Valley, Township of Langley, B.C.

This Discussion Paper has been prepared on behalf of the concerned citizens and members of the Glen Valley Neighbourhood Coalition (GVNC) in Langley, B.C

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