



Islamic Republic of Iran

Ministry of Economic Affairs and Finance

General Department of Economic Affairs and Finance of North Khorasan

The Diammonium Phosphate

Bojnourd Industrial Park No. 3

Center of Investment Services of North Khorasan

2021 April

Summary of Technical-Economical Pre-Feasibility Study

The Name: The Diammonium Phosphate

Sector: Industrial

Subsector: Chemical Products

ISIC Code: 2412612355 , 2429412874

The owner of:

Organization of Economic Affairs and Finance (North Khorasan)



The ADDRESS:

Iran, North Khorasan, Bojnourd

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1 Abstract

1.1 Project Profile - Summary Sheet

Table 1: Summary Sheet

Project Introduction			
Project Title	The Diammonium Phosphate		
Sector	Industrial		
Sub Sector	Chemical Products		
Location	Iran, North khorasan, Bojnourd		
The County	Bojnourd		
Products / Services	Diammonium Phosphate Fertilizer		
Annual Nominal Capacity	15,000		Tons
The Raw Material	Ammonia, Phosphoric acid, Sulfur		
Employment	29		Person
Land Area	7,992		m^2
Floor Area	3,130		m^2
Energy and Water Consumption	Water Consumption	10,000	m^3 in year
	Electricity Consumption	150	KW
	Gas Consumption	200,000	m^3 in year
Fixed Capital	276,719		Million Rial
Working Capital (The First Year)	195,501		Million Rial
Payback Period	4.3		Year
Net Present Value (NPV)	470,163		Million Rial
Internal Rate Of Return (IRR)	42		%
Modified Internal Rate of Return (MIRR)	27		%
Break Even Point	26		%
The Exchange Rate (Dolar)	240,000		Rial
Description	In this project, all the materials related to the study of the diammonium phosphate market especially domestic and foreign supply and demand, are examined.		

Table 2: Legal Authorizations

Licensure Status:	
Issuance status	Descriptions
Principal Agreement (Establishment licensure)	<input checked="" type="checkbox"/>
Land Allocation	<input checked="" type="checkbox"/>
Environmental Inquiry	<input checked="" type="checkbox"/>
Possibility of Water Supply	<input checked="" type="checkbox"/>
Possibility of Electricity Supply	<input checked="" type="checkbox"/>
Possibility of Electricity Supply	<input checked="" type="checkbox"/>
Possibility of Gas Supply	<input checked="" type="checkbox"/>

Table 3: Total Investment

Descriptions	Local Currency Required			Foreign Currency Required (Million Euro)	Total (Million Euro)
	(Million Rial)	Rate	Equivalent in (Million Euro)		
Fixed Capital	276,719.3	240,000	1.15	0	1.15
Working Capital	195,501		0.81	0	0.81
Total Investment	472,220.3		1.97	0	1.97

- Value of Foreign Equipment / Machinery: 0 Million Euro
- Value of Local Equipment / Machinery: 0.23 Million Euro
- Net Present Value (NPV):1.95 Million Euro in Years
- Internal Rate of Return (IRR):42 %
- Payback Period:4.3 Years

Table 4: General Information

Company Profile	
Project Type	Establishment <input checked="" type="checkbox"/>
Company Name	North Khorasan Organization of Industry, Mine and Trade
Contact Person (Name and Position)	Morteza HoseyniMasoom
Email	smt.nkh1383@gmail.com
Mobile	09153864144
Tel	05831552
Website	nkh.mimt.gov.ir
Address	North Khorasan Province, Bojnurd, North Khorasan Organization of Industry, Mine and Trade
Company's Legal Structure	Government <input checked="" type="checkbox"/>

2 Project Location

2.1 Province: North khorasan

2.2 The County: Bojnourd

Bojnourd is the capital city of North Khorasan Province, Iran. It is about 701 km from Tehran. Bojnourd is located in the plains enjoying a mild and mountainous weather.

There are several reason for investing in bojnourd, such as:

2.2.1 Agriculture Section Advantages

- Suitable and diverse climatic conditions and having relatively suitable rainfall
- Having far more livestock per capita than the national average
- Having a considerable supply of diverse fruits
- The Possibility of establishing agricultural conversion industries in industrial parks

2.2.2 Tourism Section Advantages

- Having the presence of different ethnicities and producing handicrafts related to the culture of each ethnic group
- Being in a special geographical position and traveling 24 million passengers annually (ten percent of the total number of traveling passengers in the country) through North Khorasan

2.2.3 Mine and Industry Section Advantages

- Having large industries of alumina, steel, piping, petrochemical, cement and the availability of the development of industrial activities in downstream industries and creating a value chain.
- Conducting mineral exploration studies in Bojnourd, and valuable minerals for processing
- The existence of the Bojnord special economic zone has distinct advantages, including the shortest distance to the provincial capital among all special economic zones in the country, as well as its proximity to the Bidak industrial town.

2.2.4 Urban Development Section Advantages

- Appropriate and significant justification of urban and commercial projects and plans according to the characteristics and advantages of tourism, agriculture and industrial areas.
- The existence of transferable lands with suitable location.
- The need for commercial and tourism spaces in Bojnourd due to the low per capita of these spaces.

This project will be construct in part 220 and 221 with coordinates (4148029,556076) in Bojnourd Industrial park No. 3. Proposed location of project is shown in Figure 1.

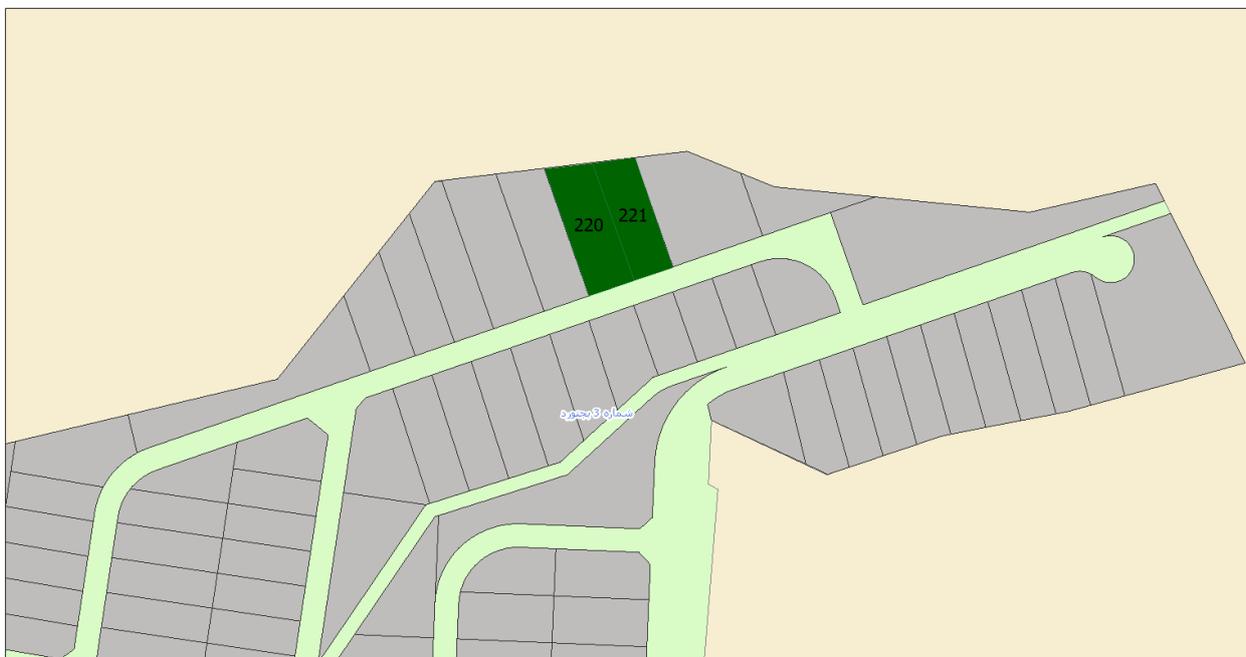


Figure 1: Location of Proposed Land in Bojnourd Industrial park No. 3

2.3 The Project: The Diammonium phosphate

2.4 Access to the Infrastructures

Table 5: Access to Infrastructures

No.	Needed Infrastructures	Distance to the Project	The Supply Infrastructures
1	Water	0	is provided
2	Electricity	0	is provided
3	Gas	0	is provided
4	Telecommunications	0	is provided
5	High way	2 km	is provided
6	Sub way	0	is provided
7	Airport	39	is provided
8	Amirabad Port (Behshahr)	427	is provided
9	Bandar Abbas Port	1,523	is provided
10	Rail way station of Joveyn	200	is provided
11	Rail way station of Jajarm	223	is provided

3 Technical Specifications of Plan

3.1 Product

Table 6: Project Specifications Based on ISIC Code

The Project	ISIC Code	Customs Tariff	Environmental Category
Diammonium phosphate (Purified Less than 65%)	2412612355	31054000	6
Diammonium phosphate (Purified greater than 90%)	2429412874	31054000	6

In this project, all the materials related to the study of the diammonium phosphate market especially domestic and foreign supply and demand, are examined.

According to agricultural statistics in 2,019, all fertilizers required by the country are supplied from the products of 5 petrochemical factories including: Razi, Marvdasht, Kermanshah, Assaluyeh and Khorasan. Regarding the production of phosphate and potash fertilizers, domestic production meets about 19% of the country's needs. Due to the fact that part of the fertilizer required by the country is purchased from abroad, the purchased fertilizer enters the country after the transportation and customs formalities. Also, according to agricultural statistics in 2,019, most of the amount of diammonium phosphate fertilizer has been imported to Iran from foreign countries. Due to the demand for this type of fertilizer in Iran, it is necessary to produce this type of chemical fertilizer in Iran. Unfortunately, there are no accurate statistics on the import and export of diammonium phosphate. In this project proposal, a factory for the production of diammonium phosphate will be constructed for sale in Iran and possibly for export to neighboring countries, which is currently Razi Petrochemical of Mahshahr and several private companies producing domestic diammonium phosphate. Therefore, according to the needs of the country, the construction of a diammonium phosphate factory is necessary.

According to studies on the production of diammonium phosphate, production is expected to increase between 2,021 and 2,025; This reassures new investors. Also, the domestic demand for this product will increase by about 42,000 tons from 2,020 to 2,023, which considering the capacity of factories with progress (above 75%), the country's need is the same 42,000 tons. It should be noted that the capacity of this factory is 15,000 tons, so from the perspective of the needs of the country, there is no need to worry about the construction of this factory and it is an essential need of the country. The authors of the plan offer a capacity increase of up to 40,000 tons to esteemed investors.

3.2 Project's Requirements

It is necessary to check the unit quality control system and observe the necessary standards. Presentation of inspection steps in different sections such as raw materials, product, wastewater, etc. by mentioning the control parameters of each stage and the results obtained from it and how to apply the results in material processing is of major importance

and its explanation is necessary. Determination of the compliance of diammonium phosphate with the standards of chemical fertilizers, both in terms of domestic consumption and export through chemical and physical analysis in the laboratory, which usually includes moisture analysis, sieve analysis, microbial analysis, chemical analysis (including nitrogen, Determining the amount of chlorine and sodium, iron fertilizer method, etc.). The specialized fertilizer laboratory of the Agricultural Research and Training Center and Natural Resources can be used to measure the required characteristics of fertilizers.

3.3 Space and Infrastructure Required

Table 7: Land Purchase Costs (Million Rial)

Specifications	Area (m^2)	Price per m^2	Cost		
			Paid Cost	Needed Fund	Total
A piece of land in Bojnourd	7,992	0.5	0	3,996	3,996

Table 8: Site Preparation and Development Costs (Million Rial)

Description	Working Capacity	Unit	Unit Price	Paid Cost	Needed Fund	Total
Excavation	4,000	<i>cm</i>	0.3	0	0	1,200
Wall Construction and door	$2*(80+100) = 360$	<i>Sm</i>	9	0	0	3,240
street construction (5% of the amount of land)	400	<i>Sm</i>	7	0	0	2,800
Green space and Lighting (1% of the amount of land)	80	<i>No</i>	8	0	0	640
Total				0	0	7,880

Table 9: Civil Works, Structures and Buildings Costs (Million Rial)

Description	Area (m ²)	Unit Price	Paid Cost	Needed Fund	Total
Production Hall	1,800	25	0	0	45,000
Raw material warehouse	600	30	0	0	18,000
Product warehouse	500	25	0	0	12,500
Office building	200	45	0	0	9,000
Welfare & guardroom	30	45	0	0	1,350
Total			0	0	85,850

Table 10: Infrastructures

No	Description	Unit	Annual Consumption	Unit Cost (Rial)	Total (Million Rial)
1	Water consumption	m ³	10,000	7000	70
2	Electricity consumption	Kwh	101,000	1100	111.1
3	Gas consumption	m ³	200,000	1200	240
4	Gasoline	Litr	6000	30000	180
Total					601.1

3.3.1 Equipment and Machinery

Table 11: Plant Machinery and Equipment Costs(Million Rial)

Description	Unit Cost	Costs Required				Total
		Local Costs	Costs of Currency		Cost To Complete	
			Rate	(Million Euro)		
Reactor	4,000	4,000	240,000	0.01	0	4,000
Belt conveyer	150	150		0.001	0	150
Bucket elevator	1,500	3,000		0.01	0	3,000
Ammonia tank	4,000	4,000		0.01	0	4,000
Phosphoric acid reservoir	4,000	4,000		0.01	0	4,000
Crusher	200	200		0.001	0	200

Description	Unit Cost	Costs Required				Total
		Local Costs	Costs of Currency		Cost To Complete	
			Rate	(Million Euro)		
Heat exchanger	5,000	5,000		0.02	0	5,000
pump	4,000	24,000		0.1	0	24,000
Plumbing lines	60	6,000		0.02	0	6,000
dryer	1,200	1,200		0.005	0	1,200
Cyclone	400	1,200		0.005	0	1,200
Granulation	3,400	3,400		0.01	0	3,400
Packaging machine	700	700		0.002	0	700
Total Cost of Machinery		56,850		0.23	0	56,850

The exchange rate is: 1 € = 240,000 Rial

3.3.2 Raw Material and Intermediate Components

Table 12: Raw Material and Intermediate Components (Million Rial)

Description	Unit	Total Consumption of the Raw Material	Price per Unit of Raw Material	Annual Cost of Providing Material
Ammonia	ton	3,000	36	108,000
Phosphoric acid 90%	ton	2,508	350	877,800
Sulfur	ton	6,000	27.5	165,000
Total				1,150,800

3.3.3 Management and Human Resources

Table 13: Salary of Administrative Staff (Million Rial)

No.	Position	Number of Shifts	Personnel per Shift (No.)	Total Staff (People)	Monthly Salary (per Person)	Annual Salary
1	manpower (in Administrative sector)	-	-	9	60.83	6,570
2	manpower (in Production sector)	-	-	20	52.87	12,690
Total				29		19,260

- Number of skilled personnel required: 22
- Number of non- skilled personnel required: 7
- Total number of personnel required: 29

4 Market Study and Competition

4.1 Examining Supply And Demand Trends

The amount of domestic supply or production the diammonium phosphate based on production licenses (according to the information of the ministry of industry, mine and trade) from 2015 to 2020 is as follows.

Table 14: The Amount of marble stones Domestic Supply

Year	Nominal Capacity (Tons)
2015	6,620
2016	9,830
2017	13,230
2018	51,450
2019	515,550
2020	521,750

The real production capacity of active units in 2015 up to 2019 is shown in Table 15.

Table 15: The Real Production Capacity of Active Units in 2015 up to 2020

Year	Nominal Capacity (Tons)
2015	6,353
2016	9,434
2017	12,696
2018	49,375
2019	494,760
2020	494,760

The following chart shows the prediction of production according to the Table 15 based on linear regression.

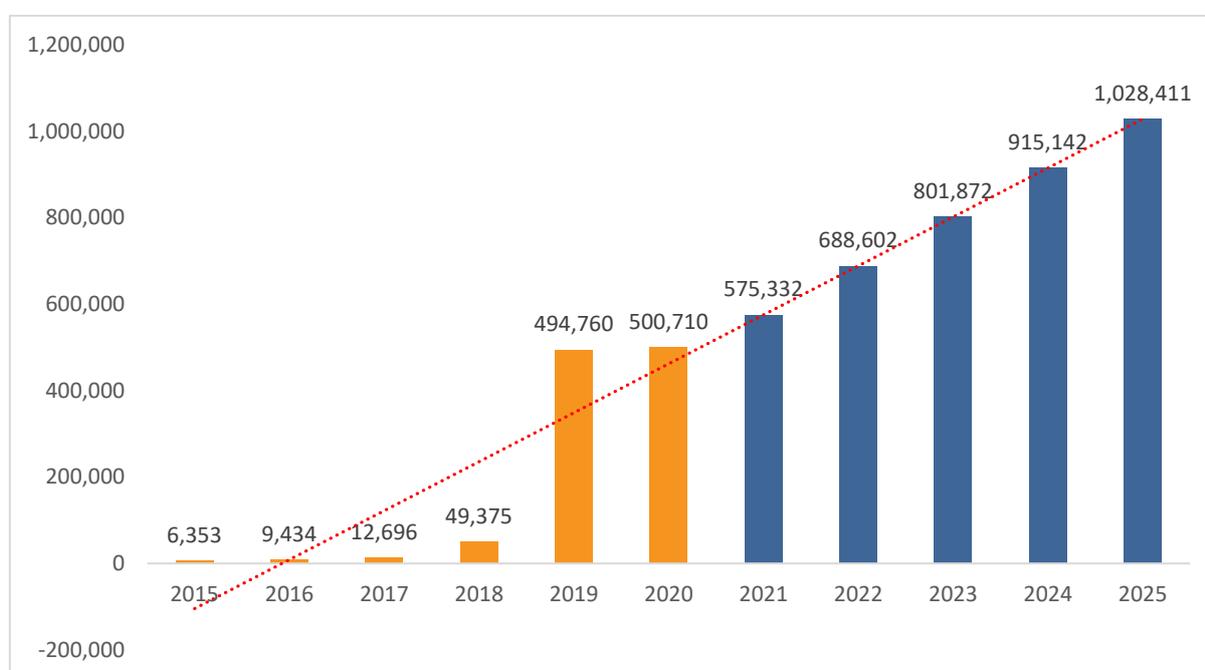


Figure 2: The Prediction of Production

As the Figure 2 shows, the amount of the diammonium phosphate production is increasing. In Table 16, the information of the units that have obtained a license is provided based on the amount of progress according to the information of the ministry of Industry, Mine and Trade.

Table 16: The Amount of Progress of Units that have Lisence

Progress Percent	Capacity (Ton)
0% - 25%	128,470
25% - 50%	0
50% - 75%	55,000
75% - 100%	0

The amount of imports is based on the information of the Tehran Chamber of Commerce, Industries, Mines and Agriculture at <http://www.tccim.ir> according to the (There is no data for 2019 and 2020 so the information is considered as the initial data for the forecast for the coming years from 2015 to 2018) following table.

Table 17: The Amount of Imports From 2015 to 2018

Year	Customs Tariff	Imports (ton)	Countries
2015	31054000	612	China, France, Germany, Jordan, UAE
2016	31054000	880	China, UAE, Spain, Netherland, Jordan
2017	31054000	2,127	China, Jordan, Belgium, England, UAE, Germany, Turkey
2018	31054000	2,942	China, Jordan, France, Turkey, Mexico, Netherland, UAE, Germany

The following chart shows the prediction of production according to the Table 17 based on linear regression.

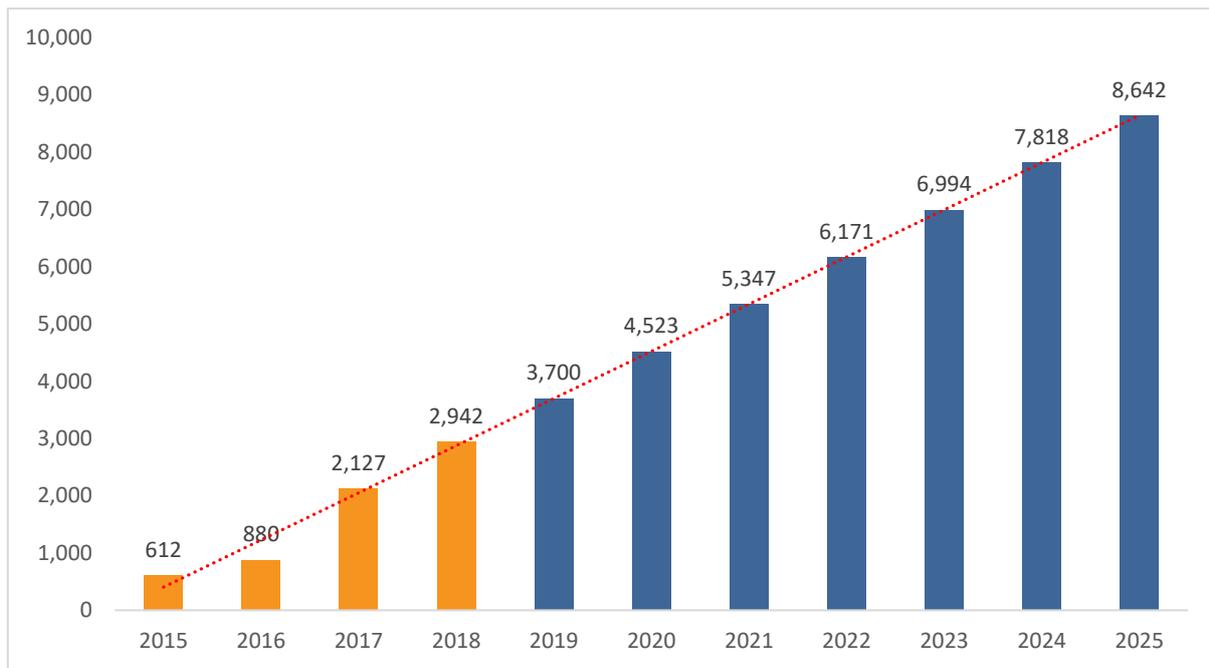


Figure 3: The Prediction of Imports

As Figure 3 shows the prediction of imports is decreasing.

The amount of exports is based on the information of the Tehran Chamber of Commerce, Industries, Mines and Agriculture at <http://www.tccim.ir> according to the (There is no data for 2019 and 2020 so the information is considered as the initial data for the forecast for the coming years from 2015 to 2018) following table.

Table 18: The Amount of Exports From 2015 to 2018

Year	Customs Tariff	Imports (ton)	Countries
2015	31054000	0	-
2016	31054000	1,237	Afghanistan
2017	31054000	1,329	Afghanistan, Sri Lanka
2018	31054000	111	Sri Lanka

The following chart shows the prediction of exports based on linear regression.

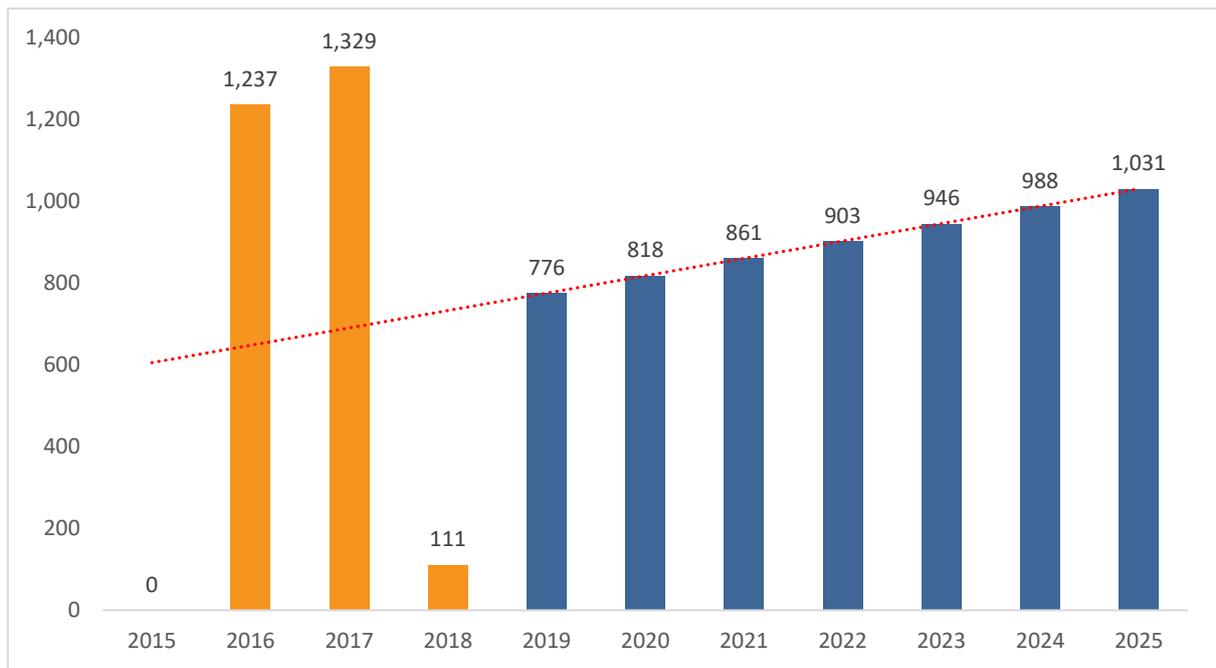


Figure 4: The Prediction of Exports

As Figure 4 shows the prediction of exports is increasing.

The amount of domestic demand that is equal to the amount of domestic production plus the amount of imports minus the amount of exports is presented in Table 19.

Table 19: The Amount of Domestic Demand

Year	Demand (Tons)
2015	6,965
2016	9,077
2017	13,494
2018	52,206

The following chart shows the amount of domestic demand based on linear regression.

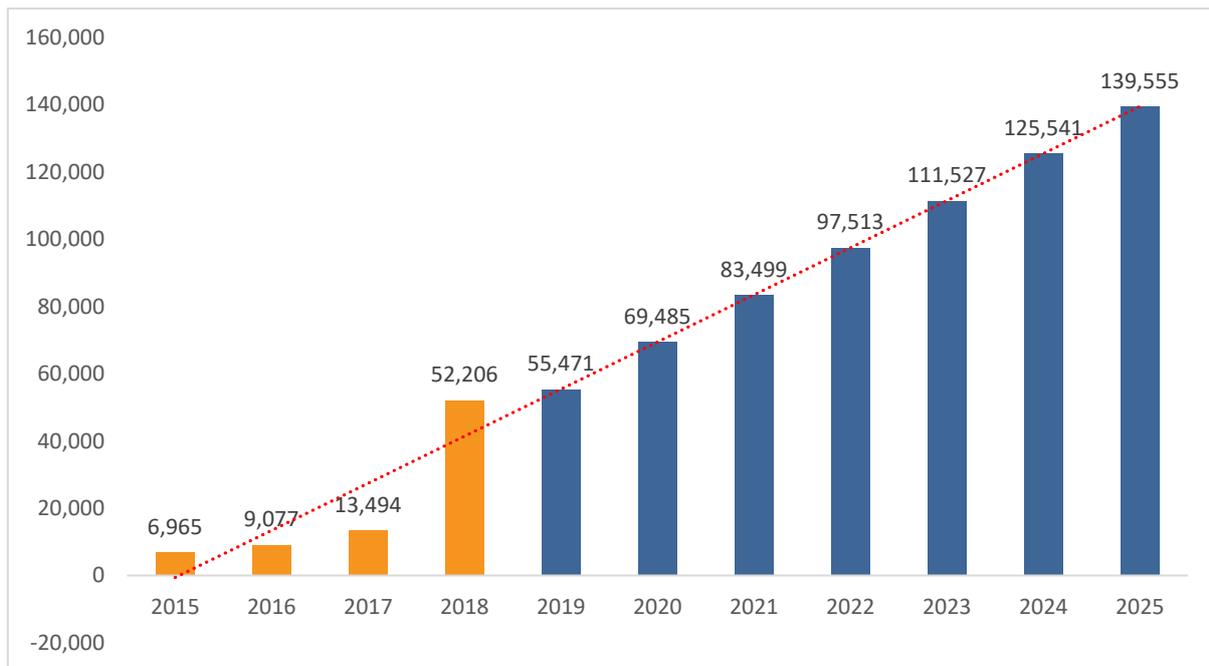


Figure 5: Prediction on Domestic Demand

As Figure 5 shows the prediction of domestic demand the diammonium phosphate is increasing.

5 Financial Projection

5.1 The Cost Estimate

Table 20: Total Investment (Million Rial)

No.	Subject	Cost
1	Fixed Capital	276,719.3
2	Working Capital	195,501
Total Investment		472,220.3

Table 21: Fixed Capital (Million Rial)

Subject	Paid Cost	Cost Required			Total cost	
		Local Cost	Foreign Exchange Cost			Needed Fund
			Rate	(€)		
land purchase	0	3,996	240,000	0.02	0	3,996
Landscaping	0	7,880		0.03	0	7,880
Building	0	85,850		0.35	0	85,850
equipment and machinery	0	56,850		0.23	0	56,850
Laboratory and workshop supplies and equipment	0	336		0.001	0	336
Facilities	0	21,680		0.09	0	21,680
Transportation	0	23,800		0.09	0	23,800
Office and services equipment	0	1,609		0.006	0	1,609
Pre-operation costs	0	49,562		0.2	0	49,562
Unforeseen (10% of the above items)	0	25,156.3		0.1	0	25,156.3
Total Fixed investment	0	276,719.3		1.15	0	276,719.3

Table 22: Working Capital (Million Rial)

Subject	Day	Total
Packaging material (2 months raw materials and packaging)	60	191,800
Salary (2months salary)	60	3,210
Imprest fund (15 days of water, electricity, fuel and repair costs)	15	491
Total		387,301

Table 23: Fixed and Variable Costs

No.	Production Cost	Fixed Cost		Variable Cost	
		%	Cost	%	Cost
1	Raw material	0	0	100	1,150,800
2	Energy & utility	20	126	80	505
3	Repair & Maintenance	20	2,232	80	8,929
4	Production salary	70	13,482	30	5,778
5	Depreciation	100	24,869	0	0
Total Production Costs			40,710		1,166,012

5.2 Break-Even Analysis

Table 24: Break-even Analysis

Period	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Break-even ratio (%)	26.12	21.98	18.76	17.84	16.88	14.81	14.25	13.74	13.27	12.85

5.3 Sensitivity Analysis of IRR

Table 25: Sensitivity Analysis of IRR

Variation (%)	Sales Revenue	Increase In Fixed Assets	Operating Costs
-20.00%	-77.08%	48.45%	79.50%
-16.00%	-49.06%	47.06%	73.02%
-12.00%	-1.05%	45.77%	66.16%
-8.00%	18.03%	44.55%	58.84%
-4.00%	31.31%	43.42%	50.95%
0.00%	42.35%	42.35%	42.35%
4.00%	52.10%	41.35%	32.77%
8.00%	60.95%	40.41%	21.64%
12.00%	69.10%	39.51%	7.34%
16.00%	76.71%	38.66%	-21.61%
20.00%	83.86%	37.86%	-70.20%

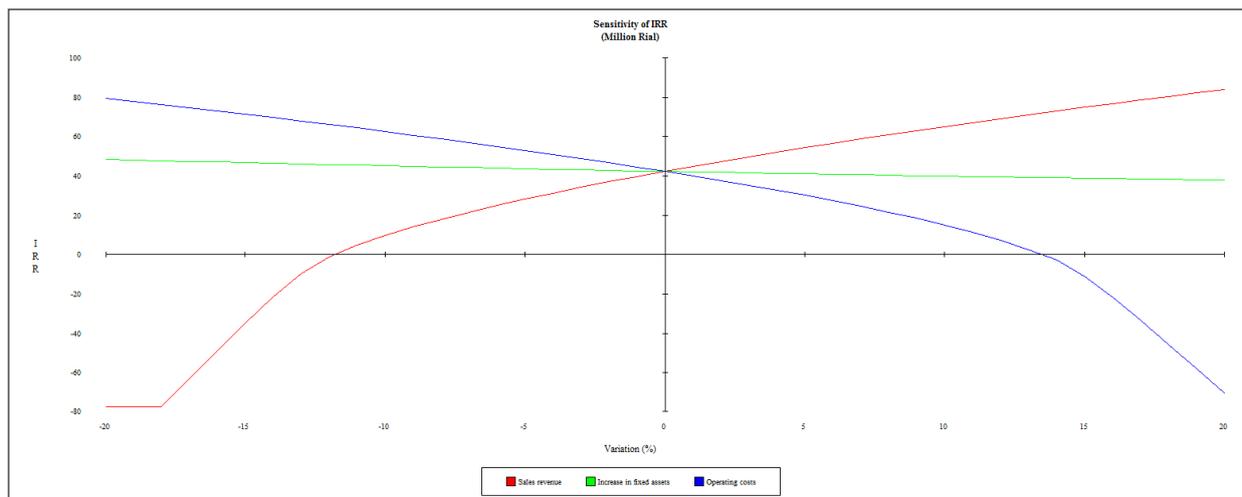


Figure 6: Sensitivity Analysis of IRR

6 Duration of Project Operation

The time of doing early stages and completing its process is about 20 months.

Table 26: Action Plan and Implementaion Schedule

Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Land Purchase	█																							
Constructing Buildings		█	█	█	█	█																		
Execution of Facilities			█	█	█	█	█	█	█	█														
Order, Purchase of Machinery				█	█	█	█	█	█	█	█	█	█	█										
Landscaping					█	█	█	█	█	█	█	█	█	█	█									
Machinery Strat-up and Trial Production									█	█	█	█	█	█	█	█	█	█	█	█				

7 Incentives, Features And Advantages of Project

North Khorasan Province is a province located in northeastern Iran. Bojnord is the capital of the province. This province contains many historical and natural attractions, such as mineral water springs, small lakes, recreational areas, caves and protected regions, and various hiking areas. Advantages of the agriculture of this province involves favorable and diverse climatic conditions and other parameters affecting growth.