Fields of Green for All

NON-PROFIT COMPANY

Collectively Reforming South Africa's Cannabis Laws

CANNABIS 101
THE PLANT & ITS USES

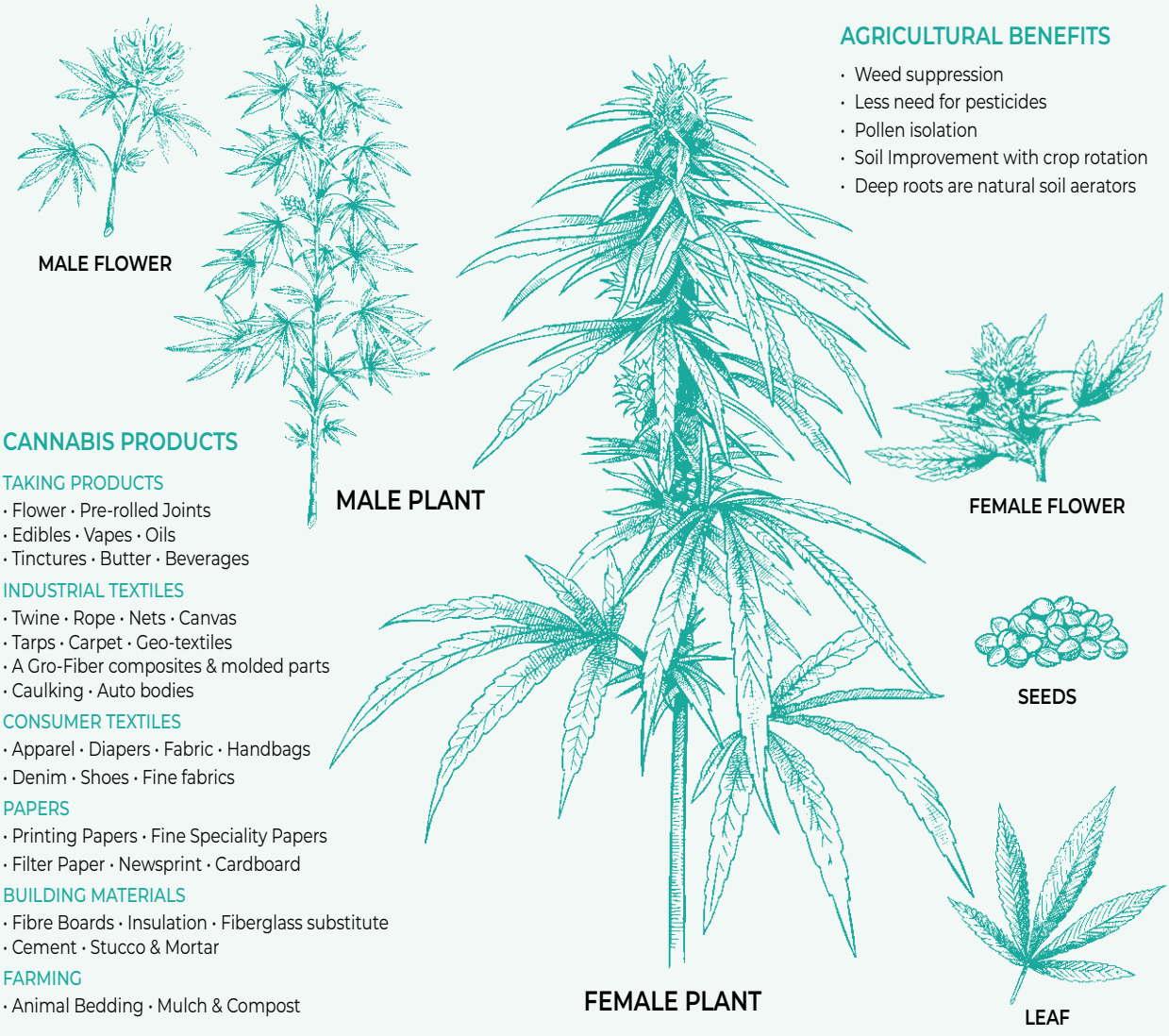
A Full-Spectrum Manifesto For Policy Reform

1. Cannabis 101 - The Plant and Its Uses

This first chapter of our Manifesto, Cannabis 101, is essential reading for all who are new to our Cannabis world, particularly legislators and government departments responsible for drafting laws and regulations. The recently published draft Cannabis for Private Purposes Bill is littered with factual errors and misunderstandings about the plant, from growing it to consuming it and everything in between. The root cause failure of this Bill is a lack of factual Cannabis knowledge. This knowledge is easily accessible, and our manifesto should be the first learning resource lawmakers use in getting to understand Cannabis from a botanical, growing, consumption and cultural perspective.

Our language, abbreviations and cultivar names form part of our Cannabis culture, born out of a need to stay in the shadows because of societal stigma and the risk of falling foul of the law. Whilst Cannabis is being adapted and diluted to fit in with mass-market consumerism, it is important to maintain a balance between protecting our culture and making it accessible to people who may have reservations about Cannabis. The reservations are often the result of stigma, as well as beliefs based on incorrect "War on Drugs"-type information.

BOTANY OF THE CANNABIS PLANT

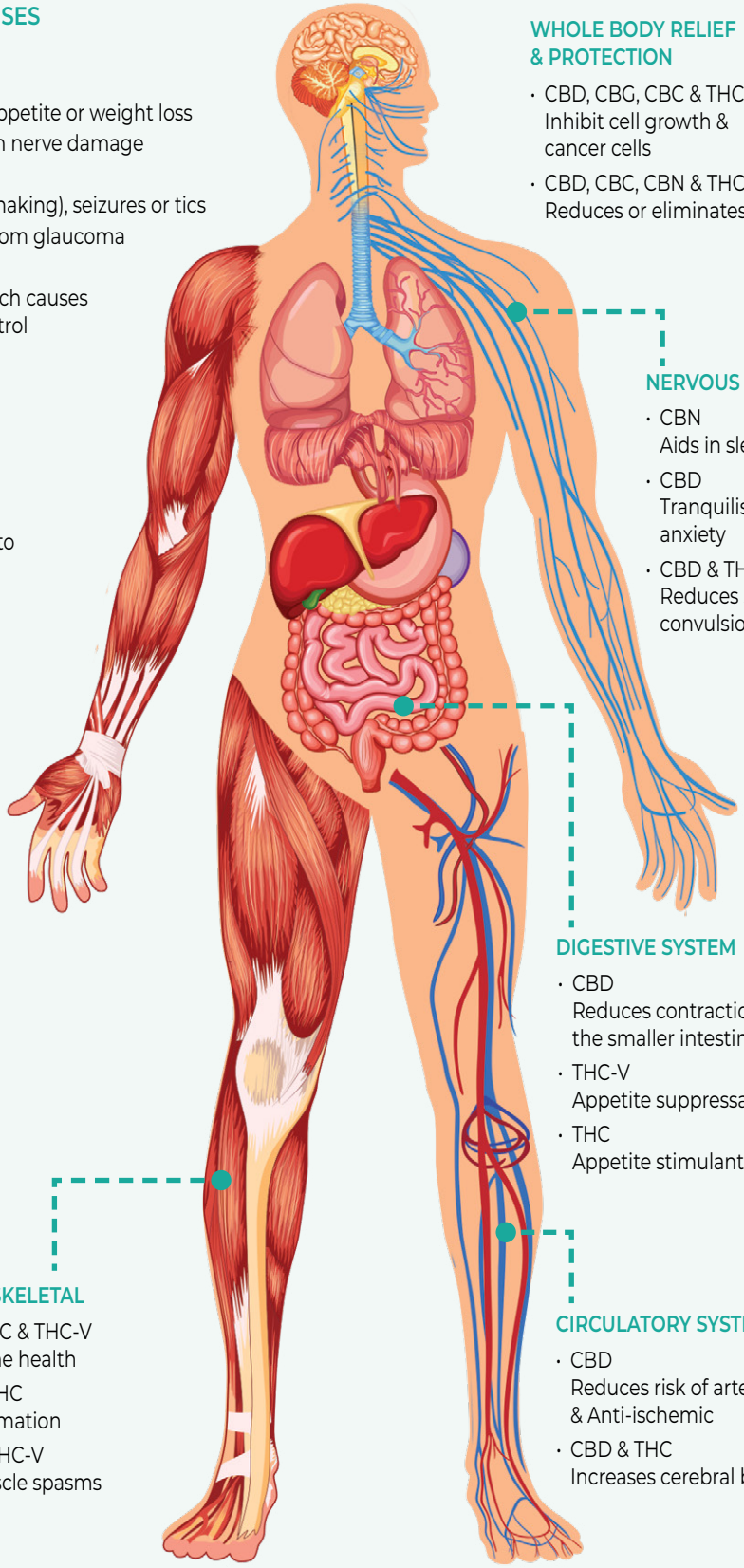


MEDICINAL CANNABIS USE

MEDICINAL CANNABIS USES

Assists in the treatement in:

- Pain or inflammation
- Nausea, vomiting, loss of appetite or weight loss
- Tingling or numbness from nerve damage
- Mood and sleep problems
- Muscle spasms, tremors (shaking), seizures or tics
- Fluid pressure in the eye from glaucoma
- HIV/AIDS
- Multiple sclerosis (MS), which causes gradual loss of muscle control
- Lupus
- Rheumatoid Arthritis
- Substance use disorders
- Mental disorders
- Autoimmune conditions
- Epilepsy
- Nausea and vomiting due to chemotherapy
- Non-cancer chronic pain
- Palliative care
- Altimeters



WHOLE BODY RELIEF & PROTECTION

- CBD, CBG, CBC & THC
  Inhibit cell growth & cancer cells
- CBD, CBC, CBN & THC
  Reduces or eliminates pain

NERVOUS SYSTEM

- CBN
  Aids in sleep
- CBD
  Tranquilises & relieves anxiety
- CBD & THC-V
  Reduces seizures & convulsions

ENDOCRINE & IMMUNE RESPONSE

- CBD, CBG
  Kills or slows bacteria growth
- CBG
  Treats fungal infections
- CBG
  Reduces blood sugar levels & treats sporiasis

DIGESTIVE SYSTEM

- CBD
  Reduces contractions in the smaller intestines
- THC-V
  Appetite suppressant
- THC
  Appetite stimulant

MUSCULAR & SKELETAL

- CBD, CBG, CBC & THC-V
  Promotes bone health
- CBD, CBC & THC
  Reduces inflamation
- CBD, CBN & THC-V
  Suppress muscle spasms

CIRCULATORY SYSTEM

- CBD
  Reduces risk of artery blockage & Anti-ischemic
- CBD & THC
  Increases cerebral blood flow

1.1 What Does The Cannabis Plant Look Like?

1.1.1 Seeds

Cannabis seeds are where it all begins, with each seed carrying a unique genetic profile resulting in thousands upon thousands of potential variations. One single seed can grow into a plant yielding more than 1kg of dried flower, but an identical seed with the same lineage may only grow into a plant yielding a few hundred grams or less depending on the variables. Cannabis seeds contain no THC or cannabinoids, and whilst they are intended to be grown, seeds themselves can be turned into food, as they are highly nutritious for both humans and animals.

Seeds

1.1.2 Seedlings

For seeds to start their growth journey, they first need to germinate. Seeds are in a dormant state until they are placed in a moist, warm environment. Once they break the surface of the grow medium, such as soil, they are known as seedlings. Seedlings are still frail and need to be cared for, as direct light or extreme temperatures can stunt their growth or kill them. It is often at the seedling stage that the grower picks out the strongest seedlings and discards the rest. It is for this reason that a grower may have hundreds of seedlings but only chooses a few dozen to take to the next stage of growth.

Seedlings

1.1.3 Clones

Growers also make use of clones - cuttings from a female plant that are placed in hydrated jiffy pellets, rockwool cubes or directly into a grow medium such as coco coir. These cuttings then produce roots and take the plant straight to the seedling stage. This method is used in order to guarantee the sex (female) of the plant or to propagate particular Cannabis genetics. Cloning is widely used in indoor growing and in the medical Cannabis industry where stable genetics are vital.

Clones

Young vegetative Cannabis Plants that are a few weeks into their life cycle.

Adult vegetative Cannabis plants 6-8 weeks into their life cycle from seedling stage.

1.1.4 Vegetating Plants

Once seedlings have developed their first set of "true" leaves that resemble the typical serrated Cannabis leaf structure, they will carry on growing, classically in the shape of a Christmas tree but there are a variety of shapes and sizes the Cannabis plant can grow into, either naturally or "trained" by the grower.

The vegetative state is the phase where the plant biomass increases exponentially and can last for months on end. What keeps a Cannabis plant in the vegetative state is the hours of light it is exposed to - ideally 18 hours of light. This is why the vegetative state for growing outdoors starts in spring and carries on into the summer, as the days get longer.

For indoor gardens, the light is artificially manipulated according to the needs of the grower or the space available. Growers can also select the strongest plants during this phase and discard the weaker ones. The number of plants in a vegetative state does not necessarily indicate the number of plants that will be retained for the flowering phase.

Mature vegetative Cannabis plants a few months old, ready to transition into the flowering stage.

Vegetative Cannabis plants increases biomass through growth of fan leaves which act like solar panels for the plant.

1.1.5 Flowering Plants

Towards the end of the vegetative state, the Cannabis plant would have increased the number of lateral branches, internodes, leaves and root-ball mass, resulting in a bushy Cannabis tree that has yet to have any buds or flowers. As the light hours decrease in the transition to autumn and winter, the plants begin to flower. The flowering stage is what gives us our prized buds and it is a natural response to the Cannabis plant's readiness to be pollinated. The flowers are covered in trichomes and these contain the cannabinoids and terpenes.

A typical African land race Cannabis plant a few weeks into the flowering stage reaching well over 2 metres in height.

Depending on the genetics and other variables such as cold temperatures, Cannabis flowers can take on beautiful hues.

An example of a Cannabis "cola" which is the entire flowering branch made up of flowering bud sites.

A typically Christmas tree shaped Cannabis plant that has reached the end of the flowering stage. Some fan leaves have been removed to show the colas and bud sites.

A mature flowering Cannabis plant that has been pruned and trained to have multiple main colas resulting in a shorter and bushier plant compared to the taller natural Christmas tree shape.

1.1.6 Male & Female Plants

During the vegetative stage or when Cannabis plants transition from the vegetative to the flowering stage, the gender of the plant is revealed. Female plants produce flowers containing the highest amount of cannabinoids and terpenes and males produce pollen sacs. If female and male plants are left alone, they will pollinate, resulting in seeds being produced inside the flowers. These seeds, as discussed previously, hold the genetic make-up of the parents.

Selective breeding has resulted in the many popular cultivars we enjoy today, as well as many others from the past. However, if the male plants are removed early in the vegetative or flowering stage, before they start producing pollen, then the females produce better quality flowers. Without pollen, the plant will direct all resources into the flowers, resulting in higher yields and an overall superior product compared to seeded flowers. Flowers without seeds are commonly known as "Sensimilla", a term that originated in Jamaica. Loss of male plants contributes to a smaller harvest so many growers plant more than they intend to harvest because of this.

Specialised "feminised" seeds or clones from female plants are often used to guarantee the number of plants to harvest but both these options are expensive and not accessible to all growers.

Female plant

Male plant

Female plant

Male plant

1.1.7 "Hemp"(Industrial Cannabis) vs Cannabis Plants

It is a common misconception that Hemp and Cannabis plants are two different species. This is not true, they are two different types of Cannabis, a type of flowering plant in the *Cannabaceae* family. In order to keep Cannabis containing THC illegal, prohibitionists[7] came up with an arbitrary figure linked to the THC (tetrahydrocannabinol) content of the two types of plant. This is set by international conventions (see Section 2.4) and by individual countries, usually at 0.3% or less THC content by dry weight. This subject is discussed at greater length in Section 5.4.

Hemp

Cannabis

Hemp

A greenhouse filled with mature Cannabis plants ready to be harvested. The first step requires defoliating and removing fan leaves before removing branches.

At the end of their life cycle Cannabis plants can grow into massive trees leaving behind lots of fibrous biomass that could be used in industrial applications or simply composted for the next growing season.

1.1.8 Harvesting Cannabis

Towards the end of the flowering cycle, the plant will begin to show signs that it is ready to be harvested. Harvesting needs to happen within a certain time period specific to the cultivar being grown. Some plants can be harvested within eight weeks, others only after 12 or even 16 weeks. The process of harvesting involves cutting the branches off the Cannabis plant and removing excess leaves.

It is important to note here that Cannabis leaves, while they have their uses as biomass (compost), are not used for either smoking, vapourising or extracting.

The flowers are then dried in a variety of ways, depending on the context. Growers in parts of South Africa may dry Cannabis in direct sunlight but this is usually due to lack of indoor space and adversely affects the final product. Cannabis should be cured away from direct sunlight with low humidity and carefully controlled ventilation. Unfortunately these optimal conditions are only available to those with the resources. That is why so many of our rural farmers can only sell their product for the minimum price as the inadequate access to resources has affected quality in the supply chain.

Once the flowers are dried, they will be manicured or trimmed (if they were not trimmed before drying) and stored, ready for use. Some growers will cure their dried and trimmed flowers in jars for weeks or months at a time. Cannabis, like fine wines, requires extreme care during harvesting and curing to ensure a good quality product. Many growers use the small “sugar leaves” that are trimmed from the final product in extractions for concentrates, adding to the fact that we can use the whole plant in a sustainable way.

Once the branches are removed from the main Cannabis stem, they are hung to dry, ideally in a dark and cool environment.

A close-up of a sticky dried Cannabis bud, covered in trichomes, which has been curing in an airtight jar for a few months.

1.2 How Is Cannabis Flower Ingested?

1.2.1 Smoking

Pipe smoking

Joint smoking

Bongs

1.2.2 Vapourising

Vape pen

Jules Stobbs heating up his glass rig to the appropriate temperature before dabbing

1.3 What Are Cannabis Concentrates / Extracts?

Cannabis concentrates have been around since the plant and human beings first struck up a relationship. There are various reasons such as: Easier storage and transportation; Efficiency and ease of medical dosage; or maybe just to get more bang for your buck!

Cannabis concentrates are a great way of maximising the yield of a crop. Whilst whole flowers can be used in making concentrates, it is more economical to use the trimmed "frosty" sugar leaves and small popcorn nugs as they still contain trichomes rich in cannabinoids.

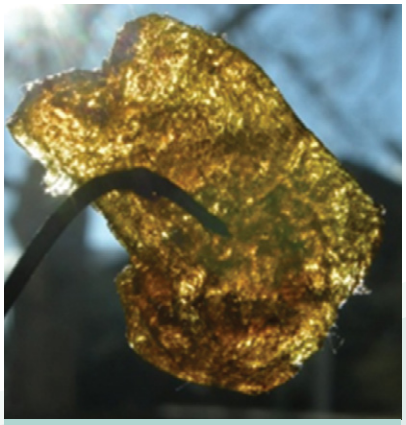
Concentrates are an art form, and it takes many hours of hard work and dedication to produce the crème de la crème for the connoisseur or patient. Concentrates can be used in several ways: Ingested (most common medicinal use, especially for serious illness); used to make tinctures, topical creams and baked goods; and vapourised using a glass pipe or a purpose-made vaporiser (also known as "dabbing").

The current upsurge of interest in concentrates has created its own brand of misinformation and some fear surrounding this form of Cannabis. Find out as much as you can about this alternative use of a non-toxic plant. If the solvent extraction is vacuum-purged by an experienced extractor, you should have no cause for concern. For some fun and in order to educate and share, we've compiled a list of various types of concentrates and their different names and categories for your perusal.

1.3.1 Butane Extraction

Butane Extraction is also known as BHO, Butane Honey / Hash Oil. BHO (butane hash oil) concentrates are extracted using butane, as this method preserves the terpene profile and creates both excellent dabs and great medicine. Sugar leaf, trim, popcorn buds and any material "not pleasing to the eye" can go into the mix for making BHO. The dried material is packed into a column – the column can be made from PVC pipe, stainless steel or BC glass (Pyrex). The idea is to blast ice cold butane over and through the plant material.

Butane pulls all the subtle terpenes and flavonoids that are destroyed using other solvents. Butane is the most environmentally friendly option as far as solvents go; it already exists in the body and has been used in the food industry for many years. Once the butane has been blasted into a pyrex dish, the solvent is evaporated and then vacuum purged using a vacuum pump and a desiccation chamber. Various consistencies are available according to the taste of the connoisseur i.e. wax, honeycomb, shatter, terp sauce, diamonds, etc[2].



BHO shatter

BHO crumble

BHO honeycomb

Alcohol extraction

1.3.2 Alcohol Extraction

Alcohol Extraction is also known as Rick Simpson Oil (RSO). This is a form of solvent extraction using ethanol or food-grade isopropyl alcohol. Made famous by cancer survivor Rick Simpson, it is a simple solvent-extraction method. The plant matter is soaked in alcohol and the alcohol is then evaporated off, which results in a sticky, viscous oil that is dark, almost black in appearance. The RSO can be stored in tubs or syringes[3].

Glycerine tincture

1.3.3 Tinctures

A wide variety of liquids and oils (coconut oil, butter, alcohol etc) can be used for soaking Cannabis to extract the cannabinoids.

- **Topical DMSO emulsion**

  DMSO, in the form of a topical cream – is a pain reliever and allows the absorption of alkaloids through the skin. This is used in a topical preparation. Just about any solvent extract can be used to make up the emulsion – CO2 and ethanol are commonly used[4].

- **Canna butter**

  Butter not margarine! Cannabis leaf, flowers or concentrate can be used and the idea is to simmer the butter and cannabis with a cup or two of water. After a while, the mixture is strained to remove the plant matter; then placed in a fridge to set. Any remaining water is poured off.

- **Glycerine tincture**

  Cannabis is soaked in glycerine to absorb the cannabinoids. The tincture is filtered or strained in a similar way to the canna butter.

- **Sublingual Spray**

  Sublingual spray a tincture placed in an atomiser. It is sprayed into the mouth and rapidly absorbed by the mucous membranes. It is usually made from a CO2-extract and medium-chain tryglycerides (MCT) base.

Hempseed oil

1.3.4 Hash / Kief

This is the oldest form of Cannabis concentrate, a technique practised for thousands of years. Hash is usually prepared during the coldest time of the year, so that the trichomes literally snap off when the plants are threshed or bundled and beaten with sticks in a drumming motion (Moroccan style). Another method is to roll the dry plants in a mat, which is then walked on or pounded. The room used for this process is specific and not used for any other purpose.

The small clean room is prepared with sheets or plastic covering the floors and walls. The clouds of trichome-rich dust settle on the surfaces and are then collected. In Morocco, the hash is kept in powder form until ready for sale, at which point it is beaten and pressed. In the Netherlands, drums made of mesh rotate the plant matter and allow the trichomes to fall for later collection. This method of beating or threshing is also practised in parts of central and West Africa, with some variation. In modern times hash making has evolved to use water, ice and various micron size filters to create a purer and more potent product called "Bubble Hash".

Hash

Kief

1.3.5 Dabbing

Cannabis concentrates can be used for a form of vapourising popularly known as dabbing. A small amount of Cannabis extract - either BHO or CO2 (RSO is not suitable for vapourising due to trace amounts of solvent) - are heated on a coil or "nail" and the vapour is inhaled.

Dabbing is a popular pastime in Cannabis culture with an entire sub-culture devoted to glass art for "rigs" blown by artists into intricate shapes with colourful patterns[7].

Jules Stobbs dabbing on his custom blown glass rig.

A piece of delicious fudge infused with a mild dose of Canna butter.

Topical Cannabis cream emulsion.

An infused cookie packaged with basic labelling. It is important to have warnings on the packaging to prevent unintended consumption.

1.4 The Cannabis Plant In South Africa

SA CANNABIS

FOOD, FUEL, FIBRE, HOUSING & MEDICINE FOR ALL

RAPID ECONOMIC DEVELOPMENT PLAN

PROBLEM
- 29% Unemployment
- Zero Economic Growth
- Declining Agricultural Sector
- Climate Change
- Poor Diet
- Poverty

PROJECTIONS
- SA Recreational and Medical worth R27 billion by 2023
- Globally $103.9 billion by 2023
- Industrial value not yet reliably calculated

SUNRISE INDUSTRY
- Recreational & Medical worth R27 billion by 2023
- Globally $57 billion by 2027

GREEN RESTORATION
- Grow your own reparations
- Primary Reconstruction & Development Agent
- SA potential to be a global leader of an inclusive sustainable cannabis industry.

WHAT OUR PEOPLE NEED

- Economic Prosperity
- Green Jobs
- Build your own house
- Healthy Food
- Climate friendly
- Green gold of the SA poor
- Cheap Medicine

"Open up and regulate the commercial use of hemp products, providing opportunities for small-scale farmers" - *President Ramaphosa SONA, Feb 2020*

"We have trained our sights on supporting green growth on the continent, and on ensuring that the continent takes advantage of the opportunities presented by the green transition. This includes new industries in energy, materials engineering, the circular economy, sustainable agriculture and clean production." - *President Ramaphosa speech to the African Union, Feb 2020*

GLOBAL CANNABIS

- 30 countries have legal cannabis for medical use.
- Growing number of states in the USA and countries are legalizing or embrace cannabis for recreational use.

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- USA raised $16 billion in taxes from recreational and medical cannabis creating over 300,000 jobs.

- Colorado state with a population of 5,7 million people has generated $15 billion in taxes and created 41,000 jobs

USES OF THE PLANT

FLOWER
- Medical
- Recreational

SEED
- Bio Fuel
- Plastic
- Personal Care
- Food

LEAF
- Juicing
- Mulch

STALK

HURD
- Clothing
- Paper

BAST FIBRE
- Building Material
- Bedding
- Paper

CANNABIS SUNRISE INDUSTRY

PRODUCTION
- Potential to produce Food, Fuel, Fibre & Medicine
- Estimated conservative production values per hectare of hemp with average yields under good growing conditions can generate the following for these specific end uses

EMPLOYMENT
- 20,000-hectare agricultural co-operative hub model supports 10,000 small farmers, farming two hectare each, employing an agricultural laborer per hectare, creates 30,000 jobs, generates income of R3,5 billion per hub farming.
- Ten hubs farming 200,000 hectars generates R35 billion revenue

FARMING/ CULTIVATION
- Per farmer per hectare bio-region & climate dependent stalk biomass R50,000.
- Fibre R18,000, Seed R155,000
- Cannabinoids R1000,000
- Average income per hectare is about R175,000
- Revenue of R350,000 for a small farmer on 2 hectares

PROCESSING
- 3 decortication technologies
- 4 processing lines
- 50,000 tons of fibre
- 120,000 tons of hurd
- employing 150 plant and support workers

CLIMATE FRIENDLY
- Sequesters up to 10,000 tons of carbon per hectare, where one cooperative hub could sequester up to **200 million tons** of carbon

SOCIO ECONOMIC POTENTIAL

- Brand new Sunrise Industry to kick start economic growth
- Affordable Health care
- Immune Boosting food grain rich in Omega fatty acids and protein
- Petroleum replacement to make plastic and biofuel
- Grow your own environmentally friendly house
- Revive the textile industry
- Massive job creation in multiple manufacturing applications

ENABLING LEGISLATION

INDUSTRIAL CANNABIS
- Treat ALL cannabis as an agricultural commodity - cash crop
- Utilise existing genetics & small farmers as the cornerstone of production
- Regulate THC / psychoactive levels at processing point

MEDICAL CANNABIS
- Differentiated by use
- Pharmaceutical cannabis is utilised for specific conditions obtained via a doctor's prescription and manufactured under Good Manufacturing Practice conditions
- Treatements for non-specific conditions accessed though traditional and complementary health channels.

RESPONSIBLE ADULT USE

Expand the existing Constitutional Court ruling:
- to include all people without access to private land to have access to canabis
- for new legislation to include the ability to cultivate, extract, process, manufacture and sell cannabis-based products for recreational use
- to regulate like alcohol and tobacco so as to be inclusive.

PROPOSED STRUCTURE FOR CANNABIS SA

- Developmental state plays a central role in developing the multi billion Rand cannabis value chain.
- Managed by Cannabis Development Agency in the Presidency.

- New pathway for rural development and land policy.
- Empower farmers with seed, knowledge and resources to participate in the cannabis economy.
- Establishment of co-operative hubs for grading, agro-processing, value add, job and community wealth creation.

CANNABIS HAS THE POTENTIAL TO ACT AS SOUTH AFRICA'S PRIMARY RECONSTRUCTION AND RECOVERY AGENT

The Cannabis Plant Infographic (2020), CDCSA Western Cape [https://cdcsa.co.za/]

1.5 Cannabis And Employment Opportunities

'Cannabis has the potential to act as South Africa's primary reconstruction and recovery agent." - CDICWC[5] June 2020

Particularly given the ravages of the Covid-19 pandemic and ensuing lockdown, the potential for job creation through a legally regulated Cannabis industry is promising. However, the broad outline of positions listed below must be taken in the context that these positions already exist, albeit largely within the unregulated Cannabis industry in South Africa. It follows that we already have the expertise to train the upcoming generations of entrepreneurs in this exciting sector.

Working in the Cannabis industry can be a fulfilling career and there are many paths to choose from. Cannabis cultivation, processing & distribution positions work directly with the plant. Support industry positions may not be directly involved with the plant, but are crucial to the functioning of the industry. Below is a list of the current positions we believe a vibrant Cannabis industry requires. In future, when an open, legal and equitable market is established in South Africa, the scope of both direct and support industries will widen considerably.[6]

1.5.1 Cannabis Cultivation, Processing & Distribution

Farmer (Industrial Cannabis)
Horticulturalist ("Master Grower")
Farm Manager & Assistants
Greenhouse Manager & Assistants
Indoor Grow Facility Manager & Assistants
Harvest Technicians & Assistants
Seed Suppliers & Personnel
Packaging Workers
Maintenance Technicians
Hygiene & Cleaning Services
Quality Control Officer
Health & Safety Officer
Equity Compliance Officer / Consultant
Master Extractor / Technician
Extraction Laboratory Manager & Assistants
Edibles Chef & Kitchen Assistants
Nutritionist
Warehouse Manager & Assistants
Security Personnel
Couriers & Drivers
Sales Representatives
Regulation Compliance Officer / Consultant
Cannabis Hub Manager & Assistants
Cannabis Hub Administration
Dagga Private Club Manager
Dagga Private Club Administration & Assistants
Cannabis Retail Manager
Cannabis Retail Store Admin
Budtender
Dispensary Manager
Dispensary Admin & Assistants
Cannabis Testing Laboratory Staff
Cannabis Tour Guide
Home Cultivation Consultant
Doctors, Nurses & Assistants
Pharmacists & Assistants
Traditional Healers & Nyangas / Herbalists
Sustainable Agriculture Practitioners
Education & Training Professionals
Scientists, Academics & Research Professionals
Employees of the office of the Cannabis OmBUDsman

1.5.2 Cannabis Industry Support

Agricultural Hub Staff
Horticultural Supply Staff
IT Manager
Web Developer
Human Resources Manager
Marketing Director & Team
Software Architects & Developers
Legal Professionals & Assistants
Accounting Professionals & Assistants
Crypto Currency & Blockchain Experts
Insurance Professionals
Banks & Investment Experts
Tax Experts
Import / Export Industry Professionals
"Head Shop" Cannabis Accessory Suppliers
Glass Blowers / Laboratory Equipment Suppliers
Environmental Watchdogs / Consultants / Specialists
Trade Union Representatives
Travel Agents / Tour operators
Electricians
Plumbers
Journalists & Content Creators / Writers
Photographers, Film Crew & Editors
Event Organisers
Graphic Designers
Artists & Musicians
"Wellness" Practitioners
Auctioneers
Packaging Suppliers
Logistics Experts
Real Estate Agents

Footnotes

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