Business Proposal for Rural Livelihood in Mate Ka Tala Village, Barmer District, Rajasthan and also

Project-A Comprehensive Value Chain and Feasibility Analysis, and Production Optimization for Fig Crop

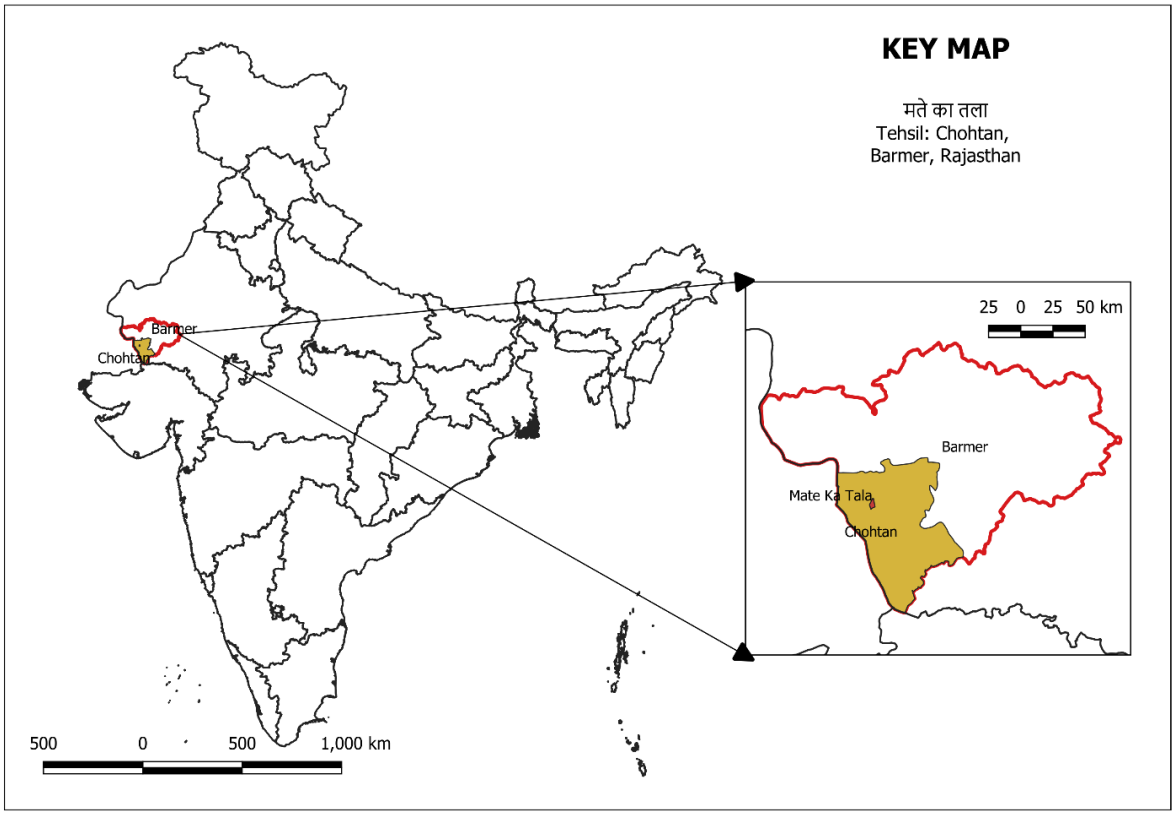
By

Kajal Singh (Self Project)

Executive Summary

In the arid expanse of Mate Ka Tala village, 18km away from Chhotan subdistrict, nestled within the rugged terrain of Barmer district, Rajasthan, I present an innovative proposal for the initiation of a sustainable Fig cultivation project. This agricultural endeavour transcends mere farming; it serves as a beacon of economic resilience, environmental stewardship, and community empowerment. Positioned strategically in the heart of the Thar Desert, this project capitalizes on the region's unique climate, optimizing fig cultivation practices tailored to arid conditions.

Managed by local farmers, the project introduces advanced agricultural techniques that



harmonize with traditional knowledge, ensuring optimal yield and quality. A well-structured financing plan, with 70% funding from agricultural grants and 30% equity from local stakeholders, underpins the project's financial viability. Positive NPV, a high IRR, and a short payback period further affirm its economic potential. The project also aims to enhance soil health through organic farming practices, ensuring long-term sustainability.

The Fig cultivation project in Mate Ka Tala is not just about growing a fruit; it is a step towards enhancing economic independence and food security, and building a resilient future for the village and its people.

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Fig Cultivation Project

Project proposal for 15 lakhs

1. Introduction

In the arid landscape of Mate Ka Tala village, Barmer district, Rajasthan, the Fig cultivation project emerges as a beacon of hope for local farmers. This initiative is designed to harness the region's unique climate, offering a sustainable and profitable agricultural solution. Figs, known for their resilience in dry conditions, are an ideal crop for this environment, promising not only to enhance the livelihoods of the farmers but also to contribute to the village's overall economic stability. By integrating modern agricultural techniques with traditional practices, the project aims to optimize fig production while preserving the local environment. The involvement of local farmers ensures that the benefits of this project are deeply rooted in the community, promoting both economic independence and environmental sustainability. This project represents a significant step towards a more prosperous and resilient future for Mate Ka Tala and its people.

1.1. Livelihood Options in Village

As we can see from the data there are In Mate Ka Tala village, located in the Barmer district of Rajasthan, the primary livelihood options are deeply tied to the region's arid landscape and traditional practices.' The majority of the population around 80% are farmers. Agriculture, though challenging due to the harsh climate, remains a key source of income, with crops like Bajra, pulses, and mustard, Jeera being commonly cultivated. Livestock rearing, particularly of Cows, goats and sheep, is another crucial livelihood, providing both food and income through the sale of milk, wool, and meat.

The village is situated approximately 19 km away from the sub-district headquarters of Chohtan and 69 km away from the district headquarters of Barmer. Public bus service is available within a distance of more than 10 km from the village, while private bus service is accessible within the village itself. The nearest railway station to Mate Ka Tala is Bhachhbar, which is located within a distance of 27.64 km. The closest airport is Jaisalmer Airport, which is approximately 133.73 km (Aerial distance) away from the village.

In terms of nearby amenities and facilities, Mate Ka Tala has access to several banking options. The village has three banks located in the nearby town of Chohtan, including Au Small Finance Bank Limited, Bank of Baroda, and ICICI Bank Limited.

2. Market Study/Scope Analysis

2.1. Global Scenario

The global scenario of fig production highlights significant trends and statistics regarding its cultivation and trade. As of recent data, the total global harvested area for fig (Ficus carica) is approximately 281,522 hectares, with a production yield of around 1,264,943 tonnes as reported by FAOSTAT in 2022. This indicates a yield rate of approximately 44,932 hectograms per hectare (Ramadan, 2023). The production of figs occurs primarily in Mediterranean countries, contributing to around 90% of the global fig output.

2.2. Indian Scenario and Demand

India has become a significant participant in the global fig industry due to the country's increasing production of figs (Ficus carica). India is ranked 15th in the world for fig production and 9th for the area of land used for harvesting figs(Ramadan, 2023). The total fig market in India is around 5000 crore, in that the dry fig market is worth 4,000 crore and the fresh and other product market is 1,000 crore. India mainly imports figs to match their consumption; see the fig below. The main exporters of high-quality figs in India are Turkey and Afghanistan.

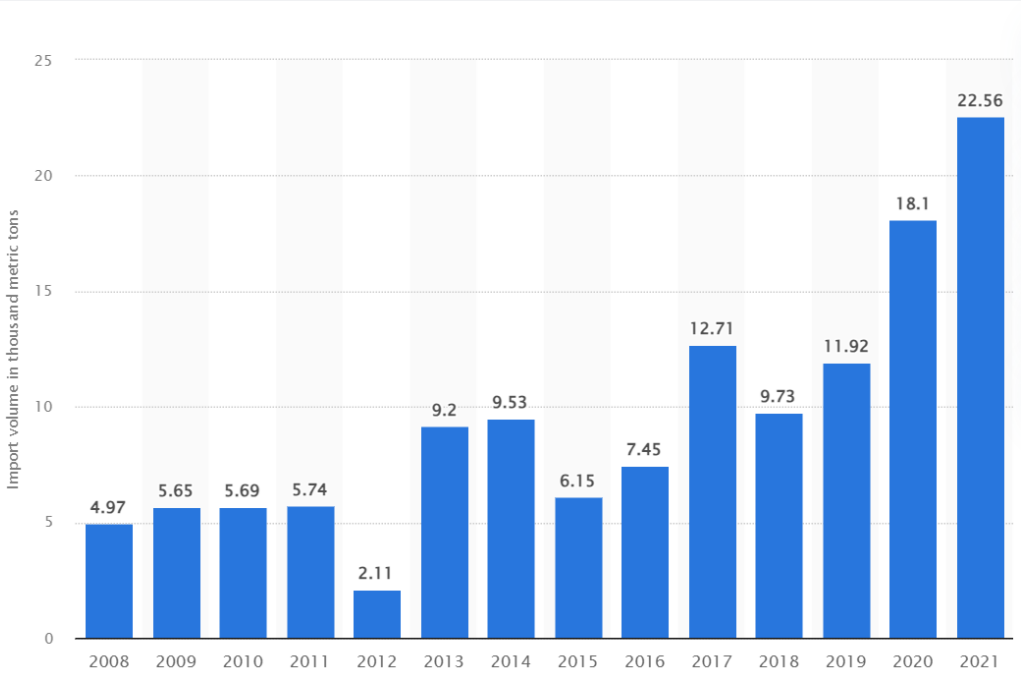


Figure 1: Import volume of dried figs across India from 2008 to 2021

Source: *https://www.statista.com/statistics/872368/india-dried-fig-import-volume/*

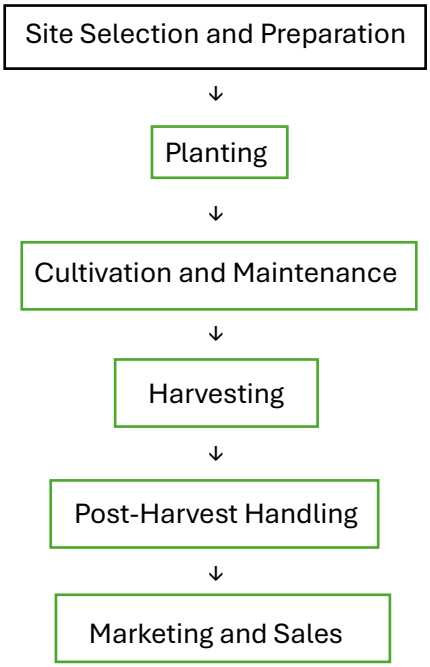
India also exported around 6,200 metric tons of figs for the fiscal year 2021-2022, with the main destinations being the Middle East and Europe. The export value of figs amounted to around $10 million, indicating a steady growth in quantity and income in recent years. Notable Indian states engaged in fig exports are Karnataka, Maharashtra, and Haryana, renowned for their production of premium figs appropriate for international trade.

Major metro areas like Chennai, Bangalore, Mumbai, Delhi, and Ahmedabad demand the highest figs. Retail costs range from Rs. 800 to Rs. 2000 per kg, with Bangalore and Chennai having the lowest average prices and Ahmedabad, Mumbai, and Delhi with the highest.

The importance of figs in the Indian export market is recognised as a significant opportunity, especially in the context of increasing health awareness and the demand for organic and exotic fruits. Efforts to enhance fig cultivation and improve export quality are ongoing, potentially leading to a more favourable trade balance in the future.

3. Process, Operational Details, Methodology

3.1. Process



3.2. Operational Details

The fig cultivation project involves several key stages. Initially, the site selection and preparation are crucial, requiring well-drained soil with a slightly acidic to neutral pH. Land must be cleared and tested, with holes dug for planting and enriched with cow dung. Fig saplings are then planted at a spacing of 12 feet by 12 feet. Regular maintenance includes watering, fertilization, and pruning. Pest management is also essential to control diseases and pests. During harvesting, figs are collected when ripe, sorted, and handled carefully. Post-harvest, figs are cleaned, packaged, and stored to maintain quality. Finally, a marketing strategy is developed based on market research to promote and sell the figs.

3.3. Methodology

1. Conduct a literature review to gather information on fig cultivation practices, market trends, and the characteristics of the Diana fig variety.
2. Perform market surveys and interviews with farmers, agribusiness experts, and market stakeholders to understand market demand and consumer preferences.
3. Undertake field studies to collect data on cultivation practices, productivity, disease resistance, fruit quality, and post-harvest handling.
4. Develop a value chain map to delineate the stages of fig cultivation, processing, and marketing, and identify value-addition opportunities.
5. Perform an economic analysis to evaluate the financial viability of Diana fig cultivation, considering costs, revenue projections, and market dynamics.
6. Assess sustainability aspects, including environmental impacts, resource conservation, and effects on rural livelihoods.
7. Engage with key stakeholders such as farmers, extension services, government bodies, and industry experts to incorporate diverse perspectives.
8. Consult with agricultural scientists, horticultural specialists, and market analysts to validate research findings and enhance the analysis.
9. Evaluate technological interventions and best practices for optimizing fig production, including irrigation, soil management, pest control, and post-harvest technologies.

4. Stakeholder Analysis

Stakeholder	Interest	Influence	Involvement
Farmers and Landowners	Maximize crop yield, and profitability, and ensure sustainable farming practices.	High	Active - Day-to-day farming activities, decision-making.
Aggregator - Agrohabit Company	Ensure the success of fig cultivation for business reputation and future sales.	High	Supportive - Plant supply, cultivation advice, Buys dried and fresh figs directly from farmers
Local Community	Economic opportunities, employment, local business growth, and improved food security.	Medium	Indirect - Employment opportunities, local commerce.
Government Agencies and Local Authorities	Promote agricultural development, increase local income, ensure sustainable land use.	High	Regulatory - Oversee compliance with regulations and policies.
Investors and Financial Institutions	Profitability and viability of the project for returns on investment.	High	Financial - Provide funding, monitor financial performance.
Environmental Organizations	Concerned with the environmental impact, advocating for sustainable practices.	Medium	Advocacy - Ensure adherence to environmental standards.

Consumers and Markets	Quality, price, and availability of figs.	Medium	End-user - Influence market demand through purchasing decisions.
Research and Development Institutions	Improve agricultural practices, develop disease-resistant varieties, enhance productivity.	Low	Research - Conduct studies, provide innovations and insights.

5. Cost of the Project

5.1. Total Fixed Cost for Fig Production

Land	160000
Pond size (90*90*16) for 5 acres	133333
Solar for 5 acres	96000
Drip system	200000
Plants (165 plants in an acre) of Rs. 160/plant	211200
Shed for worker/crop for 5 acres	80000
Total Fix Cost	**880533**

5.2. Operation & Management Expenses in Fig Production in 5 Acres

Tractor Rent with Diesel Per Day (10 days a year)	32000
Fixed Labour (5 acres @ 1.5 lakh/annum)	150000
Electricity	51900
Plant Nutrient Per Plant (Rs. 140/plant)	184800
Fruit Pickers (50 kg per day)	
Fruit Picker annual rate (for 50 kg)	211200
Total Operational Cost	**629900**

6. Means of Finance

This project has a total cost of Rs 15,10,433 of which 50% of the cost would be a loan from the SBI bank with an interest rate of 11.5% for 5 years.

Sr. No	Particulars	Details
1	Total Project Cost	₹ 15,10,433
2	Loan Amount @50%	₹ 7,55,216
3	Equity from Promoters @50%	₹ 7,55,216
4	Interest Rate	11.5%
5	Loan Tenure	5.0
6	Monthly EMI Payable	16,609
7	Annual Amount Repaid (Rs.)	₹ 1,99,308

7. Profitability Statement

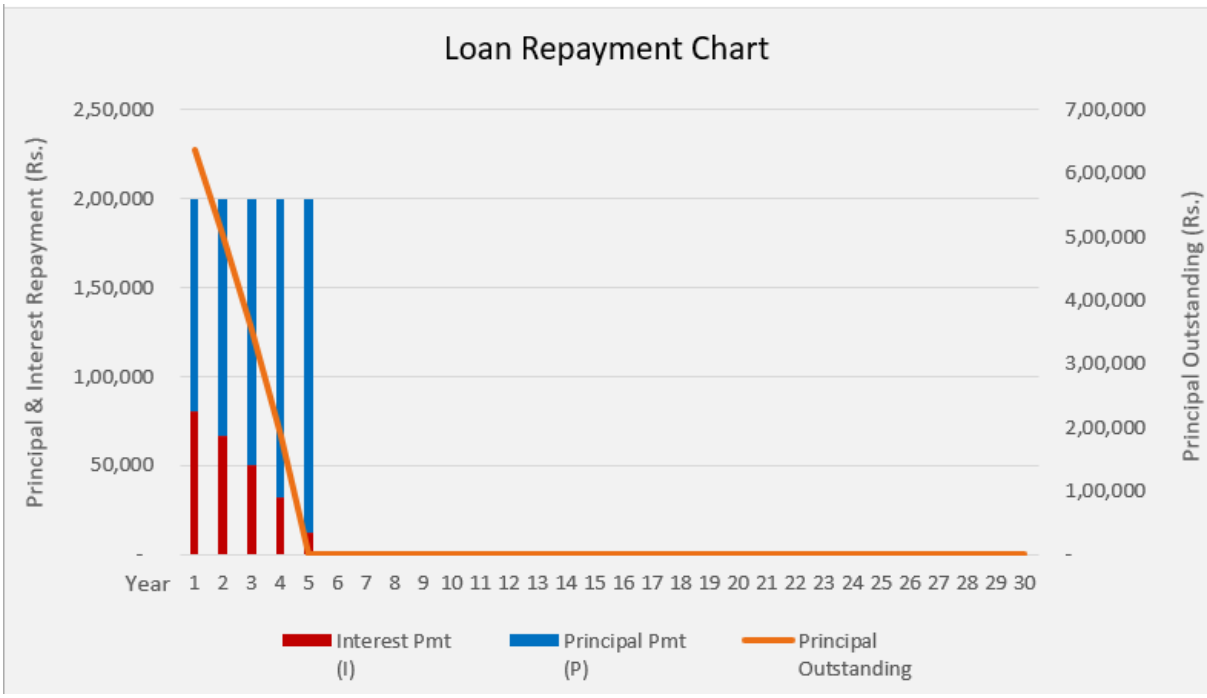
7.1 Loan Repayment

In this section 7.1 regarding Loan Repayment, all the subsections cover the EMI payment procedure for a span of five years. At the outset of each year, the balance carried forward is the same as the closing balance from the preceding year. The EMI payment for each year is further broken down into its constituent parts: the interest component and the loan repayment component, which are itemized separately. The cumulative interest paid over the five successive years would be the sum of the total interest paid during each of these years, and likewise, the cumulative loan repayment over the same period would be the sum of the total loan repayment for each of the five years.

Loan Repayment Schedule (Yearly)

(figures in Rupees)

Year	Principal Pmt (P)	Interest Pmt (I)	Total Payment (P+I)	Principal Outstanding	Cumulative Interest	Cumulative Principal
1	1,18,581	80,729	1,99,310	6,36,635	80,729	1,18,581
2	1,32,960	66,350	1,99,310	5,03,674	1,47,078	2,51,542
3	1,49,083	50,227	1,99,310	3,54,591	1,97,305	4,00,625
4	1,67,161	32,149	1,99,310	1,87,431	2,29,455	5,67,785
5	1,87,431	11,879	1,99,310	-	2,41,334	7,55,216
Total	**7,55,216**	**2,41,334**	**9,96,550**			



7.2. Monthly Repayment

Loan Repayment Schedule (Monthly)

(figures in Rupees)

Month	Principal Pmt (P)	Interest Pmt (I)	Total Payment (P+I)	Principal Outstanding	Cumulative Interest	Cumulative Principal
1	9,372	7,237	16,609	7,45,844	7,237	9,372
2	9,461	7,148	16,609	7,36,383	14,385	18,833
3	9,552	7,057	16,609	7,26,831	21,442	28,385
4	9,644	6,965	16,609	7,17,187	28,408	38,029
5	9,736	6,873	16,609	7,07,451	35,281	47,765
6	9,829	6,780	16,609	6,97,621	42,060	57,595
7	9,924	6,686	16,609	6,87,698	48,746	67,518
8	10,019	6,590	16,609	6,77,679	55,336	77,537
9	10,115	6,494	16,609	6,67,564	61,831	87,652
10	10,212	6,397	16,609	6,57,353	68,228	97,863
11	10,310	6,300	16,609	6,47,043	74,528	1,08,173
12	10,408	6,201	16,609	6,36,635	80,729	1,18,581
13	10,508	6,101	16,609	6,26,127	86,830	1,29,089
14	10,609	6,000	16,609	6,15,518	92,830	1,39,698
15	10,710	5,899	16,609	6,04,807	98,729	1,50,409
16	10,813	5,796	16,609	5,93,994	1,04,525	1,61,222
17	10,917	5,692	16,609	5,83,078	1,10,217	1,72,138
18	11,021	5,588	16,609	5,72,056	1,15,805	1,83,160
19	11,127	5,482	16,609	5,60,929	1,21,287	1,94,287
20	11,234	5,376	16,609	5,49,696	1,26,663	2,05,520
21	11,341	5,268	16,609	5,38,354	1,31,931	2,16,862
22	11,450	5,159	16,609	5,26,904	1,37,090	2,28,312
23	11,560	5,050	16,609	5,15,345	1,42,140	2,39,871
24	11,670	4,939	16,609	5,03,674	1,47,078	2,51,542
25	11,782	4,827	16,609	4,91,892	1,51,905	2,63,324
26	11,895	4,714	16,609	4,79,997	1,56,619	2,75,219
27	12,009	4,600	16,609	4,67,988	1,61,219	2,87,228
28	12,124	4,485	16,609	4,55,863	1,65,704	2,99,353
29	12,240	4,369	16,609	4,43,623	1,70,073	3,11,593
30	12,358	4,251	16,609	4,31,265	1,74,324	3,23,951
31	12,476	4,133	16,609	4,18,789	1,78,457	3,36,427
32	12,596	4,013	16,609	4,06,193	1,82,471	3,49,023
33	12,716	3,893	16,609	3,93,477	1,86,363	3,61,739
34	12,838	3,771	16,609	3,80,638	1,90,134	3,74,578
35	12,961	3,648	16,609	3,67,677	1,93,782	3,87,539
36	13,086	3,524	16,609	3,54,591	1,97,305	4,00,625
37	13,211	3,398	16,609	3,41,380	2,00,704	4,13,836
38	13,338	3,272	16,609	3,28,043	2,03,975	4,27,173
39	13,465	3,144	16,609	3,14,577	2,07,119	4,40,639
40	13,594	3,015	16,609	3,00,983	2,10,134	4,54,233
41	13,725	2,884	16,609	2,87,258	2,13,018	4,67,958
42	13,856	2,753	16,609	2,73,402	2,15,771	4,81,814
43	13,989	2,620	16,609	2,59,413	2,18,391	4,95,803
44	14,123	2,486	16,609	2,45,290	2,20,877	5,09,926
45	14,258	2,351	16,609	2,31,031	2,23,228	5,24,185
46	14,395	2,214	16,609	2,16,636	2,25,442	5,38,580
47	14,533	2,076	16,609	2,02,103	2,27,518	5,53,113
48	14,672	1,937	16,609	1,87,431	2,29,455	5,67,785
49	14,813	1,796	16,609	1,72,618	2,31,251	5,82,598
50	14,955	1,654	16,609	1,57,663	2,32,905	5,97,553
51	15,098	1,511	16,609	1,42,564	2,34,416	6,12,652
52	15,243	1,366	16,609	1,27,322	2,35,782	6,27,894
53	15,389	1,220	16,609	1,11,933	2,37,002	6,43,283
54	15,536	1,073	16,609	96,396	2,38,075	6,58,820
55	15,685	924	16,609	80,711	2,38,999	6,74,505
56	15,836	773	16,609	64,875	2,39,772	6,90,341
57	15,987	622	16,609	48,888	2,40,394	7,06,328
58	16,141	469	16,609	32,747	2,40,863	7,22,469
59	16,295	314	16,609	16,452	2,41,176	7,38,764
60	16,452	158	16,609	-	2,41,334	7,55,216

7.3. Detailed Analysis of Profit

		Year 1	Year 2	Year 3	Year 4	Year 5
Fixed Cost	**Total Capital Cost (A)**	**₹ 8,80,533.00**				
Operational Cost	Tractor Rent with Diesel Per Day (10 days a year)	₹ 32,000.00	₹ 32,320.00	₹ 32,643.00	₹ 32,969.00	₹ 33,299.00
	Fixed Labour cost	₹ 1,50,000.00	₹ 1,54,500.00	₹ 1,59,135.00	₹ 1,63,909.05	₹ 1,68,826.32
	Electricity	₹ 51,900.00	₹ 52,419.00	₹ 52,943.19	₹ 53,472.62	₹ 54,007.35
	Plant Nutrient Cost	₹ 1,84,800.00	₹ 1,88,496.00	₹ 1,92,265.92	₹ 1,96,111.24	₹ 2,00,033.46
	Fruit Pickers Salary	₹ 2,11,200.00	₹ 2,17,536.00	₹ 2,24,062.08	₹ 2,30,783.94	₹ 2,37,707.46
	Total Operational Cost (B)	**₹ 6,29,900.00**	**₹ 6,45,271.00**	**₹ 6,61,049.39**	**₹ 6,77,246.48**	**₹ 6,93,873.92**
Financial Expenses	Total Maintaince and Depreciation Cost (Rs.)	24560	26033.6	26033.6	26033.6	26033.6
	Interest on Term Loan	₹ 80,729.00	₹ 66,350.00	₹ 50,227.00	₹ 32,149.00	₹ 11,879.00
	Principal Repayment	₹ 1,99,310.00	₹ 1,99,310.00	₹ 1,99,310.00	₹ 1,99,310.00	₹ 1,99,310.00
Income	Net Revenue: Fresh Fig	₹ 5,06,880.00	₹ 6,03,724.83	₹ 6,23,395.00	₹ 6,44,075.80	₹ 6,65,831.21
	Net Revenue:Dry Fig	₹ 14,85,000.00	₹ 15,84,000.00	₹ 16,90,128.00	₹ 18,03,366.58	₹ 19,24,192.14
	Net Total Revenue (C)	**₹ 19,91,880.00**	**₹ 21,87,724.83**	**₹ 23,13,523.00**	**₹ 24,47,442.37**	**₹ 25,90,023.35**
Net Profit		**₹ 4,81,447.00**	**₹ 15,42,453.83**	**₹ 16,52,473.61**	**₹ 17,70,195.89**	**₹ 18,96,149.43**

8. Debt service coverage ratio (DSCR)

Sr No	Particulars	Year-1	Year-2	Year-3	Year-4	Year-5
1	Profit After Tax (Net Profit)	₹ 4,81,447	₹ 15,42,454	₹ 16,52,474	₹ 17,70,196	₹ 18,96,149
2	Depriciation	24560	26033.6	26033.6	26033.6	26033.6
3	Interest	₹ 80,729	₹ 66,350	₹ 50,227	₹ 32,149	₹ 11,879
	Total	**₹ 5,86,736**	**₹ 16,34,837**	**₹ 17,28,734**	**₹ 18,28,378**	**₹ 19,34,062**
1	Interest	₹ 80,729	₹ 66,350	₹ 50,227	₹ 32,149	₹ 11,879
2	Loan Repayment	₹ 1,18,581	₹ 1,32,960	₹ 1,49,083	₹ 1,67,161	₹ 1,87,431
	Total	**₹ 1,99,310**	**₹ 1,99,310**	**₹ 1,99,310**	**₹ 1,99,310**	**₹ 1,99,310**
	DSCR	**2.94**	**8.20**	**8.67**	**9.17**	**9.70**
	AVG DSCR	**7.74**				

9. Internal Rate of Return Analysis (Cashflow Analysis)

Year >>	0	1	2	3	4	5	6
Total Project Cost	**₹ -1.51**						
Toll Revenue		₹ 1.99	₹ 2.19	₹ 2.31	₹ 2.45	₹ 2.59	₹ 2.74
Operating Costs		-₹ 0.63	-₹ 0.65	-₹ 0.66	-₹ 0.68	-₹ 0.69	-₹ 0.71
Net Cash Flows (NCF)	**₹ -1.51**	₹ 1.36	₹ 1.54	₹ 1.65	₹ 1.77	₹ 1.90	₹ 2.03
Cumulative Cash Flows	**₹ -1.51**	₹ -0.15	₹ 1.39	₹ 3.05	₹ 4.82	₹ 6.71	₹ 8.74
Discount Rate	**10%**						
Discount Factor	**₹ 1.00**	₹ 0.91	₹ 0.83	₹ 0.75	₹ 0.68	₹ 0.62	₹ 0.56
Present Value of NCF	**-₹ 1.51**	**₹ 1.24**	**₹ 1.27**	**₹ 1.24**	**₹ 1.21**	**₹ 1.18**	**₹ 1.15**
Cum. Disc. Cash Flows	**-₹ 1.51**	-₹ 0.27	₹ 1.00	₹ 2.24	₹ 3.45	₹ 4.63	₹ 5.78
Net Present Value	**₹ 5.78**						
IRR - Project	**98%**						

All Values calculated are in Millions

The high IRR indicates that the project is highly profitable. However, this could also suggest that market conditions might not have been fully accounted for. To address this, the NPV (using a discount rate of 10%) and ROI have also been calculated. Both metrics are positive, confirming the project's viability. Additionally, the cumulative cash flow analysis shows a payback period of less than two years, with the project generating positive net profit starting from the second year onward.

Conclusion

The fig cultivation project in Mate Ka Tala Village, Barmer District, Rajasthan, represents a strategic and sustainable agricultural initiative aimed at capitalizing on the unique agro-climatic conditions of the region. By focusing on the Diana fig variety, known for its high market value and adaptability, the project is poised to deliver significant economic returns and contribute to the local economy.

With a carefully crafted business plan that encompasses site preparation, advanced cultivation practices, effective pest management, and a comprehensive marketing strategy, this venture has been designed to maximize productivity and profitability. The financial projections and market analysis underscore the viability of this project, making it a compelling investment opportunity.

Securing the necessary funding will enable the successful implementation of this project, fostering agricultural innovation and creating sustainable livelihoods in the region. The support and partnership of stakeholders, including the State Bank of India, will be instrumental in transforming this vision into a thriving agricultural enterprise.

We are confident that this project will not only meet but exceed its goals, paving the way for future expansion and contributing to the broader goals of rural development and sustainable agriculture in Rajasthan.

Letter of Intent

Mohan Singh

President, Hudda SHG

Mate Ka Tala Village,

Barmer District, Rajasthan

344701

1st September 2024

The Branch Manager

State Bank of India

Chohtan Branch

Chohtan,Barmer

344701

Subject: Request for Agricultural Loan for Fig Cultivation Project in Mate Ka Tala Village, Barmer District, Rajasthan

Dear Sir/Madam,

I am writing to express my intent to apply for an agricultural loan of Rs. 7,55,216 from the State Bank of India to support the establishment and development of a fig cultivation project in Mate Ka Tala Village, Barmer District, Rajasthan.

I am a resident of Mate Ka Tala Village and have identified fig cultivation as a viable and profitable agricultural venture, particularly the cultivation of the Diana fig variety. The proposed project will involve the planting and maintenance of fig trees on a well-prepared farmland, following sustainable and scientifically proven agricultural practices.

I have attached a detailed project report, including cost estimates, revenue projections, and a timeline for implementation, for your reference. I would greatly appreciate your favorable consideration of this loan request. The loan will be repaid as per the terms and conditions set by the bank, and I am committed to adhering to all required financial obligations.

I look forward to the opportunity to discuss this project in detail and to work with the State Bank of India in bringing this agricultural initiative to fruition.

Thank you for your time and consideration.

Yours sincerely,

Mohan Singh

Quality Control Strategies for Extending Shelf Life and Preserving Natural Color in Diana Dried Figs

Introduction

Diana dried figs are highly valued for their distinctive flavour, nutritional benefits, and versatility in culinary applications. These figs, known for their natural sweetness and chewy texture, play a significant role in domestic and international markets, making them an essential product for growers and distributors alike. However, preserving their quality, particularly concerning shelf life and natural colour, presents formidable challenges. Factors such as the production of ethylene, which accelerates ripening and deterioration, and enzymatic browning driven by oxidative reactions in higher moisture content figs can significantly impact the visually appealing attributes and shelf stability of the product(Venkatesan & Muniyan, 2024). Fig fruits are abundant in amino acids, carbohydrates, dietary fibers, and minerals.The fig has a mineral concentration that is two to four times higher than that of other fresh fruits. Fig contains higher levels of iron and copper compared to the majority of other fresh fruits, as well as dried fruits and vegetables(Shelar et al., 2022). Based on USDA data for the Mission variety, dried figs have high levels of fiber, copper, manganese, magnesium, potassium, calcium, and vitamin K, which are essential for meeting human nutritional requirements(Joseph & Raj, n.d.).

This study aims to explore various quality control strategies to effectively extend the shelf life of Diana dried figs while maintaining their natural color. Specific objectives include identifying efficient methods to investigating natural preservatives and modified atmosphere packaging techniques that can protect against color degradation(Shelar et al., 2022).

The scope of this report encompasses an examination of several post-harvest challenges, including enzymatic browning and moisture-related spoilage, which can compromise the quality of dried figs. It will analyze various treatments and preventative measures to extend shelf life, as well as discuss the economic implications and practical limitations of these strategies(Palumbo et al., 2022). By shedding light on these aspects, the report aims to provide insights into the best practices for maintaining the quality of Diana dried figs through careful quality control.

Quality control is crucial in the dried fig production process, as it directly correlates with product quality, safety, and consumer satisfaction. Implementing effective quality control measures not only enhances the longevity and aesthetic appeal of the figs but also contributes to reducing post-harvest losses and maintaining market competitiveness. This study will underscore the importance of adopting advanced preservation techniques that can safeguard the quality of Diana-dried figs, thus supporting producers in meeting consumer demands and sustaining the viability of their operations(Venkatesan & Muniyan, 2024).

Methodology

The methodology for this study on the quality control strategies for extending shelf life and preserving the natural colour of Diana dried figs involves a systematic approach that includes drying, blanching, and subsequent storage evaluations. Initially, figs are harvested with a moisture content ranging from 70% to 80% and an average weight of approximately 60 to 70 grams per fig. To begin drying, a sample of 1 kg of freshly harvested figs is placed in a solar dryer for 2 to 3 days. During this drying phase, the average temperature within the dryer remains between 39°C to 45°C, with a relative humidity of 20% to 30%.

After the initial drying period, the figs are removed from the solar dryer and subjected to punching, which involves making small punctures in each fig to further facilitate moisture removal. The figs are then returned to the solar dryer for 1 to 2 days under the same temperature and humidity conditions. This process typically reduces the weight of the figs to approximately 350 grams, reflecting a final moisture content of about 25% to 30%.

6.6.3.1. Experiment no 1: To assess the colour retention and shelf life extension; the figs undergo a hot water blanching process. The first treatment involves submerging the dried figs in boiling water at 100°C for 30 seconds, then cooling in ice-cold water. This blanching step is crucial as it inactivates enzymes responsible for colour degradation. The experiment is repeated with another sample a second time with a blanching duration of 1 minute to analyse its effects more thoroughly. After the blanching treatments, the figs are again placed back in the solar dryer for an additional 1.5 to 2 days, allowing them to reach a moisture content of approximately 15% to 20%. Once dried, the figs are transferred to storage conditions maintained at temperatures between 16°C to 19°C for further observation.

Observations:

To analyze the effects of the various treatments, condition of the figs at three key time intervals: Day 0, Day 15, and Day 30, see the below figures. Preliminary results suggest that the 30-second blanching treatment yields the best outcomes regarding moisture retention and color preservation compared to the longer blanching duration. But the limitation is with colour retention the enzymatic browning started after 20 days in both the experiments.

6.6.3.2. Experiment no 2: For the experimental phase, two methods of heat treatment were employed, focusing on the effects of salt water blanching on color retention and shelf life enhancement. In Experiment No. 2, a sample of dried figs was immersed in a solution of hot water mixed with 3.5% salt (mimicking seawater) at a temperature of 80-90°C for varying durations. The first batch underwent blanching for 30 seconds and was immediately cooled in cold water for another 30 seconds. A second batch was subjected to the same temperatures for 1 minute while a third batch was treated for 2 minutes,

following the same cooling protocol. After these treatments, all samples were placed back in the solar drier for an additional 2 days.

The moisture content of the figs post-blanching ranged from 13-15%. Subsequently, the samples were stored at a controlled temperature of 16-19°C for observation over a period of 30 days.

Observations: were made regarding the effectiveness of salt water blanching on color retention and shelf life. Shorter blanching times, particularly the 30-second treatment, yielded the best results, maintaining the figs' vibrant color with no signs of spoilage throughout the observation period. This enhancement is likely due to the saline solution's ability to mitigate enzymatic browning reactions, which are typically accelerated by moisture-related problems. The blanching process deactivates enzymes responsible for browning while the salt solution may help to stabilize the color.

Conversely, the samples subjected to longer blanching durations of 1 and 2 minutes exhibited significant colour changes after 20 and 15 days, turning dark brown to blackish in appearance. This discolouration is potentially attributed to the excessive heat and prolonged exposure to the aqueous environment, which could have catalyzed further enzymatic reactions or caused damage to the fruit's cellular structure, leading to the leaching of pigments.

***Figure**: 30sec, 1 min, 2min, Hot Water+Salt Blanching*

The results emphasize the importance of controlled blanching times in optimizing both the visual appeal and the longevity of dried figs.and this is the best chemical-free organic crop. The summary of the drying and treatment process, along with moisture content measurements, is detailed in the Table below.

Experiment No.	**Treatment**	**Blanching Time**	**Post-treatment Moisture Content (%)**	**Colour Observation After 30 days**	**Spoilage Observed**

1	Hot Water + 3.5% Salt	30 seconds	13-15%	Bright, no spoilage	No
2	Hot Water + 3.5% Salt	1 minute	22-24%	Darker, slight spoilage	Yes
3	Hot Water + 3.5% Salt	2 minutes	25-30%	Blackish, significant spoilage	Yes

. ***Experiment no 3*****:** Following the drying processes, two experimental treatments aimed at enhancing colour retention and extending shelf life were conducted. The first of these experiments involved the use of sulphur fume treatment, applying sulphur as a preservative to improve the quality of the dried figs. For this treatment, two specific concentrations were tested: 10 grams of sulfur per kg of fruit and 4 grams of sulfur per kg of fruit. The sulfur was burned with charcoal (koila) inside a wooden box that contained the figs, allowing the sulfur fumes to permeate the fruit for 2 hours.

Observations: A comparative analysis revealed that the figs treated with 10 grams of sulfur exhibited a noticeable change in color, becoming a light yellow hue, which is considered mandi market acceptable. In contrast, the treatment with 4 grams of sulfur did not yield any significant changes in color. This could potentially be attributed to the larger volume of the wooden box relative to the small sample size, leading to less effective fumigation of the figs.

Inference: While sulfur dioxide treatment can effectively preserve dried fruits by inhibiting enzymatic browning and microbial growth, it is important to note that excessive sulfur residues can be harmful when consumed. Sulfur compounds can cause respiratory issues, gastrointestinal distress, and allergic reactions in some individuals if present in significant quantities in food products. Therefore, the application of sulfur must be carefully controlled to ensure that the levels remain within safe consumption limits [9] . In summary, this methodology provided a systematic approach to evaluating the effectiveness of drying methods and sulfur fume treatments on the quality retention of Diana dried figs, helping inform better preservation practices in the industry.

Experiment No.	**Treatment Description**	**Sulphur Concentration**	**Observations After 30 Days**
3	Sulphur Fume Treatment	10 g/kg	Colour changed to light yellow, market acceptable
4	Sulphur Fume Treatment	4 g/kg	No significant colour change