FarmWise: Smart Agriculture Investment Case

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May 2025

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1 Introduction

FarmWise is an innovative smart agriculture platform designed to enhance productivity and sustainability for Tunisian farmers. By integrating IoT sensors, edge computing, and AI-driven analytics, FarmWise provides real-time insights to optimize farming practices.

2 Motivation

Tunisia's agriculture sector is vital, contributing approximately 9.47% to the country's GDP in 2023 [1]. However, challenges such as low crop yields, water scarcity, and climate change impacts necessitate the adoption of smart farming solutions to ensure food security and economic growth.

3 Challenges and Solutions

3.1 Challenges

- **Low Crop Yields**: Average yields are under 2 tonnes per hectare, significantly lower than the average for lower-middle-income countries [2].

- **Water Scarcity**: Agriculture consumes about 80% of Tunisia's natural water resources, highlighting the need for efficient water management [3].

- **Climate Change**: Increasing droughts and soil degradation affect agricultural productivity [4].

- **Limited Access to Technology**: High initial costs and limited digital literacy hinder technology adoption among farmers [5].

3.2 FarmWise Solutions

- **Precision Agriculture**: Deployment of IoT sensors and AI models to monitor and optimize crop growth.

- **Efficient Water Management**: Real-time soil moisture monitoring and predictive irrigation scheduling.

- **Climate Resilience**: Data-driven insights to adapt farming practices to changing climate conditions.

- **Accessible Technology**: Affordable, offline-capable solutions with user-friendly interfaces and training programs.

4 Per-Hectare Investment Analysis

4.1 Cost Breakdown

Table 1: Estimated Cost per Hectare

Component	Unit Cost (TND)	Quantity
LoRaWAN Gateway (shared)	1,200	0.2
Soil Moisture Sensors	45	4
Temperature & Humidity Sensors	30	2
Edge Computing Device	300	1
Solar Panel & Battery System	210	1
Installation & Miscellaneous	150	–
Total Estimated Cost	**1,800 TND**	

4.2 Expected Returns

Assuming an increase in yield from 2 to 3 tonnes per hectare and a market price of 1,000 TND per tonne:

- **Additional Revenue**: 1 tonne x 1,000 TND = 1,000 TND

- **Net Profit (Year 1)**: 1,000 TND - 1,800 TND = -800 TND

- **Net Profit (Year 2 onwards)**: 1,000 TND (assuming no additional investment)

5 Scaling to 20 Hectares

5.1 Total Investment

- **Per Hectare Cost**: 1,800 TND

- **Total for 20 Hectares**: 1,800 TND x 20 = 36,000 TND

5.2 Expected Returns

- **Additional Revenue per Hectare**: 1,000 TND

- **Total Additional Revenue**: 1,000 TND x 20 = 20,000 TND

- **Net Profit (Year 1)**: 20,000 TND - 36,000 TND = -16,000 TND

- **Net Profit (Year 2 onwards)**: 20,000 TND annually

6 Sustainable Profit Model

- **Subscription Services**: Monthly fees for data analytics and support.

- **Training Programs**: Paid workshops and certifications for farmers.

- **Partnerships**: Collaborations with cooperatives and NGOs for bulk deployments.

7 Potential Assistance

- **Banks**: Access to agricultural loans for equipment purchase.

- **Government Programs**: Subsidies and grants for smart farming initiatives.

- **NGOs**: Support for training and deployment in rural areas.

8 Project Timeline

8.1 Next 6 Months

- Finalize hardware and software integration.

- Conduct pilot tests on 5 hectares.

- Gather data and refine AI models.

8.2 6 Months to 1 Year

- Expand deployment to 20 hectares.

- Launch subscription services.

- Establish partnerships with local cooperatives.

8.3 1 to 3 Years

- Scale to 100 hectares.

- Introduce advanced features (e.g., pest detection).

- Explore international markets.

9 Conclusion

FarmWise presents a viable solution to enhance agricultural productivity in Tunisia. With a manageable initial investment and a clear path to profitability, it offers an attractive opportunity for investors interested in sustainable agriculture and technology.

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