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3. This entry has not been submitted in another DECA competitive event.
4. Credit for all secondary research has been given to the original author through the project's bibliography, footnotes or endnotes.
5. All activities or original research procedures described in this entry are accurate depictions of my efforts or, in the case of team projects, the efforts of my team.
6. All activities or original research described in this entry took place between the 2018 Chartered Association Career Development Conference and the 2019 Chartered Association Career Development Conference.
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To the best of my knowledge, I verify that the above statements are true and that the student's (students') work does not constitute plagiarism.

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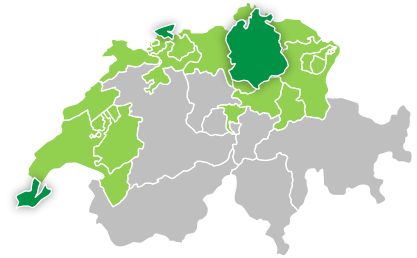


I. EXECUTIVE SUMMARY



Description of Business and Location

MetroFarm is a private limited company headquartered in Zürich, Switzerland. We plan to revolutionize the agricultural industry by placing **large scale vertical hydroponic systems in urban cities in Switzerland**. Currently, Switzerland suffers from a lack of space due to the Swiss Alps (that take up 65% of the country's total land). Our plan is in lockstep with the Swiss government, who recognized the problem and created policies such as the Spatial Planning Act to improve space efficiency and subsidize all who work towards this goal. With limited fertile area and a total population of around 2.3 million in Zürich, Basel-Stadt and Geneva, self-sufficiency is a rising threat to the nation.



Mission Statement

MetroFarm aims to create an organic and well-nourished future using polished vertical farming technologies, ultimately empowering an agricultural movement of efficiency and modern thinking.



Problem

We plan on addressing the following problems with MetroFarm:

Disappearing Farmland

Farmland is disappearing due to overuse, erosion, urban development and pollution

Dangerous Pesticides

Fruits and vegetables contain pesticides that be stored in the colon and slowly poison the body

Harmful GMOs

When created poorly, GMO food can leave unwanted material in the body, leading to long term effects and problems

Extreme Climates

Extreme temperatures inhibit growth of vegetables due to unreliable harvesting seasons

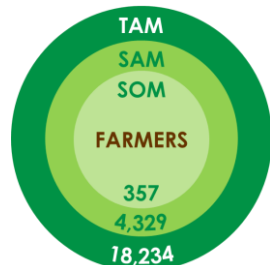
Expensive Imports

Countries spend hundreds of millions of dollars importing produce that cannot be grown due to extreme climates

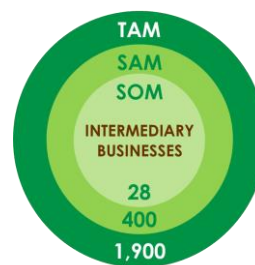


Target Market

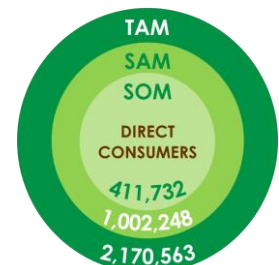
We identified three distinct markets: **Farmers, Direct Consumers, and Intermediary Businesses**. Farmers will purchase our systems, Direct Consumers will buy our produce from our showrooms, and Intermediary Businesses will contract with us for a year and purchase bulk produce to sell at their market. We will use a TAM-SAM-SOM Approach to tackle the market (Section IV: Customer Segments), specifying our market realistically.



LTV: \$1,205,760
GM: 60%
Modules



LTV: \$232,239
GM: 74%
Bulk Produce



LTV: \$88
GM: 81%
Produce



Unique Value Proposition

MetroFarm's high quality service and products are the result of its FAST attributes. Being **forward-thinking**, MetroFarm takes careful measures in the design of modular builds to enhance its customers' agriculture production for the long term. **Affordability** and accessibility are other tenets of our culture through cost-efficient vertical farming technologies beneficial to corporate and individual farming ventures. MetroFarm's operations are **sustainable** as reusable materials are used in the manufacturing of modular builds. Finally, we are devoted to being honest and **transparent** with all our customers, competitors, and business partners through numerous CSR programs and a **positive brand identity**.

Solution

Process:

MetroFarm plans on taking advantage of hydroponic systems described below:

Nutrient filled water (NFW) is pumped to the top level of the system



NFW flows through the different levels, and is absorbed by roots



Plants are grown, cut and packaged and replaced with new ones in tubes

Stacking hydroponic systems (to the right) on top of each other will create a vertical farm to increase efficiency and decrease the amount of space necessary for operations.

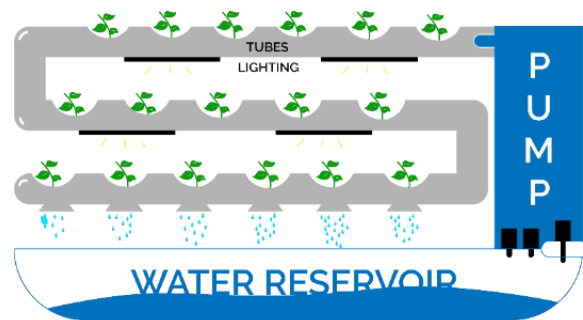
Benefits:

- **Density:** Commercial hydroponic food production allows on average **4 times the number of crops in the same space** than soil-based farming.
- **Efficiency:** MetroFarm will use less amount of land, meaning our systems can function in urban cities in Switzerland. Hydroponics also offers water conservation by **reducing water consumption by up to 90%.**
- **Environment:** With 38.6% of all ice-free land already devoted to agriculture, MetroFarm's limited ecological footprint through vertical farming **eliminates the need for wide open fields.**

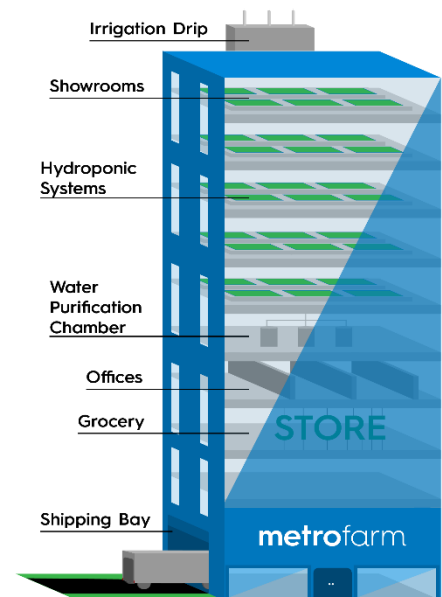
Ultimately, our solution is to help push the world towards a modern take on the agriculture industry (Figures to the right).

Detailed Financials

MetroFarm plans on having three distinct revenue streams: **Modules, Produce, and Bulk Produce.** Our modules are sold at \$20 per cubic meter, produce sold at \$10 per kilogram and our bulk product (business to business) is sold at a pre-established price of \$24,000 per year. Our first year is not profitable but has upward trends at the end of the year (seen in Section X), and we are projected to break even in October of 2019. **After three years we are approaching upwards of \$3,700,000 in revenue, generating a Net Profit at 15%: \$552,205.** All retained profits are reinvested into the business for the first two years.



GroRoom in Zürich



Detailed Financials

Year	2019	2020	2021
Revenue	\$2,056,960	\$3,012,250	\$3,721,710
Cash Balance	\$255,159	\$187,742	\$603,221
Retained Earnings	\$(460,359)	\$63,620	\$552,505
Profit Margin	-22%	2%	15%

Capital and Loan Investment

Sasin (CFO): \$170,000 (Percent of Ownership: 33%)
Shaun (COO): \$170,000 (Percent of Ownership: 33%)
Matt (CEO): \$170,000 (Percent of Ownership: 33%)
Total Share Capital: \$510,000 (100%)

Time: January 2019 – January 2024
Loan Requested: \$400,000
Interest Rate: 8.75%
Interest Paid After Three Years: \$95,293

Total Investment of \$400,000 with a Total Loan Payback of \$495,293.

Thank you for considering the requested loan of **\$400,000** with an **8.75% annual interest rate** over 5 years. We, at MetroFarm, look forward to discussing the profitability of this business venture with you.



II. ANALYSIS OF THE INTERNATIONAL BUSINESS SITUATION

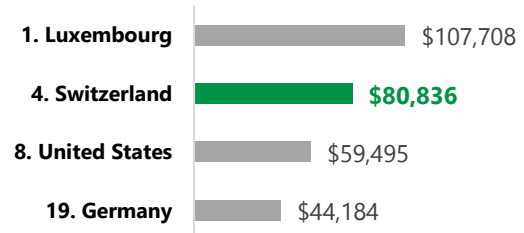
A. Economic, political and legal analysis of the company

Describe the trading country's economic system, economic information important to your proposed business/product/service, the level of foreign investment in that country.

Switzerland is a vibrant, free-market, politically and economically stable country thriving on its natural beauty and growing industry. It is landlocked in Central Europe with low import tariffs, yet it struggles to find easy and affordable access to crops from around the country.

Switzerland has one of the most developed economies in the world, thanks to its powerful banking system that began in the early 18th century. What began as a means of protecting wealthy European banking interests has transformed into one of the largest offshore financial centers in the world. Coupled with the neutrality maintained during both World Wars, the Swiss have maintained a stable political and economic environment that have enabled them to become the fourth highest GDP per capita in the world and are continually expanding, shown in Figure 2A: GDP per Capita Ranked.

Figure 2A
GDP per Capita Ranked
(in US Dollars)



Foreign involvement is high due to diplomatic relations with almost all countries, and historically Switzerland has served as an intermediary between other states. The Swiss have lowered taxes on many sectors but have left notable trade protectionism in place for its agricultural production. **As an innovative, stable, and domestic agriculture-friendly country, Switzerland offers major opportunities for MetroFarm.**

Describe the trading country's governmental structure and stability, how the government controls trade and private business

Switzerland is one of the closest countries in the world to a full democracy. There is no President or Prime Minister, and the citizens themselves hold the most voting power. The rest of the government is organized similar to the United States. The government is also one of the most stable in the world, due to its neutrality on many issues. The market is remarkably free and is a member of European Free Trade Association (EFTA)¹, but not the European Union (EU). The EFTA is an "intergovernmental organization of Iceland, Lichtenstein, Norway and Switzerland" and was created in 1960 to promote "free trade and economic integration between its members"². Despite this trade union, Switzerland still suffers from lack of imports of agricultural products, especially since all four of the countries in the EFTA have similar geographies. Meanwhile, not being in the EU increases costs of international trade, motivating Switzerland to look for self-sufficient methods to resolve these problems.



For the past 25 years, the protection of farmers has slowly begun a fundamental reform to reduce costs for farmers. As trade liberalization opened, tariff costs decreased, ultimately increasing international trade between other countries. These agreements were made to eliminate import barriers, reduce export subsidies, revise agricultural tariffs and cut domestic support. More recently, Switzerland has been recognized as the 14th largest export economy, exporting roughly \$279B and importing \$277B in 2016. Their top exports are Gold, Watches, Cars and Medicines, and their top export destinations are Germany, China, the United States and France³. Switzerland imports 40% – 50% of its food and with 54,000 farms, the agricultural sector only accounts for 1% of the country's Gross Domestic Product⁴.

Figure 2A: "GDP per Capita 2017, by Country." Statista, 2017.

¹ "The European Free Trade Association." Frequently Asked Questions on EFTA and the EEA | European Free Trade Association,

² ibid

³ "Switzerland." OEC - Brazil (BRA) Exports, Imports, and Trade Partners,

⁴ Swissinfo.ch. "Government Unveils Sensitive Agricultural Reform Plans." SWI Swissinfo.ch, Swissinfo.ch, 1 Nov. 2017,

Describe the laws and/or governmental agencies that affect your business/product/service [i.e., labor laws, trade laws (U.S. and foreign)]

Most agricultural laws in Switzerland focus on protecting farmers from imports, and products grown in the country are protected from taxes. Furthermore, Swiss law states that the government must support agriculture, agricultural research and the protection of the countryside, all benefiting MetroFarm. The Federal council will step in and compensate farms for below average demand. Switzerland is ideal for MetroFarm because of the government's focus on becoming a self-sufficient country.

B. Trade Area and Cultural Analysis

Geographic and demographic information, other pertinent cultural information, competitive advantages and disadvantages of the proposed product and/or service

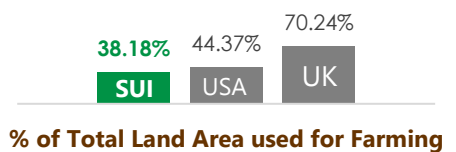
A landlocked country of towering mountains, deep lakes, grassy valleys, small villages and thriving cities that blend the old and the new, Switzerland is the nexus of diverse physical and cultural geography of Western Europe. It is renowned for both its natural beauty and its way of life.

Geographic: Switzerland is a small country located in Western Central Europe, bordering France, Germany, Liechtenstein, Italy and Austria. Its total land area is 41,200 km² in which almost 65%⁵ of the land is taken by the Swiss Alps, therefore making the land nearly uncultivable (unable to harvest). The Swiss soils, terrain and climate do not favor traditional methods of farming and farms are usually small family enterprises. They use dairy products to make their world-renowned Swiss cheeses, making up a significant portion of the agricultural revenue. To protect these farmers and preserve the national security goal to remain largely self-sufficient in food, the Swiss federal government developed a complex system of protections that restrict agricultural products, built on high import tariffs and tariff rate quotas (limiting the merchandise quantities that can be imported) that are maintained for most products which are domestically produced. Approximately 80% of gross farm incomes is attributed to government intervention⁶. **Starting from 91,000 farms in 1991, there was an apparent decrease of 40% in the number of farms, to 54,000, within 30 years⁷.** The percent of the country covered in farmland is significantly lower to its European companions, highlighting the immediate necessity of efficient measures to take advantage of what little space Switzerland has.

Demographic: Switzerland is home to over 8 million residents, the majority of whom speak German or a similar variant: Swiss German. However, the population of Switzerland is not spread out evenly throughout the regions. The highly dense areas are towards the North, like Zürich, Basel and the west, like Geneva, all having over 150,000 residents each. Being closer to Germany and France – powerful nations in terms of their economic and political status – these cities are more developed and populated. Moreover, the Swiss Alps take up almost all of the South side of Switzerland, ultimately making it nearly inhabitable for residents. As the most populated city in Switzerland, Zürich features a variety of cultural backgrounds. As shown in Figure 2C below, most of the population speaks German or French.

MetroFarm will operate in three highly populated provinces: **Basel-Stadt, Zürich, and Geneva**, bringing a total population of around 2 million. Each of these provinces have plenty of agricultural land for cultivation, but with the poor-quality soil it is still difficult to support a population of 8 million (plus exports) that aims to be self-sufficient. **Switzerland is a small country with a growing economy that will be ready to accept MetroFarm's innovative ventures.**

Figure 2B
Agricultural Statistics



⁵ Alpenwild.com, www.alpenwild.com/staticpage/swiss-alps/.

Figure 2B: United Kingdom - Agricultural land (% of land area). (n.d.).

⁶ Switzerland - Agriculture. (n.d.).

⁷ Swissinfo.ch. (2006, August 17). Farmers continue to feel the squeeze.

Figure 2C
Demographics of Swiss Provinces

Province	Agricultural Land	Unemployment Rate	Income	Age	Language	Population
Zürich ⁸	21.0 ha	3.54%	CHF 103,211	40.9	German	1,487,969
Geneva ⁹	28.9 ha	5.28%	CHF 101,058	41.2	French	489,524
Basel-Stadt ¹⁰	33.1 ha	3.76%	CHF 107,354	43.2	German	193,070
Total						2,170,563

Socioeconomic: Although the Swiss take pride in their beautiful Swiss Alps, farming is very troublesome due to the land taken by the mountain range. The government is advocating for efficient use of what little land that they have, and citizens are looking to create more space for farms in the future. The Swiss are all looking for environmentally friendly methods to make farming efficient, making Switzerland an optimal location for MetroFarm.

SWOT Analysis: To further analyze operations in Switzerland, we have created a SWOT analysis (Figure 15B), focusing on describing the main internal and external factors that will affect MetroFarm, shown in Section XV: Appendix.

Analysis of the potential location – importance and requirements of each trade document required by the U.S.A. and the country of choice

Switzerland's economic structure is pronounced by its outward orientation. Being closely integrated into the world economy, Switzerland's prosperity is dependent on international trade in goods and services and investment activities. Thus, the core object of the Swiss foreign economic policy is the continuous improvement of access to international markets. In addition to the Free Trade Agreement with the European Union of 1972 and the EFTA Convention, Switzerland currently has a network of 30 free trade agreements with 40 partners, which significantly attract foreign investors and international business activity¹¹. The US is an important country of origin of foreign direct investment in Switzerland, with investments of USD 300 billion. Nearly 100 billion dollars' worth of goods and services were traded between Switzerland and the US in 2017, with nearly equal volume of trade in each direction¹². With strong environmental legislation, Switzerland has a unified pro-green and environmentally-conscious attitude that perfectly match with MetroFarm's objectives. The Swiss Agency for the Environment, Forests and Landscape annually allocates three to four million Swiss francs to support the development of pilot demonstration plants that aim to protect the environment¹³. **The Spatial Planning Act of 2013 sets out to use available space in a more efficient and economical way, utilizing small spaces for huge crop yields, aligning with MetroFarm's goals.**

Figure 2D
Outlying Policies in Switzerland Regarding the Motives of MetroFarm

Policy	Description	Impact
Energy Act	Incentives and tax relief for energetic restorations and renewable energy plants	MetroFarm will prosper under supportive policies.
Swiss Biodiversity Action Plan	Promote biodiversity directly through the connection of federal policies and other areas	MetroFarm will contribute to national biodiversity improvement policies.
Free Trade Agreement	Promote Free Trade between countries of the EFTA and economic integration	The economy grows in Switzerland and political relations are bettered
Spatial Planning Act of 2013	Efficiently use space for farming and other entrepreneurial activities	Help motivate new farming solutions throughout the nation to help save space



III. PROBLEM

Every day, dwindling natural resources contribute to Earth's extinction of rare animals and dying environments. The population is increasing, and new methods of conservation are being researched to preserve the Earth. Among the diminishing resources is the most crucial to the survival of mankind: agricultural land. As highlighted by the national

⁸ Federal Statistical Office. (n.d.). Zürich.

⁹ Federal Statistical Office. (n.d.). Geneva.

¹⁰ Federal Statistical Office. (n.d.). Basel-Stadt.

¹¹ State Secretariat for Economic Affairs SECO. (n.d.). List of Free Trade Agreements of Switzerland.

¹² Swiss-U.S. Relations Switzerland-United States of America. (n.d.).

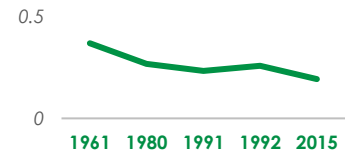
¹³ Key aspects of environmental protection in Switzerland. (n.d.)

Soil Tilth Laboratory, farmland is so important that “each human on earth lives off the farming equivalent about a third of a football field today”. The Earth continually loses more agricultural land every day due to overuse, erosion and urban development over the last century. **According to the American Farmland Trust, farmland disappears at a rate of 2 acres per minute.**

As if this is not enough, produce available to consumers in grocery stores and supermarkets is not always fresh and healthy. Farmers use pesticides to protect the crops from insects, which are proven to have negative effects on the crops and cause illnesses among its consumers. These chemicals are stored in the human body’s colon and slowly poison the body. Scientists even put out GMO (genetically modified organisms) fruits and vegetables, but many consumers do not feel safe about purchasing something that came out of a lab. One-quarter (25%) of the human population always checks whether their product is genetically modified, and the **Pew Research Center¹⁴ says that 57% of interviewed US adults said that GMOs are generally unsafe.**

With the effects of climate change becoming more and more severe, crop growth will suffer. Extreme temperatures, rising sea levels and weather events will increasingly kill more valuable food sources and cover arable land. Regions that already battle harsh environments will be hurt the most, as only small changes in temperature can shorten growing seasons and make land uncultivable. **The recent summer heatwave in Europe wreaked havoc on crop production, raising prices worldwide.** Geospatial scientist Brian Barker observed that “In Germany, the Czech Republic, Norway, and Lithuania, crop yields have significantly dropped and are in poor condition— and prices do not respond well to drought”. Events like this will become more and more common, reducing the output of the outdated farming techniques currently used in most countries¹⁵.

Figure 3A
Arable Land in the World



IV. CUSTOMER SEGMENTS

Segmentation: Due to the nature of MetroFarm’s operations, our market is segmented into three sections: **the farmer, consumer and Intermediary Businesses**. We designed our approach after gathering primary and secondary research to prioritize MetroFarm’s market resources. We used research from government documents, websites and census records to determine our conclusions about our market.

- **Farmers:** We will be primarily targeting our modular builds to farmers, who have the biggest share of the market. In the agriculture industry, Switzerland accounted for around 50,000 farms, of which 6,000 were organic farms. Around 150,000 farmers were employed and registered in the census, and paired with the government’s policies to promote farming, farms are looking for ways to be more efficient with their space¹⁶.
- **Direct Consumers:** We will use our GroRooms (showrooms) stationed in Zürich, Geneva and Basel-Stadt, to showcase our modular farming systems and simultaneously sell produce farmed to direct consumers. These may include consumers who need simple groceries, or also farmers who need to determine if our systems can be used in their operations. By doubling our showrooms as sources of income, we can diversify our revenue and spread awareness of the advantages by using our products.
- **Intermediary Businesses:** Our smaller, still efficient, market are other businesses that act as sellers. These include grocery stores, supermarkets, and packaging companies. Our produce will be sold in bulk, like most B2B¹⁷ transactions, and help increase our product recognition as well as partnerships with grocery store chains, creating long-lasting relationships with organizations around Switzerland.

Objectives: In the report by the Swiss Office for Spatial Development, it is clearly stated that their main goal of the year is to decentralize and become a self-sufficient economy. As the Swiss agricultural market becomes decentralized (power being given to the provinces), it will be easier for MetroFarm to set up operations because the main goal of

¹⁴ Funk, C., & Rainie, L. (2015, July 01). Genetically Modified Foods (GMOs) and Views on Food Safety.

¹⁵ Prolonged hot, dry conditions affect European crop prices – Climate Change: Vital Signs of the Planet. (2018, September 20)

¹⁶ Federal Statistical Office. (n.d.). Farming.

¹⁷ B2B: Business to Business – where one producer sells to either another business (either as an intermediary or a consumer)

these provinces, as well as private businesses, is to use space efficiently for maximum production. **Through the Spatial Planning Act, the government is promoting entrepreneurship in the agriculture industry by giving them more space to farm as well as increased subsidies¹⁸.**

“ A system of policies [subsidies] and incentives from the federal level can be used to establish and make effective use of space and spatial planning at the level of the functional spaces”

– Swiss Office for Spatial Development¹⁹

MetroFarm’s biggest goals are to gain revenue and brand recognition. By targeting these specific markets, we plan to increase our customer base, influencing others to promote our products as well. With Switzerland’s ongoing promotion of environmental and spatial acts, MetroFarm is looking to capitalize and grow into an international business.

Approach: We plan to take advantage of a **TAM-SAM-SOM** market approach (detailed in Section VII: Channels). Our Total Available Market (TAM) includes our total market, regardless of whether they are prospective customers or not. Within that market, the Serviceable Available Market (SAM) specifies a group of prospective customers within that group. Finally, our Serviceable Optimal Market (SOM) is a group actively looking to purchase our products as a business. Specifically, this will range from farmers looking to promote government policies while looking to increase efficiency to consumers looking for fresh and affordable produce. The table below quantifies the data we collected:

Figure 4A
Customer Segments Displayed in a TAM-SAM-SOM Format

Concentration	Market		
	Farmers	Intermediary Businesses	Direct Consumers
Total Available Market (TAM)	18,234 farms	1,900 businesses	2,170,563 people
Serviceable Available Market (SAM)	4,329 farms	400 businesses	1,002,248 people
Serviceable Obtainable Market (SOM)	357 farms	28 businesses	411,732 people
Prediction of Market Reached within 3 years	214 farms	23 businesses	133,779 people

As we narrowed down our market, we researched each segment’s basic needs and desires. Even though our SOM is supposed to be our goal, it is unrealistic for a company to reach all these people after just three years. This model is used to determine the amount of people reached throughout a business’ lifetime. After extensive research, MetroFarm determined that there is a necessity for fresh, affordable produce through a forward thinking, sustainable means of production. Our goal is to fulfill our customer’s desires described in detail in the following sections.



V. UNIQUE VALUE PROPOSITION

As the future of agriculture, vertical farming provides high crop yields through organized, versatile, and space efficient farms. Current companies looking to expand vertical farming internationally are situated in Asian countries. Launching vertical farming in smaller countries like Switzerland will help grow their economy. MetroFarm’s high quality service and products are the result of its **FAST** attributes.



Forward-Thinking



Affordable



Sustainable



Transparent

Forward-thinking: MetroFarm’s products will always exceed customers’ expectations. Our modular builds will produce fresh, tasty, and high-quality produce. MetroFarm has taken careful measures in the design of modular builds to ensure that our customers’ farming operations will be enhanced for the long term. For instance, commercial hydroponic food production allows on average 4 times the number of crops in the same space than traditional farming. Computerized systems (Figure 15A) connected to the builds will precisely manage lighting, water, and chemical levels to stimulate growth. **LED lights grow lettuce in just 40 days as compared to the average 2 months in traditional farming.**

¹⁸ Business group pushes for more streamlined farming sector. (2018, October 15).

¹⁹ S. (2008). SPATIAL PLANNING AND DEVELOPMENT IN SWITZERLAND.

Affordable: MetroFarm's products are very accessible and affordable for customers, whether it be for large farming operations or personal ventures. Vertical farming as a practice is very efficient, cutting costs for soil and pesticides through hydroponics and computerized systems.

Sustainable: As a company, MetroFarm's operations are very sustainable with reusable materials being used to manufacture modular builds. Plastics and other materials are easy to collect and repurpose, effectively upcycling old, useless trash, into a product that benefits farmers and the environment. Upcycling is often considered a better alternative to recycling, because instead of recreating the same product, a new, higher quality product is created. Using upcycled trash will also be cheaper for MetroFarm in the long run by avoiding the costs of manufacturing new plastic.

Manufacturing tubes costs around \$54 per unit, while upcycling old plastics will cost around \$17 per unit²⁰.

Transparent: MetroFarm will devote itself to the development of a positive brand identity focused on providing everyone with innovative, safe means of farming healthy produce. We are aware of the importance of healthy produce and innovative farming methods to ensure the preservation of Earth's biodiversity and natural resources. To truly make our vision of sustainability and health a reality, we will enact a **Green World Initiative**, where for every 100 MetroFarm modular builds sold, we will plant ten trees in areas that have suffered from deforestation as well as fund Corporate Social Responsibility programs to create a good public image and help communities in need of assistance for food (Section 10C).

Besides affordable prices, MetroFarm's products offer numerous other benefits that pertain to individual consumers and retailers. These benefits align with MetroFarm's **FAST Attributes** and are explored in detail in Section VI: Solution.

Consumer Benefits

Crops harvested at peak flavor
Locally grown
Organically grown without GMOs and Chemicals
Water and Soil/Land Conservation

Retailer Benefits

Consistent Pricing
No issues with environment surrounding farms
Greater trust between customer and retailer
Spatial Awareness and Efficiency



VI. SOLUTION

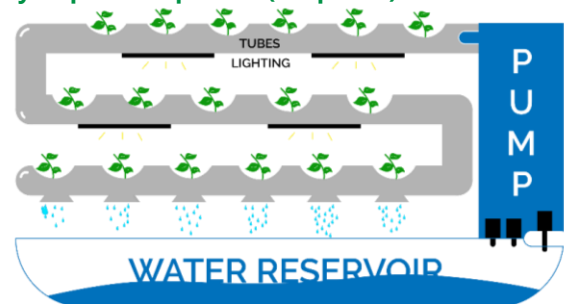
Mission Statement

MetroFarm aims to create an organic and well-nourished future using polished vertical farming technologies, ultimately empowering an agricultural movement of efficiency and modern thinking.

MetroFarm provides a variety of features to each consumer, while maintaining its objective laid out above. MetroFarm will enter the Swiss agricultural industry as a small, eco-friendly (with high potential) business in the three provinces described in Section II: Analysis of the International Business Situation. We want the opportunity to showcase our brand, setting the stage for expansion in the future and will capitalize on this opportunity by primarily marketing a modern and affordable farming system based on our three differentiating features below.

Vertical Farms rely on **hydroponics: a subset of hydroculture, growing plants without soil by using mineral nutrient solutions in a water solvent**. Simply put, tubes are setup throughout the building housing various plants with streams of solutions flowing through them²¹. They are then stacked on top of each other to create an effective looping system (Figure 6A), reutilizing the same source of water the whole time. The systems run on computer timers to stimulate growth without damaging the plants. We plan on repurposing resources to build multiple farms for our showrooms.

Figure 6A
Hydroponics Explained (Simplified)



²⁰ Rodon Group. "Plastic Injection Molding 101 - Costs of Manufacturing a Mold." The Rodon Group,

²¹ Shrestha, A., & Dunn, B. (n.d.). Hydroponics.

Water Reutilization Process:

1. Pump up water from the reservoir into the tubes.
2. Circulate the water within the tubes so that it reaches all plants.
3. Collect the excess water back in the reservoirs.
4. Purify the water and send it back to the pumps.

Being landlocked, Switzerland suffers from a limited water supply, so reusable, purified water is the perfect solution for farming systems. These indoor systems rely on artificial lighting – mimicking the intensity of the sun – set to maximize output efficiency. Costs will be found in Section IX: Cost Structure.

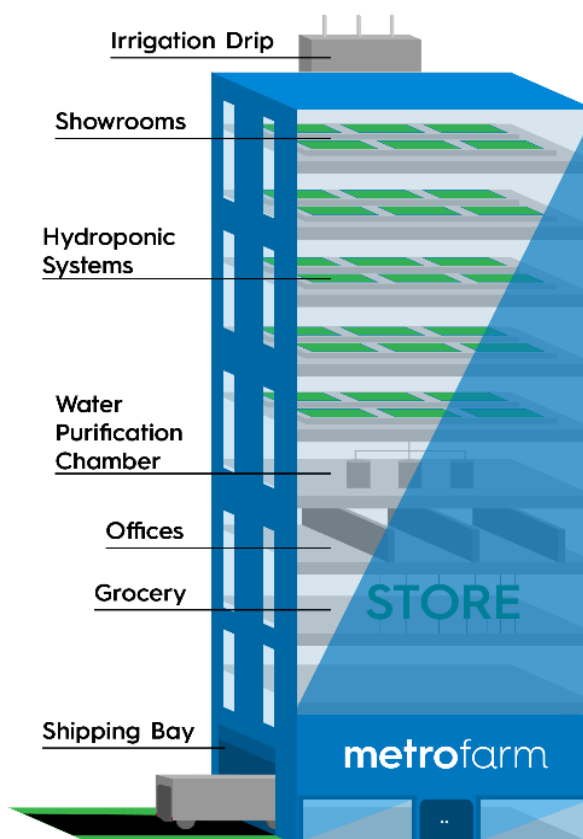
Illumination System: Our farms are indoor, meaning our crops need to be fed artificial light to mimic the intensity of the sun, so we will set up a complex system of lights that controls the lighting. Described briefly in Section V: Unique Value Proposition, the lights we will use are a combination and monitored system of lights to maximize growth²²:

- T5, Compact and Induction Fluorescents
- High Intensity Discharge Lights (MH or HPS)
- Light Emitting Diode (LEDs)

Hydroponic Farming: We created our own computerized software to monitor lights and are selling and installing the systems to farmers so that they can grow produce with ease. Although stimulating plants through artificial means is not a traditional method of agriculture, vertical systems are proven to show increased productivity compared to traditional farms. **With the same amount of land, hydroponic methods have a greater yield. In a report written by the International Journal of Agricultural Extension, hydroponic yield of strawberries was 85 kg ha⁻¹, and traditional methods grew around 70 kg ha⁻¹ of strawberries²³.** New hydroponic farming solutions use less water, electricity, fertilizer, and produce less waste than traditional methods. Produce grows bigger, faster and stronger than soil-based methods, with no off season and consistent outputs²⁴.

The diagram to the right depicts farming with a vertical solution. At the top are our hydroponic farms. The top floor will be used as a showroom of the processes, and the floors below will be the produce that is grown, packaged and sold to the consumer. After the water flows through all the systems, it is purified in the room and moved to the drip, pumping the water up to each of the floors that need it. Our employees can work in the offices, consisting of cubicles, conference and break rooms, and other such amenities. Our grocery below will be where we sell our products to the consumers (like any farmers market). Lastly, we have a shipping bay that ships packages (our systems or our bulk produce) directly to our consumers. **This is the innovative system that we prefer to use for our GroRooms (Zurich, Geneva, and Basel-Stadt), but since our builds are modular, farmers can alter the systems to fit the space for their purposes.**

Figure 6C:
Proposed GroRoom Model



²² Light. *Hydroponics in your home*. (n.d.).

²³ Treftz, C. (n.d.). International Journal of Agricultural Extension.

²⁴ Why Hydroponics | GYOstuff | Grow Your Own | Hydroponics, Organics & Indoor Gardens. (n.d.).

Benefits: The benefits of MetroFarm's operations are separated into three to specify the business plan below:

- **Density:** Opposed to massive plots of land on traditional farms, MetroFarm will utilize vertical systems to grow crops. We do not require open fields, so MetroFarm will use much smaller amount of land to grow the same amount of produce. **This advantage means that MetroFarm can produce in major cities in Switzerland.**
- **Efficiency:** MetroFarm will be able to grow more crops at a much faster rate by growing them indoors with LED lighting. LED lighting can be fine-tuned to emit light in the ideal wavelengths for specific plants to trigger the process of photosynthesis and promote growth. LED lights allow plants like lettuce to be ready within just 40 days, as compared to the average 2 months in traditional farming. **Commercial hydroponic food production allows on average 4 times the number of crops in the same space than traditional soil-based farming.** Hydroponics also offers water conservation by reducing water consumption by up to 90%²⁵. MetroFarm will have crop yields fast enough to supply all its customers with fresh produce.
- **Environment:** The primary environmental advantage that MetroFarm brings to the table is the ecological footprint of the business. Vertical farming eliminates the need for wide open fields, so forests and fields do not have to be wiped out at the expense of corporate expansion. **The second environmental advantage is the absence of pesticides and chemicals, which will be eliminated from the farming process since crops will be grown indoors, safe from insects and animal-transmitted diseases.**



VII. CHANNELS

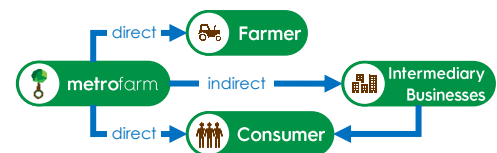
Marketing Channels: MetroFarm will utilize many online promotion tactics, as well as local strategies (posters, magazines, mail, etc.) to target Swiss locals including farmers, and residents looking for fresh produce. A key strategy that MetroFarm will use is **Search Engine Optimization (SEO)**, ensuring that our company name will appear high on the list of search results regarding the agriculture industry (in Switzerland at first, but in the future, we plan to have this expand to other nations). In addition, MetroFarm plans on using **Google Ad-Sense** and **Google Pay-Per-Click (PPC)** **Advertising** to showcase our brand to prospective customers. PPC tracks visitors of our website and uses algorithms to determine their preferences. It cuts excess costs (see Section IX: Cost Structure) for advertisements by targeting specific groups of customers that fall in our segments. The table below summarizes what we will be using:

Figure 7A
MetroFarm's Main Marketing Methods

Forms	Description	Benefit
SEO	Keeps our company name at the top of searches	Increased recognition
Local	Posters, magazines, mail, newspapers, etc.	Reach local demographic of Switzerland
Google Ad-Sense	Increased advertising range	Increased recognition
Google PPC	Personalized advertisements based on consumer	Keeps out unlikely customers; cost effective

Distribution Channels: Our distribution methods will be either **direct** or **indirect**, depending on the party receiving MetroFarm's systems. Meaning, that after gathering waste and other necessary materials, MetroFarm will sell its modular builds directly to customers or through intermediary businesses. The adjacent graphic shows who we will distribute to. Most of our distribution will be done by trucks, planes and trains to reach our customers on time.

Figure 7B
MetroFarm's Distribution Channels



VIII. REVENUE STREAMS

A. What is the revenue model?

Because our business is situated in Switzerland, we have converted all Swiss Franc (CHF) values to the American Dollar (USD) at a current exchange rate of 1.00 CHF to \$1.00 USD. We have three streams below:

²⁵ What is Hydroponics? Johnson, F. 20 September 2018

- **Modules:** Stated in Section IV: Customer Segments, we plan on selling vertical farming systems straight to the farmers. Because the structural integrity of our farms is modular (detailed in Section V: Unique Value Proposition), we are going to sell them by the cubed meter. Within the farming demographic, we altered the price per meter cubed depending on the amount of land held by the customer. **We want to create an incentive for traditional farmers to take advantage of their space and increase production, so the more space held by the consumer, the less they must pay for each m³.**
 - ♣ 0 – 10,000 m³ = \$25 / m³
 - ♣ 10,000 – 20,000 m³ = \$20 / m³
 - ♣ 20,000+ m³ = \$15 / m³
- **Intermediary Business:** With the planet looking for a brighter future, grocery stores are starting to sell organic produce more than chemically produced ones²⁶. To support this goal, we want to sell produce grown in our GroRooms in bulk to intermediary businesses (like grocery stores). Signing a contract with MetroFarm for a year will help establish our name in the grocery market, as well as helping us penetrate the market with an existing product in an existing market.
 - ♣ \$24,000 per year to purchase in bulk (paid \$2,000 per month)
- **Direct Consumers:** Our GroRooms will operate similarly to a farmer's market where customers can walk inside and purchase the produce of their choosing (measured by the kilograms). This will be more affordable compared to current imported produce, and it will also cost less for MetroFarm to produce (detailed in Section IX: Cost Structure).
 - ♣ \$10 per kilogram

B. What are the lifetime values?

In marketing, Lifetime Values is a prediction of the gross profit attributed to the entire market relationship with a customer. It helps define our penetration in the market in the long-term, which helps increase the value of the business. We have split up our LTVs based on each of our customer segments and have calculated our LTVs using the equation below. We calculated the Average Customer Lifespan²⁷ and Average Retention Rate through analyzing market data and calculating the durability of systems.

$$\text{Lifetime Values} = T * S * C * P$$

Figure 8A
MetroFarm Lifetime Values (LTVs)

Variable and Description		Farmers (per farm)	Intermediary Businesses	Direct Consumers
T	Average Customer Lifespan	25.6 years	14.9 years	14.3 years
S	Average Value of Sale	\$100,000	\$24,000	\$10
C	Average Retention Rate	78.5%	79.2%	80.6%
P	Gross Margin Percentage ²⁸	60%	81%	74%
LTVs	Lifetime Values	\$1,205,760	\$232,239	\$88

With the high Lifetime Values, retaining loyal customers for long periods of time will be of ease for MetroFarm. Maintaining a base of repeat customers ensures that MetroFarm has strong support to grow and expand operations from. A loyal customer base reduces the expenditure needed for future customer acquisition costs. Acquiring a new customer is roughly 5 times the cost as much as retaining a previous customer²⁹.

C. What is the revenue?

We were able to determine our revenue through extensive research³⁰ on existing markets for vertical farming as well as markets in Asia and other such countries where products like ours are set up successfully. Since we are selling

²⁶ Steinmetz, George. "We Don't Have Enough Organic Farms" National Geographic, National Geographic, 21 Nov. 2018,

²⁷ What is Hydroponics? Johnson, F. 20 September 2018

²⁸ Figure 8C: Gross Margin

²⁹ "Customer Acquisition Vs. Retention Costs – Statistics And Trends." Img,

³⁰ Steinmetz, George. "We Don't Have Enough Organic Farms" National Geographic, National Geographic, 21 Nov. 2018, / What is Hydroponics? Johnson, F. 20 September 2018

modules instead of full-fledged systems, farmers are more likely to buy them because they are experimenting with new systems. With such a strong economic status, the average income is higher in Switzerland (detailed in Section II: Analysis of International Situation), which means they have more disposable income. With more disposable income, higher prices rarely alter their choices to purchase groceries. **Compared to other nations, our organic produce is relatively expensive, however since Switzerland must currently import most produce, prices are already high at \$16.50 per kg³¹, which makes our produce cheaper.**

Figure 8B: Three Year Revenue and Sales Forecast											Fiscal Year Begins		Jan-19		
metrofarm															
	12-month Sales Forecast for 2019													Annual Sales Forecast	
	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Annual Total	2020	2021
Modules Sold	2,144	2,294	2,453	2,833	2,918	3,194	3,475	3,658	5,563	6,638	6,756	6,943	48,869	75,694	91,596
Sale price @ unit (average of the three)	20	20	20	20	20	20	20	20	20	20	20	20	20.00	20.00	20.00
Cat 1 TOTAL	42,880	45,880	49,060	56,660	58,360	63,880	69,500	73,160	111,260	132,760	135,120	138,860	977,380	1,513,880	1,831,920
Produce Sold to Direct Consumer	1,573	2,043	4,432	4,799	6,523	6,533	6,755	6,941	7,124	7,452	9,188	10,995	74,358	104,237	133,779
Sale price @ unit	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Cat 2 TOTAL	15,730	20,430	44,320	47,990	65,230	65,330	67,550	69,410	71,240	74,520	91,880	109,950	743,580	1,042,370	1,337,790
Produce Sold to Another Business	14	14	14	14	14	14	14	14	14	14	14	14	168	19	23
Sale price @ unit	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000.00	24,000.00	24,000.00
Cat 3 TOTAL	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	336,000	456,000	552,000
Monthly totals: All Categories	86,610	94,310	121,380	132,650	151,590	157,210	165,050	170,570	210,500	235,280	255,000	276,810	2,056,960	3,012,250	3,721,710

Our prediction shows MetroFarm making \$2.0 million the first year, \$3.0 million in the second and \$3.7 million in the last year. Our most significant revenue is our Modules, and our least significant (excluding Ad Impressions) is Produce Sold to Another Business. To improve our revenue in any situation where the operational integrity of our business is lacking, increasing sales price and decreasing our costs of goods sold will solve this problem.

D. What is the gross margin?

The costs for our product include the tubes, lighting, computers and transportation costs. Using the tables from Section X: Detailed Financials, we have calculated the gross margin below:

$$\text{Gross Margin} = \frac{R - O}{R} * 100$$

Figure 8C:
Gross Margin Percentages per Product

Variable and Description		Farmers	Direct Consumers	Intermediary Businesses
R	Revenue per sale	\$20	\$10	\$24,000
O	Costs of Goods Sold	\$12.5	\$5.75	\$13,250
GM	Gross Margin	60%	74%	81%

As shown in the figure above, MetroFarm makes considerable gross profit margins from their three different customer markets. MetroFarm's highest gross profit margin comes from intermediary businesses. High gross profit margins demonstrate MetroFarm's ability to maintain sustainable operations, as they are retaining assets.



IX. COST STRUCTURE

A. What are the Customer Acquisition Costs?

Discussed briefly in Section IV: Customer Segments and Section VII: Channels, we plan on using the TAM-SAM-SOM Approach to reach our customers.

Figure 9A:
Customer Acquisition Costs

Activity	Time Frame	Single Ad Cost	Yearly Ads	Annual Cost	Total Cost
Google PPC	2019 – 2021	\$0.20	10,000	\$2,000	\$4,000
Newsletters	2018 – 2020	\$505	12	\$6,060	\$12,120
Magazines	2019 – 2022	\$92	12	\$1,104	\$3,112
Newspapers	2019 – 2022	\$231	26	\$6,006	\$18,018
TV	2019 – 2023	\$1,004	10	\$10,041	\$29,961
Totals	5 years	\$2,254	-	\$25,211	\$67,211

³¹ swissinfo.ch. "Demand for Organic Food Grows Strongly in Switzerland." *SWI Swissinfo.ch*, Swissinfo.ch, 1 May 2018.

Based on the equation below, we have calculated our customer acquisition cost to be **\$1.52 per customer**.

$$\frac{\text{Total Advertising Costs after Three Years}}{\text{Customer Count after Three Years}} = \frac{\$67,211}{44,235} = \$1.52 \text{ per customer}$$

B. What are the Distribution Costs?

Transportation is our biggest distribution cost since MetroFarm ships the systems to their customers. With our target market being within the three provinces: Zürich, Geneva and Basel-Stadt, shipping will not be too expensive. We were able to calculate gas costs and leasing expenses (for trucks) and calculate an average of \$13,512 (Table 10B). Leasing trucks gives us more flexibility on when we can deliver, and in the long run, eliminates risk for high costs compared to commercial shipping.

C. What are the Human Resource Costs?

As most of our employees are mere labor workers, we are looking to hire 36 employees total including the owners. The CEO, CFO and COO will not take a salary for the first three years and invest the profits back into the business for the following years. Excluding the CEO, CFO, COO and the Engineers, we will be distributing the employees evenly to each branch. We plan to pay a total payment of \$774,144 in the first year for Human Resource Costs. In terms of Payroll taxes, it will cost MetroFarm \$61,942 (at a tax of 8%) and \$123,863 for Payroll Benefits (at a rate of 16%). At the end of years two and three, we will pay \$859,224 to employees for salary, and \$206,214 for salary benefits and taxes.

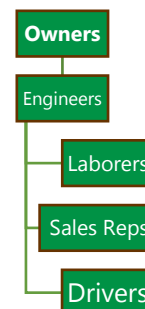


Figure 9B
Human Resource Costs for Year 1

Employee Title	Number of Employees	Pay / Hour	Hours / Month	Months / Year	Annual Expense
CEO/COO/CFO	3	-	160	12	None
Laborer	9	\$10	160	12	\$172,800
Sales Rep	9	\$10	160	12	\$172,800
Engineer	3	\$100	96	8	\$230,400
Driver	6	\$12	96	12	\$82,944
Customer Support	6	\$10	160	12	\$115,200
Total	36	-	-	-	\$774,144

Payroll Taxes and Benefits for Year 1

Employee Title	Annual Payroll Expense	Cumulative Payroll Tax	Annual Expense	Cumulative Benefits Rate	Total Salary Benefits
CEO/COO/CFO	None	-	None		
Laborer and Sales Rep	\$345,600	8%	\$27,648	16%	\$55,296
Engineer	\$230,400	8%	\$18,443	16%	\$36,864
Driver	\$82,944	8%	\$6,635	16%	\$13,271
Customer Support	\$115,200	8%	\$9,216	16%	\$18,432
Total	\$774,144	8%	\$61,942	16%	\$123,863

D. Additional Costs?

MetroFarm will purchase several assets to continue business operations. MetroFarm has found two warehouses in Zürich and Geneva and have negotiated prices down to \$13,542 a month, coming to about \$325,000 a year. MetroFarm also has three showrooms in Zürich, Geneva, and Basel-Stadt, with rent expenses \$15,000 a month (\$45,000 a month for all three showrooms). **Our total rent expense is \$864,000 for all three years and the total asset expenses for year one, two and three are \$996,960, \$996,312, \$1,000,442 respectively.** Utilities are very costly due to electricity and water usage for our systems in our GroRooms.

Figure 9C
Additional Costs Breakdown

Asset	Monthly Expense	Year 1	Year 2	Year 3
Rent Showrooms	\$45,000	\$540,000	\$540,000	\$540,000
Rent Warehouses	\$27,083	\$324,000	\$324,000	\$324,000
Utilities	\$8,429	\$107,960	\$112,312	\$120,442
Fixed Assets	-	\$25,000	\$20,000	\$16,000
Total Expenses	\$80,512	\$996,960	\$996,312	\$1,000,442



X. DETAILED FINANCIALS

A. Projected Income Statement

metrofarm													
Table 10A: Forcasted Statement of Income													
For the years ended December 31, 2019, 2020 & 2021													
	2019 Fiscal Year												Totals
	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	2019
Operating Revenue													
Modules Sold	42,880	45,880	49,060	56,660	58,360	63,880	69,500	73,160	111,260	132,760	135,120	138,860	977,380
Product Sold to Direct Consumer	15,730	20,430	44,320	47,990	65,230	65,330	67,550	69,410	71,240	74,520	91,880	109,950	743,580
Product Sold to Another Business	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	336,000
Total Operating Revenue	86,610	94,310	121,380	132,650	151,590	157,210	165,050	170,570	210,500	235,280	255,000	276,810	\$ 2,056,960
Cost of Goods Sold:													
Cost of Tubes	2,693	2,881	3,081	3,558	3,665	4,012	4,365	4,594	6,987	8,337	8,486	8,720	61,379
Costs of Computers	300	300	300	300	300	300	300	300	300	300	300	300	3,600
Cost of Lights	17,496	18,720	20,018	23,119	23,812	26,065	28,358	29,851	45,397	54,169	55,132	56,658	398,795
Transportation (Gas and Trucks)	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	42,312
Total Cost of Goods Sold	23,989	25,401	26,899	30,477	31,277	33,876	36,522	38,246	56,184	66,307	67,418	69,179	\$ 506,087
Total Gross Profit	62,621	68,909	94,481	102,173	120,313	123,334	128,528	132,324	154,316	168,973	187,582	207,631	\$ 1,550,873
	72%	73%	78%	77%	79%	78%	78%	78%	73%	72%	74%	75%	77%
Operating Expenses:													
Payroll	64,512	64,512	64,512	64,512	64,512	64,512	64,512	64,512	64,512	64,512	64,512	64,512	774,144
Payroll taxes and benefits	15,483	15,483	15,483	15,483	15,483	15,483	15,483	15,483	15,483	15,483	15,483	15,483	185,805
Utilities	15,241	8,429	8,429	8,429	8,429	8,429	8,429	8,429	8,429	8,429	8,429	8,429	107,960
Interest Expense	2,917	2,878	2,839	2,799	2,759	2,719	2,679	2,638	2,579	2,556	2,514	2,473	32,350
Taxes and Licensing	2,323	2,542	2,764	3,531	4,124	4,521	5,124	5,532	5,214	4,676	4,121	3,878	48,350
Depreciation	534	534	534	534	534	534	534	534	535	535	535	535	6,412
Insurance	895	895	895	895	895	895	895	895	895	895	895	895	10,740
Office Supplies	100	100	100	100	100	100	100	100	100	100	100	100	1,200
Lease/Trip Net Fees	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Advertising	4,553	1,878	1,878	1,878	1,878	1,878	1,878	1,878	1,878	1,878	1,878	1,878	25,211
Web design and maintenance	1,500	850	750	750	750	750	750	750	750	750	750	750	9,850
Rent	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	864,000
Repairs	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	17,100
Professional Fees	500	500	500	500	500	500	500	500	500	500	500	500	6,000
Miscellaneous	100	100	100	100	100	100	100	100	100	100	100	100	1,200
Total Operating Expenses	185,083	175,126	175,209	175,936	176,489	176,846	177,409	177,776	177,400	176,839	176,252	175,958	2,126,322
Income/ Loss before tax	(122,462)	(106,217)	(80,728)	(73,763)	(56,176)	(53,512)	(48,881)	(45,451)	(23,084)	(7,866)	11,330	31,673	(575,448)
Tax Expense	(12,246)	(10,622)	(8,073)	(7,376)	(5,618)	(5,351)	(4,888)	(4,545)	(2,308)	(787)	1,133	3,167	(115,090)
Retained Earnings	\$ (110,216)	\$ (95,596)	\$ (72,655)	\$ (66,387)	\$ (50,559)	\$ (48,161)	\$ (43,993)	\$ (40,906)	\$ (20,775)	\$ (7,079)	\$ 10,197	\$ 28,506	\$ (460,359)
	-127%	-101%	-60%	-50%	-33%	-31%	-27%	-24%	-10%	-3%	4%	10%	-22%

B. Projected Cash Flow Statement

metrofarm													
Table 10B: Forcasted Statement of Cash Flows													
For the years ended December 31, 2019, 2020 & 2021													
Account Name	2019 Fiscal Year												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2020
Beginning Cash Balance	\$ -	\$ 616,555	\$ 511,707	\$ 429,760	\$ 354,041	\$ 294,111	\$ 236,538	\$ 333,093	\$ 282,693	\$ 252,384	\$ 235,730	\$ 236,311	\$ 255,159
Cash Inflows:													
Owner Funds	360,000	-	-	-	-	-	150,000	-	-	-	-	-	-
Loan Proceeds	400,000	-	-	-	-	-	-	-	-	-	-	-	-
Modules Sold	42,880	45,880	49,060	56,660	58,360	63,880	69,500	73,160	111,260	132,760	135,120	138,860	1,513,880
Product Sold to Direct Consumer	15,730	20,430	44,320	47,990	65,230	65,330	67,550	69,410	71,240	74,520	91,880	109,950	1,042,370
Product Sold to Another Business	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	28,000	456,000
Total Cash Inflows	846,610	94,310	121,380	132,650	151,590	157,210	315,050	170,570	210,500	235,280	255,000	276,810	3,012,250
Available Cash Balance	846,610	710,865	633,087	562,410	505,631	451,321	551,588	503,663	493,193	487,664	490,730	513,121	3,267,409
Cash Outflows:													
Equipment Purchases	10,000	-	-	-	-	-	-	-	-	-	-	-	10,000
Furniture and Fixtures	15,000	-	-	-	-	-	-	-	-	-	-	-	10,000
Inventory Purchases	23,989	25,401	26,899	30,477	31,277	33,876	36,522	38,246	56,184	66,307	67,418	69,179	686,065
Payroll	64,512	64,512	64,512	64,512	64,512	64,512	64,512	64,512	64,512	64,512	64,512	64,512	859,224
Payroll taxes and benefits	15,483	15,483	15,483	15,483	15,483	15,483	15,483	15,483	15,483	15,483	15,483	15,483	206,214
Utilities	15,241	8,429	8,429	8,429	8,429	8,429	8,429	8,429	8,429	8,429	8,429	8,429	112,312
Depreciation	534	534	534	534	534	534	534	534	535	535	535	535	6,412
Taxes and Licenses	2,323	2,542	2,764	3,531	4,124	4,521	5,124	5,532	5,214	4,676	4,121	3,878	64,165
Insurance	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Office Supplies	100	100	100	100	100	100	100	100	100	100	100	100	1,000
Lease/Trip Net Fees	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	36,000
Advertising	4,213	2,523	2,523	2,523	2,523	2,523	2,523	2,523	2,523	2,523	2,523	2,523	23,000
Web design and maintenance	1,500	850	750	750	750	750	750	750	750	750	750	750	8,000
Shipping	1,126	1,126	1,126	1,126	1,126	1,126	1,126	1,126	1,126	1,126	1,126	1,126	13,512
Repairs	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	18,500
Rent	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	864,000
Professional Fees	500	500	500	500	500	500	500	500	500	500	500	500	9,000
Miscellaneous	100	100	100	100	100	100	100	100	100	100	100	100	1,300
Tax Expense	(12,246)	(10,622)	(8,073)	(7,376)	(5,618)	(5,351)	(4,888)	(4,545)	(2,308)	(787)	1,133	3,167	15,905
Subtotal	221,800	190,904	195,072	200,114	203,266	206,528	210,240	212,714	232,572	243,679	246,165	249,707	2,980,609
Other Cash Outflows:													
Loan Principal	5,338	5,377	5,416	5,456	5,496	5,536	5,576	5,617	5,658	5,699	5,740	5,782	72,767
Loan Interest	2,917	2,878	2,839	2,799	2,759	2,719	2,679	2,638	2,579	2,556	2,514	2,473	26,292
Subtotal	8,255	8,255	8,255	8,255	8,255	8,255	8,255	8,255	8,237	8,255	8,254	8,255	99,059
Total Cash Outflows	230,055	199,159	203,327	208,369	211,521	214,783	218,495	220,969	240,809	251,934	254,419	257,962	3,079,668
Ending Cash Balance	\$ 616,555	\$ 511,707	\$ 429,760	\$ 354,041	\$ 294,111	\$ 236,538	\$ 333,093	\$ 282,693	\$ 252,384	\$ 235,730	\$ 236,311	\$ 255,159	\$ 187,742

Figure 10C

Summarized Information of Tables 10A and 10B

Year	2019	2020	2021
Revenue	\$2,056,960	\$3,012,250	\$3,721,710
Cash Balance	\$255,159	\$187,742	\$603,221
Retained Earnings	\$(460,359)	\$63,620	\$552,505
Profit Margin	-22%	2%	15%

Figures 10A, 10B and 10C includes MetroFarm's cash flow, income statement and summary for the next three years and a detailed monthly forecast for 2019. To the right is Figure 10D, our balance sheet for the end of the first year. All the figures depict steady operations toward consistent expansion and improvement (see Section 10D for rationale behind growth). At MetroFarm, we are dedicated to achieving our targets.

metrofarm Figure 10D: Balance Sheet As of 12/31/2019			
Assets		Liabilities	
Current Assets:		Current Liabilities:	
Cash	255,159	Accounts payable	67,418
Accounts Receivable	135,120	Other Current Liabilities	4,510
Inventory	69,179	Current portion Long Term Loans	99,041
Other Current Assets	43,523	Total Current Liabilities	170,969
Total Current Assets	502,981	Long Term Loans	300,959
Fixed Assets	25,000	Total Liabilities	471,928
Less: Accumulated Depreciation	6,412	Net Assets	
Net Fixed Assets	18,588	Equity	
		Share Capital	510,000
		Retained Earnings	(460,359)
		Total Equity	49,641
Total Assets	\$ 521,569	Total Liabilities and Equity	\$ 521,569

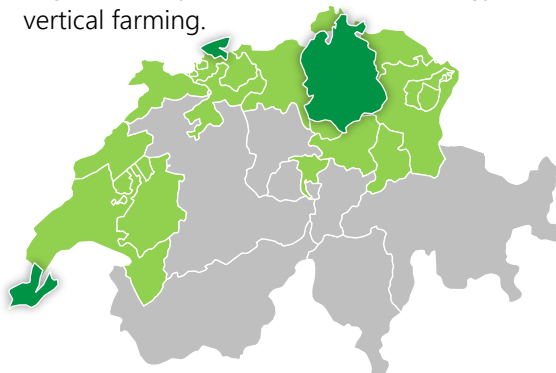
C. Projected Three-Year Plan

MetroFarm will grow at a steady rate in the coming years. The figures below display our three-year plan:

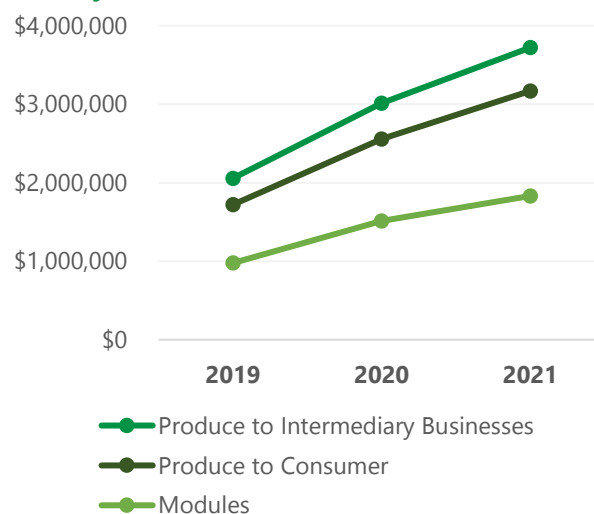
MetroFarm has upward sales figures (Figure 10H), increasing our overall operation efficiency (Figure 10F) and is expressed in detail below:

**Figure 10G
MetroFarm Public Growth**

MetroFarm will experience positive exposure and expansion in operations over the next three years due to the Swiss agriculture and consumer market eager to accept an innovative technology such as vertical farming.



**Figure 10H
Sales by Product Line**



After successfully dominating the Swiss market and becoming financially stable, we are ready to expand to the African continent, targeting countries suffering through intense food shortages. We plan on using a sister technique to Hydroponics, called Aeroponics, **with higher yields, better flavors, more flexibility and less water usage**. In this system, plant growth is facilitated by suspending them in the air in an enclosed environment, providing them the necessary nutrients by spraying their roots in the **form of mist**. Ultimately, our goal at MetroFarm (with Aeroponics) is to run an affiliated not-for-profit business (or organization) for the following reasons:

- Improved public relations around the world
- New and improved techniques being introduced to new markets
- Increased number of investors and shareholders
- Improving public health of countries in need of basic necessities (food, water, etc.)
- Positively impacting economies around the nation

D. Brief Narrative Description of Planned Growth

As shown in the forecasts above, we are expected to experience an overall net profit increase from -22% (-\$455,781) in 2019 to 15% (\$555,315) in 2021. MetroFarm is projected to reach sales of \$2,057,470 in year one and then see higher sales as we increase up to approximately \$3.7 million by year three (2022). These projections will be fulfilled by

MetroFarm's adherence to its efficient promotion plan laid out in Section VII: Channels. The plan focuses on using search engine optimization, Google Ad Sense, and Google Pay-Per-Click (PPC) Advertising in conjunction with local ads through posters and direct mail to showcase our brand to prospective customers and ensure maximum exposure. Sales increases will also be achievable through efficiency improvements as we gain experience in our operations.

Over time, our GroRooms will become an interactive platform for our customers. The promotion plan laid out in Section VII: Channels will increase foot traffic, turning GroRooms into hubs for face-to-face customer interaction. At the GroRooms, customers will get a close look at our modular builds and produce. The GroRooms will also serve as a center for customer support, helping MetroFarm maintain relationships with its customers and bolster customer growth for the long term. MetroFarm will utilize GroRooms as a measurement for its sales performance, innovation, and customer satisfaction, as customers will be physically coming into the showrooms. MetroFarm's business model is strong, organized and prepared for long-term growth.

E. Projected Plan to Meet Capital Needs

- Personal and internal resources**

As the owners of MetroFarm, we – Sasin (CFO), Shaun (COO), and Matt (CEO) – will collectively invest \$510,000 into the company. **We will each initially pool \$120,000, and six months after the business is operational, will each invest \$50,000.** These funds will comprise of individual personal savings, investments from family members as well as from previous endeavors in our field.

- Earnings, short-term and long-term borrowing, long-term equity**

To ensure the prosperity of our business, all our profits will be reinvested into MetroFarm. The profits will be used to improve the efficiency of our operations, whether it be production or distribution. Profits will also be used for researching and developing new products to diversify and penetrate new markets. For example, we will dedicate funds to designing and updating our computer systems to enhance customer experience as well as to keep up with modern technologies.

- External Sources**

According to previous projected financial statements, we are requesting a \$400,000 bank loan to be repaid over 5 years beginning on January 1st, 2019 with an interest rate of 8.75%. This bank loan will effectively jumpstart our operations, and we are confident that we will repay the loan in a timely manner, based on the projections seen in Section X: Detailed Financials.

- Repayment Plans**

In order to ensure profitability of MetroFarm, we will not take money from the company to pay off our own investment. We will not take a salary for the first three years, and instead will be paid in Stocks of the company. On top of that, we will reinvest all retained earnings back into the business until we reach a state of financial stability. We will focus on growing the company and creating a long-term value for the company rather than short-term returns.

- Plan to repay borrowed funds or provide return on investment to equity funds**

MetroFarm will pay back the loan in a timely manner, with monthly payments of \$8,255 (Section X: Detailed Financials) lasting from December 31st, 2019 to December 31st, 2023. Over the course of monthly payments, we expect to pay \$95,293 (Figure 10I) in interest over the next five years, providing you with an immediate return on investment. Our annual loan principal payment will rise from \$66,691 in 2019 to \$79,395 in 2021.

Figure 10I
Loan Amortization in 5 years

Year	Principal Paid	Interest Paid (interest rate 8.75%)	Loan Balance
Dec 31, 2018	0	0	\$400,000
Dec 31, 2019	\$66,691	\$32,368	\$300,941
Dec 31, 2020	\$72,767	\$26,292	\$201,782
Dec 31, 2021	\$79,395	\$19,663	\$142,050
Dec 31, 2022	\$86,628	\$12,431	\$67,843
Dec 31, 2023	\$94,519	\$4,539	\$0
Total	\$400,000	\$95,293	



XI. KEY METRICS

At MetroFarm, we are committed to data driven business techniques. Therefore, we have identified a series of key metrics (P.E.L.C.O. Model) that evaluate our finances, operations, and industry position. These will help us monitor our progress towards achieving our goals and fulfilling our mission statement.

Figure 11A
Financial Key Metrics (P.E.L. Elements)

	Metrics	Purpose	Calculation	Benchmark	How to Improve
Profitability	Revenue	Measure sales and gauge market desirability	$SP^{32} * \text{Quantity Sold}$ See Table 8B	\$3 million by 2021	Data and sales analysis of current revenue streams to maximize market development
	Gross Profit Margin (%)	Measure of profitability	$\frac{(\text{Revenue} - \text{COGS}^{33})}{\text{Revenue}}$ See Table 10A	Greater than 75%	Decrease manufacturing costs by finding quality suppliers for lower prices
	Net Profit (%)	Total overall performance	$GP - \text{Expenses} - \text{ITD}^{34}$ See Table 10A	Greater than 15%	Decrease overhead costs by minimizing utility usage
Efficiency	R.O.C.E. Return on Capital Employed	Efficiency of capital invested	$\frac{\text{Net profit}}{(\text{IT}^{35} + \text{Equity})} * 100$	Greater than 10%	Maximizing profits while reducing debts and paying loan
	Inventory Turns	Measure inventory turnover	$\frac{\text{COGS}}{\text{Average Stock}}$	1.6 weeks	Improve sales record as well as and increase buying frequency
Liquidity	Working capital ratio	Measure short-term assets	$\frac{CA}{CL}$	3:1	Increase value of accounts receivable by letting farmers purchase on credit and decrease inventory purchases
	Acid Ratio	Determine ability to pay CA ³⁶	$\frac{CA - \text{Stock}}{CL}$	5:2	
	Net Cash Flow	Cash Inflows and Outflows	Cash In – Cash Out	Greater than \$65,000	Increase profitability and decrease COGS

Figure 11B
Operating Metrics (C.O. Elements)

Customer	Lifetime Value	Prediction of net profit attributed by a single customer	$T * S * C * P$ See Figure 8A	Farmers: \$200 DC ³⁷ : \$80 IB ³⁸ : \$200,000	Incentivize the customer to return to company and improve quality of our systems
	Acquisition Costs	Cost to gain a single customer	See Section 10A	Less than \$4	Decrease advertising expenditure
	Customer Satisfaction	How satisfied our customers are	$\frac{\text{Satisfied Customers}}{\text{Total Customers}}$	Greater than 85%	Improve quality of product and customer support
Operations	On time Deliveries	Timeliness of our shipments	$\frac{\text{On Time Deliveries}}{\text{Total Deliveries}}$	Greater than 90%	Increase advertising and recognition costs
	Employee Satisfaction	How satisfied our employees are	$\frac{\text{Satisfied Employees}}{\text{Total Employees}}$	Greater than 90%	Improve salary benefits and start employee engagement programs

³² SP: Sales Price at each Unit

³³ COGS: Cost of Goods Sold

³⁴ ITD: Interest Taxes and Dividends

³⁵ LT: Long Term Debt Liabilities

³⁶ CA: Current Assets

³⁷ DC: Direct Consumer

³⁸ IB: Intermediary Businesses



XII. COMPETITIVE ADVANTAGE

Vertical farming is the future of agriculture, providing efficient use of space, higher organic production and successful farms in extreme climates. However, current companies are looking to expand this throughout the world. These systems have been situated in Asian countries, while utilizing vertical systems in smaller countries like Switzerland will help grow its economy. However, MetroFarm will take a different approach to this solution:

Modular Builds are parts and pieces of the structure that are individual and smaller to help simplify transport costs, lower production costs, and increased customization. Mass producing the pieces will allow reduced production cost while simultaneously creating a system that can configure to individual customer's needs.



Modular Builds



Reusable Materials

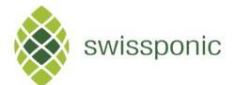


Computerized Systems

Reusable Materials will be gathered from the waste of the host cities. Plastics and other materials are easy to collect and repurpose, effectively upcycling old, useless waste, into a product that not only benefits farmers, but is environmentally friendly. Upcycling is often considered a better alternative to recycling, because instead of recreating the same product, a higher quality product is created. Using upcycled trash will also be cheaper for MetroFarm in the long run, as we will not have to pay for brand new plastics to be manufactured.

Computerized nutritional systems will precisely manage lighting, water, and chemical levels to stimulate plant growth. Lighting can be cut down to certain wavelengths set to mirror a plant's balance of chlorophyll A to chlorophyll B, choosing the perfect colors and intensity to maximize production. Computerized programs that can manage large systems remotely cuts down on production cost, while providing a more desirable product to farmers (prototype seen in Section XV: Appendix).

MetroFarm's debut into the still-developing vertical farming market will establish a strong foundation for years to come. However, there is one competitor, SwissPonic, whose take on hydroponics includes bringing small systems (roughly 1.5 cubic feet) into a consumer's household for decorative purposes. MetroFarm's motives to mass produce crops for Switzerland differs completely from their decorative focus, enabling both companies to grow and emphasize eco-friendly initiatives for generations.



XIII. CONCLUSION

We believe that MetroFarm has unique ideas and innovative thinking that will take the agriculture industry to the next level. The current state of farming is becoming inefficient, including large plots of land, lots of vehicles to plow the land and other costs from environmental effects, but MetroFarm will change the future of farming using vertical hydroponic systems. Using lighting, water, and hydroponics, we can grow far more than traditional means while staying organic and GMO free.

As owners of MetroFarm, each owner (Sasin, Matt and Shaun) will put in \$120,000 of our personal funds going into 2019, and after six months of operations, will each invest another \$50,000. In total, we will invest \$510,000 into MetroFarm, looking for another source of finance to make our business flourish.

We are requesting a loan of \$400,000 to be repaid over 5 years at 8.75% interest (discussed in more detail in Section X: Detailed Financials). With this loan, MetroFarm will develop into a booming start-up in Switzerland, supplying many organic groceries in Zürich, Basel-Stadt and Geneva. Our projected financial performance and our innovative ideas illustrate a steady increase as MetroFarm will develop its presence in the Switzerland.



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XV. APPENDICES

Figure 15A
Computer and Mobile System Prototypes



Figure 15B
S.W.O.T. Analysis for MetroFarm with P.R.I.M.O.F. Elements

Internal Factors	Strength	Weaknesses
	People: <ul style="list-style-type: none"> Concise organizational structures (HR) streamlines communication and improves output 	People: <ul style="list-style-type: none"> Minimum wage requirements may take from profits in the business
	Resources: <ul style="list-style-type: none"> Tubes are repurposed within the company Computers make our systems easier to manage Software is not reliant on other companies 	Resources: <ul style="list-style-type: none"> Computers and lights must be bought from other businesses Tubes are taken if they are unused or donated
	Innovation: <ul style="list-style-type: none"> Modern farming being introduced commercially first time in Switzerland New methods looking to increase efficiency and create more output 	Innovation: <ul style="list-style-type: none"> May have risk because introducing a modified version of an existing product to a new market in Switzerland High investment costs for venture capitalists, and not profitable until second year
	Marketing: <ul style="list-style-type: none"> Eco-Friendly company will have good public relations and a good image with the world 	Marketing: <ul style="list-style-type: none"> Smaller host country could lead to less widespread recognition of MetroFarm
	Operations: <ul style="list-style-type: none"> Smooth operations in terms of producing, packaging and shipping (Figure 6B) Producing the same amount as a traditional farm with less space 	Operations: <ul style="list-style-type: none"> Small companies may have trouble keeping up with costs for shipping and handling since transportation is costly Building development and maintenance will be high
	Finance: <ul style="list-style-type: none"> Three streams of revenue, all diversifying our product and placing it into three different markets Not many employees needed, so excess profits are invested back into the business 	Finance: <ul style="list-style-type: none"> Costs for systems may keep some farmers (on the poorer side) from buying it Lots of money needed to start the business: around 1 million with investments and share capital

S.W.O.T. Analysis for MetroFarm with P.E.S.T.L.E. Elements

External Factors	Opportunities	Threats
	Political: <ul style="list-style-type: none"> Swiss government structure pushes its economy towards self-sufficiency Switzerland has implemented various policies that agree with MetroFarm's goals 	Political: <ul style="list-style-type: none"> With the country being so small, importing and exporting is their main business, and tariffs are so low that the incentive to import is greater than to buy/produce domestically
	Economic: <ul style="list-style-type: none"> 4th highest GDP per capita in the world Surrounded by the EU and is currently in the EFTA, promoting free trade and economic growth Swiss economy makes it an ideal location for the business 	Economic: <ul style="list-style-type: none"> In terms of volume of GDP, Switzerland is a small country, so their GDP is not very high Money is poured into government purchases which takes away from the government tax cuts given to small businesses
	Social: <ul style="list-style-type: none"> Eco-friendly companies have a good image 	Social: <ul style="list-style-type: none"> Small companies will have trouble being recognized
	Technological: <ul style="list-style-type: none"> New technologies used to push to modern tech 	Technological: <ul style="list-style-type: none"> Expensive technology for business to work
	Legal: <ul style="list-style-type: none"> Swiss gov't has very few taxes and tariffs on sales for businesses 	Legal: <ul style="list-style-type: none"> Strict business regulation could prevent consumers from buying our products
	Environmental: <ul style="list-style-type: none"> MetroFarm is very efficient with its space and it has no effect on the environment because it is eco-friendly 	Environmental: <ul style="list-style-type: none"> A lot of money goes towards the eco-friendly goals like Solar Panels, Wind Energy and other such methods