



HydroGel AgriTech

High-Level Feasibility Study

Submitted to:

The Ministry of Digital Economy and Entrepreneurship

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Founders and investors considering this project are advised to conduct further analysis on projected adoption rates, development costs, and ongoing operational expenses. This additional scrutiny will help mitigate potential risks related to technology challenges, changes in regulations, market penetration, and competitive pressures.

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A National Entrepreneurship Policy Project



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Executive Summary

HydroGel Agritech Jordan is a startup dedicated to enhancing agricultural practices in Jordan through the development and application of alginate-based hydrogel beads for soil amendment. These beads are designed to enhance soil health, improve water efficiency, and provide timed nutrient release, addressing the critical issues of water scarcity and soil degradation in Jordan. By offering a sustainable method to increase agricultural productivity and water conservation, HydroGel Agritech aligns with the nation's Economic Modernization Vision, which emphasizes sustainable development and environmental stewardship. These unique hydrogel beads are made from eco-friendly alginate material that retains water and release nutrients gradually, reducing the need for frequent irrigation and fertilization. This technology is highly scalable and can be adaptable for various types of crops and farming scales, making it suitable for small gardens as well as large agricultural operations. Revenue will be generated through the sale of hydrogel beads, consultation services for customized soil health solutions, and water management services.

HydroGel Agritech targets farmers, agricultural cooperatives, urban gardeners, and horticulturalists in Jordan and other arid and semi-arid regions globally. The startup will differentiate itself through innovative soil amendment products that offer superior water retention and nutrient management capabilities compared to existing solutions. By fostering cross-sector partnerships and leveraging advanced materials, HydroGel Agritech is poised to make a positive impact on agricultural sustainability in Jordan and beyond.

I. Introduction

HydroGel Agritech Jordan is dedicated to addressing the pressing agricultural challenges in Jordan, primarily water scarcity and soil degradation. The startup introduces alginate-based hydrogel beads as a soil amendment solution designed to improve soil health, enhance water retention, and provide controlled nutrient release. These hydrogel beads are a game-changer for Jordanian agriculture, offering a sustainable way to boost crop yields and conserve water resources.

The core product, alginate-based hydrogel beads, leverages cutting-edge material science to provide a unique combination of water retention and nutrient management. These beads absorb and store water, releasing it slowly as plants need it, thus significantly reducing the need for frequent irrigation. Additionally, they encapsulate nutrients, gradually releasing them into the soil, which helps in maintaining a consistent nutrient supply to crops over time.

HydroGel Agritech Jordan's solution is scalable and adaptable, making it suitable for a wide range of agricultural settings from small urban gardens to large commercial farms. The startup aims to revolutionize agricultural practices by promoting the use of advanced materials that are both eco-friendly and highly effective in addressing Jordan's specific agricultural challenges. The key objective of the startup is improving water efficiency, enhancing soil health while increasing crop yields, and promoting sustainable agriculture.

2. Market Analysis

Jordan's economy is showing signs of recovery, with the World Bank forecasting a GDP growth rate of 2.3% for 2024. Agriculture continues to be a crucial sector, contributing approximately 4% to the GDP and playing a key role in food security. However, it faces significant challenges, including water scarcity and soil degradation, which impact productivity. The agricultural sector accounts for about 50% of Jordan's water consumption. The 2017 census reported around 107,000 farm holdings in Jordan, with 37,000 dedicated to commercial purposes. Notably, 64% of the total irrigated area relies on groundwater, intensifying the country's water issues¹.

The government's Economic Modernization Vision emphasizes sustainable agricultural practices and efficient water management, fostering an environment conducive to innovations like HydroGel's alginate-based hydrogel beads. These beads are poised to enhance agricultural productivity, conserve water, and improve soil health, supporting Jordan's national sustainability goals.

The target audience for HydroGel Agritech Jordan includes farmers, agricultural cooperatives, urban gardeners, and horticulturalists. These groups are actively seeking sustainable and efficient solutions to address water scarcity and soil health challenges. Jordan's agricultural landscape covers approximately 2.6 million hectares, much of which is subject to water stress and poor soil quality. Aiming to penetrate 10% of this market equates to about 260,000 hectares, indicating substantial potential for HydroGel's technology. The alginate-based hydrogel beads are priced between JOD 800 and JOD 1,000 per ton, offering a cost-effective and scalable solution for water-efficient and sustainable agriculture.

The competitive landscape for HydroGel Agritech includes traditional soil amendments like compost and manure, which improve soil fertility but lack the advanced water retention and nutrient release features of hydrogel beads. Existing water retention products provide some benefits but do not offer the dual functionality of HydroGel's technology. Moreover, traditional irrigation systems demand significant water resources without directly addressing soil health. HydroGel Agritech Jordan differentiates itself by providing a unique combination of water retention and nutrient management, offering a significant advantage over current solutions and technologies.

The Jordanian agricultural market is diverse, with potential for growth in both urban and rural areas. The country's arid and semi-arid climate poses challenges for traditional farming methods, creating a strong demand for innovative solutions that can improve water and soil management. The total addressable market includes farmers and agricultural organizations

1

https://www.fao.org/fileadmin/templates/ess/ess_test_folder/World_Census_Agriculture/WCA_2020/WCA2020_TMRs/TMR_Jordan_2017_Finalized.pdf

across Jordan, with potential applicability in other regions facing similar environmental challenges^{2 3 4}.

3. Business Model

HydroGel Agritech Jordan offers a business model centered around providing advanced agricultural inputs through the sale of alginate-based hydrogel beads. These hydrogel beads are designed for soil amendment to enhance water retention and nutrient management in agricultural settings. The primary revenue streams include the direct sale of hydrogel beads, customized consulting services for soil health and water management, and collaborative partnerships with agricultural and environmental organizations.

The business model emphasizes scalability and adaptability, making it suitable for various agricultural operations, from small urban gardens to large commercial farms. By focusing on sustainable practices, HydroGel Agritech Jordan not only addresses critical agricultural challenges in Jordan but also aligns with the global trend towards eco-friendly farming solutions. The company plans to generate revenue by offering high-value products and services that meet the growing demand for sustainable and efficient agricultural technologies.

The services and products offered by HydroGel Agritech are:

- **Alginate-Based Hydrogel Beads:** Customizable hydrogel beads designed for soil amendment, available for purchase by farmers, gardeners, and agricultural cooperatives.
- **Consulting Services:** Professional consultation for customized soil health solutions and water management strategies.
- **Partnerships:** Collaborations with agricultural organizations, research institutions, and government agencies to promote the use of advanced soil amendment technologies.

HydroGel Agritech plans to generate revenue through the following streams:

- **Sales of Hydrogel Beads:** Direct sales to customers seeking to improve soil and water management.
- **Consulting Services:** Fees for professional consulting on soil and water management practices.
- **Partnerships and Collaborations:** Revenue from partnerships and collaborative projects with agricultural and environmental organizations.

² The World Bank In Jordan, World Bank.

³ "Water Scarcity in Jordan," FAO, 2023.

⁴ "Jordan Vision 2025," Government of Jordan, 2022

The table below summarizes the revenue projections for HydroGel Agritech for the first five years of operation.

Table 1: Revenue Projection

Description / Year	1	2	3	4	5
Sale of Hydrogel Beads (Tons)	10	25	45	70	100
Sale Hydrogel Beads (JOD per ton)	1,000	1,000	1,000	800	800
Subtotal Hydrogel Beads (JOD)	10,000	25,000	45,000	56,000	80,000
Custom Formulation Services (unit)	5	10	12	15	18
Custom Formulation Services (JOD per unit)	4,000	4,000	4,000	4,000	4,000
Subtotal Custom Formulation Services (JOD)	20,000	40,000	48,000	60,000	72,000
Partnerships and Collaborations (unit)	3	4	7	9	12
Unit Partnerships and Collaborations (JOD per unit)	5,000	5,000	5,000	5,000	5,000
Subtotal Partnerships and Collaborations (JOD)	15,000	20,000	35,000	45,000	60,000
Total Revenues (JOD)	45,000	85,000	128,000	161,000	212,000

HydroGel Agritech Jordan’s revenue is projected to grow significantly over the first five years, reflecting increased market adoption and expanded service offerings. The primary revenue streams are as follows:

1. **Sale of Hydrogel Beads:** The company plans to sell hydrogel beads in quantities starting from 10 tons in Year 1, increasing to 100 tons by Year 5. The price per ton starts at JOD 1,000, with a slight decrease to JOD 800 as prices are expected to drop with the advancement of technology. This stream is expected to generate JOD 10,000 in Year 1, rising to JOD 80,000 by Year 5.
2. **Custom Formulation Services:** HydroGel will provide tailored soil amendment solutions, starting with 5 services in Year 1 and increasing to 18 by Year 5, each priced at JOD 4,000. This stream is expected to generate JOD 20,000 in Year 1, reaching JOD 72,000 by Year 5.
3. **Partnerships and Collaborations:** The company aims to form strategic partnerships, starting with 3 in Year 1 and increasing to 12 by Year 5, each priced at JOD 5,000. This is expected to generate JOD 15,000 in Year 1, growing to JOD 60,000 by Year 5.

Total Projected Revenues: Revenues are projected to grow from JOD 45,000 in Year 1 to JOD 212,000 by Year 5, demonstrating a steady increase driven by expanded sales and service offerings.

Hydrogen Beads make up the majority of the quantity sold (70%) and contribute a significant portion of the total revenue (42%) taking into account the price change per ton. Customer Formulation Services, through constituting only 9% of the total quantity sold, contribute significantly to revenue (33%) because of their consistently high price of 4,000 JOD per unit.

Partnerships and Collaborations have a balanced contribution, representing 21% of the quantity and 26% of the revenue, with a steady price of JOD 5,000 per unit.

Overall, the mix shows a reliance on high-volume Hydrogel Brads with moderate revenue contribution and high-price services and collaborations with substantial revenue contributions, suggesting a potential to optimize the product mix or pricing strategies for enhanced revenue balance.

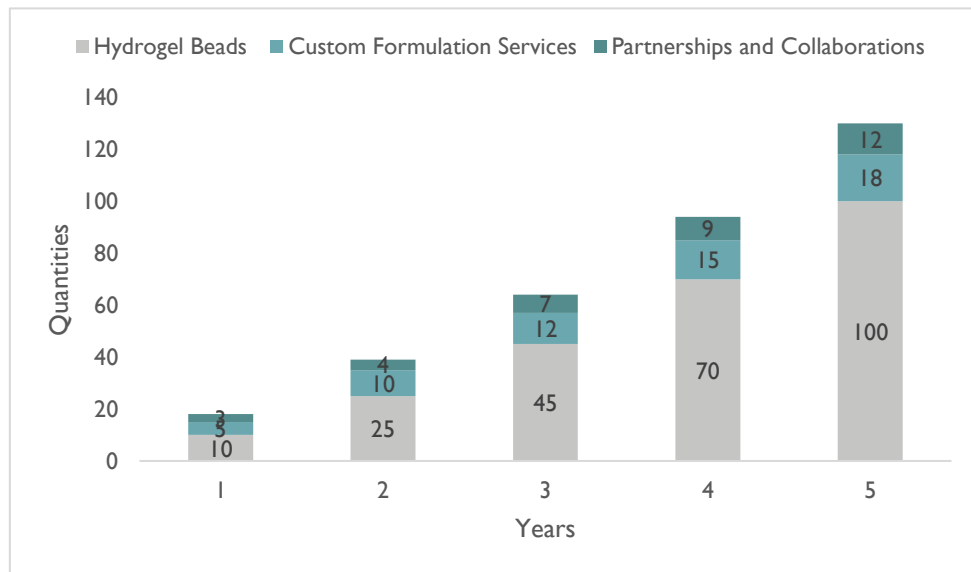


Figure 1: Product Mix by Quantity

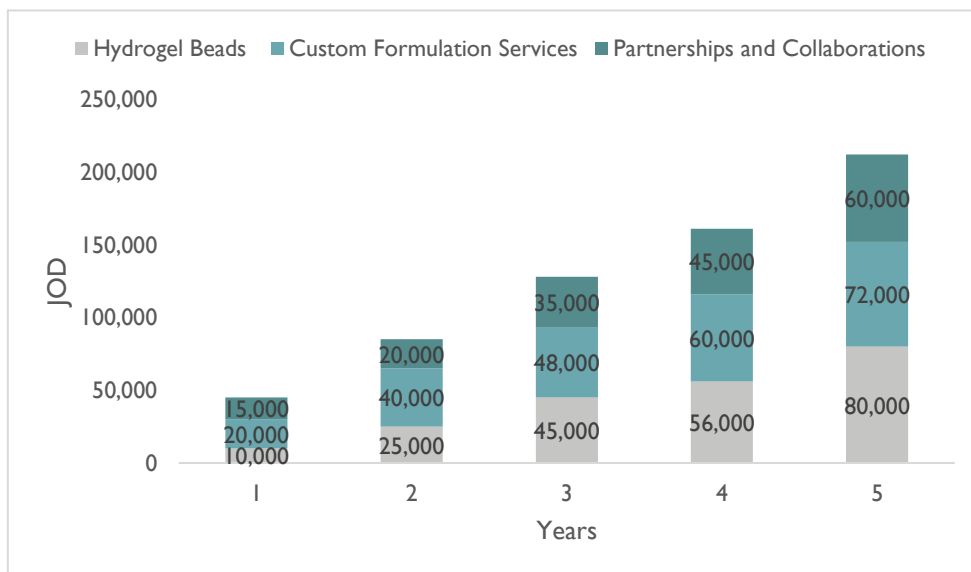


Figure 2: Product Mix by Revenue

4. Technical Analysis

The hydrogel beads are designed for high absorbency, capable of holding substantial amounts of water relative to their weight. Made from alginate, a naturally derived biopolymer, these beads are biodegradable and eco-friendly. The primary material, alginate, is sustainably sourced from marine algae, ensuring that the hydrogel beads are both effective and environmentally responsible.

The hydrogel beads possess excellent water retention capabilities, absorbing and slowly releasing water to plants as needed. This feature is vital for reducing irrigation frequency and conserving water, particularly in arid climates. Additionally, the beads encapsulate nutrients, providing a controlled release over time. This ensures that plants receive a consistent supply of essential nutrients. By improving soil structure and moisture retention, the beads contribute to maintaining healthy soil conditions, which is crucial for sustainable agricultural practices.

The application process of the hydrogel beads begins with soil preparation, where the beads are mixed into the soil to absorb water and nutrients. This step can be integrated into regular soil amendment practices. Once incorporated, the hydrogel beads significantly reduce the need for frequent watering by gradually releasing stored water. As they are biodegradable, the beads do not require removal, making them a convenient and sustainable solution.

The hydrogel beads offer scalability, making the technology suitable for various sizes of agricultural operations, from small gardens to large farms. The use of biodegradable materials aligns with sustainable agricultural practices, reducing environmental impact. Furthermore, by enhancing water and nutrient management, the hydrogel beads improve the overall efficiency of agricultural operations.

The cost of goods sold (COGS) for HyroGel Agritech reflects the expenses related to producing and delivering the hydrogel beads and consulting services:

1. **Hydrogel Beads:** The cost per ton of producing hydrogel beads is JOD 200, with projected demand rising from 10 tons in Year 1 to 100 tons in Year 5. This results in COGS increasing from JOD 2,000 in Year 1 to JOD 20,000 in Year 5.
2. **Custom Formulation Services:** The cost per service is JOD 1,000, with projected demand increasing from 5 services in Year 1 to 18 services in Year 5. COGS for this stream rises from JOD 5,000 in Year 1 to JOD 18,000 in Year 5.
3. **Partnerships and Collaborations:** The cost per partnership is JOD 1,500, with demand growing from 3 partnerships in Year 1 to 12 in Year 5. This results in COGS increasing from JOD 4,500 in Year 1 to JOD 18,000 in Year 5.

Total COGS: The total COGS is projected to increase from JOD 11,500 in Year 1 to JOD 56,000 by Year 5, reflecting the cost growth associated with higher production and service levels as shown in the table below.

Table 2: Cost of Goods Sold – Five Year Projection

Description / Year	1	2	3	4	5
Sale of Hydrogel Beads (Tons)	10	25	45	70	100
Sale Hydrogel Beads (JOD per ton)	200	200	200	200	200
Subtotal Hydrogel Beads (JOD)	2,000	5,000	9,000	14,000	20,000
Custom Formulation Services (unit)	5	10	12	15	18
Custom Formulation Services (JOD per unit)	1,000	1,000	1,000	1,000	1,000
Subtotal Custom Formulation Services (JOD)	5,000	10,000	12,000	15,000	18,000
Partnerships and Collaborations (unit)	3	4	7	9	12
Unit Partnerships and Collaborations (JOD per unit)	1,500	1,500	1,500	1,500	1,500
Subtotal Partnerships and Collaborations (JOD)	4,500	6,000	10,500	13,500	18,000
Total COGS (JOD)	11,500	21,000	31,500	42,500	56,000

Human resource costs cover key roles including the Founder/CEO, Sustainable Construction Engineer, Horticulturist, and a Business Operations Manager. The team is expected to grow from three members in Year 1 to six members by Year 5 as shown in the table below.

Table 3: Manpower recruitment plan – five-year projection

Title / Year	1	2	3	4	5
Founder/CEO	1	1	1	1	1
Agricultural Scientist	1	1	1	1	2
Chemical Engineer	1	1	1	1	2
Sales & Marketing Specialist	0	0	1	1	1

HydroGel Agritech Jordan plans to build a multidisciplinary team to drive the development and growth of its innovative agricultural technology. The human resource costs cover key positions that are crucial to the startup’s success. These costs are projected to grow steadily over the first five years as the team expands to meet increasing operational demands.

Table 4: Manpower total cost- five-year projection

Title / Year	1	2	3	4	5
Founder/CEO	11,200	11,760	12,348	12,965	13,614
Agricultural Scientist	7,000	7,350	7,718	8,103	17,017
Chemical Engineer	7,000	7,350	7,718	8,103	17,017
Sales & Marketing Specialist	-	-	7,718	8,103	8,509
Total HR Salaries	25,200	26,460	35,501	37,276	56,156
Social Security Cost	3,591	3,771	5,059	5,312	8,002
Health Insurance Cost	900	900	1,200	1,200	1,800
Total HR Cost	29,691	31,131	41,759	43,787	65,959

HydroGel Agritech Jordan projects its annual operating expenses (OpEx) to cover essential costs for maintaining business operations and supporting growth. In Year 1, the total OpEx is estimated at JOD 40,052, including costs for electricity, water, rent, fuel, maintenance, telecommunications, advertising, and legal and accounting fees. These expenses increase to JOD 94,467 by Year 5, reflecting expanded operations, increased marketing efforts, and additional R&D investments. Major expenditures include rent and advertising, with advertising costs rising significantly from JOD 2,000 in Year 1 to JOD 15,000 annually by Year 4 to enhance market presence and drive customer acquisition. The consistent rise in OpEx aligns with the scaling of operations and strategic initiatives to support the company's growth and market expansion. The table below includes the data for manpower costs.

Table 5: Operational Expenditures – five-year projection

Description / Year	1	2	3	4	5
Electricity	300	300	300	300	300
Water	30	30	30	30	30
Rent	2,500	2,000	2,000	1,500	1,500
Fuel	30	30	30	30	30
Maintenance	100	100	100	100	100
Telecommunication	100	100	100	100	100
Website Charges	10	10	10	10	10
Advertising	2,000	7,000	12,000	15,000	15,000
Cleaning Material & Consumables	50	50	50	50	50
Research & Development	1,000	1,000	1,000	2,000	2,000
Legal & Accounting Fees	600	600	600	800	800
Subtotal OpEx (JOD)	36,411	42,351	57,979	63,707	85,879
Other Costs	3,641	4,235	5,798	6,371	8,588
Total OpEx (JOD)	40,052	46,586	63,777	70,078	94,467

HydroGel Agritech Jordan plans an initial CapEx of JOD 30,000 in Year 0 to establish its operations, focusing on R&D for hydrogel technology (JOD 10,000), production equipment (JOD 15,000), and facility setup (JOD 5,000). Additional investments are planned to support ongoing innovation and scaling, with JOD 5,000 allocated for further R&D in Year 2 and JOD 10,000 for equipment upgrades in Year 4. These expenditures are crucial for developing, manufacturing, and scaling the hydrogel beads sales, ensuring HydroGel Agritech Jordan is equipped to meet market demand and drive sustainable agricultural advancements.

Table 6: Capital Expenditures Cost – five-year projection

Description / Year	0	1	2	3	4	5
R&D for Hydrogel Technology	10,000			5,000		
Production Equipment	15,000					10,000
Facility Setup	5,000					
Total CapEx (JOD)	30,000			5,000		10,000

5. Financial Analysis

6.1 Financial Study Assumptions

The feasibility study is based on the following key assumptions:

Discount Rate: The study employs a conservative discount rate of 14%, reflecting a cautious approach to valuation.

Financing Structure: The project is entirely financed by equity. This conservative approach avoids the financial leverage and thus underestimates project value, given the lower cost of debt compared to equity.

Terminal Value: The project assumes a zero-terminal value at the end of year five, aligning with the study's conservative outlook.

Cash Flow Projection: Cash flows beyond year five are excluded from the analysis, focusing on the initial project phase.

Tax Rate: The assumed tax rate of 0% complies with Jordan's income tax law.

Depreciation Rate: Capital expenditure (CapEx) is depreciated at an annual rate of 20%. Any deviation from this rate may impact projected profitability but not project feasibility, as depreciation is a non-cash expense.

Working Capital Assumptions

Operational liquidity requirements are guided by the following assumptions:

- **Cash Reserves:** The project will maintain cash equivalent to 30 days of projected annual operational expenses, ensuring robust liquidity management.
- **Accounts Receivable (A/R) Collection Period:** The average collection period for receivables is 45 days, reflecting expected credit sales conversion into cash.
- **Accounts Payable (A/P) Payment Period:** The average payment period for payables is 0 days, indicating the timeframe for settling supplier obligations.
- **Inventory Management:** Inventory levels will be maintained to cover an average of two months of sales quantity, ensuring optimal stock levels to meet demand efficiently.

Capital expenditures expected to be incurred in the first year were included as part of the initial costs of the project.

Provisions were made within the initial cost to cover any potential negative net free cash flow that may arise during the first five years of operation, if needed.

The annual salary structure comprises 14 payments per year instead of the conventional 12 payments.

6.2 Financial Study:

6.2.1 Projected Working Capital

This table shows that the net working capital needed for the project for the first year of operation is JOD 10,879, which has to increase steadily year over year to reach JOD 43,706 in the fifth year of operation. The steady increase in the working capital comes to cover the rapid increase in the project operations and mainly the increase in the projected revenues.

Table 7: Working capital projection (JOD)

Description/Year	1	2	3	4	5
Cash	3,338	3,882	5,315	5,840	7,872
Accounts Receivable (A/R)	5,625	10,625	16,000	20,125	26,500
Inventory	1,917	3,500	5,250	7,083	9,333
Accounts Payable (A/P)	-	-	-	-	-
Net Working Capital	10,879	18,007	26,565	33,048	43,706
Changing in Working Capital		7,128	8,558	6,483	10,657

6.2.2 Project Initial Cost

The project's initial cost is projected to be JOD 27,431, comprising JOD 10,000 as CapEx, JOD 6,552 as provisions for the first-year negative free cash flow and JOD 10,879 as net working capital.

Table 8: Initial Cost Summary (JOD)

Description/Year	JOD
CapEx	10,000
Provisions for the first year(s) negative free cash flow(s)	6,552
Net Working Capital	10,879
Total Initial Cost	27,431

6.2.3 Projected Income Statement

The projected income statement indicates that the project will experience a loss of JOD 8,552 in the first year of operation. However, the project is expected to generate a profit from the second year of operation, reaching JOD 52,533 in the fifth year.

Table 9: Projected Income Statement (JOD)

Description/Year	1	2	3	4	5
Total Revenues	45,000	85,000	128,000	161,000	212,000
COGS	11,500	21,000	31,500	42,500	56,000
Gross Profit	33,500	64,000	96,500	118,500	156,000
OpEx	40,052	46,586	63,777	70,078	94,467
Net Profit Before Tax and Depreciation	-6,552	17,414	32,723	48,422	61,533
Depreciation	2,000	3,000	3,000	3,000	9,000
Net Profit Before Tax	- 8,552	14,414	29,723	45,422	52,533
Tax Expense	-	-	-	-	-
Net Profit	- 8,552	14,414	29,723	45,422	52,533

The project is expected to generate a negative net profit margin in the first year of operation of -19.0%. However, from the second year onwards, the net profit margin will be positive and grow over the course of the study. In the fifth year of operations, the net profit margin is expected to reach 24.8%.

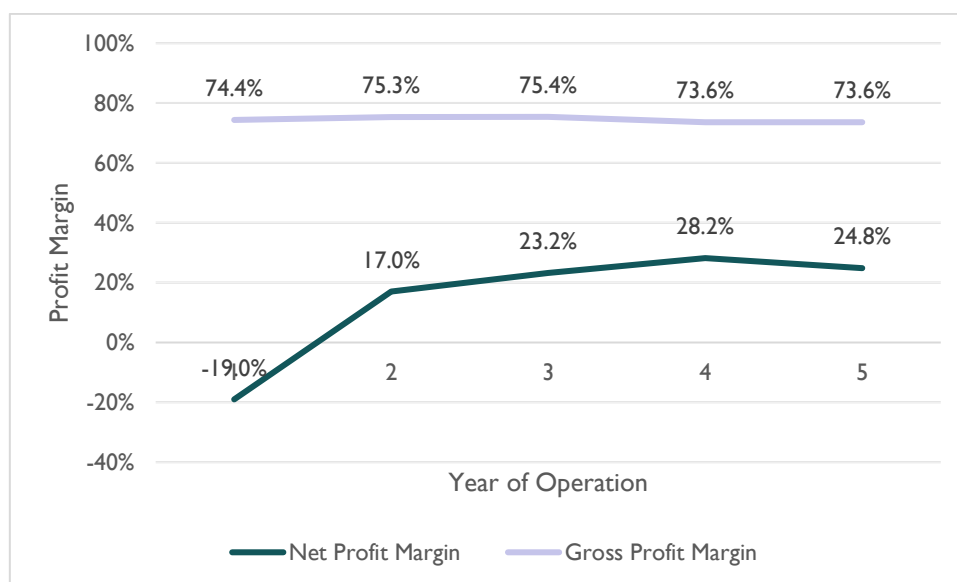


Figure 3: Gross vs Net Profit Margin

On the asset management side, the study shows that the return on investment will increase steadily from -41.0% in the first year of operation to 94.0% in the fifth year.

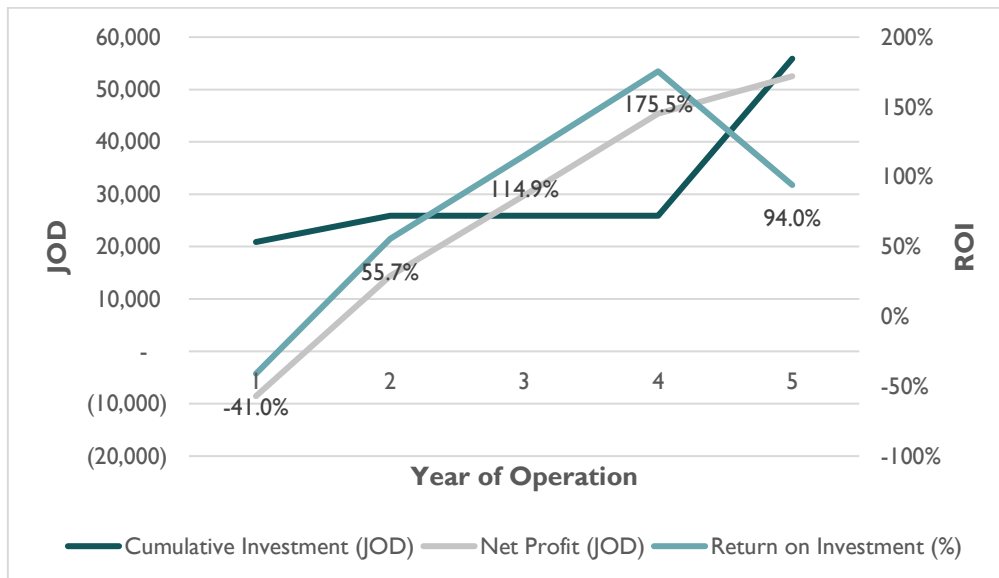


Figure 4: Return on Investment

6.2.4 Projected Free Cash Flow Statement

The table below demonstrates that the project will generate a negative free cash flow from the first year of operation, JOD 6,552. However, due to the projected expansion in business operations, the project is expected to generate a steady positive net free cash flow growth in the following years. By the end of your five, the projected free cash flow will reach JOD 20,876.

Table 10: Free Cash Flow (FCF) Projection (JOD)

Description/Year	0	1	2	3	4	5
Cash-in Flow						
Net Profit		- 8,552	14,414	29,723	45,422	52,533
Depreciation		2,000	3,000	3,000	3,000	9,000
Injected Capital	27,431					
Total Cash-in Flow	27,431	- 6,552	17,414	32,723	48,422	61,533
Cash-out Flow						
Initial Cost	20,879		5,000			30,000
Changes in Working Capital			7,128	8,558	6,483	10,657
Total Cash-out Flow	20,879	-	12,128	8,558	6,483	40,657
Free Cash Flow	6,552	-6,552	5,287	24,165	41,939	20,876

Based on these results, the project's feasibility indicators demonstrate its viability, with a net present value of JOD 22,873.1 and a profitability index of 1.83. Moreover, the project's internal rate of return (IRR) is expected to be 32.20%.

Feasibility Indicators	
Net Present Value (NPV)	22,873
Profitability Index (PI)	1.83
Internal Rate of Return (IRR)	32.2%

6.3 Sensitivity Analysis

To assess the project's sensitivity to market conditions, a sensitivity analysis was conducted involving six unfavorable scenarios:

- Decrease projected revenues by 5% while keeping other variables constant.
- Decrease projected revenues by 10% while keeping other variables constant.
- Increase operational expenditure by 5% while keeping other variables constant.
- Increase operational expenditure by 10% while keeping other variables constant.
- Increase initial costs by 5% while keeping other variables constant.
- Increase initial costs by 10% while keeping other variables constant.

Table 11: Sensitivity analysis outcomes

Sensitivity Scenario	Net Present Value (NPV)	Profitability Index (PI)	Internal Rate of Return (IRR)
Original case	22,873	1.83	32.20%
Drop in revenues by 5%	788	1.03	14.67%
Drop in revenues by 10%	- 33,313	0.24	-12.66%
Increase in OpEx by 5%	10,337	1.35	22.14%
Increase in OpEx by 10%	- 2,199	0.93	12.27%
Increase in initial cost by 5%	14,949	1.42	24.28%
Increase in initial cost by 10%	11,103	1.28	21.19%

The sensitivity analysis shows that the project is feasible but sensitive to unfavorable market conditions. A 10% drop in revenues or a 10% increase in operational expenditures (OpEx) could harm project feasibility indicators. The drop in revenues has a more dramatic impact on the project viability than the increase in the OpEx or initial cost by the same magnitude. It is recommended that investors check and further study the market to ensure that the projected revenues are achievable within the thresholds of the proposed initial cost and operational expenditures.

6. Integration with Other Sectors

HydroGel Agritech Jordan can impact various sectors. In government and policy, it supports water conservation and sustainable agriculture initiatives, aligning with national goals. Environmental management benefits from improved soil health and water efficiency, aiding in conservation efforts. The construction industry can use hydrogel-treated soil in urban green projects, enhancing sustainability. Educational and research institutions can leverage the hydrogel technology for studies on agronomy and sustainability, fostering innovation. In water management, HydroGel's products reduce water use in agriculture, supporting efficient irrigation practices. Finally, integration with the logistics sector ensures efficient distribution, making the technology accessible to a broader market, and aligning with energy sector goals by reducing irrigation-related energy demands.

7. Entrepreneur Persona

The ideal leader for HydroGel Agritech Jordan is a visionary with expertise in material science, agronomy, and sustainable agriculture. This individual should possess strong business acumen, a commitment to environmental sustainability, and the ability to drive innovation. They should excel in cross-sector collaboration, navigating regulatory landscapes, and promoting eco-friendly agricultural solutions. The entrepreneur must also have a passion for improving agricultural practices in arid regions like Jordan, combining scientific knowledge with strategic thinking to scale the business and make a significant impact.

8. Stakeholders

HydroGel Agritech Jordan will engage with a diverse group of stakeholders to ensure the successful adoption and impact of its hydrogel technology. These stakeholders include:

- **Farmers and Agricultural Cooperatives:** Primary users of hydrogel products, benefiting from improved soil health and water efficiency, which enhance crop yields and sustainability.
- **Government Bodies:** Key partners in promoting sustainable agriculture through supportive policies, regulations, and incentives for adopting innovative agricultural technologies.
- **Environmental Organizations:** Allies in advocating for eco-friendly practices and providing insights into environmental impacts, helping to align HydroGel's products with broader sustainability goals.
- **Educational and Research Institutions:** Collaborators in research and development, facilitating studies on the efficacy and benefits of hydrogel technology in various agricultural settings.
- **Construction and Landscaping Companies:** Potential users of hydrogel-treated soil for green infrastructure projects, enhancing urban sustainability and environmental resilience.

- **Logistics and Supply Chain Partners:** Essential for the efficient distribution of hydrogel products to reach a wide range of agricultural users across different regions.
- **Investors and Financial Institutions:** Supporters who provide the capital necessary for scaling operations and expanding market reach, critical for long-term growth and impact.

By working closely with these stakeholders, HydroGel Agritech Jordan can ensure that its innovative solutions are effectively integrated into agricultural practices, contributing to sustainable development and environmental conservation.

9. Risk Assessment and Mitigation

HydroGel Agritech Jordan has identified key risks that could impact its operations and has developed strategies to mitigate these risks effectively.

Risk	Likelihood	Risk Mitigation Technique
Market Adoption Risks	Moderate	Conduct education campaigns and offer trial programs to build familiarity and trust in hydrogel technology.
Product Efficacy Risks	High	Perform extensive testing across various soil types and climates; tailor product formulations to ensure effectiveness.
Supply Chain Risks	Moderate	Establish multiple supplier relationships and maintain inventory buffers to ensure continuity and cost stability.
Fluctuations in Tourist Numbers and Economic Conditions	High	Diversify the customer base by targeting different geographic markets and demographic segments. Develop flexible pricing strategies and expand the offering to include virtual tours to mitigate the impact of decreased physical tourist traffic.

Based on the sensitivity analysis, the project is feasible but sensitive to unfavorable market conditions. To ensure the success and sustainability of the project, several recommendations and mitigation techniques are advised.

Given that a 10% drop in revenues has a more dramatic impact on project viability than a similar increase in operational expenditures (OpEx) or initial costs, it is crucial to conduct

thorough market research. Investors should carefully study the market to verify that the projected revenues are achievable within the established thresholds. This involves analyzing market demand, competitive landscape, pricing strategies, and potential market disruptions.

Diversifying revenue streams can mitigate the risk associated with a potential drop in revenues. By exploring additional markets or expanding product offerings, the project can reduce its dependency on a single revenue source, thereby enhancing financial stability. Implementing a comprehensive revenue monitoring system to track sales performance in real-time will allow for quick identification of revenue shortfalls and timely corrective actions. Additionally, controlling and optimizing operational expenditures is essential. This includes negotiating better terms with suppliers, adopting energy-efficient practices, and regularly reviewing budgets to adjust for market fluctuations.

Engaging with regulatory bodies is another critical step. Proactively collaborating with Jordanian agricultural and environmental authorities to align hydrogel technology with regulatory requirements will facilitate smooth market entry and create opportunities for obtaining government support and subsidies. Expanding awareness and education efforts by launching comprehensive campaigns targeting farmers and agricultural cooperatives will highlight the benefits of hydrogel technology. Demonstrating real-world applications and offering pilot programs can help increase adoption and trust.

Fostering strategic partnerships with agricultural cooperatives, environmental organizations, and research institutions can enhance product development, expand market reach, and provide access to valuable expertise and resources. Continuous investment in research and development to refine hydrogel formulations and adapt them to diverse agricultural conditions will ensure the product remains competitive and effective across different soil types and climates.

Enhancing supply chain resilience by diversifying suppliers and creating inventory buffers will mitigate risks related to material shortages and price fluctuations, ensuring consistent product availability. Lastly, strengthening the market position through innovation should be prioritized. Staying ahead of competitors and continuously improving the technology will highlight the unique benefits of HydroGel's solutions, differentiating the company in a competitive market.

In summary, to mitigate the risks identified in the sensitivity analysis, it is recommended to conduct detailed market studies, diversify revenue streams, control operational expenditures, engage with regulatory bodies, expand awareness and education efforts, foster strategic partnerships, invest in continuous R&D, enhance supply chain resilience, and prioritize innovation. These measures will enhance the project's resilience against unfavorable market conditions and support long-term success.

10. Conclusion

HydroGel Agritech Jordan is positioned to positively influence the agricultural sector in Jordan by addressing the critical issues of water scarcity and soil degradation. The company's innovative alginate-based hydrogel technology provides a sustainable solution that enhances water retention and nutrient management, thereby improving crop yields and promoting

efficient water use. The anticipated growth in revenue and the strategic emphasis on expanding market reach highlight the company's potential for success.

Through targeted educational campaigns, ongoing research and development, and strategic partnerships, HydroGel Agritech Jordan aims to effectively promote the adoption of its technology and integrate it into various agricultural practices. The company's commitment to sustainability, coupled with a thorough understanding of market needs and risks, positions it well to contribute to Jordan's agricultural resilience and environmental sustainability.

By continuing to innovate and adapt to evolving market dynamics, HydroGel Agritech Jordan will not only enhance agricultural productivity but also support broader goals of resource conservation and environmental stewardship, aligning with the national vision for sustainable development.

Nonetheless, entrepreneurs are advised to conduct additional analysis on projected demand, initial costs, and operational expenses to mitigate potential risks associated with technology, market fluctuations, and/or competition that could jeopardize the project's viability.

Disclaimer

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Founders and investors considering this project are advised to conduct further analysis on projected adoption rates, development costs, and ongoing operational expenses. This additional scrutiny will help mitigate potential risks related to technology challenges, changes in regulations, market penetration, and competitive pressures.

The report does not constitute any form of commitment or recommendation on the part of MoDEE or Istadama Consulting.