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A COMPREHENSIVE STUDY OF AFGHAN SAFFRON



Research, Planning and Policy Directorate, April, 2013

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About US: Afghanistan Investment Support Agency began as an agency that provided licenses to companies wishing to invest in Afghanistan. "AISA" has now evolved into a proactive institution on promoting and attracting investment to Afghanistan.

Our Vision: is to become a world-class investment promotion and support agency by ensuring a business-friendly environment for private sector development and thereby robust and sustainable economic growth in Afghanistan.

Our mission: is to create sustainable enterprise development particularly small and medium by providing quality services to investors, facilitating cross border partnerships, advocating business enabling measures & reforms and by promoting Afghanistan as an attractive business and investment destination proactively.

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Preface

Since AISA's establishment in 2003, there have been tremendous investments in Afghanistan both foreign and domestic totalling 8.9\$ billion according to a survey conducted on business fixed investments in Afghanistan, most of these investments are allocated to the construction, telecommunications, banking, and transportation sectors. Agriculture, despite covering greater area of Afghan GDP and yet having huge potential for investors has been overlooked. Therefore this report thrived to examine the hypothesis that those areas which received limited attention from the government, NGO's and investors – in this case the Afghan Saffron have good potential to grow and can have high return for investors.

The objectives of this paper are to study the market structure and performance of Afghan Saffron, to look at the potential opportunities from an investor's prospective, to identify the constraints and factors of market failure, and to finally recommend measures and actions for the development of this industry. We employed a more general approach for the identification of market opportunities and constraints. Data and information was collected through onsite visits to businesses and factories, interviews and discussions with business owners, heads of associations and officials at the Ministry of Agriculture, and previous studies and reports made on saffron in Afghanistan.

The paper argues that given the strong growth of the global market for saffron and the increasing demand in most regions of the world, there is strong potential for saffron exports and production in Afghanistan. The Afghan saffron industry has doubled in size 2003, and it should be a good reason for the government to place this sector at its top priority for support. Based on the data collected from the Ministry of Agriculture, DACCAR and surveys our projections show that saffron industry in Afghanistan in terms of number of employees, size of production, and share in GDP can grow extensively.

Recommendations

We found that although saffron has been given with limited attention in Afghanistan, the market structure is in dire shape there are limited numbers of player who control the market price. Due to lack of competition which is the result of a non-efficient market structure – firms' performance and conduct are not desirable or up to international standards, while their prices are very high, the quality of their finished products in terms of

packaging and finishing and is dire. As a result this sector is highly affected. Moreover, there is no tendency among the Afghan firms to acquire new technology, apply latest techniques and to improve their quality, and standardized their product to an international level requirement.

Abbreviations

AISA	Afghanistan Investment Support Agency
SDO	Sanayee Development Organization
CSO	Central Statistics Office
MAIL	Ministry of Agriculture, Irrigation and Livestock
EPAA	Export promotion agency of Afghanistan
DACAAR	Danish Committee for Aid to Afghan Refugees
DFID	UK Department for International Development
FAO	Food and Agriculture Organization
ICARDA	International Center for Agricultural Research in Dry Areas
IDRC	International Development Research Centre
NSCSC	National Saffron Coordination and Support Committee
RALF	Research Alternative Livelihood Fund
USAID	US Agency for International Development
UAE	United Arab Emirates
USA	United States of America
NGO	Non Governmental Organizations
Glossary	
Jerib	2000 Meter Square of land

Note:

The conversion rate used in this paper for converting Afghanis to US dollars is AFN 50 = \$1.
A billion means a thousand million.

Preface:

One of the oldest natural plants which have attracted the world by its significant characteristics such as color, taste and aroma, Saffron is the most expensive product and pharmaceutical plant in the world, saffron has been grown from ages, all over the world. In figure 1ⁱ provided below briefly explains saffron plant known as *Crocus sativus*, a corm survives for one season, producing via this vegetative division up to ten "corm lets" that can grow into new plants in the next season. The compact corms are small brown globules that can measure as large as five centimetres (2.0 in) in diameter, have a flat base, and are shrouded in a dense mat of parallel fibres; this coat is referred to as the "corm tunic". Corms also bear vertical fibres, thin and net-like, that grow up to 5 cm above the plant's neck.

The plant grows to a height of 20–30 cm (8–12 in), and sprouts 5–11 white and non-photosynthetic leaves in a fine structure that covers and protects the crocus's 5–11 true leaves as they develop. The latter are thin, straight, and blade-like green foliage leaves, which are 1–3 mm in diameter, either expand after the flowers have opened ("hysteranthous") or do so simultaneously with their blooming ("synanthous"). Its flower-bearing structures bear specialised leaves that sprout from the flower stems; the latter aestivating in spring, the plant sends up its true leaves, each up to 40 cm (16 in) in length. In autumn, purple buds appear. Only in October, after most other flowering plants have released their seeds, do its brilliantly hued flowers develop; they range from a light pastel shade of lilac to a darker and more striated mauve.

The flowers possess a sweet, honey-like fragrance. Upon flowering, plants average less than 30 cm (12 in) in height. A three-pronged style emerges from each flower. Each prong terminates with a vivid crimson stigma 25–30 mm (0.98–1.2 in) in length.

Water which is most important for any agriculture activity and is usually a limited resource however this is not the case for saffron, it requires the least amount of water and would never face a problem in areas with limited water resources, it has been tested that in

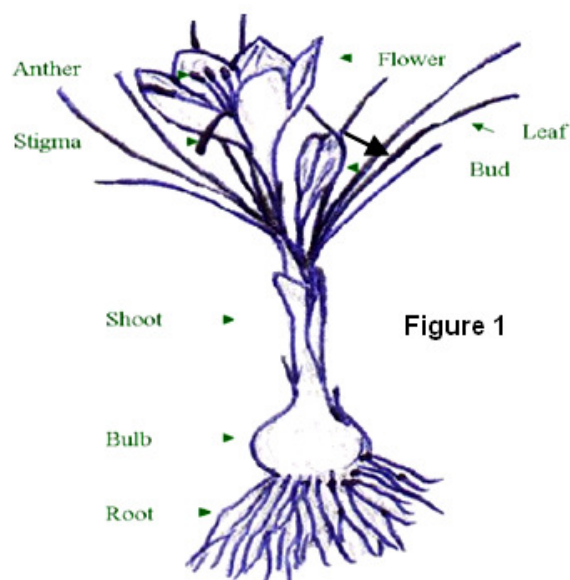


Figure 1

cold winter or warm summer this plant does not have any particular disease and does not need use of urea. The most important part is the production process of saffron which identifies the actual value of it, the areas that really matter are the process which includes the transportation of the plant, division of the plants, drying process, grading them and finally packaging it, and then it is ready for sales, this paper is based on chapters which will in detail discuss Objective, Methodology, Production of Saffron, Planting Saffron, Harvesting Saffron, Processing Saffron, Packaging and Branding, Trading Saffron and finally Conclusion and our recommendations.

Methodology

Throughout this research we have collected both qualitative and quantitative data; we mainly relied on both primary research through field surveys and on secondary research on previous studies and reports.

For field surveys, we visited saffron processing units and saffron growing sites in Kabul, Mazar-e Sharif and Herat provinces. Interviews and discussions with saffron traders, farmers, middlemen, wholesalers, retailers and buyers who are involved in exports to major global markets such as Germany, France, UAE and USA. Afghan government officials were another main source of information. To find out how much further the Afghan saffron industry has the potential for growth in terms of value addition and employment opportunities, we will gather the required information and present them in a conclusive manner by highlighting the key lessons learned and recommendations on saffron development.

Chapter 1:
Overview of Saffron Industry

Overview of Saffron Industry

History:

Historically the word saffron goes as back as 10000 years, saffron is said to be derived from the word “zarparan”ⁱⁱⁱ in Dari language which means that a flower its stigma is valued the same as gold like precious and expensive metal and this word had been turned in to saffron later on. It is said differently in many languages in Pashto and Arabic it is pronounced as “Zaferan”, in Farsi and Turkish it is pronounce as “Zefrun”, in English Saffron, in Spanish “Azafran” and French “Safrane”. Experts says that saffron has long been grown in Greece, Turkey, Afghanistan and Iran, and it has spread from far north up to far east of India, China, from West up to Spain.

The old Khorasan part of which consisted of the today’s Afghanistan, Iran and according to analyst’s saffron has been grown in Afghanistan about 2000 years back. 80 years ago some farmers in Herat had grown saffron and some 30 years back saffron has been grown by the agriculture directorate of Herat for trial purpose, but saffron was sow mainly when the refugees from Iran returned to Afghanistan in the year of 1991, who had previously worked in saffron fields in Iran brought back with them saffron corns, Saffron as planted in Pashtoon Zarghoon and Ghoryan district of Herat province.

In 1998 some NGO’s established saffron trials with local farmers in semi-arid villages of Pashtoon Zarghon district of Herat province, by 2007 due to good results and high returns more than 1300 farmers are now growing saffron in this district, as a result from 2002 the ministry of Agriculture and some NGO’s began to distribute saffron corms to farmers and other saffron growers in the provinces of Herat, Mazar-i Sharif, Baghlan, Kabul, Wardak, Bamyan, Logar, and it is said to be tested and grown in about 26 provinces throughout Afghanistan.

About Afghan Saffron and the World:

Today, significant success has been achieved and saffron is increasingly been grown in Afghanistan, saffron is cultivated in more than 7 provinces regularly, a total area of around 250 hectares involving approximately 1,300 farmers. 67,500 work days have been created, and around 3000 kg of saffron is the estimate for the current year – with a value of

around \$3900000, calculated according to an average price of \$1300/kg (in addition to annual 1406.25 MT of livestock fodder produced as a by-product).

Country-wide investment so far resulted in 14 private Afghan companies are now engaged in processing and marketing saffron and the interest in buying Afghan saffron from abroad is increasing (including the US and Europe, UAE where it can pay the increasing in saffron price.). Estimated total suitable area for saffron production in Afghanistan is about 7,000-10, 0000 hectares. After cultivation of this area total production will be about 50,000 to 70,000 kg.

Countries which are mainly famous for the highest value of saffron production are Iran which produces 200 tons per year, Greece which produces from 5 up to 8 tons a year, Afghanistan about 4 tons, Murakish and Kashmir which produces from 2/3 tons each, India up to 2 tons, Spain and Italy produces up to 1 ton each however France, Algeria, Egypt, Germany, Australia and China also have minimum saffron productions , the current global demand sits at 180/tons a years but if they consider growth trend in saffron uses and if each individual a year uses .25/grams of saffron for personal use , not considering commercial uses it will amount to 1500 tons per year demand.

Quick facts on Why Saffron for Afghanistan

1	Low water requirement	I or 2 irrigations usually suffice in Afghanistan
2	Labour Intensive	250 person days per year
3	Simple Machinery	All activities are possible by hand manually
4	Easy Transportation	Compared to other crop product saffron is not bulky
5	Higher Income	At least 5000\$ USD income per year
6	International Market	Demand Increases year by year
7	Short Growing Season	One month labour required per year
8	Suitable Water Requirement	During saffron growing season other crops do not need water
9	7 Years production	Land preparation can cultivation labour requirements only in the first year
10	Low Risk	Drought resistance no specific saffron diseases
11	Gender	80% of activities can be carried out by women
12	Good Storage Abilities	Up to 2 years after drying
13	High Productivity	Afghanistan soil and climate are very suitable

These are some of the quick facts which are explained in detail though out the paper.

Importance and Usages of Saffron:

Saffron is the most expensive and the only agriculture product that is sold by the weight of per gram, it has its own importance among agriculture products, its importance is due to its limited need to water, once harvested it can be cultivated from five to seven years, can be harvested in fertile land, can easily be transported

The three stigmas of the saffron flower are the most important economic part of the plant. The saffron stigma is rich in aroma and color. In dried or powdered forms, stigmas are commonly used as: spice or coloring in food preparation materials in pharmaceutical, cosmetic and perfume industries, dye material in textile production. Saffron anti-cancer effects have been studied extensively during recent years. Saffron leaves are also used as animal feed. Five (5) Jeri of saffron produces about 1.5 tons of leaf dry matter per year.

Chapter 2:
Saffron Plantation

Saffron Plantation Establishment:

There is no doubt that saffron is one of the crops adaptable to the climatic condition of Afghanistan, for better growth and production, saffron requires the following specific conditions:

Climate: Mild winters with heavy snowfall and hot summers are excellent; which means that the climate of some parts of Afghanistan, such as Herat Province, is highly suitable for saffron production, as well saffron has been tested in 26 provinces with positive results.

Temperature: Saffron grows well under temperate and dry climates; its vegetative growth coincides with cold weather and freezing condition. Saffron tolerates maximum of +45°C and minimum of -18°C.

Moisture: Annual rainfall requirement for saffron is about 300 mm. Saffron maximum water requirement is in March and April of about 15 to 20 liters per m² per irrigation period.

Soil: Saffron can be grown in a wide range of soils, with moderate structure and good infiltration but for better growth and production, soil should be sandy loam, rich in calcium and high content of organic matter. Saffron is believed to be a low nutrient requiring plant and so fertile soils with high nutrient contents is not ideal because this may result in excessive vegetative growth and little flower production. Optimal soil pH value required by saffron plant is 7-7.5. Soils with high moisture content and prone to water logging or flooding are not suitable for saffron production, as corm decomposition resulting from fungus infection may occur.

Land Preparation:

The land should be prepared before planting saffron corms as follows, deep plugging of land (20 - 25 cm) Land levelling, Removal of weeds and dead plant material, stones, etc from the field. Making of suitable ridges or small plots, Soil preparation is practiced in autumn or winter, and application of 4-6 tons well decomposed animal manure per Jerib is recommended, a second shallow tillage is necessary in late March or early April.

Planting Methods and Plant Density

Different planting methods are used in different countries. The following planting methods are applicable in Afghanistan

1) Ridge Planting Method (Fig 2)

Ridge planting method has the following advantages: irrigation is easy, corm is prevented from being soaked in water – logged soils and therefore corm decomposition is prevented. Ridge cultivation provides better protection against high temperature as well as pest and diseases. In ridge planting method, the following must be observed:

- Height of ridge should be about 30 cm.
- Distance between ridges can be 75 cm when prepared by machine/tractor or 50 cm between ridges when prepared manually.
- Planting rate should be a minimum of 1,000 kg corm per Jerib to a maximum of 2,600 kg corm per Jerib.
- Planting distance between corms is flexible.
- Planting depth should be 20-25 cm below the surface of the ridge

2) Flat Bed Planting Method (Fig 3)

The following must be observed in flat bed planting method

- Plant density should be 50 plants per m²
- Planting rate is 1,000 kg corm per Jerib. (0.5 kg per m²)
- Distance of planting in good levelled field should be 20 cm between rows and 10 cm between plants.
- Alternatively, 40 cm between rows and 5 cm between plants is acceptable and planting depth is 15 cm.

3) Traditional Planting Method (Fig 4)

The traditional planting method is done by planting of saffron corm in a pit, under this method, the following is commonly practiced

- The Distance between pits is 25 cm
- Pit radius is about 20 – 25 cm
- Pit depth is 20 - 25 cm

Figure 2



Figure 3



Figure 4



- 3-15 corms are planted per pit

Corm Preparation before Planting

Corm Selection:

Corm for planting should come from 2 to 4 year old saffron corm bank or saffron multiplication field. Corm should be healthy with no injuries. It should be big size with approximate weight of 8 g or more and a diameter of 3 cm. However, medium size corm with the weight 6 g and diameter of 2.5 cm could also be used in the absence of big size corm.

Corm storage:

Corm should be planted immediately after they are removed from the field. Corm storage before planting is not recommended because it may reduce the flowering potential of the plant. In cases however, that storing is essential, then corm should be stored in dry and cool room (3 to 5°C) with good ventilation for only a few days but not more than a month.

Corm packaging and transport:

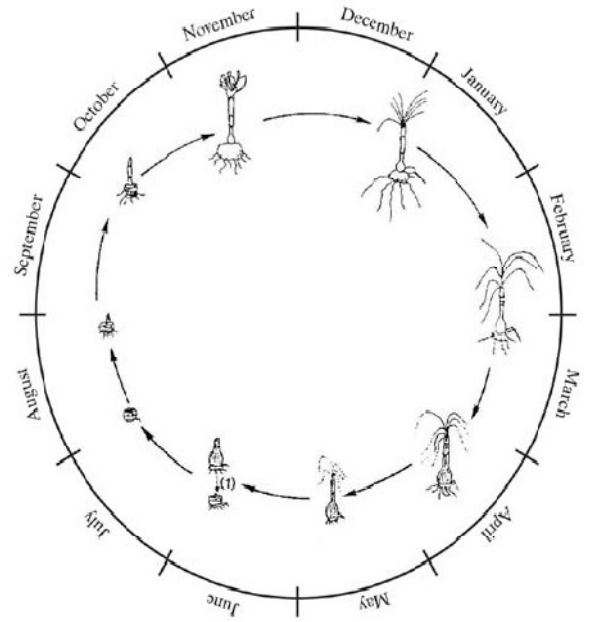
Saffron corm packaging and transportation to new fields should be done very carefully. Plastic or carton boxes are suitable. A maximum load of 15 – 17 kg per box is optimal.

Corm treatment:

It is not recommended to apply fungicide on the corm before planting, because the mercury contents may hamper the quality of the spice. However, if fungicides such as Vitava or Ceresan are applied, the instructions of the manufacturer should be strictly observed (300 – 500 g for 100 kg corm have been recommended). Wearing of breathing mask and rubber gloves during application is a must. Put the untreated corms on a plastic sheet and spread the powder fungicide evenly on top of the corms, then carefully roll the corms to further spread the fungicide powder on corm surface

Planting of Saffron Corm

Regardless of what planting method is used, in Afghanistan in general planting of saffron corm is done from late May through early October. However, recent research results from Khurasan Province in Iran with similar climate conditions as Herat Province indicate that planting of saffron corm from April through June leads the best production. Planting of saffron corm should be done following the instruction described for the different planting methods.



No	Saffron Production Cycle												
	Production Activity	Monthly Activity of Takes											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Fertilizer Application and deep												
2	Periodic Light Tilling												
3	Planting of Corms												
4	First Irrigation												
5	Flower Appearance and Harvest												
6	Irrigation every 12-14 days												
7	Refinement of Stigma												
8	Foliage Cutting for Fodder												
9	Lift Daughter Corms												
10	Daughter Corms Forming												
11	Root and Leaf Development												

Given the table above explains the saffron production cycle in detail, starting with fertiliser, light tilling, planting of corms, first irrigation, flowers appearance and harvest, refinement of stigma, foliage cutting of fodder, lifting and forming daughter corms and root leaf development.

The yield of the crocus flowers is generally low in the first year and increases over time. The production reaches its peak at its 4th and 5th year. The total life cycle of the crocus flower is 8 years which is explained in the table provide below.

Saffron Yeilds in Different Years of Field Age		
Age of Field	Flower Yield (kg/ha)	Dry Saffron Yeild (kg/ha)
1st Year	100	1.32
2nd Year	400	3.95
3rd Year	600	7.8
4th Year	800	10.5
5th Year	1,000	13.2
6th Year	700	9.15
7th Year	600	7.8
8th Year	400	5.2
Average of 8 Years	562.5	7.36

Care and Maintenance of Saffron Plantation

Immediate Care after Corm Planting:

Care must be exercised after planting the corm, do not walk inside the field, unless it is necessary to avoid stepping on the planted corm because corm is sensitive that once you stepped on it, its survival may be affected.

Fertilizer Application:

Saffron requires limited amount of nutrients compare to other agricultural plants. It is estimated that for 1 kg of saffron dry matter only about 12 g Nitrogen, 3 g Potassium and 22 g Phosphorous are removed from the soil. Application of too much fertilizer to the plant is not recommended because this will result in excessive vegetative growth that will negatively affect the corm quality and flower development. The only fertilizer application required is therefore the application of 4 to 6 tons per Jerib of well decomposed animal manure before ploughing and planting.

Irrigation:

Saffron is a suitable plant for semi-arid regions like Afghanistan where water limitation is a prevalent problem. Saffron corm normally undergo dormancy period for 5 months starting from early May up to late October where irrigation is not required. The dormancy period of saffron coincide with the period where water is limited.

The irrigation requirements of saffron, if there is any, occurs at times when other crops have little or no need for irrigation, so saffron does not compete with other crops for irrigation water. The growth of saffron starts immediately after first irrigation at the end of its dormancy period, therefore, irrigation at the end of September is essential to induce early flowering.

The succeeding growth period of saffron usually falls into the winter and spring period with sufficient rainfall. However, if rainfall is not sufficient after the flower harvesting and at the emergence of the leaves, a second irrigation should be applied. Irrigation during summer has some positive effects on the saffron yield but it is not recommended because of the high risk of fungal infection to the corm due to water logging.

Saffron Corm Thinning:

New saffron corms grow above the old corm each season and they normally protrude on soil surface by about 1-3 cm each year. The corm protruding on the surface is normally damaged by frost and thereby affecting the growth of plant. Therefore, periodically after 4 years up to 7 years, some corms need to be removed from the mother plant and these corms can be used as planting material in establishing another saffron field. Corms should be removed from the mother plant carefully by digging using shovel.

Weed control:

Weed control is an important practice in saffron cultivation; farmers have to weed regularly, as follows:

- After each irrigation
- After flowers have been harvested
- Additional weeding may be needed for control of spring and summer weeds
- Caution should be made during weeding, especially in ridge planting method, not to step on the ridge, the person doing the weeding should walk between ridges, take all the weeds out of the field in a basket and feed them to animals or heap them for composting for use in the establishment of new saffron field

Breaking of Soil Crust:

In the second year after first irrigation, breaking of the soil crust is important practice to facilitate the emergence of flowers, breaking of the crust in the soil surface up to depths of 5-10 cm is recommended.

Pests and Diseases Control:

The taste and smell of saffron corm is attractive to many animals. The corm is palatable food for insects, worms, domestic and wild animals. It is therefore necessary that the farmers should regularly check the field / for any damage. Some of the known pests and diseases related problems on saffron and their recommended solutions are as follows:

Rodents (rats and mice):

Rodents such as rats and mice cause damage in saffron fields by digging holes and tunnels in the ground and eating the corms. To control their damage, it is recommended to use trap and bait. However, caution should be made to secure that the poisonous bait is not reachable by domestic animals.

Rabbits, Birds and Snails:

Rabbits normally eat the succulent leaves and flowers of saffron. In order to control rabbit damage, the use of wire net fences has proven very efficient and therefore recommended. Snails - The same with rabbits, snails also attack the green leaves of saffron, to prevent this let fowls especially ducks and geese go through the saffron fields to eat the snails. Birds - New corms normally grow on top of old corms and these new corms are normally exposed. These corms are eaten by birds to prevent the damage, corm thinning is recommended to remove exposed corms for planting to another field. If not, cover the exposed corms with soil. Also avoid storing corms in an open field where birds have easy access to it, if it cannot be avoided to store corms in the field before planting, make sure that corms are covered to hinder birds from access to it.

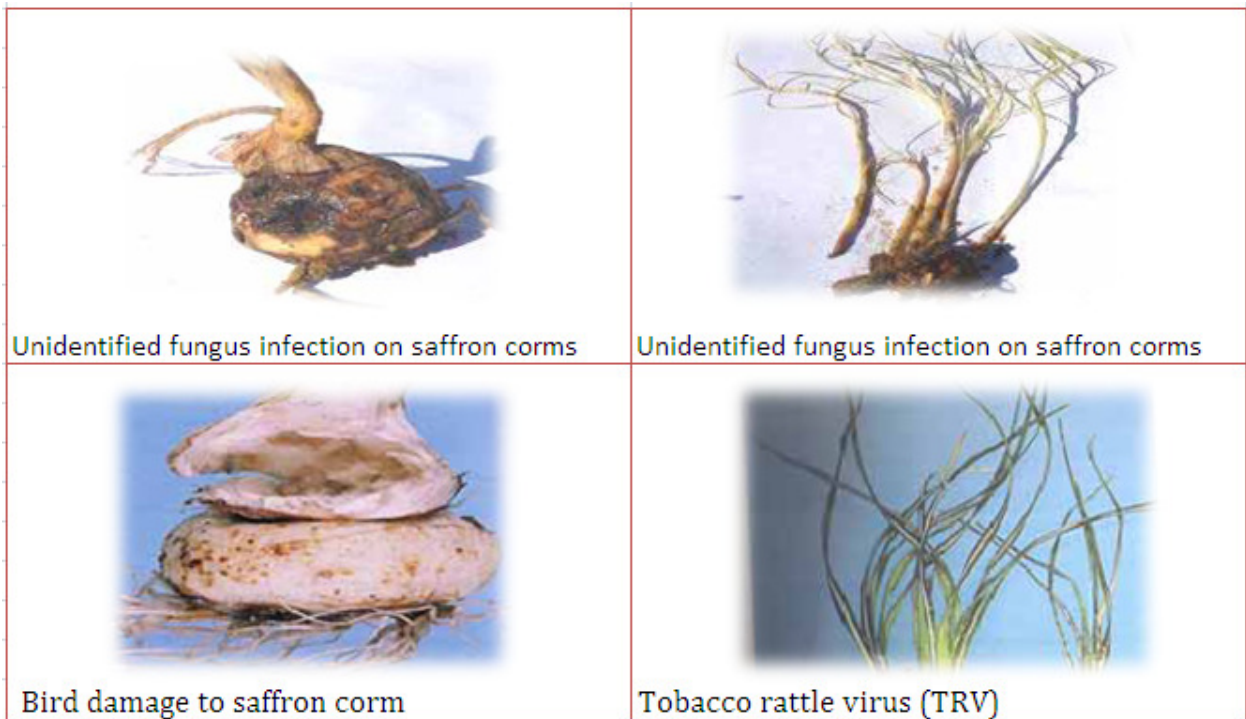
Insects:

An unidentified insect, in the form of white worm that lives on the soil also creates damage to saffron plant by eating the corm. The symptoms of damage by this type of worms include discoloration or yellowing of leaves, wilting, and finally drying of the plant. If this problem occurs, it is recommended to immediately up -root the infected plant, separate the remaining good corm for planting and burn the infected corm. Fungus - Aside from fungus infection on the corn planting materials, occasionally fungus infection on living saffron plant also appear.

However, no clear identification and control has been studied yet. Domestic animals – In summer, where all other plants turn brown, saffron remains green there by making it attractive to domestic animals like goats and cows. Saffron field must be protected from these animals by constructing fences. It is highly recommended to use living fence using legume trees or shrubs to be planted around the field. The leguminous living fence will provide several benefits, aside from protecting saffron from domestic animals. The fence could be trimmed regularly and the leaves could be used as feed to animals or material for composting and the stems could be used as fuel wood.

Diseases:

Diseases on saffron have rarely been observed in Afghanistan, and virus infections such as the tobacco rattle virus (TRV, a tobnavirus) have only been observed in ornamental Saffron species in Europe.



Harvesting

Saffron Flowers Harvesting

The flowering stage of saffron starts from October and continues for some 3 weeks, each flower lives only for some 48 hours. This is the reason why saffron has such a high value. The vast amount of labour required for harvesting and on-farm processing in a relatively short period. Saffron flowers should be picked early morning as soon as they open. The timing of the harvest and speedy processing is important, as the wilting of the flowers makes the post-harvest process difficult to impossible, and the quality suffers considerably. The optimal harvest time is therefore early in the morning before there is full



sun.

The flowers should be cut from the plant by the fingernails near to the ground. It should be put in a clean basket to avoid contamination of stigma. A good flower collector can collect as much as 3,000 flowers per hour. After collection, the flowers should be transported to a farm house or other location where it should be

kept in a clean and shady place until further processing. If necessary, the saffron flowers should be stored at temperatures near 0°C, and the layer of fresh flowers should not exceed 10 cm, under these conditions, saffron flowers can be kept for up to 7 days.

Post - Harvest Processing

Separation of stigma from saffron flowers immediate post-harvest processing will give the best saffron spice quality, during the post-harvest processing; the stigmas are separated from the flowers. The stigmas are bright orange-red and are clearly visible among the lilac petals. It takes some 450,000 stigmas to make up a kilogram of saffron spice. Workers must process 150,000 – 170,000 flowers to produce one kilo. The deep red stigmas are attached to the flowers by pale filaments called styles. These, as well as the

yellow stamens, are worthless as spice. Many merchants prefer to buy only pure saffron, requiring that the stigmas be separated from the styles, which has to be done by hand as long as the material is fresh. The following must be taken into consideration when separating saffron stigma from the flower: Separate stigmas from flowers in a clean environment, Ensure that the place where stigmas are separated from flowers is free from dust. Ensure that the people who do this work keep their hands clean at all times, washing thoroughly with antibacterial soap. Separate the stigmas from the styles depending on the requirement of potential buyers, some buyers (wholesalers and retailers) prefer the styles to be included and arrange in bunches. The reason for this is that buyers want to make sure that saffron is pure and free from adulteration because saffron is so expensive, some supplier's are tempted to adulterate it with cheaper material and dye it all red to pass it off as pure. If buyers can see the styles, they are confident that the saffron is pure. They can then separate the styles from the stigmas themselves and sell the saffron under their own labels.

Drying of Saffron

The stigma must be dried immediately to keep its quality. Saffron drying must be done in a proper way to achieve the right moisture content level. If it is too moist it may get infected with fungus, especially those causing toxic aflatoxins. If saffron is too dry it may break easily and turn into powder and weight will be reduced below the trade requirements and farmers will lose money. In Afghanistan most saffron is air dried. It takes up to a week to dry saffron under this method. Using this method, the following must be taken into considerations: Air dry saffron in an area free from dust and direct sunlight and in an area where birds have no access, Put individual saffron stigma in a drying container like pale, basin, tray or big plate, cover the container with thin cloth or screen to prevent contamination. When covering the container, make sure that there is good aeration. Simple electric drier was recently introduced in Herat Province with good results. Drying with electric dryers takes minutes rather than days and makes it easier to control the moisture level (12 % to 14 %) of the saffron. Improved kilns dryers are also available where drying temperature and humidity could be controlled better, making the quality of dried saffron better but these are currently considered too expensive.

Chapter 3:
Market Analysis

Market Analysis

Afghan should invest in building a separate identity for Afghan saffron, one that is entirely separate from saffron from Iran or any other country, coupling it with a reputation for high quality. At the moment, in economic terms, Afghan saffron is a simply an unbranded commodity and, because buyers have no particular reason to purchase it in preference to saffron from anywhere else, producers have very little scope for negotiating prices. If Afghan saffron were recognized as special because of its quality, producers could ask for more than buyers pay for saffron from other countries. Afghan saffron is largely unknown at the moment and if producers take care to export only good quality spice buyers will learn to appreciate it.

Market Structure

In order to know whether the structure of the Afghan saffron market is monopoly, oligopoly, monopolistic competition, or perfect competition, we need to study the following elements to determine the market structure.

Number and size distribution of firms:

There are around 14 companies, and 26 saffron grower associations in Afghanistan. But in terms of market share there are 3 major companies 2 in Herat and 1 in Kabul – that supply greater percent of overall Afghan saffron production. It shows that concentration is high in the market.

Distribution Channels

The farmer makes less benefit from sell of their products, the distribution channel is short. I.e. fewer intermediaries. The distribution channel/chain should be controlled by the farmers. Afghan farmers are less or in no contact with foreign buyers. They sell their products via traders, who keep critical market information with themselves to profit more, at the cost of farmers' profit.

Type of product:

Most of the growers produce saffron applying the same techniques but their quality varies highly from one firm to another for the reason that there no certification authority who can set and apply standardised rules for processing and packaging.

For example the main product of saffron is Negin, which is all red, however some producers may dry it well, and other may not process it to well to remove the stigmas, where the yellow

on the stigmas are useless and if not dried well there is an extra weight added to this expensive product.

Ease of entry and exit:

Saffron business is not very complex business and it does not require lots of capital or time, for processors to set up processing machineries and if trader to build office if a farmer can start with a Jeri of land which again require very limited water.

Exit barriers:

To exit the market a farmer may have to wait for the either entire seasons of harvesting or lose the seeds. For processor selling their machinery might be very difficult at a good price – as there is no market for specialized second-hand machineries in Afghanistan. For traders, processors or farmers the saffron network you build over the years will vanish and might of no use in other fields or work.

Firms Conduct:

In this section, the objective is to study the conduct of traders, processor and farmers in terms of policy objective, pricing strategies, and marketing strategies. Furthermore, to evaluate the question that how market structure affects the way the firms compete.

Policy objectives:

Saffron businesses in the market are very much short sighted – their main objective and focus is instant profit. They have no long-term plan for growth and market share. This has led to the penetration of saffron market by Iran and their saffron is exported via Afghanistan.

Pricing objectives:

Saffron business market has no other strategy for pricing except to adopt a price discrimination policy. These strategies give them the chance to earn higher profits than what they would have received if they had a competitive pricing strategy. However, with such a strategy, they will lose a large number of their customers in the long-run.

Marketing strategy:

Firms in this industry neither have market research nor effective advertising activities. Mostly the managers and owners of saffron businesses do not understand the importance of marketing activities and they don't even have website.

Among many other factors, one is lack of competition between the firms this due to the oligopolistic structure of the market. This shapes an environment in which Afghan firms

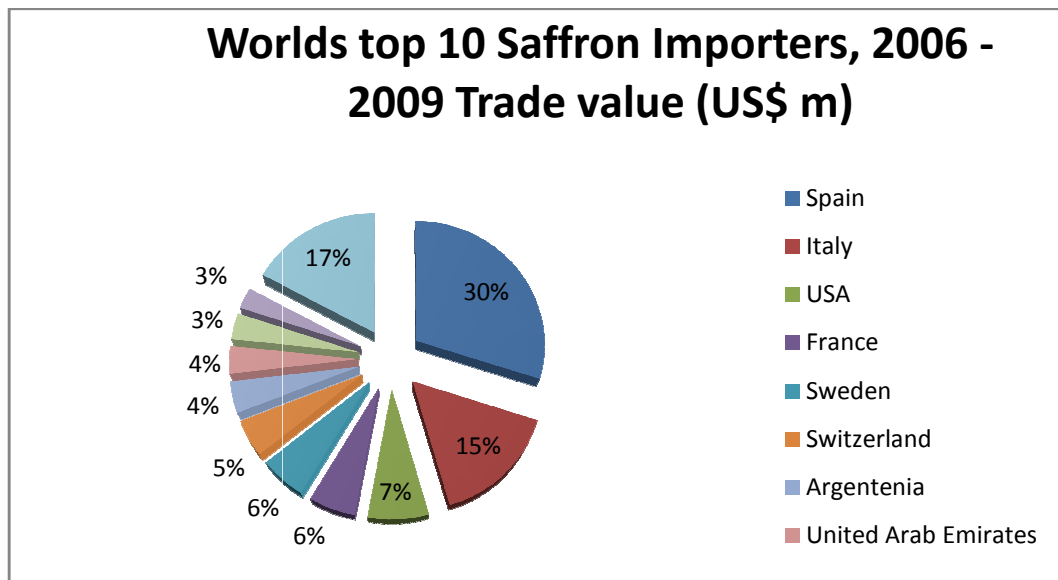
behave in a way that is neither optimal for themselves nor for consumers – price is high, quality of processed saffron in terms of processing is grim, innovation lacks, market is penetrated by foreign products. In upcoming sections, we will provide recommendation for relevant bodies to improve this situation.

Production Capacity:

Availability of corn is an issue and they have high prices. Some import corms from Iran rather than buying from Afghan farmers with high prices. There for government should support in this regard.

Afghan Saffron exports

The majors markets of Saffron importers are Spain, USA, Italy, France, Sweden, Switzerland, Argentina, UAE, Japan, United Kingdom etc, however recently there has been a great increase in Afghan saffron exports mainly to France and Spain in bulk quantities which is a positive sign of a growing demand.



Source UN Com-trade Database

SWOT Analysis

Strengths:

The most expensive spice in the world (Average prices are USD 1,200/kilogram – The world currently produces 230MT with 90% grown in Iran worth USD70-100 million. Large price fluctuations are experienced just before harvest time when saffron is scarce. Ideal climatic factors in western region – The low water requirements (300mm) and ample amount of dry land means that is ample space for increasing Afghan production, the main markets for Afghan saffron are: Iran, India, UAE, France and United States but the saffron is not marketed as Afghan. It is very labour intensive and therefore Afghanistan is well positioned to take advantage of its cheaper labour. It would be too expensive to shift production to European or US countries. The processing and post-harvest of saffron flowers also employs a great number of people, especially women in post harvesting handling.

Weaknesses:

Marketing of Afghan saffron still underdeveloped – Afghan saffron is currently marketed as Iranian saffron. Medium-term maturation period required for growing saffron with full production realized in the third year. Many farmers have a poor economic situation and find it difficult to wait for the crop to become fully productive (although with training, farmers can realize 50% of the yield within the 1st year of production). Moreover, the costs of planting with corm are USD\$ 1000/ Jeri which is prohibitively expensive.

No drying, sorting and packaging skills among farmers – farmers are under supported and need training in appropriate post-harvest and hygienic techniques. Consequently, the flowers contain too much dust and sand, present quality (moderate to poor) still is not marketable in western or industrial countries as well the weaknesses includes

- Lack of bulbs – Getting good quality corm may be a problem for many farmers
- Current corm banks cannot support farmer interest
- Lack of storage facilities or economic situation to speculate on prices to capture maximum value through harvest
- Limited demand for afghan saffron
- Un availability of standardized saffron processing centers

- No working Laboratory for quality analysis for farmers , associations , cooperatives and companies
- Unavailability of national standard for Afghan saffron and ignorance about international quality standards and certification for the products
- No specific export promotion policy for saffron
- Lack of capital to buy the harvest from the farmers
- Lack of trust between farmers and companies

Opportunities:

As organic export product – niche marketing to gain better prices, Afghan saffron could compete for a share of world market in the medium-long term. Great business potential for small farmers

- With farmers as a fair crop sharing (to buy bulbs, for 5 year cycle , not on yearly basis) could be a great opportunity form 'Islamic investments' without fixed interest but on crop sharing basis;
- With companies: capital to buy saffron from the farmers(yearly basis)

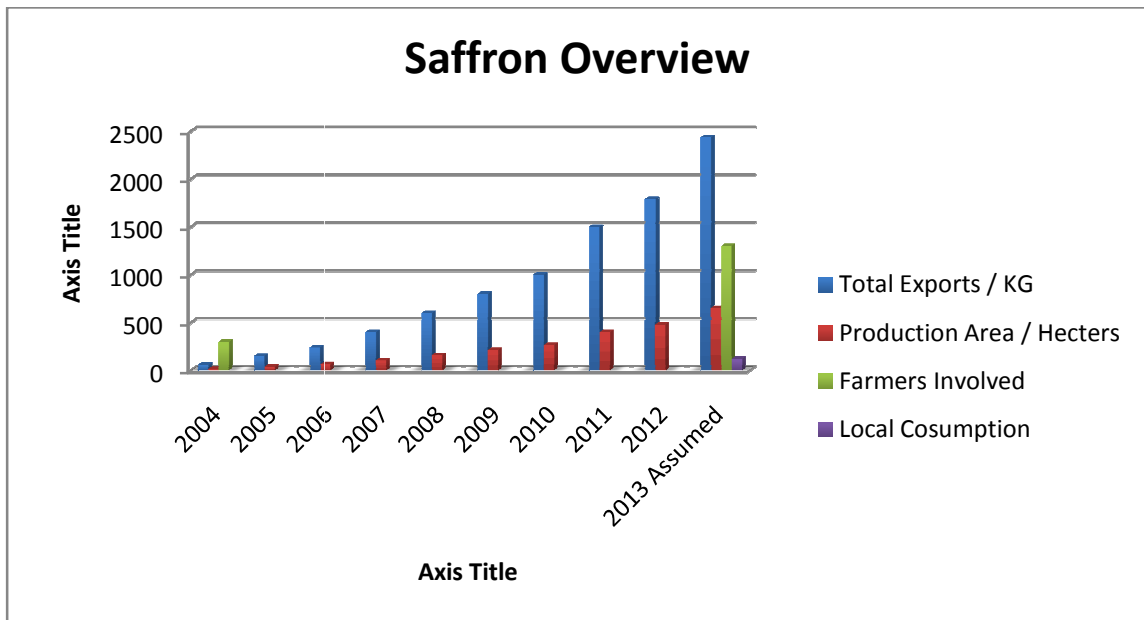
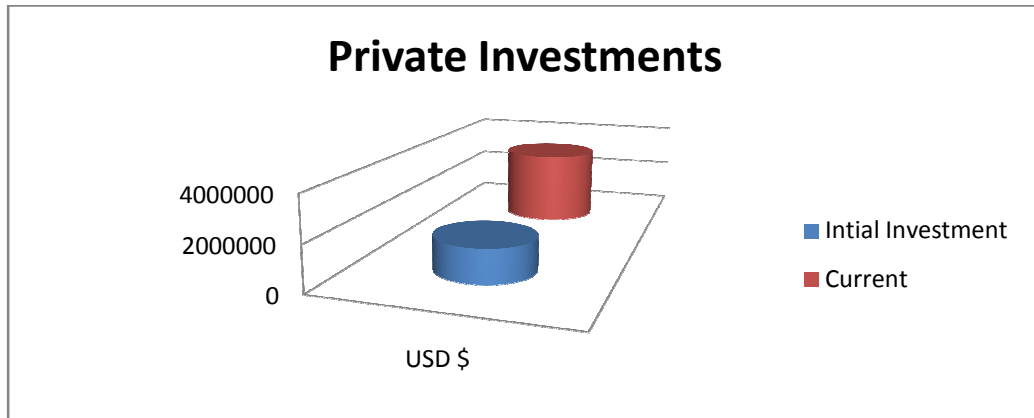
Threats:

Quality and reputation of Iran`s saffron AND entering of China to the saffron`s world market Smuggling exports to India, Iran, Pakistan undermines the quality assurance of the Afghan brand persistent drought years can delay first irrigation and affect quality

Chapter 4:
Investment Opportunities

Investment Opportunities

The figure below shows an estimate based on our survey that the initial private investments of the firms surveyed showed a comparative analysis of the initial investment of the firms over the years since 2003 and onwards has been doubled; this indicates not only the growth but the acceptability of afghan saffron in international market as well. (Graph Illustration Provide below)



Afghan saffron until 2002 was produced only in Herat province with minimum production but today the total area on which saffron is cultivated in Afghanistan stands at 850 Jerib of which 650 is in Herat only which started off with 16 Jeribs only, the total output is 3100 kilo gram assumed for the year 2013 of which 2437 is produced in Herat, only 5% of the total yield is consumed locally which shows there stands a great opportunity for saffron promotion in local markets, there is limited demand for saffron within Afghanistan, so the market for the crop is

almost all in other countries, but because the product is light and has a high value per kilo it can easily and economically be transported to from the villages to town and on by air to India, Europe and the United States where the consumers are, Afghan Saffron prices per kilo range from 55000 up to 85000 for the best quality; saffron has been harvested in 26 provinces throughout Afghanistan, in some of the provinces it has been done by NGO's for testing purpose, today 90% of the yield comes from Herat and 10% only from the rest of the provinces all together, direct labour which was initially 300 farmers involved today the number has been quadrupled.

Packaging and Storing of Saffron

Afghan saffron which is not packaged up to international standards there lies a great investment opportunity to make a packaging unit for saffron, should be packed in air-tight and light protected containers like tin cans and dark glasses. However, some buyers prefer saffron to be packed in a clear glass so that they can make the quality assessment easily without necessarily removing the saffron from the container. If



saffron is packed in a clear glass, it must be stored in a dark place until it is sold to prevent deterioration and loss of quality. Most plastic bags and solid plastic containers are not recommended in packing saffron. Although it can also be sealed, the aroma of saffron can still escape and the quality of spice becomes lower. When foods are packaged, government regulations state what information must be on the labels and these regulations vary from country to country. In most cases the labels should specify: The package contents, Net weight of contents , Name, address, telephone, e-mail of importer , A lot number to identify the source of the saffron.

Investing in a saffron processing and test laboratories facility

Afghan saffron also receives complaints from international buyer due it unprofessional processing, because there is no standard processing and testing facility available in the country there for potential investors this is a great opportunity, this is very important for saffron

because Saffron is a delicate spice and its most crucial characteristics of color, taste and aroma can only be objectively measured through testing in laboratories by trained technicians

Chapter 5:
Suggestion's and Recommendations

Suggestions and Recommendations:

Capacity building and raising farmer awareness:

- Government of Afghanistan to create an enabling environment to increase the saffron production in areas where is possible through holding workshops or seminars to enhance the Saffron grower's capabilities, improving extension workers and processors capacity in quality production, packing and processing, support and establish saffron producers associations through MAIL extension activities or NGO's, further facilitate and provide practical trainings for those been involved in processing and production of saffron by MAIL.
- Enhancing the farmers skills in saffron quality corm production through association and involve NGOs with technical experience in order to assist in the process , Establishment of microfinance system through Government or private Banks or international organizations, will be one of the major needs to support saffron growers.
- Supporting the farmer to have access to the new technology to undertake quality production, processing and packing of saffron.
- Inclusion of saffron with the agriculture faculty's curriculum and training of specialists in the universities to teach students about saffron.

Research:

- We would like to have the kind attention of Research General Directorate of MAIL to include saffron in their plans. Saffron was under study by MAIL during 1970s in Urdu Khan Research Farm in Herat and due to war conditions the results were not published.
- DACAAR has completed some studies since 1998 in Pashton Zarghoon and found out that Saffron can grow successfully in this agro-ecological zone. The result of soil and water tests of Pashton Zarghoon carried out in Iran and Holland indicate an optimum suitability for successful growth of saffron.
- Implementation of research projects undertaken by universities, Gov. Research Farms, private companies and even saffron producers Anjumans about agronomic practices, pest and disease, economical issues, social effect, marketing, processing and packaging will lead to improve both quality and quantity of saffron production.

Development of Saffron Export:

Standardization and Quality Control Systems: European and US Companies expressed their interest to purchase Afghan saffron. In order to meet the export requirement the following steps need to be taken by the Afghanistan Government.

- Creation of standard testing facility for Afghan saffron export, suitable for national and international markets, The quality and characteristics (color, taste, aroma, moisture content etc) of different types of saffron should be examined in sophisticated laboratories by trained and experienced technicians
- Afghan Saffron is currently not certified by a reliable source to meet the international criteria. Ministry of Agriculture, Ministry of Mine and industry, Ministry of Trade with the coordination of MoFA can play a significant role to support the process of obtaining saffron ISO. And also Ministry of Foreign Affairs can play an important role through Afghan Embassies to introduce the Afghan Saffron in exhibitions in saffron importing countries, and to facilitate the networking process of local private companies known to adhere with FDA standards in USA.
- Chamber of commerce can play a significant role to create linkage between international market, farmers' producers, processors and private sector. To encourage quality production and add the value of the production according to international market demand
- Establishment of Afghan saffron National Brand. This is possible through the Ministry of Trade which could facilitate the process of Afghan Saffron national branding through international lead companies in Europe and USA. By this Afghan Saffron could be recognized in the international market with its specific qualities.
- Establishment of quarantine: Plant Protection Department of MAIL could define some criteria and set up the rules for Saffron corm import. Already there are criteria for import of other agriculture goods to Afghanistan.

Marketing Facilitating:

- To boost afghan saffron exports under the label of Afghanistan's production, separate identity should be adopted for Afghan saffron, which distinguishes it from other countries' products.

- To put producers or their representatives in direct contact with the foreign buyers, especially producer groups. This means that intermediaries should be removed from within this can be done by participation and supporting saffron producers and exporters to be involved in international exhibition and festivals.
- Encouraging and supporting private sector to invest in establishment of processing and packing industries for saffron for the purpose of value addition.
- Giving awareness to saffron Anjemans or Association to create a center to develop the local market. Saffron Associations and Anjemans should be supported to establish the center and to contact with other stake holders locally or internationally.
- Encouraging domestic use of Afghan Saffron.

Coordination and cooperation

Recently saffron national coordination, development and supporting committee has been established under direct leading of MAIL with the membership of representatives of different ministries, international organization, saffron growers, private sectors, universities and professionals, but the head of the association is also owner of a renowned business firm which as time could be biased, so we recommend that the representing body should be replaced by unbiased body.

Chapter 6:
Conclusions

Conclusion

The paper studied the Afghan saffron market in terms of market structure and performance, looked at potential opportunities from an investor's prospective, identified the constraints and factors of market failure, and finally suggested and recommended some measures and actions for the development of this industry.

Comparing with the global and regional markets, it found that there are plenty export opportunities for Afghan saffron and it is widely accepted in Europe, USA, UAE and other markets for its best quality of yield. By comparing Afghan Saffron with Iran who produces 80% of the world saffron found that Iran has lower quality of saffron compared to Afghanistan, its saffron industry is much bigger in terms of number of firms, level of production, exports value, etc, therefore, there is no doubt that saffron industry in Afghanistan has great potential to grow further if packaging is designed according to international standard and farmers growing capacity is built, and processing facilities are built.

There are only a few big players who control and set the prices, the total number of active saffron firms who have exports totals to 14, Therefore, there is no full competition in the market, and this creates an environment in which Afghan firms adopt a behaviour that neither helps themselves nor the consumers price is high, quality of finished product in terms of packaging and finishing is grim, innovation lacks, market is started to be penetrated by foreign markets due to their lowered prices.

Hence, we strongly recommend that the Government of Afghanistan, especially Ministry of Agriculture, provide incentives for farmers to increase their production. Such a supply-side policy helps them benefit from the economies of scale, decrease their total cost, sell at a competitive price, and finally increase their market share. In addition, the government and the private sector must focus on improving the management skills of firms' managers which helps them increase their firms' efficiency which will help in international market competition.

As far as market completion is concerned the paper argues that there is huge demand for Afghan saffron at foreign markets, due to its high yield quality. However, looking at the factors of production, there are many challenges which hinders the foreseen

opportunities; i.e. lack of access to land, lack of access to capital, lack of skilled labours, and lack of necessary infrastructure such as processing plant.

The paper recommends both institutional and market reforms to the government to tackle some of the existing challenges; including agriculture and development of a specialized industrial central processing and packaging unit, provision of long-term interest free financing solutions for farmers, technical and management skills trainings as well, forming of a saffron association board which is not biased to any particular business man.

Appendix

Main Exporters/ Distributers and Processing firms

- | | |
|---|-----------------------|
| 1) Aroma Saffron,
www.aromasaffron.com | 8) Jahan Saffron |
| 2) Ariana Saffron | 9) TelaySurkh Saffron |
| 3) Almas Saffron | 10) Afghan Red Gold |
| 4) Mehtab Saffron | 11) Babaye Saffron |
| 5) Gharzai Saffron | 12) Kaihan Saffron |
| 6) Hari Saffron | 13) Ghoryan Saffron |
| 7) Khorsheed Saffron | 14) Ansar Saffron |

Saffron Associations:

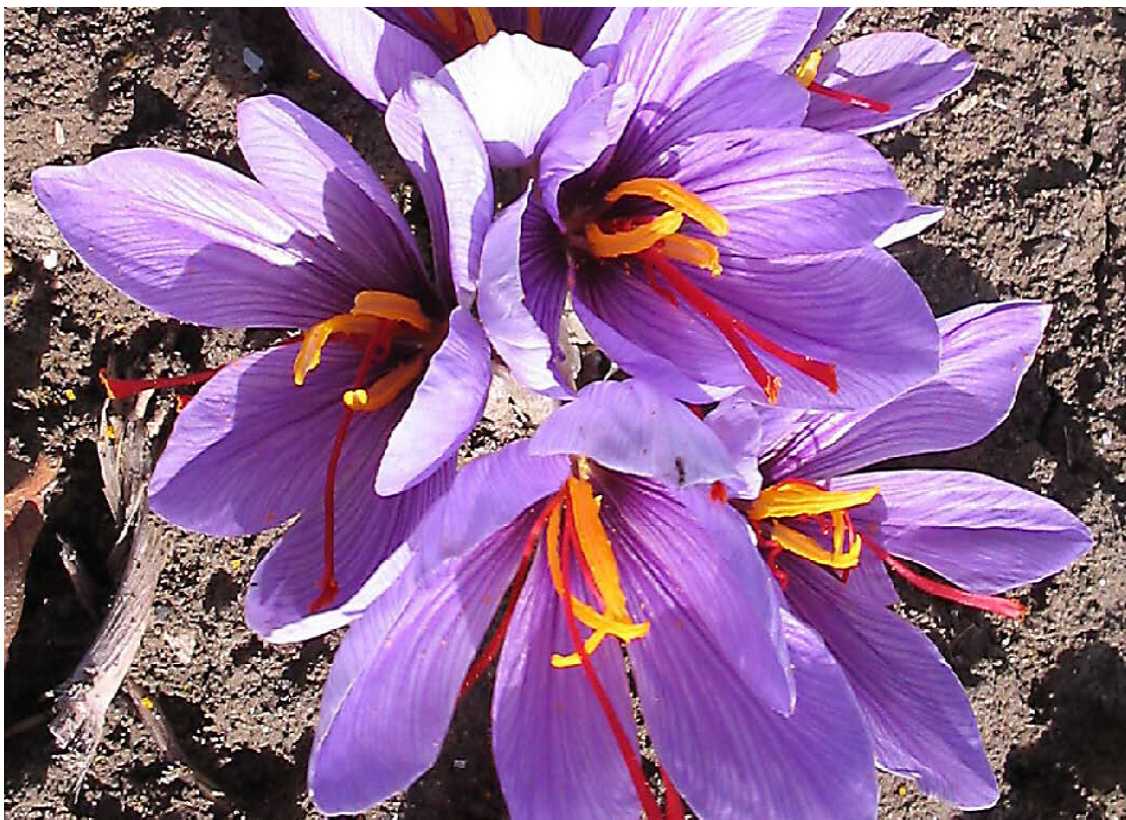
There are 28 saffron associations in Herat province only, these associations are,

- | | |
|------------------------------------|--------------------------------|
| 1) GulmirBalaPashtoon | 16) GulnazGuzra |
| 2) Sadaqat Pashtoon Zarghon | 17) Taban Anjil |
| 3) Azada Pashtoon Zarghon | 18) Afghan Anjil Saffron |
| 4) Dorokhshan Pashtoon Zarghon | 19) Gawhershah Bigom Anjil |
| 5) Foshkan Pashtoon Zarghon | 20) Tellaye Sorkh Ghoryan |
| 6) Afghan women workers | 21) Ghoryan Women Saffron |
| 7) Rawandan District | 22) Roshnan Pashtoon Zarghon |
| 8) Adalat PashtoonZ arghon | 23) Molakan Ghoryan |
| 9) Meer Abad Pashtoon Zarghon | 24) Ghoryan Saffron |
| 10) Afghan Saffron Women workers | 25) Charbarak Pashtoon Zarghon |
| 11) Robot GulBibi Pashtoon Zarghon | 26) Qaisarak Pashtoon Zarghon |
| 12) Mar Abad Pashtoon Zarghon | (Herat) |
| 13) Rahe SabzObah Saffron | 27) Astonan Village Women |
| 14) Hery Pashtoon Zarghon | 28) Dehran Village Saffron |
| 15) NeginPashtoonZarghon | |

SAFFRON MAP



Saffron Flower (Figure)



Saffron Chain in Afghanistan

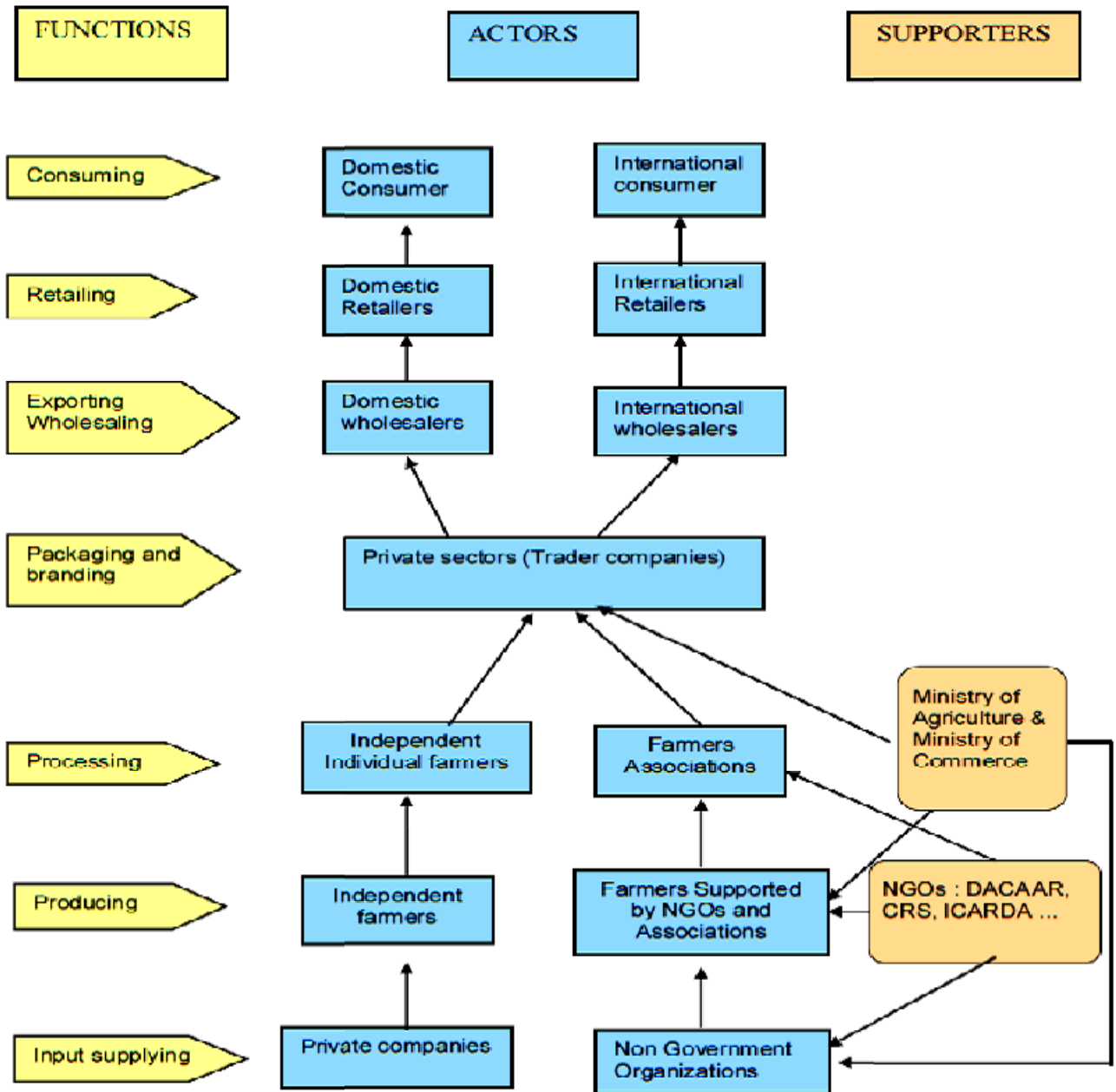


Figure-2.1: Saffron Chain in Afghanistan

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