



GeneGrow Jo

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



Ministry of Digital Economy
and Entrepreneurship



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Executive Summary

GeneGrow Jo, an agricultural technology startup is pioneering the use of gene editing to address water scarcity and harsh climate conditions in Jordan. This high-level feasibility study explores the potential of GeneGrows Jo's advanced CRISPR-Cas9 technology to enhance crop resilience, improve yields, and ensure food security. By developing drought-resistant and nutrient-efficient crops, the company aims to transform Jordan's agricultural landscape, which is constrained by limited water resources and challenging environmental conditions.

GeneGrow Jo's business model involves direct sales of genetically edited seeds, technology licensing, and educational services. These strategies aim to generate revenue while fostering sustainable agricultural practices. The startup targets farmers, agricultural cooperatives, government agencies, NGOs, and research institutions. The global market for genetically modified crops presents a significant opportunity for GeneGrow Jo's innovative solutions.

The financial analysis shows promising indicators, with revenue from seed sales and technology licensing expected to grow significantly. Initial costs include substantial investment in research and development (R&D), production, and marketing. The project demonstrates robust profitability and positive cash flow projections.

GeneGrow Jo also emphasises sustainability, aiming to reduce water and chemical usage in agriculture, contributing to ecological conservation. The study underscores the importance of continuous R&D investment, market expansion, stakeholder engagement, and public education to enhance market acceptance and regulatory compliance. With these strategies, GeneGrow Jo is well-positioned to lead in the AgriGenomics field, addressing critical agricultural challenges and promoting sustainable food production.

I. Introduction

GeneGrow Jo is positioned at the intersection of agricultural technology and genomic science, specifically within the subsector of AgriGenomics. The start-up is set to introduce a revolutionary approach to agriculture in Jordan, a country plagued by water scarcity and adverse climate conditions that pose significant challenges to traditional farming methods. GeneGrow Jo's core innovation lies in its development of cutting-edge gene editing technology to develop crop varieties that are not only resilient to harsh environments but also more nutritious and water efficient. Jordan's agricultural sector is critically constrained by its arid landscape and limited water resources, making the need for innovative solutions imperative. The introduction of crops that can withstand these conditions is more than an enhancement—it is a necessity for the sustainability of agriculture and food security in the country and the region. GeneGrow Jo's genetically edited crops promise to deliver higher yields and better-quality produce under conditions that would stress traditional crop varieties.

The technology employed by GeneGrow Jo involves precise gene editing tools that allow for the targeted modification of plant DNA to enhance desired traits such as drought tolerance and nutrient uptake efficiency. This technology is highly scalable, with applications that can range from small family-owned farms to large agricultural enterprises. The adaptability of these crops across different climate zones also open potential markets beyond Jordan, including

other regions of the Middle East and similar arid areas globally. In alignment with global sustainability goals, GeneGrow Jo's innovations contribute directly to ecological conservation efforts by reducing the need for water and chemical inputs. This not only helps in preserving vital resources but also supports the ecological balance, ensuring that farming practices can be both productive and environmentally sustainable.

2. Market Analysis

The global market for genetically modified crops is projected to grow significantly due to the increasing demand for food production enhancements in response to climate change, water scarcity and population growth. According to a 2024 report by Market Statistics and Industry Insights, the global Genetically Modified Organism (GMO) market size was valued at \$12 billion in 2022 and is expected to expand at a CAGR of 7.36% to \$18.4 billion by 2028¹. The Africa and Middle East region represent 5% of the global traded seed value in 2021 with 90% of the GM cultivation being driven by South Africa². This growth highlights a substantial market opportunity on a global scale for companies involved in agricultural biotechnology, including GeneGrow Jo, to leverage technological advancements and capture a share of this market.

On a more localized scale, this market growth presents a significant opportunity for GeneGrow Jo, especially in regions like the Middle East and North Africa that face severe agricultural challenges such as water scarcity and harsh climate conditions. By developing genetically modified crops tailored to withstand these specific challenges, GeneGrow Jo can tap into the growing demand for resilient and sustainable agricultural solutions for environments similar to Jordan. The targeted approach to addressing agricultural needs positions GeneGrow Jo to effectively meet the specific demands of farmers and agricultural operations within these regions, thereby focusing on the micro-level market potential³⁴.

GeneGrow Jo must navigate a complex regulatory landscape concerning genetically modified organisms (GMO) in Jordan. While the commercial sale of GMOs is not currently allowed, research is permitted, and there are active policy discussions that could influence future regulations.

On April 3, 2020, Jordan issued a new regulation regarding the handling of products labelled as containing genetically engineered (GE) ingredients, namely: INSTRUCTIONS FOR HANDLING FOOD & FOOD PRODUCTS ORIGINATING FROM GENETICALLY MODIFIED SUBSTANCES PRODUCED BY MODERN BIOTECHNOLOGY FOR 2018 ISSUED BASED ON ARTICLE 8.B OF FOOD LAW NO. 30/2015 & ARTICLE 7.K OF LAW OF FOOD & DRUG GENERAL ADMINISTRATION NO. 41/2008. These instructions were published in the official gazette⁵. This regulation includes several key points that are pertinent to GeneGrow Jo's operations. First, there is a five percent threshold for labelling purposes, meaning that products containing GE ingredients above this threshold must be clearly labeled.

¹ <https://www.linkedin.com/pulse/gmo-crops-seeds-market-future-outlook-9jubf/>

² <https://www.agribusinessglobal.com/special-sections/gm-seed-market-situation-and-potential-in-africa-and-middle-east/>

³ Seed - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts 2016 – 2030, ResearchMarkets.

⁴ Industry Reports, P&S Intelligence.

⁵ https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Jordan%20Issues%20Instructions%20for%20Handling%20of%20GE%20Derived%20Food%20and%20Food%20Products_Amman_Jordan_04-01-2020

Additionally, the importation of GE-labeled food products is permitted, provided that the product is produced and consumed in the country of origin.

The Jordan Food and Drug Administration (JFDA) is the sole regulatory body overseeing GE foods in the country. The FDA's regulations are based on safety assessments conducted in the country of origin, and the new regulation specifies that products must undergo these safety assessments and obtain prior approval from the JFDA. This process includes reviewing safety assessments, endorsing laboratory testing, and inspecting labels to ensure compliance.

For GeneGrow Jo, these regulatory conditions present both challenges and opportunities. The allowance for research on GE crops provides an opportunity for the company to develop its gene-editing technologies within Jordan. However, the company must closely monitor ongoing policy discussions and be prepared to adapt its market entry strategy based on any changes in regulations. Active engagement with policymakers and regulatory bodies will be crucial in this regard.

Should commercial sales of GE crops become allowed in the future, GeneGrow Jo will need to ensure full compliance with labeling and safety assessment requirements. This involves leveraging its technology capabilities to meet regulatory standards and building strong relationships with government agencies, such as the JFDA. Additionally, participating in policy discussions can help influence a favorable regulatory environment for the future commercialization of GE crops.

GeneGrow Jo's primary market includes:

- **Farmers and Agricultural Cooperatives:** These are direct consumers who will benefit from higher yields and more robust crops suited to climates similar to Jordan's.
- **Government Agencies:** With initiatives to improve food security and reduce water usage, government entities in the region could be significant customers or partners.
- **NGOs and International Organizations:** Since they are dedicated to improving global food security and agricultural sustainability, NGOs and international organizations may be interested in partnering with GeneGrow Jo to implement piloting programs or raise awareness about its technology to regions with similar challenges.
- **Research Institutions:** These institutions often look for advanced agricultural technologies to study and further develop.
- **Potential Global Expansion:** Given the similarity of agricultural challenges in regions like North Africa and parts of Central Asia, these areas represent markets for expansion.

The competitive landscape includes:

- **Traditional Breeding Companies:** These companies might not offer the same level of precision or speed in developing drought-resistant or nutrient-efficient crops.
- **International Agri-Biotech Firms:** Firms like Monsanto (Bayer), Dupont, and Syngenta are leaders in genetically modified crops but may not focus specifically on the unique challenges faced by agriculture in arid regions.

- No Jordanian firm are specifically focusing on the precise gene editing of crops to develop varieties that are not only resilient to harsh environmental conditions but also more nutritious and water efficient.

GeneGrow Jo differentiates itself through the following:

- **Localized Solutions:** Tailoring gene editing to address specific local agricultural issues, such as water scarcity.
- **Community Engagement:** Offering workshops and consulting services to help farmers adopt these technologies effectively.
- **Scalability Across Climate Zones:** Potential to adapt solutions for various global regions with similar climate challenges.

Key risks include:

- **Regulatory Hurdles:** The genetic modification of organisms is a contentious issue with strict regulatory frameworks in many countries, including Jordan.
- **Public Perception:** Misconceptions about GMOs could hinder adoption unless effectively addressed through education and transparency.
- **Ecological Impact:** Ensuring that new crops do not adversely affect local ecosystems is crucial.

To effectively penetrate the market and gain traction, GeneGrow Jo could consider:

- **Pilot Projects:** Implementing trial phases with local farms to demonstrate the benefits and gather real-world data.
- **Partnerships with Agricultural Bodies:** Collaborating with local and national agricultural agencies to align with government initiatives and gain endorsements.
- **Educational Campaigns:** Raising awareness and understanding of the benefits of genetically edited crops through seminars and informational campaigns.

3. Business Model

GeneGrow Jo operates on a hybrid business model that combines product sales, service offerings, and technology licensing, aiming to maximize impact and revenue in the agricultural sector. This model leverages the company's gene-editing technologies to offer value propositions across various market segments.

The primary revenue sources come from the direct sales of drought-resistant and nutrient-efficient seeds to farmers and agricultural organizations. Pricing for these seeds is set to increase incrementally as their value and effectiveness are proven in the market. Additionally, GeneGrow Jo generates revenue through the licensing of its gene-editing technology to other companies and research institutions, facilitating a broader application of its agricultural practices. The licensing stream provides significant income in specific years aligned with strategic partnerships or expansions.

The company also offers educational workshops and consulting services focused on sustainable farming practices and crop management under climate change conditions. These services strengthen customer relationships and help establish GeneGrow as a knowledgeable entity in agricultural innovation.

GeneGrow Jo utilizes CRISPR-Cas9 technology⁶, a sophisticated gene-editing tool that allows for precise and efficient modification of plant genomes. This technology enables the startup to develop seeds that are genetically adapted to thrive in arid and semi-arid environments, like those predominant in Jordan. These modifications focus on traits such as drought resistance, nutrient use efficiency, and increased resilience to environmental stresses.

The development and production process at GeneGrow Jo begins with research and development (R&D). The initial stages involve identifying target genetic traits for modification, followed by laboratory trials to assess the efficacy and stability of genetic changes. Field trials in controlled environments are then conducted to evaluate performance under realistic conditions. Successful varieties from field trials are moved to seed production, where, in collaboration with local farms, pilot production batches are grown to ensure that the seeds maintain their genetic integrity and desired traits at scale.

Quality control and assurance are integral parts of the process, with rigorous testing throughout the R&D and production phases to ensure that seeds meet all regulatory standards and are safe for widespread agricultural use. Scaling and distribution efforts involve developing partnerships with local and international distributors to manage the logistics of getting seeds to market, as well as establishing protocols for large-scale production while maintaining seed quality.

The infrastructure requirements for GeneGrow Jo include laboratory facilities for genetic research and seed development, equipped with the latest in biotechnological tools. R&D facilities are essential to support ongoing innovation and the development of new seed varieties. Additionally, operational offices are necessary for administrative functions and coordination of field operations.

The cost structure of GeneGrow Jo includes significant investment and research and development (R&D) to maintain technological leadership and develop new seed varieties. Costs are also associated with the production and supply chain, including the cultivation, harvesting and distribution of gene-edited seeds.

The value proposition of GeneGrow Jo includes improved crop yields and resilience to environmental stresses for farmers, which reduces losses and increases profitability. For research institutions, the company provides access to advanced genetic technologies that can accelerate agricultural research and innovation. For government and NGOs, GeneGrow Jo offers tools to achieve food security and environmental sustainability goals, supporting community welfare and ecological health.

⁶<https://crisprtx.com/gene-editing#:~:text=CRISPR%2FCas9%20%E2%80%93%20a%20revolutionary%20gene,invented%20CRISPR%2FCas9%20gene%20editing.>

The product mix for GeneGrow Jo comprises the sale of gene-edited seeds and the licensing of gene-editing technology. Over the first five years, the company projects selling an increasing number of gene-edited seed units, starting from 500 units in Year 1 and reaching 1,250 units by Year 5. The price per unit is set to rise incrementally from JOD 100 to JOD 120. This results in projected revenues from seed sales growing from JOD 50,000 in Year 1 to JOD 150,000 in Year 5.

In addition to seed sales, GeneGrow Jo anticipates revenue from licensing its technology. The company projects selling one licensing unit in Year 2 and two units in Year 5, priced at JOD 10,000 and JOD 20,000 per unit, respectively. This will contribute an additional JOD 50,000 over five years. Total projected revenues, combining both streams, are expected to increase from JOD 50,000 in Year 1 to JOD 190,000 in Year 5.

Table 1: Revenue projection

Description / Year	1	2	3	4	5
Sale of Gene-Edited Seeds (units)	500	700	800	1,100	1,250
Price / Unit Gene-Edited Seeds (JOD)	100	100	110	110	120
Sub-total Gene-Edited Seeds (JOD)	50,000	70,000	88,000	121,000	150,000
Licensing Technology (units)		1			2
Price / Unit Licensing Technology (JOD)		10,000			20,000
Sub-total Licensing Technology (JOD)	-	10,000	-	-	40,000
Total Revenues (JOD)	50,000	80,000	88,000	121,000	190,000

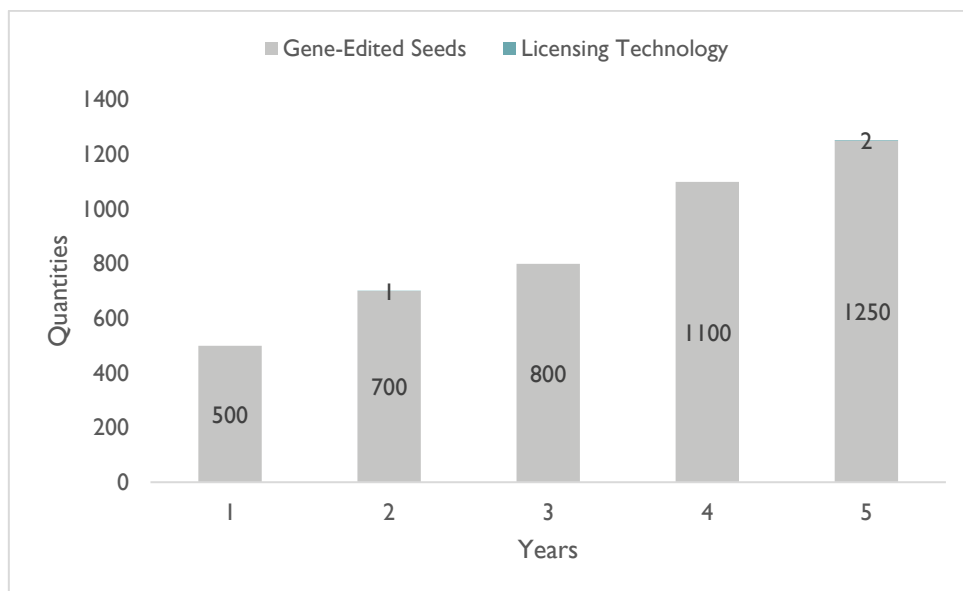


Figure 1: Product Mix by Quantity

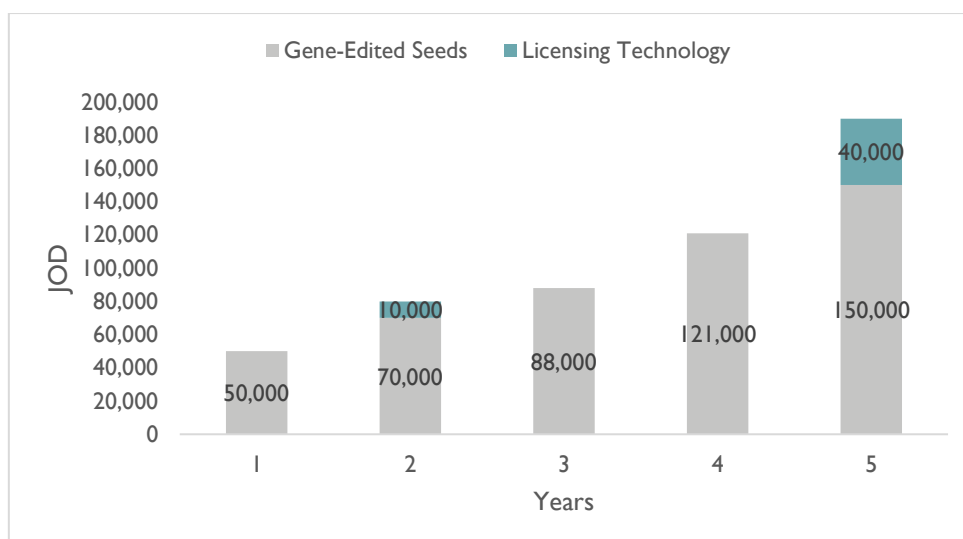


Figure 2: Product Mix by Revenue

4. Technical Analysis

The Cost of Goods Sold (COGS) for GeneGrow Jo includes expenses related to the production of gene-edited seeds and the licensing of technology. The projected demand for gene-edited seeds starts at 500 units in Year 1 and increases to 1,250 units by Year 5, with a stable COGS per unit of JOD 10 throughout the period. This results in the sub-total COGS for gene-edited seeds rising from JOD 5,000 in Year 1 to JOD 12,500 in Year 5.

For licensing technology, the projected demand is one unit in Year 2 and two units in Year 5, with COGS per unit set at JOD 2,000 initially and JOD 5,000 later. The sub-total COGS for licensing technology is JOD 2,000 in Year 3 and JOD 10,000 in Year 5. Overall, the total COGS grows from JOD 5,000 in Year 1 to JOD 22,500 in Year 5, reflecting the increased scale of operations and the associated production costs.

Table2 : Cost of Goods Sold – Five Year Projection

Description / Year	1	2	3	4	5
Projected Demand (Quantity) Gene-Edited Seeds	500	700	800	1100	1250
COGS / Unit Gene-Edited Seeds (JOD)	10	10	10	10	10
Sub-total Gene-Edited Seeds (JOD)	5,000	7,000	8,000	11,000	12,500
Projected Demand (Quantity) Licensing Technology		1			2
COGS / Unit Licensing Technology (JOD)		2000			5,000
Sub-total Licensing Technology (JOD)	-	2,000	-	-	10,000
Total COGS (JOD)	5,000	9,000	8,000	11,000	22,500

The manpower recruitment plan for GeneGrow Jo is designed to support the company's growth and operational needs over the first five years. In the first year, the team comprises a

CEO, a geneticist, and an agricultural scientist. By the third year, the team expands to include sales personnel, increasing the total headcount to four. This structure remains consistent through the fourth and fifth years, ensuring that the company has the necessary expertise in both scientific and commercial areas to drive its initiatives forward.

The steady inclusion of key roles such as geneticists and agricultural scientists from the beginning ensures a strong foundation for research and development. The addition of sales personnel in later years aligns with the anticipated growth in product offerings and market reach, reflecting a strategic approach to scaling the business while maintaining a balance between technical and commercial functions.

Table 3: Manpower recruitment plan – five-year projection

Title / Year	1	2	3	4	5
CEO	1	1	1	1	1
Geneticists	1	1	1	1	1
Agricultural Scientists	1	1	1	1	1
Sales			1	1	1
Total Cumulative HR	3	3	4	4	4

The manpower total cost for GeneGrow Jo is planned to support the company’s growth while maintaining financial sustainability. All salaries show incremental growth over the years.

Additional costs include social security and health insurance. Social security costs rise from JOD 2,993 in Year 1 to JOD 4,677 in Year 5, while health insurance costs remain steady at JOD 900 in the first two years and increase to JOD 1,200 from Year 3 onwards. The total HR cost starts at JOD 24,893 in Year 1 and grows to JOD 38,695 by Year 5.

Table 4: Manpower total cost – five-year projection

Title / Year	1	2	3	4	5
CEO/Founder	9,600	10,080	10,584	11,113	11,669
Geneticists	5,400	5,670	5,954	6,251	6,564
Agricultural Scientists	6,000	6,300	6,615	6,946	7,293
Sales	-	-	6,615	6,946	7,293
Cumulative Salaries of HR (JOD)	9,600	10,080	10,584	11,113	11,669
Social Security Cost (JOD)	2,993	3,142	4,242	4,454	4,677
Health Insurance Cost (JOD)	900	900	1,200	1,200	1,200
Total HR Cost (JOD)	24,893	26,092	35,209	36,910	38,695

The operational expenditures (OpEx) for GeneGrow show a controlled increase over the five-year period. Consistent costs are maintained for electricity, water, rent, stationary, maintenance, telecommunication, website charges, and cleaning materials. Advertising expenses increase significantly from JOD 2,000 in Year 1 to JOD 5,000 in Years 3 and 4, before dropping to JOD 100 in Year 5, reflecting an initial intensive marketing strategy. Research and development costs remain steady at JOD 1,000 annually, ensuring continuous investment in innovation. Legal and accounting fees decrease from JOD 800 in Years 1 and 2

to JOD 600 from Year 3 onwards, possibly due to streamlined processes. The sub-total OpEx rises from JOD 32,313 in Year 1 to JOD 47,130 in Year 4, slightly decreasing to JOD 44,015 in Year 5. Including other costs, the total OpEx peaks at JOD 51,843 in Year 4, before reducing to JOD 48,417 in Year 5.

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	3000	3000	3000	3000	3000
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	2,000	4,000	5,000	5,000	100
Cleaning Material & Consumables	50	50	50	50	50
Research & Development	1000	1,000	1,000	1,000	1,000
Legal & Accounting Fees	800	800	600	600	600
Sub-total OpEx	32,313	35,512	45,429	47,130	44,015
Other Costs	3,231	3,551	4,543	4,713	4,402
Total OpEx (JOD)	35,544	39,063	49,972	51,843	48,417

Initial setup costs for laboratory and R&D facilities total JOD 21,000, with additional investments in Years 2 and 4 to expand capabilities and maintain technological leadership.

Table 6: Capital Expenditures Cost – five-year projection

Description / Year	0	1	2	3	4	5
Laboratory Setup	10,000		5,000		5,000	
R&D Facilities	10,000		5,000		5,000	
Office Setup	1,000					
Total CapEx	21,000		10,000		10,000	

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 10,045, which has to increase steadily year over year to reach JOD 31,535 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	2,962	3,255	4,164	4,320	4,035
Accounts Receivable (A/R)	6,250	10,000	11,000	15,125	23,750
Inventory	833	1,500	1,333	1,833	3,750
Accounts Payable (A/P)	-	-	-	-	-
Net Working Capital	10,045	14,755	16,498	21,279	31,535
Changing in Working Capital		4,710	1,742	4,781	10,256

5.2.2 Project Initial Cost

The project's initial cost is projected to be JOD 31,045, comprising JOD 21,000 as CapEx and JOD 10,045 as net working capital.

Table 8: Initial Cost Summary (JOD)

Description/Year	JOD
CapEx	21,000
Net Working Capital	10,045
Total Initial Cost	31,045

5.2.3 Projected Income Statement

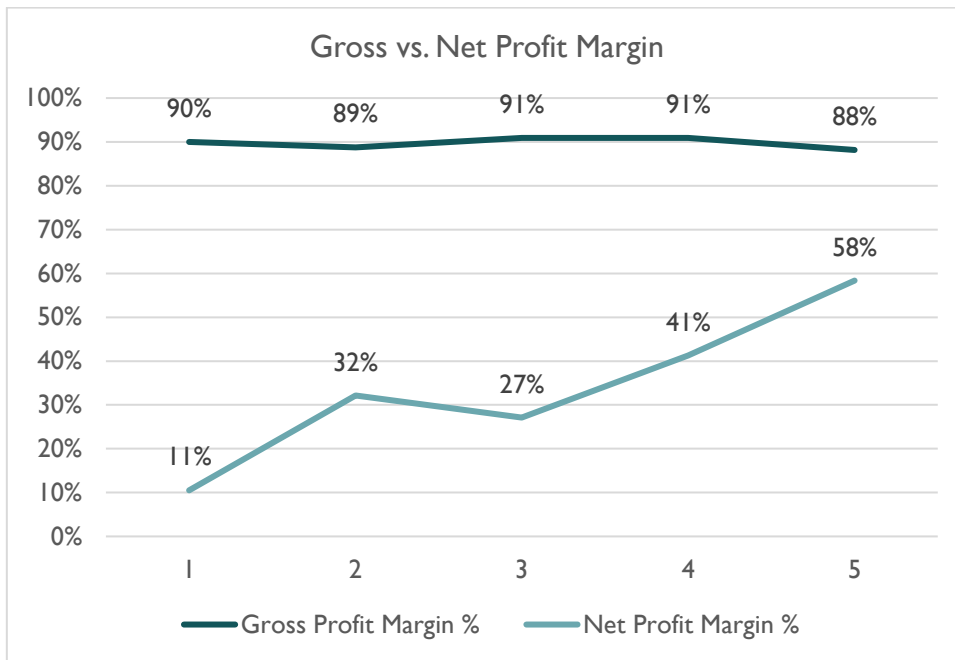
The projected income statement indicates that the project will generate a profit of JOD 5,256 in the first year of operation. Furthermore, net profits are expected to increase gradually over the study period, reaching JOD 110,883 in the fifth year of operation.

Table 9: Projected Income Statement (JOD)

Description/Year	1	2	3	4	5
Total Revenues	50,000	80,000	88,000	121,000	190,000
COGS	5,000	9,000	8,000	11,000	22,500
Gross Profit	45,000	71,000	80,000	110,000	167,500
OpEx	35,544	39,063	49,972	51,843	48,417
Net Profit Before Tax and Depreciation	9,456	31,937	30,028	58,157	119,083
Depreciation	4,200	6,200	6,200	8,200	8,200
Net Profit Before Tax	5,256	25,737	23,828	49,957	110,883
Tax Expense	-	-	-	-	-
Net Profit	5,256	25,737	23,828	49,957	110,883

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 88.2%, and the net profit margin is 58.4%.

Figure 3: Gross vs Net Profit Margin



On the asset management side, the study shows that the return on investment will increase steadily from 16.9% in the first year of operation to 217.2% in the fifth year.

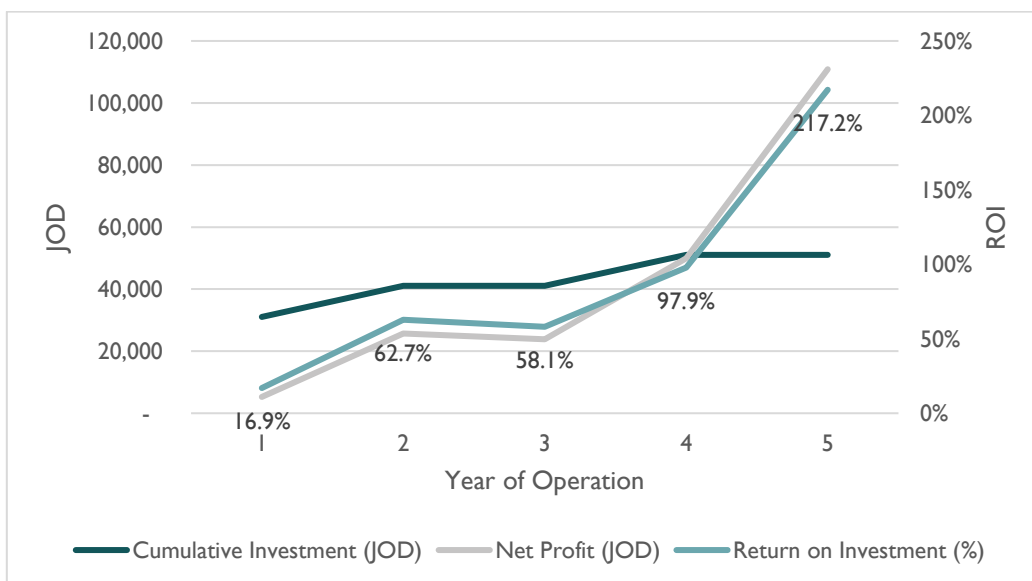


Figure 4: Return on Investment

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 9,456. 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 108,827.

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

Description/Year	0	1	2	3	4	5
Cash-in Flow						
Net Profit		5,256	25,737	23,828	49,957	110,883
Depreciation		4,200	6,200	6,200	8,200	8,200
Injected Capital	31,045					
Total Cash-in Flow	31,045	9,456	31,937	30,028	58,157	119,083
Cash-out Flow						
Initial Cost	31,045		10,000	-	10,000	-
Changes in Working Capital			4,710	1,742	4,781	10,256
Total Cash-out Flow	31,045	-	14,710	1,742	14,781	10,256
Free Cash Flow	-	9,456	17,227	28,285	43,376	108,827

Based on these results, the project's feasibility indicators demonstrate its viability, with a net present value of JOD 91,800.4 and a profitability index of 3.96. Moreover, the project's internal rate of return (IRR) is expected to be 68.39%, indicating feasibility is not sensitive to changes in market conditions.

Feasibility Indicators	
Net Present Value (NPV)	91,800
Profitability Index (PI)	3.96
Internal Rate of Return (IRR)	68.4%

5.3 Sensitivity Analysis

To assess the project's sensitivity to market conditions, a sensitivity analysis was conducted involving six unfavourable 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	91,800	3.96	68.39%
Drop in revenues by 5%	75,044	3.42	59.18%
Drop in revenues by 10%	58,287	2.88	49.74%
Increase in OpEx by 5%	84,073	3.70	63.36%
Increase in OpEx by 10%	76,345	3.44	58.42%
Increase in initial cost by 5%	90,248	3.77	65.81%
Increase in initial cost by 10%	88,696	3.60	63.40%

The sensitivity analysis shows that the project is feasible and not sensitive to unfavourable 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.

6. Integration with Other Sectors

GeneGrow Jo's gene-editing technology can impact various sectors beyond agriculture. In environmental management, the development of crops requiring less water and fewer chemical inputs can help reduce pollution and conserve resources. In the health sector, enhanced crop nutritional profiles can support efforts to combat malnutrition and improve public health. The technology sector can benefit from partnerships in agricultural data analytics and AI integration for developing new crop varieties. Educational and research institutions can collaborate with GeneGrow Jo to drive innovation and validate findings, contributing to academic and practical advancements. Furthermore, engaging with government bodies to influence favorable agricultural policies can support the adoption of genetically edited crops tailored to regional challenges, thus fostering a holistic approach to sustainable development and food security. These integrations highlight GeneGrow Jo's potential to contribute to broad societal and ecological goals through interdisciplinary collaboration and innovation.

7. Entrepreneur Persona

The ideal leader for GeneGrow Jo should have a blend of expertise in genetics, agronomy, and business management. This individual should possess deep technical knowledge of genetic engineering and its applications in agriculture, ensuring they can effectively oversee the development and application of gene-editing technologies. Business acumen is crucial, including strong skills in strategic planning, operations, and marketing, to drive the startup's growth and market penetration. Leadership abilities are essential to inspire and manage a diverse team, fostering innovation and operational efficiency. Additionally, the entrepreneur should have a solid understanding of regulatory frameworks and be adept at navigating the complexities of agricultural regulations and GMO legislation. A background in engaging with government bodies and policymakers will be beneficial in influencing favorable regulations for the commercialization of genetically edited crops. This combination of technical prowess, business strategy, leadership, and regulatory insight will be key to successfully steering GeneGrow Jo towards its goals.

8. Stakeholders

GeneGrow Jo's key stakeholders include farmers and agricultural cooperatives, who are the direct users of the genetically edited seeds, benefiting from higher yields and more resilient

crops. Government agencies are crucial partners in regulatory processes and potential subsidy providers, supporting initiatives to improve food security and reduce water usage. Academic and research institutions collaborate on R&D and validate new technologies, driving agricultural innovation. Environmental groups, advocating for sustainable farming practices, are allies in promoting the ecological benefits of GeneGrow Jo's crops. Additionally, non-governmental organizations (NGOs) and international organizations interested in global food security and agricultural sustainability may partner with GeneGrow Jo to implement pilot programs and raise awareness about its technology. Engaging these stakeholders through regular consultations, collaborative projects, and transparent communication will be vital for gaining market acceptance, influencing policy, and ensuring the long-term success and sustainability of GeneGrow Jo's initiatives.

9. Risk Assessment and Mitigation

Successfully deploying GeneGrow Jo in Jordan entails navigating several risks:

Risk	Impact	Likelihood	Risk Mitigation Technique
Regulatory Challenges	Changes in GMO regulations could impact operations.	High	Active engagement in lobbying and policy discussions.
Market Adoption	Resistance from farmers or consumers towards GMO crops.	High	Educational campaigns and transparency in product benefits.
Technological Obsolescence	Rapid advancements that could outpace current methods.	Moderate	Ongoing investment in R&D and collaboration with tech leaders.

Addressing these risks proactively with strategic planning and contingency measures will be vital for the smooth operation and long-term sustainability of GeneGrow Jo.

Continue with Innovation and R&D Investment: Sustaining a competitive edge requires continuous investment in research and development. This will not only enhance the existing product lineup but also allow GeneGrow Jo to stay abreast of technological advancements and emerging market needs. Ongoing R&D ensures the development of new, more resilient crop varieties and the improvement of existing ones, aligning with market demands and environmental challenges.

Expand Market Reach: Begin with a focus on the local market, but plan for expansion into the MENA region and globally. Target regions with similar climate challenges, such as North Africa and parts of Central Asia. This strategic approach will allow GeneGrow Jo to establish a strong presence in regions facing comparable agricultural issues, leveraging its technology to meet specific local needs.

Strengthen Stakeholder Relationships: Develop and maintain strong relationships with all stakeholders, including farmers, academic institutions, government entities, and non-governmental organizations. These relationships will be crucial for gaining market acceptance and support in advocacy efforts related to regulatory challenges. Regular consultations and collaborative projects will help build trust and demonstrate mutual benefits.

Enhance Public Education and Outreach: Implement comprehensive educational campaigns to increase public awareness and understanding of gene-editing technologies and their benefits. Addressing misconceptions about GMOs through transparent communication and educational initiatives will help mitigate public resistance and foster acceptance.

Leverage Technology Licensing: Maximize revenue through strategic licensing agreements that allow other companies to use GeneGrow Jo's technology. This can provide a steady income stream and fund further research and expansion. Licensing also facilitates broader application of technology, contributing to agricultural advancements.

Implement a Scalable Production System: Develop a production system that can scale efficiently as demand grows. Invest in automation and data analytics to optimize production and research efforts. Ensuring scalability will enable GeneGrow Jo to meet increasing market demand while maintaining product quality and operational efficiency.

Focus on Sustainability: Commit to sustainable practices in product development and internal operations. This includes reducing water and chemical usage in agriculture and aligning with global trends towards environmental responsibility. Emphasizing sustainability will enhance the company's brand image and contribute to ecological conservation efforts.

10. Conclusion

GeneGrow Jo represents a ground-breaking start-up opportunity into the field of AgriGenomics, by aiming to transform agriculture in arid regions through the use of advanced gene-editing technologies tailored for Jordan and MENA. By developing crops which are more resilient, water-efficient, and nutritious, the start-up addresses critical issues of food security and sustainability in the face of climate change challenges. The strategic approach of combining product sales, licensing, and educational services provides a business model that can leverage the company's technological innovations for commercial success and social benefit.

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

The Ministry of Digital Economy and Entrepreneurship (MoDEE) and Istadama Consulting have prepared this report using information supplied by its advisors as well as information available in the public domain.

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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.