In the name of Allah

Pre-feasibility studies

Project Name:

Production of Potassium sulfate fertilizer

and

Hydrochloric acid as by-product

Project owner : Falat Ziba Cooperative Company

Project address: Khuzestan, Rohmormoz, Romhormoz Industrial Estate

Date of P.F.S: February, 2021

General Specification	
Name of The Project	Production of Potassium sulfate fertilizer and Hydrochloric acid as
Project Conscity	by-product
Personnel Number	38 persons
Working Days	340 days
	SOP: Agricultural fertilizer
Product Usage	HCl: Acidify of well oil &Washing and acid washing of metals.
Marketing	
Product Global Price	SOP: 500 \$US/ton, HCl 30~33%: 150 \$US/ton
Domestic Demand	400 thousand tons
Domestic Production	104 thousand tons
Import	47000 tons
Export	5 ton SOP
Technical Study	
Land Area	4801.31 m ²
Building Area	1,631.90 m ²
Main Raw Materials	sulfuric acid98%, Potassium chloride
Supplying Place of Raw Materials	local
Power Requirement	220 KW
Water Requirement	9000 m ³
Fuel Requirement	2,000,000 m ³ gas
Economical & Financial Study	
Fixed Investment Cost	432,158.30 million Rails \cong 1.750 million Euro
Working Capital	183,488.68 million Rails \cong 0.742 million Euro
Total Investment Cost	615,464.98 million Rails \cong 2.492 million Euro
Annual Sale	1,322,500.0 million Rails≅ 5.35 million Euro
Net Present Value(NPV)	724,774.46 million Rails≅ 2.93 million Euro
Break Even Point(BEP)	22.02 %
Internal Rate of Return(IRR)	51.11%
Investment Return Period	3.35 years
Investment Sources Ratio: Equity:16.75% Bank financial facilities:3.25% Finance: 80%	103,130.98 million Rail's \cong 0.417 million Euro 20,000.0 million Rails \cong 0.081 million Euro 492,516.0 million Rails \cong 1.994 million Euro

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Introduction:

Potassium is one of the necessary elements for plants and is the most abundant element in the body of the plant after nitrogen. The average amount of potassium on the surface of the soil is about 3.2 percent. The main source of the potassium for plants growth in the normal conditions is provided from the weathering of the minerals with potassium. Potassium moves easily in the plant and is found in large amount in active and growing parts of the plant. Potassium is effective in activating the enzymes, production of protein, photosynthesis, adjusting the osmotic pressure, cell expansion, movement of the aperture, transferring the material in the vessel of the phloem, equilibrium of anion and cation. Potassium also has a role in formation of sugar and starch, fat metabolism, stabilization of nitrogen and neutralizing the organic acids. The role of potassium in the plant is more of a catalyst and lack of potassium reduces the resistance of the plant against pests and plagues. Given the importance of potassium in the quality of the production, this element is called a quality element. Fertilizers are known as suitable sources in order to fulfill the nutrient needs of the plant and the most common fertilizers with potassium are: Hydrochloric acid, Sulfate of Potash-Magnesia, potassium nitrate, potassium sulfate. If the ion of the chlorine is harmful for the plant (salty soils) it is better to use sulfate.

Khuzestan is an important agricultural province with production of 16 million tons of agricultural production and is the ranking 1 province in the production of wheat, sugar, maize and vegetables of Iran. In province has a vast area and salty water that makes the potassium sulfate fertilizers inevitable. So Falat Ziba cooperative company, considering the good potential of Khuzestan province in terms of agricultural production rank as well as finding weaknesses such as saline lands and waters in some parts of Khuzestan province, has decided to build a chemical fertilizer of potassium sulfate manufacturing company with a certificate from the organization of industry, mine and trade. It should be noted that the byproduct of the process is hydrochloric acid which is widely used in oil wells of Khuzestan province and neighboring provinces and neighboring countries.

Part of the execution operation such as landscaping, constructional operation and utilities is done by this company (physical progress 61%) and we need more funds to complete and to buy machineries and equipment and during the exploitation to buy materials. This plan is in a good condition in terms of finding raw materials, communication infrastructure and reaching the national and foreign markets.

It is worth mentioning we will accept investors who wish to import and supply up to date and high technology machineries.



1.Product introduction:

The purpose of the current plan is to produce potassium sulfate chemical fertilizer with the capacity of 10000 tons in a year, in this production process Hydrochloric acid is produced as a buy-product (capacity:10000 tons in a year).

Potassium sulfate is one of the fertilizers that supply potassium as the third important element for plants. When the amount of chloride in the irrigation water is so high and the plants are sensitive to chlorine such as *Citrus*, it is necessary to use potassium sulfate. Lack of chlorine in Potassium sulfate, does not create salt, contrary to the similar cases. Potassium sulfate contains 41 to 44 percent of potassium that is equivalent to 50-53 percent of potassium oxide (K_20).

Potassium sulfate is one of the best potassium fertilizers ever imported to the Iranian market. That is obtained from the effect of sulfuric acid on potassium chloride and when the ion of chlorine is harmful for the plant, it is better to use potassium in the form of sulfate.

Potassium with sulfur cover is found in the soil solution in the form of sulfate ion and is not attracted to the soil particles due to its negative charge, oxidation and regeneration of the sulfur happens in the biological soil and the micro-organisms in the soil can change sulfur to sulfate ion, so that is can be used for plants. Potassium sulfate can also be used as a source of potassium and sulfur in hydroponic cultivation and potassium found in potassium sulfate is the cheapest way to induce resistance against frostbite in fruits and farming plants.

Moreover, very small sizes of these fertilizers, prevents the formation of precipitates in the sprayer and irrigation systems and makes it easy to despite any problem. Here is a list of specifications for the current production of this unit based on the fertilizer grade:

Potassium sulfate Molecular Formula: K₂SO₄ Trade name: SOP K₂O content> 46% up to 50% Ph: 6 – 9 in 5% Solution Moisture: 1.5% max <u>hydrochloric acid</u> Molecular Formula: HCL + H₂O HCl: 30~33% Fe: 50 PPM max Color: Bright

Features:

- Can be used in all the gardens and farms.
- soluble in water
- Chlorine free

Advantages of using this product:

- Improves the color and taste of the sugar of the fruits
- Increases the protein production
- Increases water efficiency
- Increases resistance of the plant to pests, plagues, wind and heat.
- Stimulates flowering and fruition
- Improves the quality of the fruit and increases warehousing
- Strengthens the plant knots containing high carbohydrates such as potato.

1.1. Product name and ISIC code

ISIC is the most common classification and categorization of economic activities. ISIC classification is defined as: classification and categorization of the international standard industrial classification of all economic activities. This classification is allocated to one of the 2, 4, and ten digit codes based on the type of industry and product. ISIC code related to the potassium sulfate fertilizer and Hydrochloric acid is showed in the following table.

Product name	ISIC Code	Unit
Potassium sulfate	2412612337	ton
Hydrochloric acid	2411412468	ton

Source: Industry, mine and trade organization

1.2. Customs tariff code

Based on the export and import regulation of Islamic republic of Iran the custom tariff for the potassium sulfate and hydrochloric acid is as follows:

Heading subheading No.	Description
3104	Mineral or chemical fertilizers, potassic
31043000	Potassium sulfate
280610	Hydrogen chloride (hydrochloric acid)
28061010	of 33% or lower purity
28061090	other

Source : export-import regulations (2020)

1.3. Import and export products conditions

Given the conditions for product import and export in Islamic republic of Iran, conditions and tariffs for import and export of the potassium sulfate chemical fertilizer is as follows:

Heading Subheading No.	Description	SUQ	Import duty
3104	Mineral or chemical fertilizers, potassic		
31043000	Potassium sulfate	kg	5
280610	Hydrogen chloride (hydrochloric acid)		
28061010	of 33% or lower purity	kg	5
28061090	other	kg	5

Source : export-import regulations (2020)

The entry of fertilizer is subject to registration and Consent of water and soil institute and approval of the ministry of jihad-e agriculture.

1.4. Review and presentation of standard (national or international)

- national Standard

Number	Title	Country
128	Potassium sulfate fertilizer Specification and test methods 4th .Revision 2016	Iran

Source: Institute of Standards and Industrial Research of Iran

-International Standard

No.	Topic of standard	Organization that assigned the abbreviation	Number of standard	
		CAS	7097440	
		UN	2693	
<i>1 ID of the international standard</i>	ID of the international standard	RTECS	TS 6460000	
		ICSC		
		NSN	681000229695	
		MSDS		
2	ID of safety and global MSDS	CAGA Code	PURSE	
		HAZ Code	С	
		HAZUN	3	

1.5. Review and provide information about domestic production prices and global price of the product

The price of the potassium sulfate fertilizer is high relative to the other fertilizers and its global price is about 500 US\$ per ton. The price of this fertilizer in the country is 120-140 million Rials per ton.

Global price of Hydrochloric acid with the concentration of 30 ~ 33 % is approximately 150 US\$ per ton. The price of this acid in the country is 1500-3000 Rials per kg.

1.6. Explaining the usage and application of the product in the domestic and foreign markets

Potassium fertilizers including potassium sulfate, are used to improve the efficiency and the quality of plants that lack that this important element. Adequate potassium increases the plant's resistance to drought, dehydration and even salinity.

In normal conditions the amount of measurable potassium in the agricultural soils is far from enough to support the full growth of the plant. Potassium is helps many functions of the plant such as plant enzymes, protein synthesis, production of starch, sugar and organization of water flow in the cell and plant tissue. Potassium sulfate is a rich source to strengthening the plant. The amount of the potassium in potassium sulfate isn't so different from other potassium fertilizers. Moreover, this fertilizer also includes a large amount of sulfur that is necessary for growth plant. Presence of sulfur in soil is necessary for protein synthesis and function of enzymes of the plans. In some plants , it is necessary to avoid of chlorine in order to avoid more sanity, in these cases potassium sulfate is a rich source to provide potassium.

This fertilizer has a different size. Micronized particles (less than 0.015 mm) that sometimes need high solution percentage or fertilizer in the form spray on the leaves is suitable. Manufactured fertilizers in larger sizes are suitable to be used directly on the soil, for this purpose it is necessary to use related instructions to minimize its risks.

Moreover, under following conditions, potassium sulfate is better to provide potassium and sulfur for the plants.

- Some products are sensitive to *chloride* in the KCI such as tobacco and potato. *Chloride* burns the leaves of this plant (in cases that the level of salt and irrigation is high and in cases that there is a high level of *chloride* in the water).
- Agricultural products that are sensitive to salt and hurt by that, are usually fed by potassium sulfate such as tomato and citrus.

Fertilizer of potassium sulfate is usually used for different farm and garden products such as vegetables and cucurbits and melon.

Uses of Hydrochloric acid:

- 1- Production of different types of chemicals
- 2- Acidify of well oil
- 3- Washing and acid washing of metals.
- 4- In many food processes
- 5- Neutralizing Alkaline components with metal wastage
- 6- Urea revival

- 7- Acid washing of steel
- 8- Producing different types of non-organic components to Leather polishing
- 9- Industrial and home cleaning materials.
- 10-Construction industry
- 11-Cleaning materials, tile cleaning.
- 12-Producing organic materials. (such as vinyl chloride)
- 13-Removal of precipitates boilers
- 14-Control and neutralizing Ph (food industry, drags and drinks)
- 15-Production of dichloride
- 16-Purification of sodium chloride
- 17-Cleaning and housekeeping

In the present plan, the target market of produced Hydrochloric acid in this unit is oil wells and some is exported to the Iraq's market.

1.7. Evaluation of alternative products, competitors and analysis and its effects on consumption of the product

Because potassium is an essential element of the plant, so It is not possible to replace it with phosphate and nitrogen. Main competitors of potassium sulfate fertilizers are potassium chloride and potassium nitrate. In cases that the amount of chloride in the irrigation water is high and plants are sensitive to chlorine such as Citrus, it is necessary to use potassium sulfate.

1.8. The strategic importance of the product in Iran and foreign markets

Nutrition of plants is necessary to produce better and healthier of agricultural productions for the increasing population of the world. So nutrition of plants is an essential element in order to improve the quality of the agricultural products. Until 2050, it is expected that the population of the world will increase 2.2 billion and reach 9.7 billion. Meanwhile, food diets have changed in different parts of the word that leads to more food demand. An increase in the agricultural products mainly depends on the used fertilizer that supplies the nutrition of the plant. Using chemical fertilizers has increased in the recent years and most of the increased related to the potassium with the rate of 2.5-3 percent.

Potassium sulfate with 41-44 % of potassium is one of the best potassium fertilizers in the national market and this fertilizer is obtained from the effect of sulfuric acid on potassium chloride and when the ion chlorine is harmful for the plant and also for salty plants, potassium is used in the form of sulfate.



1.9. The major producing countries and product consumer

The biggest country producers of the potassium sulfate are Canada, U.S., Russia and china.

Alongside American and Canadian company fertilizers, Russian companies have produced high quality products to maintain its share of market. Using large selling networks around the world with production and distributing different types of chemical fertilizers, they have created a large turnover and also directly affected the balance of demand and supply in the food system.



The potash source dispersion around the world

11 countries in the world have the capacity to extract and exploit potash and approximately 40 percent of the current capacity is in Canada and Potash Crop Company is equipped with the largest producing complex in Canada and is able to produce 22 percent of the potash

fertilizer of the world using inexpensive technology. Potash Company has a high producing capacity and most of its products are sold in a wholesale and besides they have a large distribution network in the North America. This company uses a comprehensive plan with many years' research and investigation that can respond to the needs of the competitors with less costs. This the biggest producing company of potash fertilizers and also the third biggest producer of nitrogen and phosphate fertilizers in the word. The central office of this company is located in the Saskatchewan province in Canada. Potash crop is the biggest in terms of production and revenue. Potash crop was the number one supplier in the world, producing 22 percent of the fertilizers in the world.

Mosaic company is an American agricultural and chemical industries that is active in production and distribution of many chemical materials such as Phosphate, Potash and nitrogen fertilizers. With the capacity of 1.4 million ton in a year, this is one of the leading companies the industry of Potash fertilizers. This company with totally 7.6 million ton of potash, produced 13% of the world potash and 42% of the potash in the North America. In 2016, this company exploited 3 potash mines in Canada and 1 potash mine in U.S. with each having its own refinery.

China, U.S., Brazil and Indonesia consume most of the potash fertilizers in the world.



Top 5 fertilizer consumers in 2018

2. Situation of supply and demand in Iran and foreign markets

2.1. Study of utilization capacity and production process since the beginning of the Sixth Five Year Economic Development Plan, unit location, the number and level of technology of available units, nominal capacity, practical capacity, lack of full capacity utilization reasons, the name of country and manufacturer of machinery used in production

Based on obtained information from Industry, Mine and Trade organization, the potassium fertilizers producers to be introduced in the following s table.

As was observed, Khuzestan is the main agricultural producer in the country and has lands and waters with high amount of chloride. There is no production unit of potassium sulfate chemical fertilizers in this province.

In the Khuzestan province there are 8 production unit of hydrochloric *acid, three* of which are among the biggest and most important producers of the hydrochloric *acid producers in Iran, they are* Bandar Imam petrochemistry (B.I.P.C), Karoon petrochemistry and Ghadir petrochemistry company. These three petrochemistry companies produce a portion of hydrochloric acid for the other petrochemicals and other industries.

Producing units of chemical federalizers are faced with some problems such as low quality machineries specially furnaces that are mainly Chinese and old and traditional.

		Number		maasuram	Investr	nent
No.	Province	of units	Capacity	ent unit	Million Rials	Thousand Euros
1	Esfahan	4	5,499	ton	76,414	
2	Alborz	6	4,983	ton	205,934	
3	Ilam	2	15,400	ton	400,313	
4	West Azerbaijan	2	928	ton	19,624	
5	Bushehr	1	14,000	ton	99,395	
6	Tehran	1	12,320	ton	110,468	1.13
7	Khorasan, South	1	3,150	ton	4,300	
8	Khorasan, Razavi	2	15,190	ton	57,000	
9	Semnan	5	61,530	ton	329,580	3.05
10	<u>Fars</u>	2	4,130	ton	96,780	
11	Qom	6	17,150	ton	179,907	
12	Qazvin	4	12,810	ton	65,340	
13	Kurdistan	1	1,400	ton	13,890	
14	Kerman	2	9,660	ton	74,575	
15	Kermanshah	2	4,340	ton	22,730	
16	Kohgiluyeh and Boyer-Ahmad	1	2,100	ton	20,950	
17	Golestan	1	700	ton	19,500	
18	Mazandaran	1	322	ton	1,758	
19	Markazi	2	12,390	ton	35,695	
20	Hamadan	2	1,505	ton	30,930	
21	Yazd	3	8,750	ton	113,870	
nominal Total capacity		50	208,256	Ton	2,105,633million Rials	
Prac	tical capacity (50%)	30	104,128	Ton	₩ 16,322,736 E	uros

Of licensed operation in the field of potassium sulfate chemical fertilizers

Source: Industry, Mine and Trade organization

	Province	Numher	Capacity	maasuram	Investment	
No.		of units		ent unit	Million	Thousand
		oj unus eni unu			Rials	Euros
1	Esfahan	17	1175725	ton	0	336,840
2	Alborz	5	3350	ton	0	38,652
3	Ilam	2	27400	ton	0	397,085
4	East Azerbaijan	3	8450	ton	0	657,231
5	West Azerbaijan	2	54710	ton	28.5	1,134,728
6	Tehran	8	15080	ton	1.41	140,756
7	Chahar Mahaal and Bakhtiari	3	750	ton	0	19,000
8	Khorasan, South	1	213	ton	0	5,051
9	Khorasan, Razavi	7	13450	ton	0	451,559
10	Khuzestan	8	231622	ton	0	23,598,155
11	Semnan	8	89950	ton	7.55	1,153,713
12	Fars	11	213995	ton	0	15,324
13	Qom	9	62830	ton	15.56	809,808
14	Qazvin	8	12139	ton	0	64,487
15	Kurdistan	2	6000	ton	0	14,813
16	Kerman	2	5175	ton	0	30,425
17	Kermanshah	1	3400	ton	0	69
18	Gilan	6	19300	ton	0	45,705
19	Lorestan	3	4280	ton	0	9,150
20	Mazandaran	3	2560	ton	0	14,090
21	Markazi	5	243750	ton	0	46,750
22	Hamadan	3	2100	ton	0	14,818
23	Yazd	6	8070	ton	0	44,530
nominal Total capacity		123	2,208,886	Ton	53.02	20 042 720
Practical capacity (50%)		60	1,104,443	Ton	33.02	23,042,133

Of licensed operation in the field of Hydrochloric acid

Source: Industry, Mine and Trade organization

2.2. Study of the status of new projects and under construction development projects (In terms of number, capacity, operation place, the physical progress rate and the level of their technology and investments by both foreign exchange and other required) and semi-finished projects

based on the information from Industry, Mine and Trade organization there are 22 under construction industrial units of potassium sulfate fertilizers in the country as a following table.

In the Khuzestan province there are tree unit of potassium sulfate and hydrochloric acid under construction:

Shimi-Sazan Pasargad Co.	Location: Mahshahr	physical progress: 75%	K2SO4: 10000 tons	KCI :13000 tons
Falat ziba Ramhormoz Cooperative company	Location: Romhormoz	physical progress: 61%	K2SO4: 10000 tons	KCI :15000 tons
Pars Kimia chlorine Co.	Location: Shooshtar	physical progress: 90%	-	KCI :25000 tons

Among the most important units of hydrochloric acid under construction is Urmia petrochemistry company in West Azerbaijan with 53% physical progress.

Under Construction	Unite of	notoccium	sulfate fortilizers	with 20_00%	of nhysical	nrograss
Under Construction	Units of	potassium	sunate tel unizers	WILLI 20-7770	or physical	progress

physical progress: 60-99%								
		Number of	Canacity	Invest	ment			
No.	Province	units	(ton)	Rail's (Million Rail)	million Euro			
1	Tehran	2	20,200	79,008	1.19			
2	Khorasan, Razavi	1	8,000	2,351	0			
3	Khuzestan	2	20,000	172,391	0			
4	Semnan	2	70,000	607,878	6.93			
5	Fars	1	10,000	30,000	0			
6	Qom	1	16,000	108,551	1.28			
7	Kerman	2	9,000	56,500	0			
8	Gilan	1	2,000	8,241	0			
9	Markazi	1	10,000	86,338	1.24			
10	Yazd	1	4,500	55,950	1.2			
Total Sum		14	169,700	1,207,208	11.84			
		physical prog	ress: 20-59%					
11	Esfahan	1	7,500	87,850	0.27			
12	East Azerbaijan	1	2,800	6,651,780	0			
13	West Azerbaijan	1	40,000	2,637,365	5.9			
14	Semnan	1	50,000	118,000	0			
15	Qazvin	1	12,000	12,100	0			
16	Qom	1	40,000	752,168	11.34			
17	Mazandaran	1	20,000	44,300	0			
18	Markazi	1	20,000	353,655	3.1			
Total Sum		8	192,300	10,657,218	20.61			

Source: Industry, Mine and Trade organization

physical progress: 60-99%							
		Number of	Canacity	Invest	ment		
No.	Province	Province units		Rail's (Million Rail)	million Euro		
1	Esfahan	1	42,240	643,000	8.2		
2	Alborz	1	10	30,541	0		
3	East Azerbaijan	1	50,000	584,000	7.7		
4	Khuzestan	3	53,000	4,968,094	15.38		
5	Fars	1	12,000	30,000	0		
6	Markazi	1	5,500	86,338	1.24		
Total Sum		8	127,70.	6,341,973	32.52		
		physical prog	ress: 20-59%				
7	Esfahan	1	9,000	87,850	0.27		
8	West Azerbaijan	1	50,000	2,637,365	5.9		
9	Khuzestan	2	3,000	34,899	0		
10	Qazvin	3	32,595	93,600	0		
11	Golestan	1	600	7,000	0		
12	Gilan	1	500	1,700	0		
13	Lorestan	1	250	550	0		
14	Mazandaran	1	20,000	44,300	0		
15	Markazi	1	26,000	353,655	1.2		
Total Sum		12	141,945	3,260,919	7		

Under Construction Units of hydrochloric acid with 20-99% of physical progress

Source: Industry, Mine and Trade organization

2.3. The trend of imports of the product in the last five years

Based on the statement of needs of the chemical fertilizers producer union, Iran needs 400 tons of Potassium sulfate. Last year, a large portion of that (more than half) was supplied by import. In the recent years, due to the sanctions and an increase in the prices, imports faced many problems, this amount decreased to 47000 tons in 2018. Imports from Belgium as one of the biggest exporter has decreased dramatically due to international sanctions and now more than 80 % is imported from china. Following table and diagram shows the amount of imported potassium sulfate fertilizer during the last 5 years.

year	Weight (ton)	Rail's value	Dollar value	Description
2018-19	47,260	1,136,558,737,068	27,052,225	80.2% from China
2017-18	88,417	1,771,639,074,686	51,941,747	85.47% from Belgium
2016-17	83,175	1,449,832,959,226	46,014,782	44.5% from China
2015-16	76,252	1,717,726,169,454	57,113,764	88.67% from Turkey
2014-15	40,115	792,317,702,121	30,150,708	82.38% from Turkey

Imports of potassium sulfate fertilizer in the last 5 years

Source : The Islamic Republic of Iran Customs Administration





Based on the investigations from the Islamic Republic of Iran Customs Administration it became clear that imports of hydrochloric acid is insignificant and almost zero, the reasons of which are summarized below:

- 1. Low prices of the product and high prices and high danger of handling it
- 2. The ability of national producers in supplying the needs of the consumers

counterparty country	Weight (ton)	Rail's value	Dollar value	Weight ratio (Wt%)
China	37,900,384	827,680,301,193	19,701,717	80.20
Belgium	1,791,040	53,581,166,650	1,292,791	3.79
Taiwan	1,656,000	38,497,306,020	901,656	3.50
Lebanon	1,470,000	76,182,142,400	1,805,398	3.11
Italy	1,171,800	36,832,210,844	883,681	2.48
France	1,041,000	32,726,168,510	779,194	2.20
India	437,000	12,339,762,843	292,927	0.92
United Arab Emirates	411,468	10,941,067,216	261,779	0.87
Germany	410,520	12,926,775,961	305,135	0.87
Jordan	278,000	11,460,241,380	271,927	0.59
Netherlands	245,000	8,395,017,243	199,087	0.52
Egypt	189,000	7,018,043,760	167,097	0.40
Chile	120,000	3,383,272,800	80,554	0.25
Greece	70,200	2,298,073,713	54,642	0.15
Sweden	49,000	1,630,791,785	38,828	0.10
Turkey	17,650	466,240,950	11,046	0.04
Spain	2,118	200,153,800	4,766	0.00
total	47,260,180	1,136,558,737,068	27,052,225	100

Imports of potassium sulfate fertilizer divided by country in 2018-2019

Source: Islamic Republic of Iran Customs Administration (2020)

Imports of potassium sulfate fertilizer divided by country in 2017-2018

counterparty country	Weight (ton)	Rail's value	Dollar value	Weight ratio (Wt%)
Jordan	296,450	7,787,510,221	231,636	0.34
Spain	92,000	3,120,900,200	87,273	0.10
United Arab Emirates	1,285,200	38,155,455,921	1,154,067	1.45
Italy	980,300	26,017,047,876	731,232	1.11
Germany	293,240	10,405,609,797	312,003	0.33
Belgium	75,568,242	1,394,338,878,922	40,892,856	85.47
Taiwan	1,080,000	20,029,300,506	578,441	1.22
Turkey	45,335	1,350,793,790	39,849	0.05
China	2,268,949	45,843,804,586	1,379,074	2.57
Sweden	784,000	19,640,940,480	605,791	0.89
Chile	120,000	2,588,875,200	78,356	0.14
France	1,518,000	40,209,984,648	1,175,073	1.72
Philippines	80,000	1,317,519,900	39,060	0.09
Lebanon	3,261,300	141,978,087,160	4,099,241	3.69
Egypt	168,000	3,061,954,672	94,403	0.19
Netherlands	304,000	9,418,815,981	259,947	0.34
India	213,800	4,775,825,760	139,456	0.24
Greece	58,400	1,597,769,066	43,989	0.07
total	88,417,216	1,771,639,074,686	51,941,747	100

2.4. The trend of consumption in the last five years

According to the inquiry from the chemical fertilizers producer union it became clear that real demand for the potassium sulfate according to the type of the lands and the type of farming is about 400 thousand tons. Due to potassium sulfate is imported fertilizer, increases in the exchange rate of currency and increase in the prices, imports and consumption has decreased dramatically. According to the statistics and related authorities and organization, apparent consumption is now 151 thousand tons that can be increased to 400 thousand tons of real demand.

Since large proportion of the raw materials are produced inside the county, when the construction of the units are completed, lack of import is solved and we will witness an increase in the consumption of fertilizer and consequently an improvement of quality and quantity of the agricultural products.

Estimating apparent consumption of potassium sulfate fertilizer in the country over the past 5 years (2014-2019)

	2014-2015	2015-2016	2016-2017	2014-2015	2015-2016	2019-2020
Domestic production (tons)	42,302	49,426	53,122	63,271	84,626	104,128
Imports (tones)	40,115	76,252	83,175	88,417	47,260	47,260
Export (tons)	0.00	0.00	500.00	2.34	5.24	0.00
The apparent consumption	82,417	125,678	135,797	156,686	131,881	151,388

2.5. The trend of export product in the last five years and the possibility of its development

Since Iran is one of the importers of the potassium sulfate fertilizer, the export of this fertilizer are insignificant and about five tons in a year, exports are mainly to Afghanistan.

Imports of Hydrochloric acid during the last 5 years increased from 6100 to 25300 tons. The destination of 80% of these exports are Iraq.

vear	Weight (ton)	Rail's value	Dollar value
2018-19	5.25	463,747,839	9,215
2017-18	2.34	220,941,824	6,031
2016-17	500	11,901,050,000	370,853
2015-16	0.0	٠,٠	۰,۰
2014-15	0.0	٠,٠	۰,۰

Exports of potassium sulfate fertilizer in the last 5 years

Source : The Islamic Republic of Iran Customs Administration

The chart of exports of Hydrochloric acid in the last 5 years

year	Weight (ton)	Rail's value	Dollar value
2018-19	25,350.34	91,216,979,875	2,015,781
2017-18	19,909.60	88,056,746,929	2,590,350
2016-17	5,862.65	31,745,241,965	1,005,554
2015-16	9,214.60	52,369,530,120	1,773,115
2014-15	6,115.57	29,924,961,414	1,118,273

Source : The Islamic Republic of Iran Customs Administration

Exports of Hydrochloric acid in the last 5 years



counterparty country	Weight (ton)	Rail's value	Dollar value	Weight ratio (Wt%)
Armenia	1,308.9	3,632,131,281	76,234	2.58
Afghanistan	481.69	3,028,752,252	69,574	0.95
Azerbaijan	403.68	323,614,565	6,330	0.80
Turkey	509.78	352,039,783	6,265	1.01
Republic Azerbaijan	24.68	17,943,940	197	0.05
Iraq	22,586.37	83,778,527,280	1,855,747	94.60
Georgia	35.24	83,970,774	1,433	0.07
total	25,350.34	91,216,979,875	2,015,781	100.00

Exports of Hydrochloric acid divided by country in 2018-2019

Source: Islamic Republic of Iran Customs Administration (2020)

2.6. Reviewing of products needs based on export priority

As mentioned in the previous section, demand for potassium sulfate in Iran is 151 thousand tons, half of which is imported, meanwhile real demand is 400 thousand tons in year. the reasons for this difference can be an increase in the exchange rate currency and higher prices of imported fertilizer that makes it difficult for farmers to buy the product.

According to the research on the farming land of Khuzestan by the researchers of the center for agricultural and natural lands of Khuzestan it became clear that 58% of the lands used to grow wheat, lack potassium (the average concentration of potassium is about 169.8 milligram in Kg of soil and this is lower that the critical amount of 175 milligram in Kg of soil). In such a conditions we need 130 Kg of potassium sulfate fertilizer in order to reach the optimum performance of 4 tons in hector. In some areas, this has reached to 325 Kg in hector. Given the 384 hector of the farming land in Khuzestan, minimum demand for potassium sulfate fertilizers is estimated as 30000 tons, adding other demands due to Citrus, citrus fruits and vegetables, this will lead to 60000 tons in a year.

Given the 250 thousand tons lack of potassium sulfate fertilizer in the country and 60 thousand tons in the Khuzestan province and the necessity of exports, it is important to complete other units and use them in the production cycle. In this regard, higher priority must be given to units with physical progress that have a better access to the national and foreign markets especially Iraq and Persian Gulf countries such as Falat Ziba Romhormoz Cooperative company with 61 percent Physical Progress in Khuzestan.

The target market of the Hydrochloric acid is Khuzestan province and Neighboring provinces. Given the high potential of steel Industries (for acid washing and pickling) and drilling operations of the well, a good market is expected for this product in Khuzestan and exports to Iraq is also an option.

3- Overview of technology and production methods and product supply in the country and compare it with other countries

this unit is designed based on the direct reaction of Sulfuric acid and Potassium chloride in two steps as following reaction, that in each step HCL gas is produced. Produced gases are gathered to water after abortion and Hydrochloric acid is produced.

1. $KCl + H_2SO_4 \rightarrow KHSO_4 + HCl$ 2. $KCl + KHSO_4 \rightarrow K_2SO_4 + HCl$

In this process, first potassium chloride salt goes in to some storage silos. At the end of this silos, potassium chloride enters a conveyor equipped with weighing system using a screw feeder.

There, by measuring the mass flow, the flow rate is adjusted using chaining the rotation of the screw feeder. Meanwhile acid sulfuric acid enters the head tank storage using a pump and its overflow is returned to storage, so that we will have a fixed head of sulfuric acid.

The flow of sulfuric acid and Potassium chloride have contact in a pre-screw reactor, so this is the first reaction at this stage. About 40 % of the HCI gas in this production unit in pre-reactor that exits the system by some sucking fans. Bisulfate flow (KHSO₄) formed at this stage enters a furnace called Mannheim. In this furnace, this bisulfate and potassium sulfate were heated to the 650°C and were melted down, so the second reaction were completed and turned into potassium sulfate. This heat is directly added to the melted materials, from the bottom and upper sides of the furnace and mixing is done with a mixer with paddle blades. In this furnace, produced HCI gasses are gathered by the suction fans and absorbed to the towers. Before entering the absorption towers, these gases must be cooled down by the thermal convent made of graphite. In the absorption towers, these gases are first washed by a concentrated Hydrochloric acid and the impurities are absorbed. Then these gasses enter the next tower and contact with water and absorption to hydrochloric acid is done. This absorption operation continues until the condensation of the hydrochloric acid reaches to 33%, then this acid is ready for the market. Moreover, melted potassium sulfate must be cooled down with cooler after it is out of furnace and then fragmentation process begins. And fragmented potassium sulfate with suitable grains enter the packaging unit.

4. Determine the strengths and weaknesses of known technologies (in outline) in the production process

The most advanced production technology is in Germany. At the moment advancements in the production of potassium sulfate is done with the method of Mannheim and had similar features to the German sample. Contrary to the Iranian cases, the main part of reactor for this line is made of special ceramics of silicon carbide that are resistant to heat and corrosion and other part are made of resistant molding alloys.

This furnace is not comparable to the metal furnace in terms of reaction efficiency, furnace's lifetime, efficiency of gas absorption and some of the its advantages compared to the previous model are;

- 1. Changing the production from batch to continuous mode
- 2. Precision and computerized material dosing
- 3. Solving the problem of reactor corrosion
- 4. Transferring the radiation heat from the ceiling and around to the surroundings of the furnace.
- 5. Completely Solving the problem of gas absorption and acid smell
- 6. Making new models of thermal exchangers and solving leakage problem and broken tubes
- Improving the production capacity by increasing the material temperature from 550 to 600°C.
- 8. Products with higher quality due to less Iron and elimination of reaction corrosion
- 9. Easy exploitation and significant reduction of the human forces and production costs due to the mechanized line and increasing the capacity

5. Determine the minimum economic capacity includes the estimated volume of fixed investment estimated volume with the separation of Rials and foreign exchange (Using information of available and under construction units, UNIDO, internet, the global data banks, technology selling companies and equipment, etc.)

Considering the demands in the market specially in Khuzestan and surrounding provinces and an effort to export more products and also given the economic capacity, it is estimated that the capacity of production is 10,000 tons of potassium sulfate fertilizer and 15,000 tons of Hydrochloric acid in year as a by-product of potassium sulfate production process. If the required cash to buy machineries is available, this production process can be completed in 340 working day in two shift in a day. The construction period is one year.

Years of	Years of operation		second year	third year	forth year
Percentag	e of capacity	70	80	90	100
potassium sul	fate fertilizer	7,000	8,000	9,000	10,000
Hydrochloric	acid	10,500	12,000	13,500	15,000
Total production		17,500	20,000	12,500	15,000
The outcome of selling					
potassium sulfate fertilizer (130 million Rails)		910,000.00	1,040,000.00	1,170,000.00	1,300,000.00
Hydrochloric (1.5 million R	acid ails)	15,750.00	18,000.00	20,250.00	22,500.00
Tetelseler	million Rails	925,750.00	1,058,000.00	1,190,250.00	1,322,500.00
Total sales	Million Euro	3.75	4.28	4.82	5.35

Plan production and sales over the next 5 years

Table of Project Investment

			requir	Total			
	done	The Foreign currency		Local Currency			
Description	Costs (million Rails)	Million doller	Equivalent Rails (Million Rails)	Million Rails	Total (Million Rails)	Million Rails	Equivalent in Million Euro
land	6,721.8	0.00	0.00	0.00	0.00	6,721.8	0.027
landscaping	4,980.00	0.00	0.00	0.00	0.00	4,980.00	0.020
Construction	56,316.5	0.00	0.00	0.00	0.00	56,316.5	0.228
utilities	4,500.00	0.00	0.00	1,100.00	1,100.00	5,600.00	0.023
Equipment& Machinery	0.00	0.00	0.00	350.000	350,000.00	350,000.00	1.417
transportation	0.00	0.00	0.00	5,000.00	5,000.00	5,000.00	0.020
Office Equipment & Supplies	0.00	0.00	0.00	740.00	740.00	740.00	0.003
total	72,518.3	0.00	0.00	356,840.00	356,840.00	429,358.30	1.738
Pre-production expenditures	800.00	0.00	0.00	2,000.00	2,000.00	2,800.00	0.011
Total of fixed Capital	73,318.3	1.28	300,150.00	356,840.00	358,840.00	432,158.3	1.750
Working capital	0.00	0.00	0.00	183,488.68	183,488.68	183,488.68	0.742
Total Investment	73,318.3	1.28	300,150.00	542,328.68	542,328.68	615,646.98	2.492

Exchange rate: 1 Euro \approx 247,000 Rails 1 \$US \approx 202,000 Rails

	Area	(m ²)	Co	st (million R	Equivalent in	
Description	done	required	done	required	Total	Euro
land	4801.31	0.0	6,721.8	0.0	6,721.8	27,214.0

landscaping price as follows as:

Scope of Work	Area done	Unit price (Rails)	Total cost (million Rails)	Equivalent in Euro
Wall of bricks (2.5 meters high)	278m	10,000,000	2,780.00	11,255
sidewalk building	300m ²	1,500,000	450.00	1,822
Green space and lighting	700m ²	2,500,000	1,750.00	7,085
total sum	-		4,980.00	20,162.0



	Building	Square me	eters area	Unit price	Total	(million	Rails)	Equivalent
Description	Туре	Done Require d		(million Rails)	Done	Requi red	Total	Euro
production and storage salon	Two twin Industrial Shed, walls 6 meters height	1,430.9	0.0	35	50,081.5	0.00	50,081.5	202,759.1
Administrativ e buildings and services	Faced made of bricks, interior design made of stone and plasterwork and ceramic floor	121.0	0.0	35	4,235.00	0.00	4,235.00	17,145.7
electronic room	Made of bricks	40.0	0.0	25	1,000.00	0.00	1,000.00	4,048.6
Gate guard	Made of bricks	40.0	0.0	25	1,000.00	0.00	1,000.00	4,048.6
Total infrastructur e and costs		1631.90	0.0		56,316.5	0.00	56,316.5	228,002.0

Construction items Information:

the view of the factory



Utilities:

Description	Technical Specifications	Re (n	equired costs nillion Rails)	;)	Equivalent in
		Done	Required	Total	Euro
Electrification	Electric supply and power 220 KW	4,000.00	0.00	4,000.00	16,194.3
Water	Split 1 "and water supply	500.00	0.00	500.00	2,024.3
Gas	gas supply and piping	0.00	500.00	500.00	2,024.3
Heating & Cooling	Air conditioning 30000 Btu	0.00	600.00	600.00	2,429.1
Total		4,500.00	1,100.00	5,600.00	22,672.1

Equipment& Machinery product line:

No.	Equipment Name	characteristics	Qty	Cost (million Euro)	Required costs (million (Rails)	Equivalent in Million Euro
1	T-103, Sulfuric acid storage	300 tons capacity, materials: CS	1			
2	T-101, KCL Hoper	15 tons capacity, materials: CS	1			
3	T-102, KCL Hoper	15 tons capacity, materials: CS	1			
4	S-102, screw conveyer	3ton/hr capacity, materials: CS, 3 m length, power:5kw, with gear box and inverter system (frequency control)	1			
5	S-104, screw conveyer	3ton/hr capacity, materials: CS, 3 m length, power:5kw, with gear box and inverter system (frequency control)	1			
6	B-101, Weight feeder	3ton/hr capacity, materials: CS, 3 m length, power:5kw, with gear box and load cell	1	0	350,000.00	1.417
7	B-102, Weight feeder	3ton/hr capacity, materials: CS, 3 m length, power:5kw, with gear box and load cell	1			
8	R-101, Pre Reactor	3ton/hr capacity, materials: SS, 4 m length, power:7kw, with gear box	1			
9	R-102, , Pre Reactor	3ton/hr capacity, materials: SS, 4 m length, power:7kw, with gear box	1			
10	R-103, Reactor	6ton/hr capacity, materials: SS,and brick lining. 9 m length, power:25kw, with gear box,burner 300000 Kcal	1			

20 21	T-108 111, Absorption tank p-102, Acid pump	5000 lit capacity, material:PE with Acid Cooler 8 m3/hr. capacity, material: PP	4		
19	C-102 104, Absorption tower	5000 Nm ³ /hr, gas capacity, material: FRP and Ceramic packing	3		
18	C-101, Quench Tower	5000 Nm ³ /hr, gas capacity, material: FRP	1		
16 17	exchanger p-101, Sulfuric	3 m3/hr. capacity, material: SS	1		
15	exchanger EX-102, hot gas	With 40 m ² , material: Cast Iron	1		
14	T-104, Sulfuric Acid head tank	With 25 tons capacity, materials: CS	1		
13	CR-102 Crusher	With blades material:SS316L and 4 m length, power:8kw and gear box	1		
12	CR-101 Crusher	With blades material:SS316L and 4 m length, power:8kw and gear box	1		
11	R-104, Reactor	6ton/hr capacity, materials: SS,and brick lining. 9 m length, power:25kw, with gear box,burner 300000 Kcal	1		

Supplier and production of the Machineries: Engineering Company of Sazeh Sanaat Pahang

Execution Period: one year

- Services:
- Basic and comprehensive design
- Construction, supplement of the equipment and Utilities (national and foreign)
- Control system and precise tools
- Instalment of equipment
- Personnel training, pre-commissioning, commissioning, capacity test

Transportation

No.	Equipment Name	Qty	The currency (EUR)	Equivalent Rails (million Rails)	Cost (million Rails)	Total cost (million Rails)	Equivalent in Euro
1	Lift Trucks	1	0.0	0.0	5,000.00	5,000.00	20,242.91
	Total		0.0	0.0	5,000.00	5,000.00	20,242.91

Office Equipment & Supplies and Services:

No.	Name	Qty	The currency (EUR)	Equivalent Rails (million) Rails)	Cost (million Rails)	Total cost (million Rails)	Equivalent in Euro
1	Office furniture	1 Set	0.0	0.0	65.00	65.00	263.2
2	Tables and chairs	4 Set	0.0	0.0	120.00	120.00	485.8
3	Dining table and chair	20	0.0	0.0	150.00	150.00	607.3
4	Fax	1	0.0	0.0	40.00	40.00	161.9
5	Phone / Modem	1	0.0	0.0	15.00	15.00	60.7
6	Computers and Laptops	2	0.0	0.0	200.00	200.00	809.7
7	Printer	1	0.0	0.0	50.00	50.00	202.4
	Refrigerator	1	0.0	0.0	100.00	100.00	404.9
	Total				740.00	740.00	2,996.0

Working capital expenses:

Description	duration	Amount (Million Rails)	Equivalent in Million Euro
Supplementary Raw Material and Packaging	1 Month	66,741.67	0.270
Semi-produced products	0.5 Month	37,070.92	0.150
Petty Cash	0.5 Month	3,810.23	0.015
Account receivable	1 Month	75,865.86	0.307
Total Sum		183,488.68	0.742

Production costs:

Description	Amount (Million Rial)	Equivalent in
		MIIIION EUFO
Costs of raw materials and packaging	800,900.00	3.243
Cost of production personnel salary	20,910.00	0.085
Cost of utilities (fuel and electricity, water)	4,819.80	0.020
Cost of repair and maintenance	20,706.30	0.084
cost of unforeseen production(5%)	42,366.00	0.172
Depreciation Cost	36,952.90	0.150
Administrative personnel salary	6,363.20	0.026
Costs of administrative and sales	13,225.00	0.054
Insurance costs	1,100.00	0.004
Total sum	947,343.20	3.835

6-The annual major required raw materials and annual and to supply outside or inside the country, domestic and foreign exchange and checking the major developments in the supply of essential required items in the past and future

Potassium chloride is the raw material of the process that is mainly supplied from the Khoor and Biyabanak cites in Esfahan province and due to the proximity of Imam Khomeini port, it is possible to use imported materials from Russia, Belarus and China. Sulfuric acid needed for the Razi petrochemistry company will be supplied from Mahsharh that is located within the 100 Km of the site. It is worth mentioning that sulfuric acid is bought from the petrochemistry in stock market.

Required Raw materials

		ı per	on			Curren	cy prices	Unit	lace		in ro	
.ON	Description	Consumption	Unit Consumpti	The am required all capa	ount 1 for acity	The currency (EUR)	Equivalent Rails million) (Rail's	Cost (million Rails)	Supplying P	Total cost (million Rail's)	Equivalent Million Eu	
1	Potassium chloride	0.55	ton	8250	ton	0.0	0.0	88	Foreign- local	726,000.00	2.94	
2	Sulfuric acid 98%	0.45	ton	6750	ton	0.0	0.0	10	Local	67,500.00	0.27	
3	Polypropylene bag, capacity: 50kg	20	pcs	200000	pcs	0.0	0.0	0.037	Local	7,400.00	0.03	
	•	tota	l			0.0	0.0			800,900.00	3.24	

7. The risk analysis of the project

Strengths:

- use of modern technology and high precision devices
- Ability to mass production
- High Internal Rate of Return(IRR)
- located in the province of Khuzestan that is one of the target markets of potassium sulfate chemical fertilizers and Hydrochloric acid
- Suitable communication infrastructure such as transit road and waterways to intensive national and foreign markets specially Iraq and Persian Gulf countries.
- Proximity to important ports such as Imam Khomeini and Khoramshahr that help exports.

Weakness:

- lack of liquidity for finance machineries supplement
- xpensive main raw material of Potassium chloride
- Environmental pollution in case of inappropriate storage of Hydrochloric acid
 Opportunities:
- Supporting the national production
- Support to attract foreign investment
- Large consumption markets around the site and Khuzestan province (national agricultural centers)
- Using main paths and central infrastructures such as freeways, south-north railways, and access to free water to facilitate export.

Threats:

- Lack of funding and financial support
- Political and regional changes in the Middle East
- High Inflation rate and increasing prices

Sensitivity analysis of IRR based on the changes in sale revenue, increased in fixed assets and operational cost



8. Human resources and employment status

The employment plan is 38 people concluded 9 people in administrative office and 29 people will be working in the manufacturing sector. Given the large number of creditable universities and graduates In Chemistry and Mechanical Engineering, it is possible to provide expert manpower.

	S	ex		Require	d	Monthly			
Job Title	F	М	Qty	Shift	Sum	person (million Rails)	Salaries (million Rails)	Annual salaries (million Rails)	Equivalent in Euro
CEO		\checkmark	1	1	1	60	60.00	984.00	3,983.8
Finance director, sales, administrative	~	~	1	1	1	50	50.00	820.00	3,319.8
Financial personnel, sales office	~	~	2	1	2	42	84.00	1,377.60	5,577.3
warehouse keeper		✓	1	1	1	35	35.00	574.00	2,323.9
Process engineer	✓	✓	1	2	2	50	100.00	1,640.00	6,639.7
Line Supervisor	✓	\checkmark	1	2	2	48	96.00	1,574.40	6,374.1
Skilled worker		\checkmark	6	2	12	45	540.00	8,856.00	35,854.3
Worker	✓	✓	6	2	12	42	504.00	8,265.60	33,464.0
Service worker		✓	1	2	2	35	70.00	1,148.00	4,647.8
Secretary	✓		1	1	1	40	40.00	656.00	2,655.9
Guard		\checkmark	1	2	2	42	84.00	1,377.60	5,577.3
Total					38	0	1,663.00	27,273.20	110,417.8

9. Determine the amount of water, electricity, gas, telecommunications and communication facilities (road - rail - Airport - Port ...) and how to provide them in the appropriate area to implementation

Romhormoz industrial estate has the fundamental infrastructures and water, electricity and telecommunication facilities are available at the site. The distance between Romhormoz and Ahwaz (Khuzestan province center) is 90 Km and Romhormoz is 100 Km far away from Imam Khomeini port and has access to all the airport, railway and transit facilities and this facilitates trade flows.

Description	unit	Annual consumption	Price per unit (Rails)	Total price (million Rails)	Equivalent in Euro
Electricity	KW	957,000	1,400	1,340	5,424.3
water	m ³	9,000	20,000	180	728.7
gas	$1 \mathrm{m}^3$	2,000,000	1,400	2,800	11,336.0
Other(petrol)	-	-	_	500	2,024.3
total				4,820.0	19,513.4

10. Economic and trade support for plan

To stimulate the industrial section and related to the resistance to economy, several projects are implemented and the following are mentioned

In order to study, exchange of views and coordination to resolve the problems and obstacles faced by manufacturing units, "the Working Group of facilitate and remove of production obstacles " is formed in all provinces and with membership of the governor (chairman), head of the provincial Ministry of Industry, Mine and Trade (Secretary), management and planning organization chairman, President of the Chamber of commerce, Industries, mines and Agriculture of province and chairman of the house of industry, mine and trade. The main tasks of this working group can be mentioned as follows:

- Helping to expedite the completion and commissioning of the production of semifinished projects and develop

- Support and contribute to the export development of provincial products.

- Investigating slowdown causes or production units suspension and problem solving coordination.

• Working Group on Economy of Resistance (boom): Regarding to the economy resistive of Ministry of Industries and Business in Act 12868 dated 2016.21.4, the funding are considered in order to completing industrial plans with a physical progress more than 60% and also improving the competitiveness of small and medium production units to increase exports.

 Investment Guarantee Fund of Small Industries: The credit guarantees issuance is guaranteed to facilitate financing was through small business facilities and securitized principal and interest and credit facilities granted by banks and financial institutions to small firms. This credit guaranties have been issued for applicants after expert review and validation, obtaining fees with the required securities and warranty credit.

10.1. Supporting of Customs tariff (products and machines) with global tariff

In order to support domestic production and supply technology facility, customs duties for the project machinery about 10 percent and relatively low. Customs duties of the imported raw materials for Potassium chloride is relatively low and about 5%.

10.2. financial support (existing units and projects) banks - investment firms

The most important sources of financial credit from banks, can be cited as follows.

- 1. **Foreign exchange reserves:** The surplus proceeds from the sale of crude oil facility will be provided support and finance of part of the foreign exchange needs of producers and exporters of private and cooperative sectors. In the framework of contracts and Islamic banking laws and regulations enacted by the opening credits are awarded based on the provisions of the import and export of goods and services.
- 2. Economy of Resistance Committee (boom): Now, funding is considered for the completion of a physical progress with 60% and industrial production units as well as enhance the competitiveness of small and medium enterprises to increase exports.

3. Foreign Investment Promotion and support Act:

Since 1955, the legal framework for foreign investment in Iran has been the Attraction and support of Foreign Investments law. In line with reforms in the economic structure of the country, the Iranian parliament has offered the foreign investment plan as a Foreign Investment Promotion and Support Act which legislated finally in 1381. This will lead to the development of the legal framework and operational environment for foreign investors in Iran. Some of the new developments in the field of foreign investments include:

- Islamic Republic of Iran is welcome of foreign investments by foreign persons, whether natural or legal persons in all areas of economic activity.
- Recognition of new investment methods in addition to foreign direct investment
- Short and quick process and approval application and foreign investment approval.

• Creating an unique organization called the Center for Foreign Investment Service Organization for Investment, Economic and Technical Assistance of Iran in order to focused and effective support of the activities of foreign investors in Iran • Further liberalization of foreign exchange mechanisms for more use by foreign investors

In case of absorbing foreign investor, the government considers some bonus, such as:

- 1. Tax exemption for the products of foreign investing companies
- 2. Presenting insurance coverage for the investors
- 3. Presenting customs exemptions for importing equipments required by foreign investing companies
- 4. Granting subside for training local manpower
- 5. Preparing free zones for investment
- 6. Granting infrastructure facilities and less expensive public services such as water and power
- 7. Guaranteeing return on profit and the main capital and prevention from their confiscation and nationalization

11. Analyzes And providing summary and final offer

According to the market analysis, it became clear that about 400 thousand tons of potassium sulfate fertilizer is needed in the country and about 104 thousand tons is produced inside and about 47 thousand tons is imported. In the recent years, given the higher exchange rates and higher prices of potassium sulfate, we have observed a significant reduction in imports.

Based on the research and estimations regarding the lands in Khuzestan province as one of the agricultural poles it became clear that national demand for potassium sulfate fertilizer with exports is 60 thousand tons, despite this significant need, there is no manufacturing unit in the province.

So with 250 thousand tons of deficiency in potassium sulfate fertilizer in the country and 60 tons of deficiency in the Khuzestan province and the need for more exports, it is necessary to complete the units in the construction cycle. In this regard, units in Khuzestan province with higher physical progress including Falat Ziba Romhormoz cooperative company are more important since they have a better geographical and infrastructural access to the national and foreign markets especially Iraqi markets.

Therefore, as Falat Ziba Romhormoz has made to construct a manufacturing company for potassium sulfate chemical fertilizer and Hydrochloric acid, If the facilities to buy up to date machineries and raw materials, it is predicted that this product is welcomed both inside and outside the country and will have high profitability. High rate of return on investment (51.1%) and short payback period are among the main advantages.

Cost of products (ton):	potassium sulfate fertilizer:	100.7 million Rails : 407.68 Euro	
	Hydrochloric acid:	1.02 million Rails: 4.13 Euro	
Sale price of products (ton) :	potassium sulfate fertilizer:	130 million Rails : 526.3 Euro	
	Hydrochloric acid:	1.5 million Rails : 6.07 Euro	
total Sales (in 100% capacity)	1,322,500.0 million Rails≅ 5.35 million Euro		
Present sales in break-even point	22.02%		
(in 100% capacity)			
Profit (in 100% capacity)	300,125.46 million Rails≅ 1.215 million Euro		
Gross value added	496,073.9 million Rails≅ 2.01 million Euro		
Net value added (million Rail's)	459,121.1 million Rails≅ 1.86 million Euro		
The Gross value added to total	38%		
Sales			
The Net value added to total Sales	35%		
The Gross value added to	81%		
Investment			
Investment Return Period	3.35 years		

Exchange rate: 1 Euro \approx 247,000 Rails 1 \$US \approx 202,000 Rails

12- Summary of pre-feasibility plan

General Specification			
Name of The Project	Production of Potassium sulfate fertilizer and Hydrochloric acid as		
	by-product		
Project Capacity	SOP:10,000 ton & HCI: 15,000 ton		
Working Days	340 days		
Working Days	SOP: Agricultural fertilizer		
Product Usage	HCl: Acidify of well oil & Washing and acid washing of metals.		
Marketing			
Product Global Price	SOP: 500 \$US/ton, HCl 30~33%: 150 \$US/ton		
Domestic Demand	400 thousand tons		
Domestic Production	104 thousand tons		
Import	47000 tons		
Export	5 ton SOP		
Technical Study			
Land Area	4801.31 m ²		
Building Area	1,631.90 m ²		
Main Raw Materials	sulfuric acid98%, Potassium chloride		
Supplying Place of Raw Materials	local		
Power Requirement	220 KW		
Water Requirement	9000 m ³		
Fuel Requirement	2,000,000 m ³ gas		
Economical & Financial Study			
Fixed Investment Cost	432,158.30 million Rails \cong 1.750 million Euro		
Working Capital	183,488.68 million Rails \cong 0.742 million Euro		
Total Investment Cost	615,646.98 million Rails \cong 2.492 million Euro		
Annual Sale	1,322,500.0 million Rails≅ 5.35 million Euro		
Net Present Value(NPV)	724,774.46 million Rails≅ 2.93 million Euro		
Break Even Point(BEP)	22.02 %		
Internal Rate of Return(IRR)	51.11%		
Investment Return Period	3.35 years		
Investment Sources Ratio: Equity:16.75% Bank financial facilities:3.25% Finance: 80%	103,130.98 million Rail's \cong 0.417 million Euro 20,000.0 million Rails \cong 0.081 million Euro 492,516.0 million Rails \cong 1.994 million Euro		