AgriSense Business Plan

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Executive Summary

40% of global crop yield is lost to pests and disease every year. Farmers rely on the human eye to identify their crop's problems. While more advanced monitoring systems exist, including towers with cameras, these require farmers to invest high initial capital for the infrastructure– something generally unfeasible for small and medium-sized farms. We will define our small and medium sized farmers as farmers with farms less than 1500 acres, the average farm size is 445 acres within the US, and those with Gross Crop Farm Income between $150K to $999K. Among these farmers, we will target those whose farm is within 100 miles of Philadelphia[i].

AgriSense is an at-your-door tech driven crop monitoring service that provides farmers with detailed analysis of their crops. We provide small to medium-sized Pennsylvanian farmers growing apples, citrus, strawberries, tomatoes, peaches, or pecans with actionable steps to improve their farm productivity and crop yield, focusing on disease and malnutrition. We provide this service using a fleet of precision agriculture drones that can quickly and accurately examine huge swathes of farmland. We offer two packages, first is the one-time visit package that charges farmers $6 per acre on a per-visit basis, and second is the yearly bundle package that makes 6 visits per year, charging $5 per acre each time. Thanks to the use of this existing technology, we are able to provide this service at an extremely cost-effective rate[ii]. The computer vision and drone communication technology at hand is being licensed from the University of Pennsylvania. These autonomous robotic drones can navigate themselves under any environment, even under dense forest canopy, and build semantic maps of the region, accurately capturing the data. Our mission is to make crop yield monitoring accessible for all farmers to increase their harvest. AgriSense's target farmers grow apples, citrus, strawberries, tomatoes, peaches, and/or pecans. Depending on crop type and its growing season, farmers may need different information on the health of their crops on different seasons. To ensure that we can provide our customers with the most precise data, we are narrowing our focus to these crops that our technology can evaluate and are abundant in Pennsylvania, and will expand in the future. In Pennsylvania alone, 35,000 farms are generating between $100-$999k in yearly sales, ranging in size from 1000-2000 acres. Since we are only operating in Pennsylvania, multiplying this number by our average product cost of $6K yields a total initial addressable market of $210MM.

AgriSense will use digital PR, video marketing, community building, and retargeting to increase engagement and brand awareness to reach this target market. Since there are various social media pages for farms and farmer associations, it is important to reach high views and click through rates on social media profiles and publications through platforms like Facebook and Instagram. We will target Facebook groups that consist of farmers to reach out to and create our social media page for people to visit and learn more about our product. Video marketing is also an effective tool for promotion as it is easily shared on social media, via blog, Youtube advertisement, and other platforms[iii]. The video can demonstrate our drone technology and visualize our fleet of drones. We will also build relationships with customers through farmer associations and organizations, such as Pennsylvania Farmers Union. We will share said video at farmers markets, attend their network and forum events to actually meet our customers, share printed materials, and ultimately earn their contact. This strategy will also strengthen our

competitive position by building a personal relationship with local farmers, spreading word of mouth, and gaining access to channels to reach out to more farmers. Finally, we will employ next-generation search advertising schemes and programmatic ads. Google and Bing are both important channels for search advertisement as they drive major online revenue. We will use search engine optimization and Google analytics to increase average traffic share, and track user interests through average click through rate, best search terms, how visitors are arriving at the website, etc. When farmers search topics like precision agriculture, crop monitoring or drones, AgriSense will be one of the top results they see.

AgriSense will achieve four milestones in the next year[iv]. Firstly, we will quickly hit *Milestone 1: Completion of Concept and Product Testing* by the end of November 2022. We do not need any investments or cash at this stage as we focus on validating the target market, getting feedback and gauging interest for our product. All team members are continuously outreaching industry experts and prospective customers to modify our concepts and develop who our target customers are, and what our addressable market is. Secondly, AgriSense is working on our Minimum Viable Product (MVP), which is a hardware of drones incorporated with our licensed technology for crop monitoring and data analytics software for consultation. We will work with a team of lawyers to broker a deal with the University of Pennsylvania to reach an exclusive licensing deal for their patent to reach *Milestone 2: Licensing Acquisition*[v]. Thirdly, CFO Nicholas Anderson and COO Fiona Su will reach out to all potential partners including legal services to have a better understanding of our costs on labor, licensing, equipment, channels, and so on, then publicize a yearly Pro Forma Projection in August 2023 to reach *Milestone 3: First Financing*. Lastly, all C-level executives led by CEO Janavi Chadha will review all assumptions of our business model and product development. Our plan is to reach *Milestone 4: Initial Plan Tests* no later than November 2023. In 2024, AgriSense will focus on adapting our product and services to the market and establishing our competitive advantage. Experienced hires may be conducted during early 2024 including a data analyst and a drone pilot. We will collect field test results and customer feedback, and CMO Irene Jeong will release a market memo in April 2024 to reach *Milestone 5: Market Testing*. In June 2024, with previous experience and product modification, AgriSense will reach *Milestone 6: Production Start-up*. The summer and fall seasons have great opportunities for growing and harvesting, so AgriSense will devote efforts to promoting our product and services, and conduct a customer survey to better improve our functionality, selling methods, and customer support services. We aim to reach *Milestone 7: Bellwether Sale* in November 2024. If all goes well, AgriSense will expand our market position and bring new funding sources in 2025 and 2026. We will reach *Milestone 8: First Competitive Action* in April 2025 and *Milestone 9: Venture Capital Funding* in November 2025. We are also expecting a product and service upgrade in April 2026 by reaching *Milestone 9: First Redesign and Significant Price Change*.
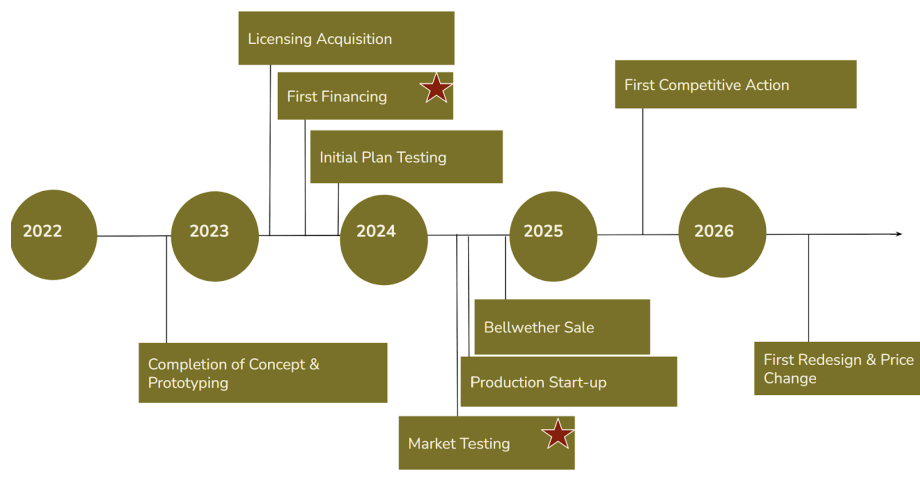
AgriSense will pursue an investment of $900K in 2023 in a single round of fundraising to be used for paying salaries, capital expenses (mainly drones) and other miscellaneous costs. AgriSense will raise funds through bootstrap financing and venture capital investment, and will not be looking to take on debt. After this initial investment, no further funding will be required in the next five years of business[vi].

AgriSense will be led by a C-Suite of five skilled individuals who each will graduate with an Ivy League education in engineering and various business disciplines. The C-Suite is composed of our CEO (Janavi Chadha), who leads our CFO (Nick Anderson), COO (Fiona Su), CTO (Henrique Lorente), and CMO (Irene Jeong). As our company grows and scales, we plan for AgriSense to take on more employees ranging from analysts who will sit under our CTO, drone operators who will sit under our COO, and sales managers who will sit under our CMO. AgriSense plans to have a separate Board of Advisors providing expert knowledge and guidance. Janavi will focus on AgriSense's vision and regularly refine AgriSense's product vision due to frequent interactions with our customers. She will utilize the skills she gained as a product manager intern at Accenture to ensure that the management team is running cohesively as a unit and reaching company goals on or ahead of schedule. Our CFO, Nick, will work to provide the much-needed financial clarity to evaluate future decisions, provide operational guidance and ensure that treasury policies are in place and working. Nick will be able to use the knowledge he has gained through past experiences in a leading global investment banking, securities, and investment management firm to help AgriSense stay on its financial goals. Our COO, Fiona, will work with Janavi to execute strategies developed by the management team and lead various strategic initiatives. Fiona's background in Systems Engineering, Data Analytics, and Project Management allows her to work well with individuals with more technical knowledge while focusing on leading strategic initiatives. Our CTO, Henrique, will set the technical direction for AgriSense's development, create and execute a strategic plan, identify the exact resources necessary to implement the project and oversee the entire process from start to finish. Henrique's background in undergrad as a Computer Science major at the University of Pennsylvania will provide him with an excellent background for leading the engineering and data team and ensure that our platform can provide our customers with easily understandable and actionable recommendations. Our

CMO, Irene, will be responsible for defining and implementing our marketing and growth programs. She will be able to utilize her experience as a Business Development Intern and her work at Microsoft to promote AgriSense to our customer base. Each management team member will be making a 50K base salary and holds 14% of the company stocks.

In AgriSense's 5-Year development plan, we don't expect to generate any revenue in the first two years of operation but will achieve net profitability by 2025, and by 2026 we will generate $1.4MM in revenues and earnings after tax of over $400K. AgriSense will also be cash-flow positive in its 5th year, generating a net $360K in cash.

AgriSense will purchase two customized drones that use our licensed crop monitoring technology for testing at a cost of $5,000 each in 2022 and purchase two more testing drones in 2023. We expect to rely on the established drone technology that does not need any further development. Two pilots will be hired to perform test flights in the field. Since we will work remotely in the beginning, the miscellaneous expenses are low, including a temporary place to store our drones and pieces of equipment only. In addition, an estimated Licensing enrollment fee is $5,000, the administration fee is $1,000, and the royalties are about 5% of yearly revenues[vii]. AgriSense will launch market testing in 2024, and we will need six more drones to complete our fleet (a total of 10 drones) by 2025, which allows us to expand our customer base and survey larger farms as well. A sales rep will join to help with designing advertising campaigns and support post-sales services. Moreover, the data analytics platform will be developed by our CTO, and two engineers will join CTO's team to expand our back-end platform and develop machine-learning algorithms to extract even more insights from the crop data we collect, thus offering better service. In 2026, sales & marketing expenses will increase to $15,000. As we gain more customers, our operating expenses on customer services also increase since we make more frequent visits, invest more resources in analyzing their crops, and use more drones.

For our pricing strategy, we will offer two packages: the "One-Time" option, which is $6 per acre for customers who only need a one-time flight to diagnose farm issues, or the 'Yearly' option which is $5 per acre and customers get a bundle of 6 visits scheduled within a year. Since the average size of farms we serve is 1000 acres, so we predict an 'Average Price per Service' is $6,000. We expect to acquire one customer every week, leading to 104 visits in 2024, and with 50% YOY sales growth, we will reach 160 visits in 2025 and 240 visits in 2026. See the AgriSense revenue projections table below.

AgriSense 5-Year Revenue Projections					
	2022	2023	2024	2025	2026
# of Visits/Services	0	0	104	160	240
Average Price per Service			$6,000.00	$6,000.00	$6,000.00
Annual Revenue	$0	$0	$624,000	$960,000	$1,440,000

AgriSense will aim to eventually be acquired as an exit option for investors. We view this as the most favorable option once AgriSense reaches a valuation in the hundreds of millions of dollars. Notable transactions in the Agritech space include the acquisition of Prospera, a company similar to AgriSense that provides crop monitoring technology, by Valmont Industries for an undisclosed amount and John Deere has been making several acquisitions in this space in the hundreds of millions of dollars. We view companies like John Deere, Bushel and Monsanto as key companies interested in an eventual acquisition of AgriSense.

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2. Company Overview

2.1 AgriSense was founded at UPenn in 2022

AgriSense's journey begins in 2022 at Philadelphia, Pennsylvania. Founder Janavi Chadha first came up with the idea after reading University of Pennsylvania GRASP Lab article led by Vijay Kumar. Dean Kumar's lab has developed a robotic system for precision agriculture to offer an efficient solution to crop monitoring. The article and the video described how these autonomous robotic scouts can travel in swarms in any environment, even in dense forest canopy using semantic mapping. With their sensors, these robotic scouts can collect data such as crop disease, pests, fruit counting, and thermal stress. Inspired by this video and the article, Janavi came up with "AgriSense'' to utilize this technology and make crop yield monitoring accessible for all farmers. As an undergrad student studying computer science at University of Pennsylvania, Janavi and her fellow classmates in engineering entrepreneurship class, Henrique, Nick, Fiona, and Irene hopped onto this journey together.

AgriSense is a C corporation, acting as a single entity. This gives AgriSense unlimited growth potential, enhanced credibility, and perpetual existence. Although we are starting off with farms near Philadelphia, we plan to expand our circle to other farm-rich states in the U.S. to help farmers improve their yield. In everything we do, we are always dedicated to our mission: to make crop yield monitoring accessible for all farmers to increase their harvest.

2.2 AgriSense helps protect crops

AgriSense is an at-your-door tech driven crop monitoring service that provides farmers with detailed analysis of their crops. We provide small to medium-sized Pennsylvanian farmers growing apples, citrus, strawberries, tomatoes, peaches, or pecans[viii] with actionable steps to improve their farm productivity and crop yield, focusing on disease and malnutrition. We provide this service using a fleet of precision agriculture drones that can quickly and accurately examine huge swathes of farmland.

3. Product and Service Offering

3.1 AgriSense offers recommendations for improving yield

AgriSense is a data-driven robotics solution designed to improve farm productivity and efficiency. We are able to address most critical problems faced by this industry and we mainly focus on estimating yield, detecting crop stress, and monitoring pests[ix]. Agrisense deploys a fleet of precision agriculture drones over the farmer's field and provides farmers with detailed crop monitoring on a large scale. Our drones can detect early stages of disease, areas where fertilizer is needed, and estimate crop size. Especially during the crop's growing season, drones will monitor the changing conditions of the field. They can give farmers an accurate analysis of their crop's status and resolution for improvement. The drone carries an intelligent sensor suite for state estimation and reconstruction, an onboard computer for rapid visualization, and is optimized for small size, weight, and cost. Backend analysts synthesize conclusions from the information provided by the drone fleet– allowing for complete and comprehensive crop analysis including implementable actions for farmers to take to increase yield. AgriSense can apply this technology to all farms growing apples, citrus, strawberries, tomatoes, peaches, or pecans.

3.2 AgriSense's core technology is owned by the University of Pennsylvania

Dr. Vijay Kumar, Dean of the School of Engineering and Applied Sciences at the University of Pennsylvania and head of the school's GRASP lab, is the inventor and patent owner for the drone technology AgriSense will license.

AgriSense will strike a deal with the university to have unconditional access and sole use of this technology[x]. By Q2 in 2023 AgriSense will lock in a licensing partnership with the university[xi]. This technology can then be coupled with standard off-the-shelf drones, requiring drone pilots to have only a basic understanding of how to set up and launch the fleet.

3.3 AgriSense's core technology is fully developed

At AgriSense, the core technology relevant to the company's success is already fully developed. The only relevant development in AgriSense's offering will come on the operational side. By year-end 2022, AgriSense will have completed its proof of concept and will be prototyping the complete offering to the customer. Throughout 2023, we will begin testing this concept so that by Q3 2024 the company has ramped up production and market testing[xii].

Also in 2024, AgriSense will make 5 key hirings– adding one sales rep, two drone pilots, and two engineers (one software, one data). While these engineers won't be modifying or developing the licensed technology behind our offering, they will be working with Henrique (CTO) to expand the quality of our offering, including a cleaner recommendation and feedback platform.

4. Industry and Market Analysis

4.1 AgTech is a rapidly growing industry

AgriSense is a smart crop monitoring service provider powered by drone technology and data[xiii], so we compete with other drones that are used in farms or agricultural purposes, and other equipment and technologies that are used to monitor and manage crops. We are associated with the target drones industry (NAIC: 336411, SIC: 3728), as well as the farm management services industry (NAIC: 115116, SIC: 0762) (NAICS, 2022). We are within the Precision Agriculture industry, or Precision Farming Market, also known as AgTech.

Precision Agriculture refers to an approach to farm management that uses technology to measure, observe and respond to crop variability in order to enhance crop quality and productivity. The crop variability refers to crop status such as temperature, in-field crop health, soil moisture, fungal infestations, dryness, pest damage, weather related damage and more. Many precision farming techniques use remote sensing applications/imagery, geospatial technology for data collection, enhanced in-field observations and suggest crop specific resolutions.

The Global Precision Agriculture industry was estimated to be USD 8.16 billion in 2021 and is expected to reach USD 14.61 billion by 2026 (Research and Markets, 2022) with a compound annual growth rate (CAGR) of 12.8%, and hitting USD 26.8 billion by 2030 (Precedence Research, 2021)[xiv]. It can be segmented further based on Offering, Application, Technology, and Geography (Precedence Research, 2021):

- By Offering Type, the market is classified into Hardware, Software, and Services. The Hardware segment dominated the market and accounted for nearly 69% of the total market share in 2021 (Precedence Research, 2021). Major hardware components include control systems, sensing devices, automations, VAT technology, and UAV/drones, and Software segment includes components like cloud computing (storage devices, shared networks and servers), predictive analytics software (Grand View Research, 2021). Although drones are part of the Hardware segment, AgriSense is also tied to the Services and Software segments and we see big market potential[xv].

- By Application Type, the market is classified into Yield Monitoring, Crop Scouting, Field Mapping, Variable Rate Application, Weather Tracking and Forecasting, Inventory Management, Farm Labor Management, Financial Management, and Others. The Yield Monitoring segment garnered a market share of 45% in 2021 (Precedence Research, 2021), and it was the highest contributor to the North American smart crop monitoring market at $189.51 million. Since Yield monitoring is forecasted to outgrow the general market with a CAGR of 13.33% (BIS Research, 2022), making it the primary focus of AgriSense. We also provide Crop Scouting and Field Mapping and will add more functions to meet customers' needs, such as Weather Tracking, the fastest-growing segment.

- By Technology Type, it is classified into Guidance Technology, Remote Sensing Technology, and Variable-Rate application (VRA) (Precedence Research, 2021). AgriSense licenses the technology invented by Penn Engineering, which is a combination of mainstream technology and ensures our competitiveness.
- By Geography, the North American region is the biggest contributor to the industry and accounted for a market share of 46% in 2021, at a value of USD 3.4 billion in 2021 with a CAGR of 11.5% from 2022 to 2030, followed by the Europe region took over 21% of market share in 2021. In addition, the Asia Pacific region is projected to grow at a CAGR of 15.5% from 2022 to 2030 (Precedence Research, 2021).

The rapid adoption of technology to reduce labor costs, increased usage of IoT devices in farming, and the need to meet the rising demand for food have pushed rapid growth of the precision farming market (Grand View Research, 2021). The agriculture industry is usually highly dependent on labor, but due to technological advancements, automation is replacing the task of laborers. Moreover, increased promotion and support from the government to adopt precision farming techniques has made the North American region an early adopter of precision farming technologies. The National Institute of Food and Agriculture (NIFA) in the U.S. offers precision technology and geospatial sensor programs to improve awareness among farmers (Grand View Research, 2021).

Additionally, the high cost of precision farming equipment can prevent the customer segment from easily adopting the tools offered to them (Markets and Markets, 2022), which might lead to high switching costs, and become an obstacle when expanding our business to developing countries that lack resources[xvi]. It would be difficult for the customers to easily find a cheaper alternative as the most advanced technology and equipment in the market is at the high end of the price range.

Overall, the precision agriculture market has immense growth opportunities due to the rising labor costs, increasing government promotion, climate change, increasing food demand, rising investments, and rapid adoption of advanced technologies in the farming industry.

4.2 *Voids in the crop-monitoring market*

There are various existing solutions for farmers to acquire crop yield monitoring. AgriSense's direct competitors are farmers themselves and critical drone market players, and indirect competitors are other crop monitoring systems and equipment made of sensors or substituted devices and crop consulting services[xvii].

On one hand, our major direct competitor is farmers and personnel on the ground, observing crops with their eyes, such as testing the soil moisture by hand and checking the field daily. Small farms usually operate by families, and owners are traditionalists who believe in their experiences and are very sensitive to costs. They also rely on free resources such as guidelines from the department of agriculture, however, as general publications, the contents are comprehensive but not designed for small crops or special conditions. This solution is practical

on a small scale but impossible to perform accurately once farms become a certain size due to the lack of systematic management methods and tools.

On the other hand, more and more drone technology companies are becoming active in the market. For example, started in 2010, Precision Hawk develops and integrates commercial drone technology, offers drone remote sensing applications and data processing services in multiple industries and agriculture is one of its specialties. Its drone mapping and analytics services are capable of counting crops, quantifying plant health, and maximizing yield. It outsources pilots and builds a large drone pilot network (Precision Hawk, 2022). Another industry leader, DroneDeploy, founded in 2013, partnered with leading drone manufacturers like DJI to provide its software to end users in a variety of industries including agriculture, and cloud-based services covering automated flight safety checks, workflows, and real-time mapping and data processing. Its pricing ranges from $149 to $599 monthly for individual users depending on the features and must be billed annually. It is limited to 1 pilot and users could only get support through email or chat (DroneDeploy, 2022). Both Precision Hawk and DroneDeploy are technological leaders in the industry for around 10 years, which have won investors' trust, both have made acquisitions and raised funding of over $130M (Crunchbase, 2022)[xviii]. Various worldwide competitors include Mothive, CropX, Arable, Ceres Imaging, Gamaya, AgriData, Agrowatcher, AgEagle, Aker Technologies and so on. AgriSense, different from competitors, performs like a technology consulting company.

The major indirect competitor is equipment-as-a-service, which farmers can then use to monitor their crops accurately and frequently. Although substitutes might be cheaper, specialized, or reusable compared to drone services, it still requires intensive capital investment up front, and might cause additional training costs for farmers to use this equipment effectively. For example, Bulgin is a manufacturer of environmentally sealed connectors and components that designs Agricultural Monitoring Systems and devices that can be installed on the ground in challenging environments (Bulgin, 2022).

Last but not least are the consultants, in which professionals gather information in the field and analyze them in the lab. Crop consulting services companies are reputational and certified experts. For example, ACS Agronomy Consultants is able to address environmental, soil, and fertility problems, and provide in-field Agronomy backed up by laboratory services and Integrated Pest Management (IPM). It also adds the setup of Precision Agriculture devices and related training to its services (Agricultural Consulting Services, 2020). Actually, farmers rarely choose this option because it is expensive and not very reachable, and farmers might use this service if there is an emergency issue.

AgriSense's solution fills this gap by providing real-time crop monitoring, data analytics, and actionable insights in an intuitive user experience that no coding or advanced technical knowledge is required. Our solution can monitor the entire farm per session (as opposed to human observers) to track the crop status in different seasons a year and price by the number of services (not selling our drones), reducing the cost significantly without requiring the farmer to sink his capital into equipment. In summary, we are an affordable and reliable end-to-end solution aimed to help small-to-medium-sized farms adapt and transform into smart farm operations.

4.3 *Billion-dollar AgTech drone market is awaiting*

To define our total addressable market, we must consider the cost of our product and who would be able to afford it, as well as who has a need for it. We recognize that farms that are too small will not have the purchasing power, nor likely the need, to acquire our services. Similarly, farms that are extremely large in nature are likely to have existing infrastructure in place already to perform their yield monitoring needs. Thus, we target those who bring in $150-$999k Gross Crop Farm Income (GCFI) annually, where our pricing per visit is around $6k. This becomes a realistic purchase for them compared to the much more expensive alternatives. In the U.S., it was estimated to be 2,012,050 farms in 2021 and 14.6% of them are in $150-$999k GCFI - making nearly 294,000 farms, with an average size ranging from 900 to 1900 acres become our potential customers (USDA, 2022)[xix]. The total land in farms was 895,300,000 acres in the U.S., and our potential customers take over 44.4% of the total land, leading to 397,513,200 acres (USDA, 2022). Multiplying this number by our average cost per acre at $6 yields a total addressable market (TAM) of $2.39 billion[xx].

In addition, AgriSense plans to first start its business in Philadelphia and surrounding areas within 100 miles, so our primary customers will be local farmers of less than 1500 acres (average US farm size is 445 acres), in the range of $150-$999K GCFI. Therefore, our primary TAM covers 35,000 small-to-medium-sized farms in the tri-state at a value of $210M.

AgriSense is ambitious to expand from PA to nationwide, and go globally in the future. According to BIS Research, "farmers are searching for potential chances to generate more profits by expanding their agricultural field efficiency". Efficiency is at the forefront of farmers' needs, given the green revolution and the shrinking of arable lands due to various factors (BIS Research, 2022). The ongoing trend in developing countries to commercialize agriculture "is expected to drive the smart crop monitoring market" (BIS Research, 2022).

4.4 AgriSense is targeting family farm owners

AgriSense's target customer base consists of small-to-medium-sized farms, and specific farms in the range of $150-$999K in GCFI, which consists of 14.6% of U.S. farms and 44.4% of U.S. farmlands. More specifically, we want to target farms where a large portion of the business income comes from farming - making it a priority. According to the USDA, with small farms making less than $350k in GCFI, the households operating these farms typically rely on off-farm sources for most of their household income (USDA, 2022), which means that the farm portion is generating revenue but not a priority. We understand that it will be hard to turn these farmers into real customers, but we will work on marketing and sales to promote precision agricultural tools and our services.

Since many of these farms are owned by a family, most decisions come down to the farm owner, who is mainly influenced by their peers (other farmers)[xxi]. As a result, we went to farmers' markets and cold-emailed these farms to reach out to our key demographic and target decision-makers; in many cases, farmers in our key markets bought new technologies for their farms in two instances. Either after seeing a comparable farm utilize the system and have success with it or after facing problems in their business by needing a specific tool. For example, when

speaking to a farmer based near Philadelphia, they mentioned that the next precision agriculture tool they will invest in for their farm is a more accurate temperature sensor. The temperature sensor will be local to their farm instead of relying on the information provided by the DoA on frost conditions. They decided to invest in a tool like this after consistently losing crops due to the frost.

Along with word of mouth and demonstrating the need for the product, farmers also mentioned that they had been introduced to various precision farming technologies through farmer conventions. Subsequently, these companies mailed brochures to them. Many of our interviewees said that these methods aren't often as compelling as a testimony from a similar farm but that they have tried a product from a convention/pamphlet before. Our marketing strategy is formatted to allow us to most effectively target this market by providing initial consulting services to spread the word about our product and attending farming conventions to spread the word about our product and hopefully obtain some initial users.

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5. Sales and Marketing Plan

5.1 AgriSense targets high-value crop farms within a 100-mile radius of Philadelphia

AgriSense will target farmers growing apples, citrus, strawberries, tomatoes, peaches, or pecans. These crops represent some of the highest dollar-value production crops in the state of Pennsylvania since we will be targeting farmers within a 100-mile radius of Philadelphia. The majority of AgriSense's target customers includes farms producing between $100-$999K in yearly sales. These are defined as small to medium-sized farms— a conscious decision considering most large-scale farms generate over $1MM in profits and can already obtain year-round monitoring for their crops. In PA, 35,000 farms are generating between $100-$999K in yearly sales, ranging in size from 50-500+ acres. Multiplying this number by our product cost of $6K yields a total initial addressable market of $210MM

Currently, our target market monitors their crops manually or hires consulting companies that send out crop experts to provide feedback. We know that there is a need for disease monitoring, seeing as 20-40% of crop production is lost to disease and pests annually - this is a significant portion for farmers and is high on their list of priorities. We provide our customers a way to more accurately monitor their crops (on an individual basis) while saving extremely valuable time, all at a lower cost than competitors (crop experts hired by consulting companies)[xxii].

5.2 AgriSense offers both a one-time and annual service

In order to make best use of its robotics-as-a-service capability while maintaining maximum flexibility to farmers' demands, AgriSense will offer its services in a subscription-style revenue model. Customers will have the option to choose between two visitation frequencies: one-time, and annual— each containing the full end-to-end offering with a crop status update, live access to the drone-captured video feed, and point-specific feedback for the farmer. While the

one-time visit is self-explanatory, the annual subscription offers six visits per year allowing for flexibility in crop choice and offering application[xxiii].

As illustrated in the table below, the pricing of the two options are set on a per acre flight cost[xxiv] with the annual per acre cost at a slight discount in order to encourage customers to commit to a longer-term contract.

One Time
"No strings attached"
$6 per acre | 1 Visit

Yearly
Bundle
$5 per acre | 6 Visits in a year

All customers have the opportunity to receive a free consultation and one-time standard flight trial.

5.3 AgriSense will employ a dual distribution channel

AgriSense will build a dual distribution channel with a focus on the direct distribution strategy and selective distribution strategy, meaning that we will provide the product and services directly to our prospective customers, and salespeople (originally venture founders) would be assigned to selected regions to promote our brand to farmers. For example, we are planning to reach out to at least 5 farmers in each township around Greater Philadelphia. Once we build contact with prospective customers, customers are welcome to schedule a one-time free consultation with our team. Next, the customers will get notifications from us with a link to recommended packages, and they could pick a package to place the order through our selling platform or contact us for further assistance.

In addition, our team will bring our products and services to farmers' conventions or forums, and present in said situations at least twice per year. In terms of the demand for the product throughout the year, AgriSense will increase the distribution frequency during specified peak crop seasons, and in regions with a significant amount of potential consumers.

Finally, we will maintain an online marketplace to enable a faster, streamlined, and more direct form of distribution to our customers[xxv].

5.4 AgriSense utilizes various advertising strategies

AgriSense will combine direct and digital marketing strategies to empower a direct distribution channel ending in our ideal– the referral program. Beginning with our digital channels, the team will use marketing techniques such as digital PR, video marketing, community building, and retargeting to increase engagement and brand awareness. It is important to perform well on social media profiles and publications through platforms like Facebook and Instagram. We will target Facebook groups that consist of farmers to reach out to and create our social media page for people to visit and learn more about our product. Furthermore, our video marketing will also be an effective tool for promotion as it is flexible to share on social media, via

blog, as a Youtube advertisement, and on other platforms. The video can, and will, be the best demonstration of our drone technology outside of a consultation. To round out our digital methods, we will take advantage of search engine optimization and Google analytics to increase average traffic share, and track user interests through average click through rate, best search terms, and learning how visitors are arriving at the website. When farmers search topics like precision agriculture, crop monitoring or drones, AgriSense will be one of the top results they see.

We will also build relationships with customers through farmer associations and organizations, such as Pennsylvania Farmers Union. AgriSense will attend farmer's markets, network and forum events to actually meet our customers, share printed materials, and get their contact. This strategy also strengthens our competitive position by building a personal relationship with local farmers, spreading word of mouth, and gaining access to channels to reach out to more farmers. In this way AgriSense will best spread awareness to its free consultation offer. Finally, we will develop our referral program to be our most effective form of advertising— offering promotions, loyalty rewards, and lifetime value[xxvi].

5.5 AgriSense's sales team will target potential customers directly

For larger farms, coalitions, or associations that have potential for group orders, we will complete direct and personal selling. To better target the smaller-sized, majority of farms, we will sell our products online on our website or even any third party websites that offer and advertise agricultural tools.

Our internal sales team will take on the brunt of this task. We will support and train our sales force by written manuals and a series of training sessions led under the sales department head. We will compensate our sales force by giving them incentives and bonuses based on the number of products they have each sold. As we have a sales team in our company that focuses on sales, instead of outsourcing it to third parties or retailers, we have a much better competitive position than other companies in terms of conveying our story and value. We can use direct, personal selling to engage and build relationships with other customers without any middle party. Following the sales learning curve, as our company learns about its product, market, and sales process, the more efficient it will become at selling, and ultimately, the more revenue AgriSense will bring in[xxvii].

6. Operations

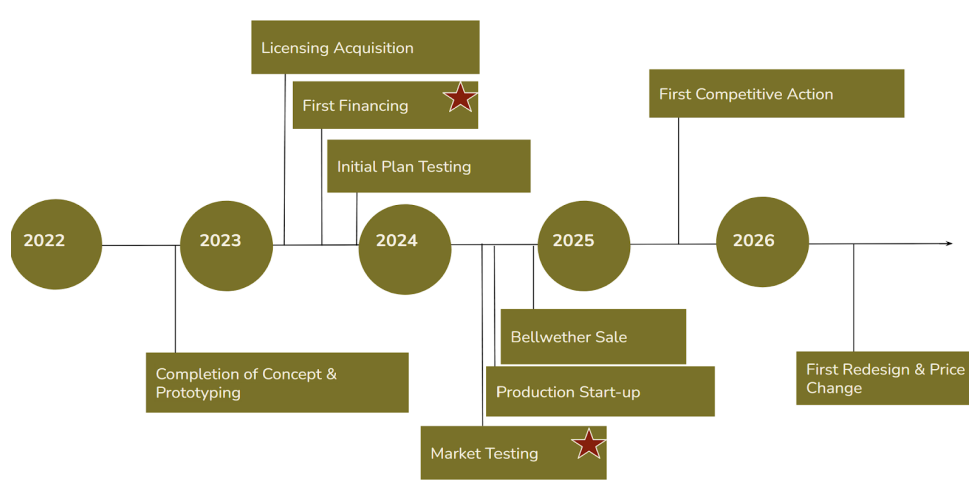6.1 *AgriSense plans to launch market testing by 2024*

Figure 1: AgriSense's Development Timeline from November 2022 to April 2026

AgriSense is expected to reach four milestones next year. First, we will quickly reach *Milestone 1: Completion of Concept and Product Testing* by the end of November 2022[xxvii]. This is a low-cost stage where we validate the target market and confirm the existence of an opportunity for our product and services. All team members will continuously reach out to industry experts and prospective customers to modify our concepts. This includes refining our pricing model and service package, target customers, number of drones to operate, and our product offering. This process also involves sending out surveys, questionnaires, phone calls to customers and experts to gauge interest, and gain feedback on our business model. Secondly, AgriSense is working on the Minimum Viable Product (MVP), which consists of hardware of drones and software for data collection and crop monitoring. CTO Henrique Lorente will develop version 0 of our data analytics platform, and run the prototyping tests by February 2023 to reach *Milestone 2: Completion of Prototype*. Next, for our *Milestone 3: First Financing,* CFO Nicholas Anderson and COO Fiona Su will reach out to all potential partners including legal services to have a better understanding of our costs on labor, licensing, equipment, and channels[xxix]. Based on these research and data, they will publicize a yearly Pro Forma Projection in August 2023 to reach. Lastly, all C-level executives led by CEO Janavi Chadha will review all assumptions of our business model and product development. Our plan is to reach *Milestone 4: Completion of Initial Plan Tests* no later than November 2023.

In 2024, AgriSense will focus on adapting our product and services to the market and establishing our competitive advantage. An experienced hiring may be conducted during early 2024 including a data analyst and a drone pilot. We will collect field test results and customer feedback, and CMO Irene Jeong will release a market memo in April 2024 to reach *Milestone 5:*

Market Testing. From this, we hope to find out what type of customers will buy our product, how many customers are interested in our product, and how well AgriSense performs generally in the market. While product testing focuses on refining our product concept and offering, market testing is more about interaction and promotion to our customers, establishing brand image, assessing market performance, and gaining insights on customer data[xxx]. In June 2024, with previous experience and product modification, AgriSense will reach *Milestone 6: Production Start-up*. Many farmers grow and harvest their crops during summer and fall, so AgriSense will devote efforts to promote our product and services, and conduct a customer survey to better improve our functionality, selling methods, and customer support services. We aim to reach *Milestone 7: Bellwether Sale* in November 2024. After reaching this milestone, we can get a better sense of customer service operation, how to handle any unexpected issues with our drones, and how much our customer's crop yield has improved through AgriSense[xxxi]**.**

If all goes well, AgriSense will expand our market position and bring new funding sources in 2025 and 2026. We will reach *Milestone 8: First Competitive Action* in April 2025 and *Milestone 9: Venture Capital Funding* in November 2025. We will be raising money to buy more drones, set up our office in Philadelphia, and expand our marketing strategy and promotion. It would especially be used for online advertisements on search engines and social media, retargeting to track users and repeatedly show our advertisement, and free trials for prospective customers, which all require a significant amount of money. The funding will also be used for customer services, travel fee, and hiring additional employees like drone pilots and data analysts. Once we have a stable customer base through our active marketing promotions, we will upgrade our service and product in April 2026 by reaching *Milestone 10: First Redesign and Significant Price Change*. This would be based on the customer's feedback and review of revenue and cash flow to further optimize the revenue model[xxxii]. We can also outsource this to consulting firms to analyze our customer trends, cash flows, revenue generation up to this point to revise our current offering.

6.2 *Steps to bring AgriSense to the market*

AgriSense is extremely well-prepared to take on the market in its current state. Because our core technology is already well established, patented and available for licensing, the biggest work that remains in preparing the company for launch is to actually raise awareness on the side of our consumers. To tackle that, a few boxes do need to be checked before the ribbon can be cut.

First and foremost, to make our business model work there are a few outstanding factors revolving around the technology of our service. Outright, the biggest barrier is signing a contract with the University of Pennsylvania to enable the licensing of US Patent 10,395,115 (Google Patents, 2019). This is the patent for the robotic systems we intend to use, allowing drones to work together and survey crops for the purposes of yield monitoring. AgriSense is working alongside Penn patent lawyers to compile a licensing agreement for this technology.

A major risk for the AgriSense team arises when the first 'Market Test' comes into play. The biggest hurdle AgriSense faces in the way of its success is actual market need. Even with

excessive financial analysis and consumer data, it's rare for any company to predict how the target customers will react to the offering. To mitigate this risk, AgriSense has done extensive community research and outreach, leading the company to make its current financial decisions[xxxiii]. Another company coming in and licensing the same technology also poses a major threat. In this case, AgriSense would lose its competitive advantage. However, to counteract this threat AgriSense is including a 'non-competitive' clause (Law Insider, 2022) in the contract with Penn Engineering giving solely the company right to use this technology in the yield monitoring space. Technologically, the major risk our company faces is the ability of the drone. Our fleet has to be able to recognize and appropriately survey the crops of our customers. To mitigate this risk, we will establish a partnership with the University of Pennsylvania to further develop the drone technology based on issues that arise as we do business with our customers.

Our facilities will be located in the city of Philadelphia– giving us central access to all surrounding farms and plantations. We intend to employ a fleet of standard market flying drones that utilize our licensed technology. We will employ drone pilots that must understand how to set up the drones to appropriately survey a farm, as well as how to maintain these drones and account for any emergent factors (such as a particular drone failing to deploy).

6.3 Resources needed by AgriSense to grow

As AgriSense is bringing the product to the market by 2024 with market testing and bellwether sales as mentioned in the operations overview, we will follow this timeline to grow our company. If our company grows rapidly and needs to bring in more workforce, our facilities will not only be located in Philadelphia, but expand to other areas in the U.S. We will expand to areas like Texas, Missouri, Iowa, Oklahoma where there's a lot of farms (USDA, 2022) , which makes it easier to target and expand our customer base. Moreover, these states are agriculturally rich with a lot of small to medium size farmers that have farm land less than 1500 acres and gross crop farm income less than $999,000 (USDA, 2022).

The key factor for our business to run is our contract with the University of Pennsylvania to license the patent for the robotic precision agriculture software[xxxiv]. This can be achieved by help from patent lawyers and strategic alliances with Penn Engineering. Another key factor is employee additions: during our second or third year, we plan to bring in drone pilots who are adept at setting up and maintaining drones as contractors, and agriculture experts and data analysts who are capable of analyzing crop data as full time employees. Since the software is programmed so that drones are autonomous drones that can navigate themselves, drone pilots are only needed as contractors to just set up the drones and tackle any emergent issues during flight. Finally, we need a fleet of standard market flying drones incorporated with our licensed technology. We can form a strategic agreement with a drone company to help us save cost in buying a large number of drones and get help in incorporating the software to the drones. Another alternative could be buying drones from Kumar's lab that are already equipped with their technology. They would have a few drones that they have used for their experiments or demo video (YouTube, 2016).

To bring these elements together, we are reaching out to agricultural experts that can give us advice and possibly join our team in the future[xxxv]. We are also reaching out to Vijay Kumar's lab to move forward with the licensing process and form any necessary partnerships. Strategic partnership with the lab or Penn Engineering is necessary to mitigate technological risks with drones. For example, if the drone fails to fly during one of our visits to the farm, or did not collect accurate, sufficient data during its flight, we would need to consult with the lab to find out the cause behind this. Since we are not the ones who have developed the technology from scratch, we would need the lab's help to resolve these issues.

Specialized equipment we need for our business would be any equipment needed to set up, maintain, charge the drones. For example, in our facilities, we would need storage space for drones, a charging booth that would charge our drones or a stock of drone batteries, trucks to transport our drones with our drone pilot to the farm, professional high quality case to protect the drones, and landing pad to prevent damage to drones when they land...etc (Pilot institute, 2022). A rental agreement for an office or facility at Philadelphia is also necessary to store these equipment. We would not need all of this equipment for each visit, but we would need them for each drone to keep them in a good condition. Any data analysis software to analyze crop data would be decided later on after consultation with our data analysts.

The specialized talent we look for varies: for drone pilots, we want people that has expertise or at least 1-2 years of experience in handling drones; for data analysts: those who have 5+ years of analyzing data, preferably agricultural related; for agricultural experts: those who have been in the field for 8+ years. We do not need huge expertise in drone pilots as drones can navigate themselves, but we need expertise for agriculture experts and data analysts to give detailed consultation to the farmers and accurate analysis on crops based on the collected data.

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7. Management Team

7.1 *AgriSense's organizational structure and culture*

AgriSense comprises a team of five skilled individuals with backgrounds in engineering and Business. Our Leadership team is composed of our CEO (Janavi Chadha), who leads our CFO (Nick Anderson), COO (Fiona Su), CTO (Henrique Lorente), and CMO (Irene Jeong).

As our company grows and scales, we plan for AgriSense to take on more employees ranging from analysts who will sit under our CTO, drone operators who will sit under our COO, and sales managers who will sit under our CMO.

To ensure that AgriSense can healthily scale our culture, we will ensure that when onboarding, we emphasize our company's culture and we provide each new member of the team an "onboarding buddy" to serve as their cultural interpreter and friendly expert when they have questions about best practices in your organization. We also want to ensure that as we expand as an organization, we have set up clear communication channels[xxxvi] between all teams in our

organization. To maintain this, we will ensure that the management meets regularly to keep each division updated on the actions of another.

Our C-suite owns 70% of our shares, equally divided among all members, with each holding 14%. We expect to dilute by 30% in raising our first round of funding. With AgriSense, the role of our board of directors, as always, is to look out for the shareholders' interests. We hope for them to accomplish this by providing direction for AgriSense, and working with the management team to refine the vision, mission, and goals of AgriSense.

7.2 *AgriSense's key leadership and their background*

Our Leadership team is composed of our CEO (Janavi Chadha), who leads our CFO (Nick Anderson), COO (Fiona Su), CTO (Henrique Lorente), and CMO (Irene Jeong). As our CEO, Janavi will focus on AgriSense's vision and regularly refine AgriSense's product vision due to frequent interactions with our customers. She will utilize the skills she gained as a product manager intern at Accenture to ensure that the management team is running cohesively as a unit and reaching company goals on or ahead of schedule[xxxvii]. Our CFO, Nick, will work to provide the much-needed financial clarity to evaluate future decisions, provide operational guidance and ensure that treasury policies are in place and working. As a Global Markets Summer Analyst at McKinsey & Company, he will be able to use the knowledge he has gained through past experiences in a leading global investment banking, securities, and investment management firm to help AgriSense stay on its financial goals. Our COO, Fiona, will focus on carrying out the company's business plan and strategy details. She will work with Janavi to execute strategies developed by the management team and lead various strategic initiatives. Fiona's background in Systems Engineering, Data Analytics, and Project Management allows her to work well with individuals with more technical knowledge while focusing on leading strategic initiatives. Our CTO, Henrique, will set the technical direction for AgriSense's development, create and execute a strategic plan, identify the exact resources necessary to implement the plan and oversee the entire process from start to finish. Henrique's background in undergrad as a Computer Science major at the University of Pennsylvania will provide him with an excellent background for working with the technology team to improve upon past iterations of our product and ensure that our analysts can provide our customers with easily understandable recommendations. Our CMO, Irene, will be responsible for defining and implementing our marketing and growth programs and will be able to utilize her background as a Business Development Intern and her work at Microsoft to inform how she works with the rest of the management team to promote AgriSense to our customer base. Each management team member will be making a 50K base salary and holds 14% of the company stocks.

7.3 *Roles and responsibilities of the board*

AgriSense plans to have a separate Board of Advisors to make strategic decisions by providing expert knowledge and guidance. We understand that unmanned aircraft laws are

constantly evolving, so having a Board of Advisors can help us strategically train our pilots and create a product that won't have to be continually changing based on evolving laws. This Board of Advisors will also help us stay up to date on the latest advancements in technology and how they can be applied to our platform. Additionally, they will help us make decisions about how to best serve our customers and ensure that we remain compliant with relevant laws and regulations.

AgriSense's board of Directors will be composed of our investors and C-suite. All of our investors are students at the University of Pennsylvania studying Engineering Entrepreneurship and have all pursued / are pursuing their own startups. AgriSense's Board of Advisors will be composed of individuals ranging from the original inventors of the technology at the GRASP Laboratory. Other members of the Board of Advisors will include leaders from the agritech industry. These individuals will provide us with valuable insight and advice on the development and implementation of our platform[xxxviii].

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8. Funding and Financials

8.1 Summary of AgriSense's Financial Plan

Years 1 and 2

AgriSense doesn't expect to generate any revenue in the first two years of operation. The cost for communications, brochures, and website setup is $1,000 for the first two years. During this time, we will begin to develop our fleet– purchasing four drones that utilizes our licensed technology for testing. We expect to spend less in R&D expenses for the first three years as we are using an established drone technology that does not need any further development. But if there are any emergent issues with our drones during our visits to the farm, we will use our R&D expenses to make any tweaks or improvements by partnering with Penn Engineering. Moreover, the online platform that our customers will use to view the results from our consultation will be developed by our CTO. This platform will be developed in house as we already have people with software engineering background, and this platform will be used to provide customers with crop analytics and store their data. Furthermore, for Year 1 and Year 2, AgriSense will be operated by five founders (CEO, CFO, CTO, CMO, and COO) with a salary starting at $50k. Since we will work remotely in the beginning, the miscellaneous expenses on travel and office supplies are low. Although our facilities are located in Philadelphia, they will be a temporary place to store our drones and supplies only. Finally, an estimated Licensing enrollment fee is $5,000 in Year 1, administration fee is $1,000 in Year 2.

Year 3

In Year 3, AgriSense will begin to pump out its offering. We will purchase six more drones to complete our fleet. This allows us to expand our customer base and oversee bigger acres of farms as well. A sales rep will join in Year 3 to help market testing, design advertising campaigns,

and support post-sales services. In doing so, we expect to acquire one customer every week– leading to 104 'visits' or services in the year. As we reach more customers, we will offer various pricing packages, while expecting the majority of our customers to opt for the 'One-Time' option, which is $6 per acre or the 'Yearly' option which is $5 an acre and customers get a bundle of 6 visits they must use within the year[xxxix]. We will provide our customers various options to choose from according to their needs and crops. From there, we know the average size of a farm with income in the $100,000-$999,999 range (roughly 1000 acres) and can predict an average 'Price per Service' of $6,000, leading to a net revenue of $1.4M by the 5th year. Unfortunately, with the start of service, we will also need to begin paying the University about 10% of our yearly gross revenue– their standard licensing policy[xl].

Years 4 and 5

Finally, in Years 4 and 5, we will continue to drive up sales, intending to grow our sales by 50% annually– leading to 240 services by the end of Year 5. This would be the ideal outcome of intensive sales and marketing strategies and investments made from Year 3. In Year 4, we will hire a data engineer to expand our back-end platform and develop machine-learning algorithms to extract even more insights from the crop data we collect, thus offering better service. This would provide more specific and accurate resolutions, a wider range of crop data, and a variety of insights on their farm to the farmers. In Year 5, sales & marketing expenses will increase to $15,000 because of regular farm visits and increased customer services. As we gain more customers, our operating expenses on customer services also increase since we make more frequent visits, invest more resources in analyzing their crops, and use more drones. At this point, we will also lease an office space at Penn Innovation, which will increase our general expenses to $30,000. Although we spend more on operating expenses, the large number of customers we have gained by Year 5 will make AgriSense profitable in Year 5.

	Begin	Year 1	Year 2	Year 3	Year 4	Year 5
Cash (E.o.Y)	$900,000	$582,000	$252,125	$58,884	$50,596	$409,408
Net Income	$0	($309,200)	($323,275)	($106,441)	$29,713	$411,212
Net Revenue	$0	$0	$0	$624,000	$960,000	$1,440,000
Gross Margin	--	--	--	60.6%	72.8%	81.2%

8.2 AgriSense's Sales Forecast and Expense Summary

Revenue Forecasts

AgriSense doesn't expect to receive any revenue in the first two years of operation. However, starting in Year 3, with the onset of our Sales and Marketing plan, we expect to acquire one customer every week– leading to 104 'Visits' or services in the year. From there, we intend to grow our sales by 50% annually– leading to 240 services by the end of Year 5.

We offer various pricing packages and we expect the majority of our customers to opt for the 'One-Time' option, which is $6 per acre. From there, we know the average size of a farm with income in the $100,000-$999,999 range (roughly 1000 acres) and can predict an average 'Price per Service' of $6000.

Knowing 'Price per Service' and 'Services Sold' we estimate our net revenue as follows:

Net Revenue		$0	$0	$624,000	$960,000	$1,440,000

Sales and Marketing Expenses

The cost for communications, brochures, and website setup is $1k for the first two years. Led by CMO, all C-level executives will also be the salesperson and build connections with PA farmers and organizations. A Sales Rep will join in Year 3 to help market testing, design advertising campaigns, and support post-sales services. In Year 5, Sales & Marketing expenses will increase to $15k because of regular farm visits and increased customer services.

R&D Expenses

We expect to have little expenses in R&D for the first three years as we are using a proven drone technology that does not need any further development in the initial stages. Moreover, the online platform that our customers will use to view the results from our consultation will be developed by our CTO. Thus, we accounted for a low four figures R&D cost for the next 5 years to account for any back-end cloud services we may need to employ. In Year 4, we will hire a Data Engineer to expand our back-end platform and develop machine-learning algorithms to extract even more insights from the crop data we collect, thus offering better service.

General and Administrative Expenses

For Year 1 and Year 2, AgriSense will be operated by five founders (CEO, CFO, CTO, CMO, and COO) with a salary starting at $50k. Since we will work remotely in the beginning, the miscellaneous expenses on travel and office supplies are low. We will conduct talent hiring in Year 3 and Year 4 includes one Sales Rep with a salary of $40k plus commissions, two Drone Pilots with a salary of $55k, one Data Analyst with a salary of $90k, and one Data Engineer with a salary of $90k. The initial team of 10 members will enjoy the same benefits such as medicare insurance and work laptops.

Additionally, AgriSense plans to spend thousands of dollars on Legal Services to assist in negotiations with Penn Engineering and other partners. We will lease an office space at Penn Innovation and the general expenses will increase to $30k in Year 5. Furthermore, an estimated Licensing enrollment fee is $5k in Year 1, administration fee is $1k in Year 2, and about 10% of our yearly gross revenue will be spent on Licensing.

Property, Plant, and Equipment

Our main expense in this category will be the drones we use. With a cost of around $5k per drone as per our primary research, we will stagger the purchases of drones throughout the five years to keep our spending in check. We will buy four drones in the first two years to allow for testing of our technology and service, and then a further six in Year 3 to prepare for market launch. We depreciate our drones at a rate of 5 years as drone technology constantly evolves. We also provision money in the 5th year to account for repairs to damage to the drones. We will spend nothing on R&D facilities and use our existing office equipment in the first two years, spending more on equipment in the last 3 years for our staff as we hire them.

Summary of 5 Year Income Statement (Year 1 Leftmost Column - Year 5 Rightmost Column)[xli]

NET REVENUES	0	0	624,000	960,000	1,440,000
COST OF GOODS SOLD	2,000	4,000	245,560	261,600	271,216
TOTAL OPERATING EXPENSES	292,200	308,275	398,881	547,288	587,572
EXTRAORDINARY INCOME (EXPENSE)	(15,000)	(11,000)	(86,000)	(121,400)	(170,000)
NET EARNINGS (LOSS)	(309,200)	(323,275)	(106,441)	29,713	411,212

8.3 AgriSense's plan for funding

Financial Plan

AgriSense will require a total of $900K investment before the end of next year[xlii]. AgriSense prefers a one-time investment (Round A) to ensure early R&D expenses and launch Milestone 5 of Marketing Testing in late 2024.

Valuation of Business

For Corteva, the trailing PE ratio is 33.98 and the forward PE ratio is 21.28 as of November 2022 (Stock Analysis, 2022). A P/E of 30 is high and Corteva is possibly overvalued, but it is normal for a fastest-growing company in its early stages. Once a company becomes more mature, it will grow more slowly and the P/E tends to decline. When P/E is below 20, it may create good investment opportunities. If AgriSense chooses to go public in the future, we may experience similar growth patterns.

In our five-year projection, AgriSense will start to gain profits in 2024. With an expected sales growth of 50% YOY, we will achieve net profitability by 2025 and reach $1MM in revenue in the mid of 2026. Other than total projected revenues of $3MM by 2026, we have a continuous investment in fixed assets (mainly drones) of 65k, an exclusive license cooperating with Penn Engineering worth at least $225k (median price paid for issued U.S. patents), plus priceless talents team. Overall, we estimated that our company value is around $3.4MM.

Offer

AgriSense has a Pre-money valuation of $3.4MM, with an investment of $900k in exchange for 20% (or less) of equity, the Post-money valuation will become $4.30MM. AgriSense seeks bootstrap financing and VC investment in early development and is not likely to take loans from banks. AgriSense is open to negotiation depending on the money and non-money benefits (such as valuable support, guidance, and resources) offered by investors.

8.4 *AgriSense offers acquisitions as an exit option to investors*

AgriSense plans to look towards acquisition as an exit option. A variety of factors have driven significant investment pouring into the AgTech sector, including but not limited to shifting consumer habits and needs, COVID and climate change factors. CrunchBase data showed nearly 5 billion dollars over 440 funding deals to VC-backed startups in 2021, which far outstripped the $3.3 billion invested in 422 deals in 2020. This is still trending since Crunchbase figures showed more than $1 billion has come into the sector In January 2022 (Metinko, 2022)[xliii].

Since 2020 three notable acquisitions that have occurred are the acquisition of Prospera by Valmont Ind. for $300MM, Bear Flag Robotics was acquired by John Deere for $250MM and the acquisition of CropMetrics by CropX for an undisclosed amount. We plan to target these companies as well as similar companies to acquire us after 5 years or once we gain an invaluable portfolio of customers.

We will focus on the strategic value of the company to the acquirer, and how our product offering can strengthen the acquirer's competitive advantage. We will also seek to partner with them to create a mutually beneficial relationship. This could include collaborations on product development, customer service, marketing, and other areas.

We will also look to get acquired by venture capital firms if we are unable to find a suitable strategic partner. We will target venture capital firms that specialize in AgTech investments and that are well-versed in the industry. We will also look to leverage our customer base and product offering to attract investors.

Finally, we will look to get acquired by public companies that are interested in our products and services. We will target public companies that have a strong focus on AgTech and that are looking to expand their customer base and product offering. We will focus on providing a mutually beneficial relationship with these companies, in order to make our acquisition a success.

Overall, we plan to look towards acquisition as an exit option in order to maximize our return on investment for our shareholders

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9. Conclusion and Ask

AgriSense is an affordable and reachable crop monitoring consulting services provider driven by data. We do this through an at-your-door service that utilizes drones to track crop status, monitor pests and crop stress, and provide yield recommendations to small to

medium-sized Pennsylvanian farmers growing apples, citrus, strawberries, tomatoes, peaches, or pecans.

The five founders of AgriSense are engineers from the University of Pennsylvania who are Janavi Chadha (CEO), Nick Anderson (CFO), Fiona Su (COO), Henrique Lorente (CTO), and Irene Jeong (CMO). Our advisors include technology inventor Professor Vijay Kumar, agricultural expert Professor Zhengxia Dou, and entrepreneur consultant Professor Jeffrey Babin. Our talented team also includes a sales rep, a data engineer, and two drone pilots.

AgriSense promises a satisfying customer journey with customer inquiry responses in two weeks, followed by our free consultation and a standard test flight. Our in-house tech support team provides timely responses including online payments, services schedules, and tech Q&A. We will offer two pricing packages: the "One-Time" option, which is $6 per acre, or the 'Yearly' option which is $5 an acre and customers get a bundle of 6 visits within a year. AgriSense will invest in both direct marketing and digital marketing, and customers are encouraged to gain referral benefits.

In our five-year development plan, AgriSense will pass four milestones by 2023 including concept testing, prototyping, initial financing, and plan tests. After the market testing in mid-2024, AgriSense will build long-term partnerships with drone manufacturers AgEagle, research facility Penn Engineering (including an exclusive license of using technology), and more industry leaders. AgriSense is expected to have a sales growth of 50% YOY and expand quickly in 2025, leading to 104 visits or services by 2026. With a total of $900K investment required before the end of 2024, AgriSense is projected to achieve net profitability by 2025 and reach $1MM in revenue in mid-2026.

In addition, AgriSense will continuously work on building connections with farmers and industry associations, upgrading products and services, and enhancing marketing channels. Thus, we also welcome all valuable guidance for our business growth.

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10. Appendices

10.1 Income Statement, Balance Sheet, Cash Flow Statement

Income Statement						
	Year 1	Year 2	Year 3	Year 4	Year 5	Industry
NET REVENUES	0	0	624,000	960,000	1,440,000	
COST OF GOODS SOLD	2,000	4,000	245,560	261,600	271,216	
% of Revenues	N/A	N/A	39.4%	27.3%	18.8%	60.0%

GROSS PROFIT	(2,000)	(4,000)	378,440	698,400	1,168,784	
% of Revenues	N/A	N/A	60.6%	72.8%	81.2%	40.0%
OPERATING EXPENSES						
Sales & Marketing	1,000	1,000	51,800	60,400	67,920	
Research & Development	2,000	2,000	2,000	111,000	117,400	
General and Administration	289,000	304,875	343,481	372,288	394,652	
Depreciation of Operating Assets	200	400	1,600	3,600	7,600	
Total Operating Expenses	292,200	308,275	398,881	547,288	587,572	
% of Revenues	N/A	N/A	64%	57%	41%	30.0%
EARNINGS FROM OPERATIONS	(294,200)	(312,275)	(20,441)	151,113	581,212	
EXTRAORDINARY INCOME (EXPENSE)	(15,000)	(11,000)	(86,000)	(121,400)	(170,000)	
EARNINGS BEFORE INTEREST & TAXES	(309,200)	(323,275)	(106,441)	29,713	411,212	
INTEREST INCOME (EXPENSE)	0	0	0	0	0	
NET EARNINGS BEFORE TAXES	(309,200)	(323,275)	(106,441)	29,713	411,212	
TAXES	0	0	0	0	0	
NET EARNINGS (LOSS)	(309,200)	(323,275)	(106,441)	29,713	411,212	
% of Revenues	N/A	N/A	-17.1%	3.1%	28.6%	8.3%

Balance Sheet						
	Begin	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
ASSETS						
CURRENT ASSETS						
Cash	900,000	582,000	252,125	58,884	50,596	409,408
Accounts Receivable		0	0	62,400	96,000	144,000
Inventories		100	200	12,278	13,080	13,561
Other Current Assets		0	0	6,240	9,600	14,400
Total Current Assets	900,000	582,100	252,325	139,802	169,276	581,369
NET FIXED ASSETS		8,800	15,400	39,800	44,200	48,600

TOTAL ASSETS	900,000	590,900	267,725	179,602	213,476	629,969
LIABILITIES & SHAREHOLDERS' EQUITY						
CURRENT LIABILITIES						
Short Term Debt	0	0	0	0	0	0
Accounts Payable & Accrued Expenses		100	200	12,278	13,080	13,561
Other Current Liab		0	0	6,240	9,600	14,400
Current Portion of Long Term Debt	0	0	0	0	0	0
Total Current Liabilities	0	100	200	18,518	22,680	27,961
LONG TERM DEBT (less current portion)	0	0	0	0	0	0
STOCKHOLDERS' EQUITY						
Non-Shareholder Contributions to Capital	0	0	0	0	0	0
CommonStock	900,000	900,000	900,000	900,000	900,000	900,000
Preferred Stock	0	0	0	0	0	0
Retained Earnings		(309,200)	(632,475)	(738,916)	(709,204)	(297,992)
Total Equity	900,000	590,800	267,525	161,084	190,796	602,008
TOTAL LIABILITIES & EQUITY	900,000	590,900	267,725	179,602	213,476	629,969

Cash Flow Statement						
	Begin	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
OPERATING ACTIVITIES						
Net Earnings		(309,200)	(323,275)	(106,441)	29,713	411,212
Depreciation		2,200	4,400	11,600	15,600	20,600
Working Capital Changes						
(Increase)/Decrease Accounts Receivable		0	0	(62,400)	(33,600)	(48,000)
(Increase)/Decrease Inventories		(100)	(100)	(12,078)	(802)	(481)
(Increase)/Decrease Other Current Assets		0	0	(6,240)	(3,360)	(4,800)
Increase/(Decrease) Accts Pay & Accrd Expenses		100	100	12,078	802	481
Increase/(Decrease) Other Current Liab		0	0	6,240	3,360	4,800

Net Cash Provided by Operating Activities		(307,000)	(318,875)	(157,241)	11,713	383,812
INVESTING ACTIVITIES						
Plant & Equipment		(11,000)	(11,000)	(36,000)	(20,000)	(25,000)
Other						
Net Cash Used in Investing Activities		(11,000)	(11,000)	(36,000)	(20,000)	(25,000)
FINANCING ACTIVITIES						
Increase/(Decrease) Short Term Debt		0	0	0	0	0
Increase/(Decrease) Current Long Term Debt		0	0	0	0	0
Increase/(Decrease) Non-Current Long Term Debt		0	0	0	0	0
Increase/(Decrease) Non-Shareholder Contributions to Capital		0	0	0	0	0
Increase/(Decrease) Common Stock		0	0	0	0	0
Increase/(Decrease) Preferred Stock		0	0	0	0	0
Dividends Declared		0	0	0	0	0
Net Cash Provided / (Used) by Financing		0	0	0	0	0
INCREASE/(DECREASE) IN CASH		(318,000)	(329,875)	(193,241)	(8,288)	358,812
CASH AT BEGINNING OF YEAR		900,000	582,000	252,125	58,884	50,596
CASH AT END OF YEAR	900,000	582,000	252,125	58,884	50,596	409,408

10.2 Financial Statement Notes and Assumptions

See attached workbook

10.3 Resumes

Attached at end of document

10.4 AgriSense's results from speaking with customers

In order to reach out to our potential customers, we mainly conducted two types of survey methods. One was in-person visits, including visiting farmers' markets, which was considered the most efficient way to reach out to farmers. We spoke to farmers in the early stage of our venture, and gained first-hand insights from local farmers that most of them are traditionalists who still rely on years of experience to monitor crops, so we saw a big potential market for our drone technology to enter in. We also noticed that farmers are sensitive to pricing including the learning cost of technology, which guided our service build-up and pricing strategy. In terms of this, we

decided to be a service provider, not a hardware or software seller, and offer affordable packages to accommodate different needs.

Another one was cold emails and calls including online surveys. Each founder reached out to at least six farmers in PA surrounding area even though only a few of them responded. We found that farmers are more inclined to talk face-to-face, instead of checking emails or picking up calls. The survey we designed only took participants 5 mins or less complete, because we understood that most people have short attention spans and people are too busy to spend more than a few minutes filling out a survey. The online survey allows participants to fill in anytime, anywhere, and can fill out some of it, set it aside, and then come back to it later. The questions we asked include farm size, corp type, disease/pest history, annual crop loss and current prevention methods, opinion on consultant forecasting services and budget, and opinion on drone technology applications. From our results, no matter the size of their farms, most of them had crop loss issues, but they seldom ask consultants for help because it's too expensive and time-consuming. They also rarely used drones - only one of them equipped with drones and operated drones by himself, although almost everyone heard drones from expo, it's still too new to them and they haven't gotten a good chance to better understand the products in the market.

Additionally, we also reached out to industry people or alumni to set up interviews. Ayden Marrullier, the sales manager of AgEagle, which is a big drone and sensor manufacturer specializing in industry use including agriculture, accepted our invitation. He introduced the vision and products of his company and affirmed the prospect of drones in AgriTech. He also agreed with the difficulty of reaching out to farmers and thought our value proposition would become a bridge to connect customers and drone technology. Furthermore, after introducing our venture and showing our slides, alumni gave valuable recommendations. For example, Narendra Kumar Vadapalli is a software developer engineer and he pointed out the importance of building online marketing channels including website design, and talent requirement for the engineering team build-up.

Below is the template of our survey:

AgriSense -- Survey

Hi! We are a student group at the University of Pennsylvania looking to develop a venture in the automated crop-monitoring space.

Though our engineering skills are advanced, we lack the field experience needed to develop a comprehensive product. So, we need your help!

Please fill out this quick (< 5 mins) survey related to your personal farm to help us on our journey to eliminate crop loss!

Thank you so much for taking the time-- you're experience and input are invaluable.

xsu@seas.upenn.edu (not shared) Switch account

* Required

What size farm do you operate? (Total Acreage) *

Your answer

What do you grow? And is it seasonal?

Your answer

Do your crops ever suffer from disease and/or pests? *

Your answer

How much crop yield do you lose annually? (% estimate) *

If for reasons other than disease/pest, please include.

Your answer

How do you currently prevent this loss? Do you use any products or services? *

Your answer

Would you hire a consultant to inform you of potential diseases/pests ahead of time? Are you aware of any? *

Your answer

Assuming this consultant could remedy 90% of your crop loss, how much do you think this kind of service would be worth? ($ estimate for one visit) *

Your answer

How do you currently prevent this loss? Do you use any products or services? *

Your answer

[Random] If that consultant was a fleet of drones, would that change anything for you?

Your answer

When speaking with farmers in person at farmer markets we found that we were more successful in gathering information with an informal conversation rather than asking them direct survey questions.

We targeted our conversations to answer the following points :

1. What methods do you currently use to monitor your crops?
2. How effective are these methods at keeping pests and diseases away?
3. What challenges have you experienced with current methods?
4. How do you think AgriSense can help you better monitor your crops and keep pests and diseases away?
5. Are there any features you would like to see in AgriSense?

Speaking directly with farmers allowed us to gain valuable insights into their needs and preferences. This information was then used to inform the development of our product and ensure that it meets the requirements of the agricultural sector.

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