



Climate-Resilient Seeds

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



Prepared by:



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Executive Summary

This high-level feasibility study explores the strategic, technical, and financial viability of a startup focused on developing climate-resilient seeds. The venture is focused on improving Jordanian agriculture through the development and distribution of seeds designed to withstand drought, salinity, and extreme climate conditions. These seeds aim to enhance crop resilience and productivity, addressing environmental challenges and promoting food security. The startup targets local farmers and international markets with similar ecological issues, aiming to improve agricultural sustainability.

The market analysis highlights the significant role of agriculture in Jordan's economy and the challenges posed by water scarcity and climate change. The climate-resilient seeds to be developed are tailored for farmers, agricultural cooperatives, and global regions with similar environmental conditions, leveraging the increasing demand for sustainable agricultural solutions.

The business model includes revenue from direct seed sales, licensing agreements, and consultancy services, ensuring steady growth. The technical strategy involves using advanced hybridization techniques and sustainable production practices to develop high-quality resilient seeds.

Financial projections indicate that the venture is expected to achieve positive net profits from the first year, with a steady increase in subsequent years. The sensitivity analysis confirms the project's feasibility even under unfavorable market conditions. Integration with government policies, environmental management, and research institutions enhances the startup's impact and sustainability.

To manage risks, the startup plans to engage with regulatory authorities, conduct pilot projects, establish strategic partnerships, and invest in continuous innovation. These measures will support the deployment of climate-resilient seeds, promoting sustainable agriculture and environmental stewardship in Jordan and beyond.

I Introduction

The climate-resilient seed development startup is dedicated to supporting Jordanian agriculture by developing and distributing seeds for crops that are drought-resistant, climate-adapted, and saltwater-tolerant. It aims to ensure crop survival and productivity in harsh environmental conditions, including saline water irrigation scenarios. Tailored seeds help conserve water, combat soil salinity, and adapt to climate change, directly addressing Jordan's environmental challenges and securing food sources. These adapted seeds are versatile for various agricultural scales and climates, offering potential for global applications.

2 Market Analysis

The global seed market, valued at \$63.0 billion in 2020, is projected to grow at a compound annual growth rate (CAGR) of 7.6% from 2021 to 2028. Within this expansive market, the segment for climate-resilient seeds is rapidly growing, driven by the increasing need for sustainable agricultural practices worldwide¹.

Jordan's agricultural sector is vital to its economy, contributing around 5% to the national GDP in 2022. Despite the country's severe water scarcity, 2020 figures indicate that agriculture consumes about 52% of Jordan's total water supply. Climate change and population growth exacerbate these issues because of reduced rainfall and increased temperatures, leading to increased soil salinity and decreased water availability. Reduced rainfall and increased evaporation hinder the natural replenishment of groundwater aquifers, and over-extraction for agricultural and domestic use worsen the situation²³. The government's Vision 2025 strategy emphasizes sustainable agricultural practices and technological innovation to improve food security and environmental sustainability⁴⁵.

Jordan's agricultural sector covers approximately 2.6 million hectares of land. If about 10% (26 thousand hectares) of this land were to adopt climate-resilient seeds, it would represent a potentially viable market for the startup. This adoption could lead to improved crop yields, thereby enhancing the livelihoods of Jordanians farmers and contributing to national food security⁶.

The primary target market for the startup's climate-resilient seeds are farmers in Jordan who are seeking crops that can withstand harsh environmental conditions. These farmers face challenges due to the country's arid climate, water scarcity, and soil salinity. Climate-resilient seeds offer a solution by providing drought-resistant and salt-tolerant varieties that can thrive under these adverse conditions.

Another key audience comprises agricultural cooperatives that play a crucial role in supporting farmers to adopt sustainable practices. These co-ops facilitate the distribution of resources, knowledge, and technology among farmers, helping them implement advanced agricultural techniques. By partnering with these cooperatives, the project can effectively promote the adoption of its resilient seed varieties, ensuring widespread use and enhancing overall agricultural productivity.

Beyond Jordan, climate-resilient seeds have potential in global markets, particularly in regions facing similar ecological stressors. Countries with arid climates and saline water resources such as those in the Middle East, North Africa, and parts of Asia can benefit from these seeds.

Several global success stories highlight the effectiveness of climate-resilient crops enhancing agricultural productivity and sustainability. In India, the International Crops Research Institute

¹ Grand View Research. (2021). "Seed Market Size, Share & Trends Analysis Report."

² https://prddsgofilestorage.blob.core.windows.net/api/documents/Jordan_-_Climate_Fact_Sheet/Jordan_Climate_Fact_Sheet_EN.pdf

³ <https://www.climatecentre.org/wp-content/uploads/RCCC-Country-profiles-Jordan-2022-Final-1.pdf>

⁴ World Bank. (2022). "Jordan: Agriculture and Food."

⁵ Jordan Ministry of Planning and International Cooperation. (2015). "Jordan 2025: A National Vision and Strategy."

⁶ FAO. (2021). "Jordan at a glance: Agriculture."

for the Semi-Arid Tropics (ICRISAT)⁷ has developed drought-resistant crops that have significantly improved yields and farmer resilience. Similarly, in Australia, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) has successfully developed salt-tolerant crops that thrive in high-salinity environments⁸.

3 Business Model

The business model is designed to address critical environmental challenges in Jordanian agriculture by focusing on the development and distribution of climate-resilient seeds. The model is structured to generate revenue from multiple streams while encouraging innovation and promoting sustainable agricultural practices. The primary revenue streams include direct sales of specially engineered seeds, licensing agreements for advanced customized seed technology, and consultancy services that provide expert advice on optimizing crop cultivation. By targeting both local farmers in Jordan and international markets in regions with similar environmental stressors, the startup aims to establish a market presence and drive adoption of resilient agricultural practices. This business model is supported by a strategic approach that includes local pilot projects and trials, strong partnerships, and targeted marketing campaigns, ensuring that current agricultural needs can be met and that the project contributes to long-term food security and environmental sustainability in Jordan and the region.

The services and products to be offered are:

- **Climate-Resilient Seeds:** seeds specifically designed to withstand drought, salinity, and harsh climate conditions, ensuring robust crop yields in challenging environments.
- **Licensing of Seed Technology:** Licensing agreements allow other regions and companies to utilize the startup's seed technologies.
- **Consultancy Services:** Providing expert agronomic advice and support to optimize cultivation practices for the new seed varieties.

The startup's approach to research and development is centered on leveraging advanced hybridization techniques to create seed varieties that are resilient to drought, climate-adapted, and salt-water tolerant. These seeds are specifically designed to thrive under Jordan's challenging environmental conditions, including scenarios where saline water irrigation is necessary. By focusing on native and locally adapted crops, the startup ensures that the developed seeds are compatible with the local ecosystem, maximizing their resilience against local climatic challenges. Innovation plays a crucial role in this process, with biotechnological advancements being employed to enhance crop resilience and productivity.

The production process involves comprehensive seed breeding programs aimed at selecting and propagating the most resilient seed varieties. This breeding process includes rigorous testing and evaluation to ensure that the seeds meet the required standards of drought resistance, climate adaptation, and salt tolerance. To guarantee the quality of the seeds, strict

⁷ ICRISAT. (2020). "Research Programs: Resilient Dryland Systems."

⁸ CSIRO. (2021). "Salt-tolerant crops: Sustainable agriculture for arid regions."

quality control measures would need to be implemented, which include regular testing for germination rates, growth performance, and resistance to environmental stressors. Sustainability is a core principle in the production process, with eco-friendly practices being utilized to minimize environmental impact. This includes reducing the use of chemical inputs and managing resources efficiently.

The startup's infrastructure is built to support extensive research and large-scale production. The company is equipped with advanced laboratories dedicated to hybridization research and seed development. These facilities are integral to ongoing R&D efforts and the continuous improvement of seed varieties. Additionally, high-quality production equipment is used to support the large-scale production and packaging of seeds, ensuring both efficiency and scalability. This infrastructure provides the ability to potentially meet the growing demand for climate-resilient seeds both locally and globally.

A multifaceted distribution strategy would need to be employed to ensure that its seeds reach the intended users effectively. Direct sales to farmers and agricultural cooperatives form the core of this strategy. To expand market reach, the startup also licenses its seed technology to other regions facing similar ecological challenges. Furthermore, the company offers consultancy services, providing agronomic support to help farmers optimize cultivation practices for the new seed varieties. This service ensures that farmers can fully leverage the benefits of the resilient seeds, leading to better crop performance and higher yields.

The anticipated revenue streams are:

- **Direct Seed Sales:** Revenue from selling seeds directly to farmers and agricultural cooperatives is expected to grow steadily over five years, starting at JOD 50,000 in Year 1 and reaching JOD 112,500 by Year 5.
- **Licensing Fees:** Licensing the seed technology to other markets is expected to generate additional income, with revenue starting in Year 2 and reaching JOD 20,000 annually by Year 5.
- **Consultancy Fees:** Earnings from providing expert agronomic advice and support, starting at JOD 10,000 in Year 1 and increasing to JOD 25,000 by Year 5.

Itemized revenues and total annual revenues are summarized in the table below:

Table 1: Revenue projection

Description / Year	1	2	3	4	5
Direct Seed Sales (unit)	2,500	2,750	3,000	3,500	4,500
Direct Seed Sales (JOD per unit)	20	20	20	25	25
Subtotal Direct Seed Sales (JOD)	50,000	55,000	60,000	87,500	112,500
Licensing of Seed Technology (unit)	0	1	1	2	2
Licensing of Seed Technology (JOD per unit)		10,000	10,000	10,000	10,000
Subtotal Licensing of Seed	-	10,000	10,000	20,000	20,000
Consultancy Services (unit)	20	25	30	40	50
Consultancy Services (JOD per unit)	500	500	500	500	500
Subtotal Consultancy Services	10,000	12,500	15,000	20,000	25,000
Total Revenues (JOD)	60,000	77,500	85,000	127,500	157,500

Revenue is projected to grow from JOD 60,000 in Year 1 to JOD 157,500 by Year 5, driven by direct seed sales, licensing fees, and consultancy services.

The product mix includes Direct Seed Sales, Licensing of Seed Technology, and Consultancy Services, each contributing differently to the total quantity and revenue over five years. Direct Seed Sales constitute the majority of the quantity sold and revenues in Year 1, gradually decreasing to about 71% by Year 5. Licensing of Seed Technology, through having a small unit count (starting at zero in Year 1 and reaching two units in Year 5) contributes significantly to revenue because of its high price per unit (JOD 10,000) thereby growing its revenue share to 12.7% by Year 5. Consultancy Services also provide a significant revenue contribution with a modest number of units sold (starting at 20 units in Year 1 and increasing to 50 units by Year 5) due to the bespoke nature of the services. Each unit is initially priced at JOD 500 and this service continues to make about 16% to 17% contribution to the revenue throughout the first five years of operation.

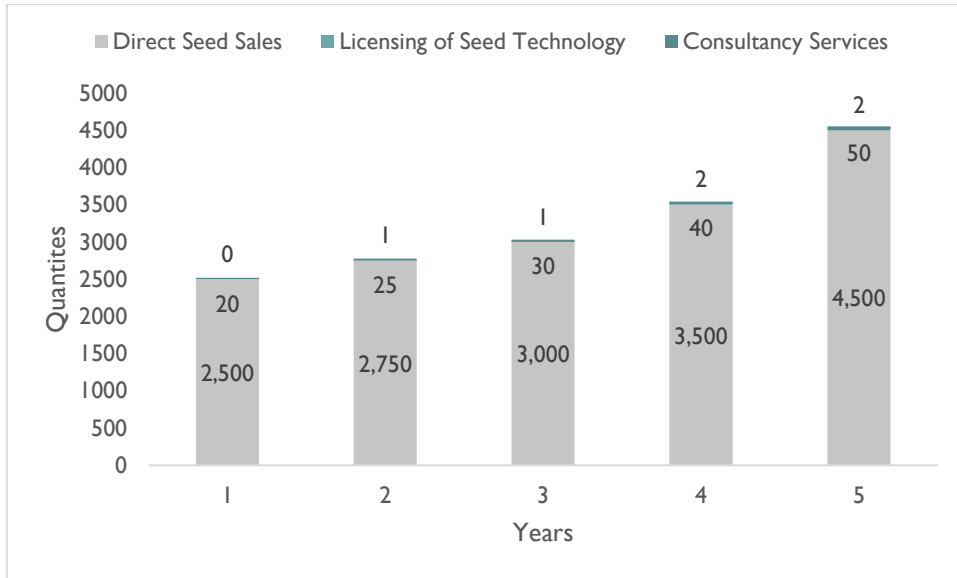


Figure 1: Product Mix by Quantity

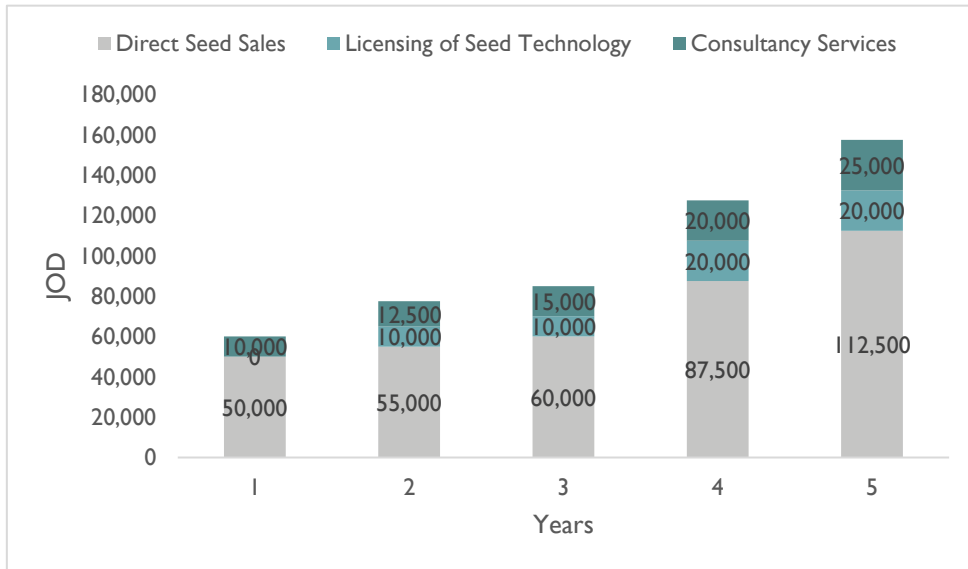


Figure 2: Product Mix by Revenue

4 Technical Analysis

The cost of goods sold (COGS) for each of the services aligns with the demand, reflecting controlled costs across the different offerings.

1. **Direct Seed Sales:** The COGS per unit for direct seed sales remains constant at JOD 5 for the first three years, decreasing to JOD 4 per unit in Year 4, anticipating improved cost efficiencies likely leading to higher gross margins as revenues increase.
2. **Licensing of Seed Technology:** There are no associated COGS for the licensing of seed technology, reflecting that this revenue stream is projected to generate profit without direct costs. This high-margin segment is expected to contribute positively to the overall profitability as it scales up from zero in Year 1 to two units by Year 5.

3. Consultancy Services: The COGS per unit for consultancy services remain constant throughout the five years.

Overall, the total COGS increase from JOD 12,900 in Year 1 to JOD 19,000 in Year 5. This rise is expected to support expanded operations. It remains modest in comparison to the growth in revenues.

Table 2: Cost of Goods Sold – Five Year Projection

Description / Year	1	2	3	4	5
Direct Seed Sales (unit)	2,500	2,750	3,000	3,500	4,500
Direct Seed Sales (JOD per unit)	5	5	5	4	4
Subtotal Direct Seed Sales (JOD)	12,500	13,750	15,000	14,000	18,000
Licensing of Seed Technology (unit)	0	1	1	2	2
Licensing of Seed Technology (JOD per unit)	0	0	0	0	0
Subtotal Licensing of Seed Technology (JOD)	-	-	-	-	-
Consultancy Services (unit)	20	25	30	40	50
Consultancy Services (JOD per unit)	20	20	20	20	20
Subtotal Consultancy Services (JOD)	400	500	600	800	1,000
Total COGS (JOD)	12,900	14,250	15,600	14,800	19,000

The initial team includes a CEO, an Agricultural Scientist, and an Operations Manager. As the business grows, additional staff such as Sales & Marketing and Administrative Staff are added, reaching a total headcount of six by Year 5.

Table 3: Manpower recruitment plan – five-year projection

Title / Year	1	2	3	4	5
CEO	1	1	1	1	1
Agricultural Scientist	1	1	1	2	2
Operations Manager	1	1	1	1	1
Sales & Marketing	0	1	1	1	1
Administrative Staff	0	0	0	1	1

The table below provides an overview of annual salaries, accounting for social security (at 14.25%) and health insurance expenses.

Table 4: Manpower total cost – five-year projection

Title / Year	1	2	3	4	5
CEO	9,600	10,080	10,584	11,113	11,669
Agricultural Scientist	5,400	5,670	5,954	12,502	13,127
Operations Manager	6,000	6,300	6,615	6,946	7,293
Sales & Marketing	-	5,670	5,954	6,251	6,564
Administrative Staff	-	-	-	5,279	5,543
Total HR Salaries (JOD)	21,000	27,720	29,106	42,091	44,196
Social Security Cost (JOD)	2,993	3,950	4,148	5,998	6,298
Health Insurance Cost (JOD)	900	1,200	1,200	1,800	1,800
Total HR Cost (JOD)	24,893	32,870	34,454	49,889	52,294

Over the first five years, total operational expenditures, including manpower, increase from JOD 29,934 in Year 1 to JOD 61,835 in Year 5. Major recurring research and development (starting at JOD 1,000 and reaching JOD 2,000), and legal and accounting fees (increasing from JOD 600 to JOD 1,000). The subtotal for OPEX grows from JOD 27,213 in Year 1 to JOD 56,214 by Year 5, reflecting a strategic investment in essential and growth-related 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
Insurance	0	0	0	0	0
Stationary	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	100	200	300	300	300
Cleaning Material & Consumables	50	50	50	50	50
Research & Development	1,000	1,000	1,500	1,500	2,000
Legal & Accounting Fees	600	600	800	800	1,000
Sub-total OpEx	27,213	35,290	37,674	53,109	56,214
Other Costs	2,721	3,529	3,767	5,311	5,621
Total OpEx (JOD)	29,934	38,819	41,441	58,420	61,835

Initial investments in equipment and infrastructure total JOD 20,000, with additional investments of JOD 3,000 for equipment in Year 1 and periodic investments in research facilities to support ongoing R&D.

Table 6: Capital Expenditures Cost – five-year projection

Description / Year	0	1	2	3	4	5
Equipment & Infrastructure	20,000	3,000	1,000	1,000	1,000	1,000
Research Facilities	20,000	2,000	0	0	5,000	0
Total CapEx (JOD)	40,000	5,000	1,000	1,000	6,000	1,000

5 Financial Analysis

5.1 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.

5.2 Financial Study:

5.2.1 Projected Working Capital

This table shows that the net working capital needed for the project for the first year of operation is JOD 13,033, which has to increase steadily year over year to reach JOD 37,179 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	4,120	4,967	6,497	7,471	8,654
Accounts Receivable (A/R)	8,438	11,250	15,938	20,938	26,875
Inventory	475	683	1,067	1,342	1,650
Accounts Payable (A/P)	-	-	-	-	-
Net Working Capital	13,033	16,900	23,501	29,750	37,179
Changing Working Capital		3,867	6,600	6,249	7,429

5.2.2 Project Initial Cost

The project's initial cost is projected to be JOD 43,033, consisting of JOD 30,000 as CapEx and JOD 13,033 as working capital.

Table 8: Initial Cost Summary (JOD)

Description / Year	JOD
CapEx	30,000
Provisions for first year(s) negative net cash flow	
Net working capital	13,033
Total Initial Cost	43,033

5.2.3 Projected Income Statement

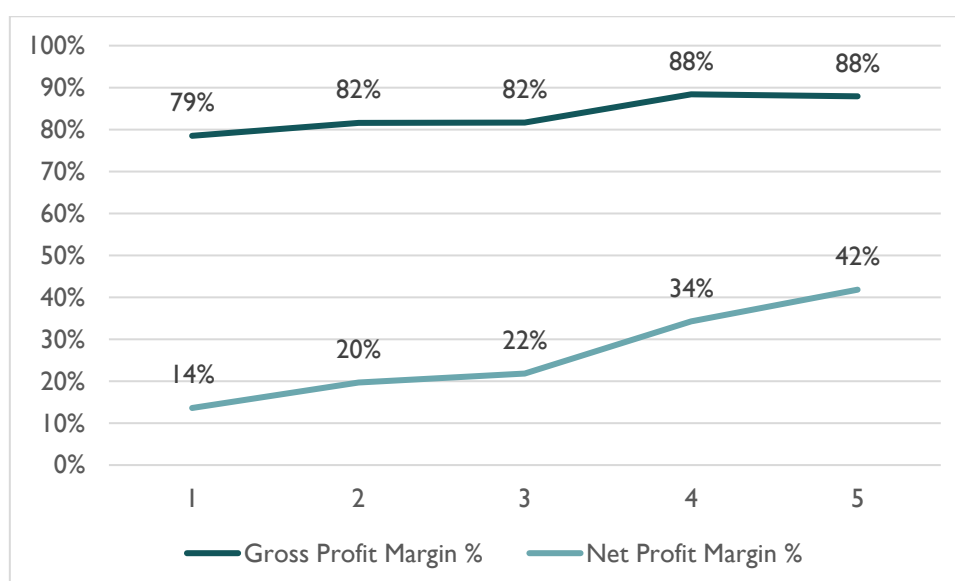
The projected income statement indicates that the project will generate a profit of JOD 9,205 in the first year of operation. Furthermore, net profits are expected to increase gradually over the study period, reaching JOD 91,250 in the fifth year of operation.

Table 9: Projected Income Statement (JOD)

Description/Year	1	2	3	4	5
Total Revenues	67,500	90,000	127,500	167,500	215,000
COGS	2,850	4,100	6,400	8,050	9,900
Gross Profit	64,650	85,900	121,100	159,450	205,100
OpEx	49,445	59,603	77,959	89,651	103,850
Net Profit Before Tax and Depreciation	15,205	26,297	43,141	69,799	101,250
Depreciation	6,000	8,000	8,000	10,000	10,000
Net Profit Before Tax	9,205	18,297	35,141	59,799	91,250
Tax Expense	-	-	-	-	-
Net Profit	9,205	18,297	35,141	59,799	91,250

In the first year of operation, the project is expected to generate positive profit margins, and revenue growth will dramatically increase the gross and net profit margins in the following years. In the fifth year of operations, the gross profit margin is expected to be 87.9%, and the net profit margin is 42.4%.

Figure 3: Gross vs Net Profit Margin



On the asset management side, the study shows that the return on investment will increase steadily from 21.4% in the first year of operation to 144.8% in the fifth year.

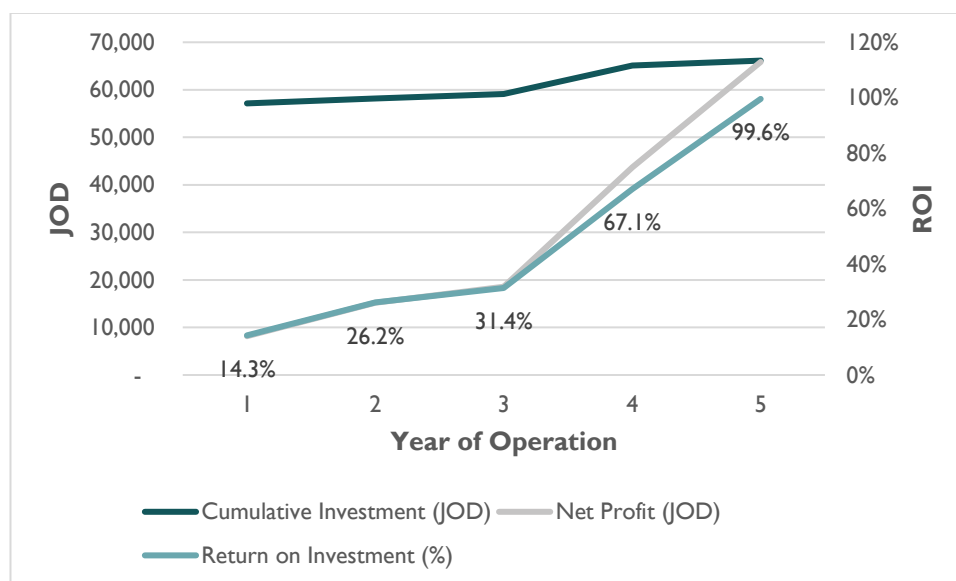


Figure 4 Return on Investment

5.2.4 Projected Free Cash Flow Statement

The table below demonstrates that the project can generate a positive free cash flow from the first year of operation, JOD 11,830. Moreover, 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 is expected to reach JOD 83,071.

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

Description/Year	0	1	2	3	4	5
Cash-in Flow						
Net Profit		5,830	13,797	28,766	51,424	80,500
Depreciation		6,000	8,000	8,000	10,000	10,000
Injected Capital	43,033					
Total Cash Inflow	43,033	11,830	21,797	36,766	61,424	90,500
Cash Outflow						
Initial Cost	43,033		10,000	-	10,000	-
Changes in Working Capital			3,867	6,600	6,249	7,429
Total Cash Outflow	43,033	-	13,867	6,600	16,249	7,429
Free Cash Flow	-	11,830	7,930	30,166	45,175	83,071

Based on these results, the project's feasibility indicators demonstrate its viability, with a net present value of JOD 84,966 and a profitability index of 2.97. Moreover, the project's internal rate of return (IRR) is expected to be 56.75%, indicating feasibility is not sensitive to changes in market conditions.

5.3 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 II: Sensitivity analysis outcomes

Sensitivity Scenario	Net Present Value	Profitability Index (PI)	Internal Rate of Return (IRR)
Original case	84,966	2.97	56.75%
Drop in revenues by 5%	63,698	2.48	46.96%
Drop in revenues by 10%	42,431	1.99	36.69%
Increase in OpEx by 5%	72,173	2.67	50.45%
Increase in OpEx by 10%	59,380	2.37	44.13%
Increase in initial cost by 5%	82,815	2.83	54.31%
Increase in initial cost by 10%	80,663	2.70	52.05%

The sensitivity analysis shows that the project is feasible and not sensitive to unfavorable market conditions. Under all the above-mentioned scenarios, the project's economic feasibility is strong and viable. 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.

Feasibility Indicators	
Net Present Value (NPV)	52,302
Profitability Index (PI)	1.92
Internal Rate of Return (IRR)	39.0%

6 Integration with Other Sectors

The climate-resilient seed startup has the potential to integrate with various sectors, enhancing sustainability and productivity.

Government and Policy Making: the startup's products and services support national agricultural policies aimed at improving food security and sustainability. Collaboration with government agencies can help scale the distribution of resilient seeds, contributing to national goals.

Environmental Management: The use of drought-resistant and salt-tolerant seeds reduces the need for water and chemical inputs, aligning with environmental conservation efforts. Environmental agencies can leverage climate-resilient seeds to promote sustainable farming practices.

Agricultural Research and Development: Partnerships with universities and research institutions can drive further innovation in crop resilience. These collaborations can lead to advancements in agricultural biotechnology and improved cultivation practices.

Global Markets: Licensing agreements enable the transfer of climate-resilient seed technology to other regions facing similar climatic challenges, fostering international cooperation, and expanding market reach.

These integrations enhance the company's impact, promoting sustainable agriculture and environmental stewardship across sectors.

7 Entrepreneur Persona

The ideal entrepreneur to lead this venture should possess a strong background in agricultural science, biotechnology, and environmental sustainability. This individual should have expertise in plant hybridization, crop resilience, and sustainable farming practices. Key skills include strategic planning, project management, and the ability to navigate regulatory frameworks.

A visionary leader, the entrepreneur should be passionate about leveraging scientific advancements to address agricultural challenges and promote food security. They must excel in fostering partnerships with government bodies, research institutions, and agricultural cooperatives. Effective communication skills are essential to advocate for the benefits of climate-resilient seeds and educate stakeholders.

The entrepreneur should have experience managing multidisciplinary teams and driving innovation in agricultural technology. A commitment to sustainability and a deep understanding of the local and global agricultural landscape are crucial for leading the company towards its mission of enhancing crop resilience and supporting sustainable agriculture.

8 Stakeholders

Engaging a diverse group of stakeholders is crucial for the success of the startup:

Farmers and Agricultural Cooperatives: Primary users of climate-resilient seeds, benefiting from improved crop yields and reduced resource dependency. Their feedback and adoption are essential for refining and validating seed performance.

Government Agencies: Collaborating with ministries of agriculture and environmental protection to align with national food security and sustainability goals. Support from these bodies can facilitate wider adoption and regulatory compliance.

Research Institutions and Universities: Partners in research and development efforts to enhance seed technologies and validate scientific approaches. These institutions can provide valuable insights and support ongoing innovation.

Environmental Organizations: Advocates for sustainable agricultural practices and biodiversity, helping to promote the company’s mission and enhance public awareness.

Investors and Funding Agencies: Providing the necessary capital to scale operations and invest in research. Engaging with impact investors and development funds can support the startup’s growth and sustainability initiatives.

9 Risk Assessment and Mitigation

Successfully deploying climate-resilient seeds in Jordan entails navigating several risks:

Risk	Impact	Likelihood	Risk Mitigation Technique
Regulatory Compliance	High	Moderate	Engage with regulatory authorities early to ensure compliance and secure necessary approvals. Advocate for supportive policies.
Market Acceptance	Moderate	Moderate	Conduct outreach and education campaigns to demonstrate the benefits and efficacy of climate-resilient seeds. Provide trial samples and pilot projects.
Diversity Maintenance	High	Low	Implement robust hybridization management practices to maintain hybridization diversity and prevent monoculture risks.
Environmental Impact	Moderate	Low	Ensure sustainable farming practices and monitor environmental effects. Adjust practices based on feedback and research.
Economic and Political Instability	High	Low	Diversify market presence and maintain flexibility in operations to adapt to changing conditions. Establish contingency plans.
Supply Chain Disruptions	Moderate	Low	Develop a robust supply chain with multiple suppliers and maintain an inventory buffer. Establish long-term contracts with key suppliers.
Technological Challenges	Moderate	Moderate	Invest in continuous R&D to stay ahead of technological advancements and address any emerging challenges.
Intellectual Property Protection	High	Moderate	Secure patents and trademarks for seed technologies. Monitor for infringements and take legal action if necessary.

Addressing these risks proactively with strategic planning and contingency measures will be vital for the smooth operation and long-term sustainability of the venture. Proactively working with Jordanian authorities is essential to navigate the regulatory landscape for seed technology. This engagement will facilitate the wider adoption of climate-resilient seeds and ensure compliance with agricultural regulations.

To ensure market acceptance, initiating pilot projects with local farmers and agricultural cooperatives is an important step to demonstrate the benefits of climate-resilient seeds. These pilot projects will provide data on the performance and adaptability of the seeds in various conditions. Additionally, successful pilot projects will help build trust with potential customers, showcasing the practical advantages and reliability of the company's products. Developing comprehensive marketing and educational campaigns is also necessary to raise awareness about the benefits of climate-resilient seeds. These campaigns target farmers, agricultural cooperatives, and policymakers to drive adoption and market acceptance.

Building strategic partnerships with research institutions and environmental organizations is vital for continuous innovation. These collaborations enhance the development of new seed technologies and align efforts with national and international sustainability goals. Partnering with renowned entities will bolster the startup's reputation and expand its influence. Additionally, implementing robust hybridization management practices will maintain hybrid diversity and prevent monoculture risks.

To mitigate environmental impact, the startup will ensure sustainable farming practices and continuously monitor environmental effects, adjusting practices based on feedback and research. Diversifying market presence and maintaining flexibility in operations will help it adapt to economic and political instability, supported by established contingency plans.

Supply chain disruptions will be addressed by developing a robust supply chain with multiple suppliers and maintaining an inventory buffer. Establishing long-term contracts with key suppliers will further ensure stability. Technological challenges can be met by investing in continuous R&D to stay ahead of advancements and address emerging issues.

Finally, securing patents and trademarks for seed technologies and monitoring for infringements will protect the company's intellectual property. Taking legal action, when necessary, will safeguard the company's innovations. Through these comprehensive measures, the startup aims to ensure the smooth operation and sustainability of its business.

10 Conclusion

Climate-resilient seeds present a business opportunity in the field of agricultural technology by addressing critical environmental challenges in Jordan and similar regions. By developing and distributing climate-resilient seeds, they can enhance crop yields, conserve water, and combat soil salinity. The start-up's scalable model and seed technologies offer potential for local and global impact, contributing to food security and environmental sustainability.

In conclusion, the project demonstrates promising feasibility indicators based on the assumptions formed during the development of this study. Nonetheless, entrepreneurs are advised to conduct additional analysis on projected demand, initial costs, and operational expenses to mitigate potential risks associated with adverse market conditions that could jeopardize its validity.

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.

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