

APPLIED SCIENCE FOR ENVIRONMENT SUSTAINABILITY

IDENTIFY CORE CLIMATE CHANGE
RISKS AND IMPACT COSTS FOR A
LOCAL COMPANY

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INTRODUCTION

Climate change is the main environmental threat and one of the most important challenges of our time. Climate excesses can have a significant negative effect on the society and businesses. In this assignment I'll be identifying core climate change risks and impact costs for food lovers market which is a local company owned by two brothers which mainly supply fresh produce.

THE HISTORY BEHIND FOOD LOVER'S MARKET

Fruit & Veg City was started in 1993 by brothers Brian and Mike Coppin. Since the beginning it has always been a family business, with emphasis placed on good old family values such as wholesomeness, trust, honesty and integrity. The brothers' vision was to create a store that would resemble a marketplace of old, where farmers brought their fresh produce from their farms to be sold to the public. This was how their first store in Kenilworth, Cape Town was run, and this is how every Fruit & Veg City store that has opened since is also run. The dedication to freshness at an affordable price has always remained one of the cornerstones on which Fruit & Veg City is built. Today there are more than 100 Fruit & Veg City stores throughout Southern Africa, and even as far afield as Australia. Yet, it remains a family business with brothers Brian and Mike still running the day to day operations of the company. Their vision is still visible in every Fruit & Veg City store, where freshness and value are placed at a premium (Stacy 2018).

The next step in the evolution of Fruit & Veg City was to create a modern eatery where food aficionados could indulge in a range of gourmet foods. It was this vision that finally gave birth to the Food Lover's Market, a theatre of food that was designed specifically with connoisseurs in mind. The Fruit & Veg City team crossed the globe in search of the hottest international trends in food. They visited the United States, Europe, Australia and the East, and then brought the best elements of what they saw in their back with them. The result is the stylish and modern food emporium called the Food Lover's Market. At the Food Lover's Market, we cater for the discerning customer, the connoisseurs, the professional 'foodies' and, of course, our regular customers who are used to the exceptional quality and variety on offer at Fruit & Veg City (Stacy 2018).

CORE CLIMATE CHANGE RISKS

Most climate scientists agree that the main cause of the current global warming trend is human expansion of the "greenhouse effect" which is the warming that results when the atmosphere traps heat radiating from earth towards space. Certain gases in the atmosphere block heat from escaping. Long-lived gases that remain semi-permanently in the atmosphere and do not respond physically or chemically to changes in temperature are described as "forcing" climate change. Climate forcing is a major cause of climate change. Climate forcing is any influence on the climate that originates from outside the climate system itself. The climate system includes the oceans, land surface, cryosphere, biosphere, and atmosphere (Anon.2014).

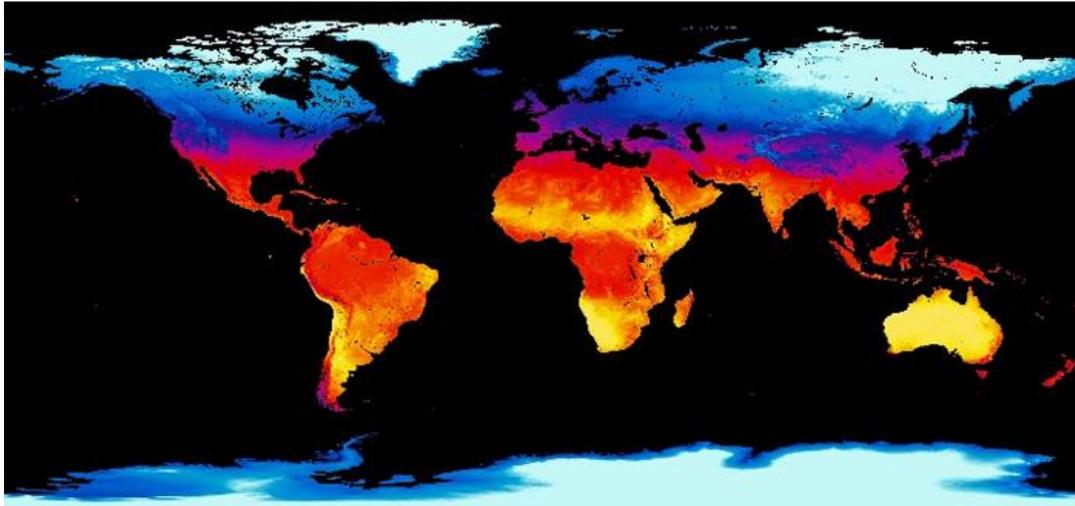
Climate change has modified agricultural productivity in South Africa through many climatic change risks but I'll be focusing on four main climatic change risks which affect agricultural productivity these climatic risks are precipitation, land temperature, carbon dioxide (CO₂) fertilization, and droughts. I will be going in detail on how these climatic risks affect the farming industry which supplies fresh produce to many companies in south Africa but in particular the company I've chose to work with which is food lovers market(Anon.2014).

Precipitation - Precipitation is any form of liquid or solid water particles that fall from the atmosphere and reach the surface of the Earth. Precipitation includes drizzle, rain, hail, and on rare occasions, snow and sleet. Different seasons and geographic locations see varying amounts of precipitation in amount and intensity. Precipitation is caused when a mass of warm, moist air hits a mass of cold air. Condensation causes the moisture to form droplets that become rain or crystals that become snow or ice. When these droplets or crystals become too heavy to be suspended in the atmosphere, they fall to earth as precipitation. Precipitation is the main source of all freshwater resources and determines the level of soil moisture, which is a critical input for crop growth. Moreover, precipitation is the main contributor of yield variability because it is much more variable than potential crop evapotranspiration, the factor that determines crop water requirements (Riley 2016). Therefore, higher precipitation will reduce the yield gap between rainfed and irrigated agriculture, but it may also have a negative impact if extreme precipitation causes flooding and water logging. From the onset Brian and Michael Coppin the owners of fruit and veg city now known as food lovers market strove to ensure that they kept a cultivated strong relationship with local farmers. This became their foundation on which their company was built. Up until today they still get most of their fruits and vegetables from small holder's farmers who are based in the western cape, early this year in March a cold front moved across the western cape and brought heavy rain that lead to a localised flooding. The cold front lasted for two weeks, flooding

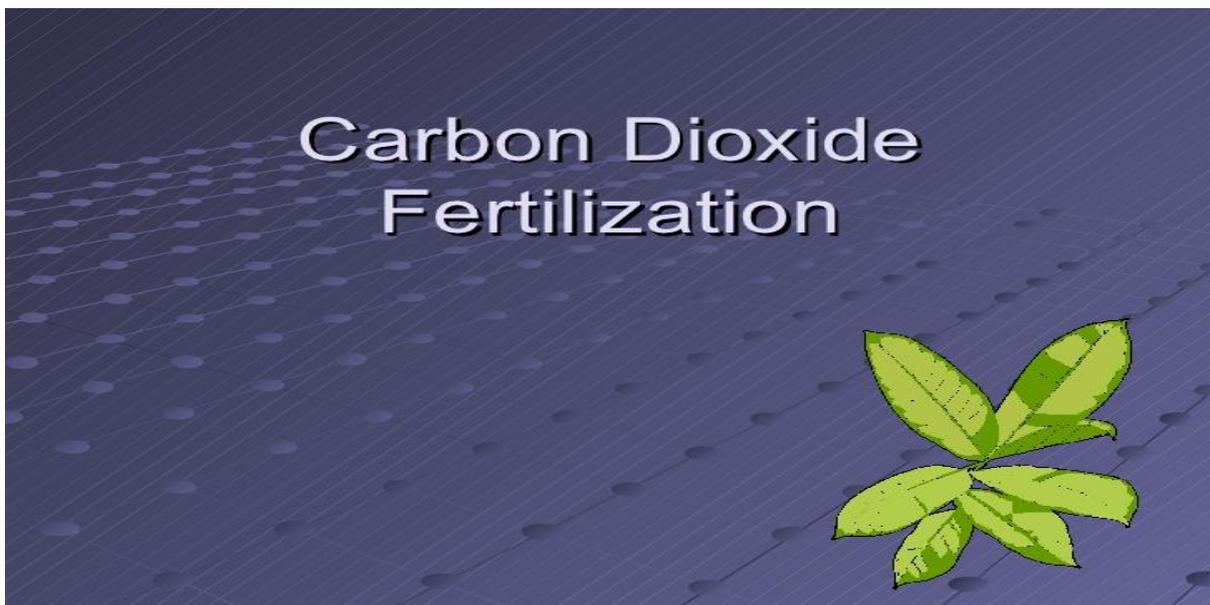
and wet weather are so costly to agricultural land because they cause delays and reduction of crop harvest. If soil is too wet it can result in poor conditions for the crops to grow; when soil is well drained then the oxygen, nutrients and trace elements that the plant needs are available. If the soil is too damp, the field's yield is severely reduced. The western cape flood caused delays in the supply of fresh produce for food lovers market so precipitation has a negative effect on their business(Anon.2018).



Land Temperature - Land Surface Temperature (LST) is the radiative skin temperature of the land derived from solar radiation. A simplified definition would be how hot the "surface" of the Earth would feel to touch in a particular location. Temperature and soil moisture determines the length of the growing season and control the crop development and water requirements. Higher temperatures shorten the crop cycle and reduce crop yields, because higher temperature leads to increased crop water requirements. Temperature is a primary factor affecting the rate of plant development, Responses to temperature differ among crop species throughout their life cycle. For each species, a defined range of maximum and minimum temperatures form the boundaries of observable growth. Vegetative development (node and leaf appearance rate) increases as temperatures rise to the species optimum level. For most plant species, vegetative development usually has a higher optimum temperature than for reproductive development (Anon 2014). Maize is a warm season crop compared to broccoli which is a cool season vegetable where the maximum temperature for growth is 25 °C compared to 38 °C. In understanding extreme events and their impact on plants we will have to consider the plant temperature response relative to the meteorological temperature (Anon.2015).



Carbon dioxide (CO₂) fertilization - CO₂ fertilization effect or carbon fertilization effect is the increased rate of photosynthesis in plants that results from increased levels of carbon dioxide in the atmosphere. The effect varies depending on the plant species, the temperature, and the availability of water and nutrients. Elevated CO₂ may have some effects on crop phenology, although stages of development are governed primarily by temperature, time and photoperiod. If dates of planting were to be changed because of the greenhouse effect, then the phenological timing of plants could be affected, higher temperatures could decrease yields by decreasing the duration of the grain-filling period or changes in photoperiod could shorten or lengthen the vegetative stage. Carbon dioxide contributes both negatively and positively in the farming industry because some crops benefit from it and some don't, and also elevated carbon dioxide fertilization reduces the amount of water needed to produce an equivalent amount of biomass (Hatfield 2017).



Drought - drought is a period of abnormally dry weather sufficiently prolonged for the lack of water to cause serious hydrologic imbalance in the affected area. When there's a drought it affects our communities and our environment in many different ways. Everything in the environment is connected, just like everything in our communities is connected. Drought affects our lives in many different ways because water is an important part of so many activities we do on a daily basis. We need water to live, and animals and plants do too. Droughts results in a fall in crop production, due to inadequate and poorly distributed rainfall. Farmers are faced with harvests that are too small to both feed their families and also to make business. A severe drought affected South Africa's Western Cape province and cut agricultural output by 20 percent this year in March, decimating the wheat crop and reducing apple, grape and pear production. This affected food lovers a lot because one of their main farms is situated in the western cape and it forced them to get fresh produce from other suppliers who charged them 20% more than what they usually pay the farmers they work with. This affected the businesses capital as well as their supply chain (Anon.2018).



STRATEGIES TO REDUCE CLIMATE CHANGE RISKS

Climate change is turning the lives of farmers upside-down, and is fundamentally changing the way agriculture is practiced severely. Different weather patterns, shorter growing seasons, extreme weather, and many other changes pose daunting problems for smallholder farmers around the world. Farms with a sound management plan are better poised to increase their food output, combat food insecurity, run more efficiently, save money, and reduce their climate impact. Starting with a baseline assessment, farm managers get a clear picture of how the farm operates, and how it can run more efficiently while producing more food. They can run efficiently by reducing greenhouse gas emissions. Producing more food with land already in use means reduced need for fresh farmland, cleared from forests. Meanwhile, farms also keep close track of weather and useful farm information, which can help them predict patterns and plan more effectively. Below are solutions on how to tackle these climate change risks.

Water conservation

Access to freshwater is vital to any farming operation. Since agriculture consumes roughly 70 percent of the world's freshwater, water conservation is urgent and necessary in areas where water is becoming increasingly scarce. Climate-smart agriculture promotes a number of water conservation practices, such as planting a buffer of trees and bushes along streams and rivers to prevent erosion and contamination from crop runoff. Another climate-smart water technique is to treat wastewater caused by agricultural processing before it is released back into waterways.



Save the soil!

On farms where climate-smart agriculture practices are used, the soil is treated almost as if it were a crop. Not only does fertile soil impart better flavour and higher nutritional value to food, soil is one of the biggest carbon sinks on the planet. Tending to the soil increases the amount of greenhouse gasses sequestered, and means healthier plants with higher yields. Healthy soil holds more moisture, keeping plant roots hydrated in dry periods. Soil conservation methods such as contour planting or no-till farming reduce erosion, keeping the soil in place during heavy rains or floods. Regular compost applications enrich the soil and minimize need for commercial fertilizers. All this links to higher climate resilience for farms, and better soil for years down the road.



Plant more trees

Farmers using climate-smart practices understand that trees do a lot on farms they can act as windbreaks, reducing soil erosion; they can enrich soil they can filter water, resulting in higher water quality they provide shade for workers and shade-loving plants the list is endless. Approximately 80 percent of deforestation is caused by agricultural expansion, and that conversion from forest to cropland produces a significant amount greenhouse gas emission. But farmers who utilize climate smart agriculture practices have lesser need to expand their farms higher yields deny the need to clear forest, and keeps those greenhouse gases sequestered in the forest.



food lover's solution

food lovers company is committed to creating a positive environmental footprint. From energy to waste, packaging to water, they understand and embrace the responsibility to run their business is the most sustainable way possible. They take proactive steps to limit any inevitable negative consequences of their day-to-day operations and are constantly seeking new innovations to enhance their positive environmental impact.



Conclusion

Our earth's climate is continuing to rise and as a result the biological systems which include crop plants, forests, oceans and fresh water is being affected. All of these resources benefit our economy and without them there would be a huge economic problem. These resources are a source of income and without them many industries would be affected. Global warming is an economical problem as a result of warm temperatures agricultural sectors are being affected warm temperatures decrease the amount of arable land and cause a decrease in soil moisture. Global warming affects the weather and results in lack of rainfall, without rainfall agriculture is impossible and droughts will lead to more loss of land. We need to take part and try to stop global warming and other effects on climate change. If the earth's temperatures continue to rise in the future, living things on earth would become extinct due to the high temperatures. If humans contribute to control global warming, this world would be cooler and the high temperatures we currently have would decrease. If everybody as one take stand and try to end most of the climate changes that are occurring, this world would be a safer place to live on.

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