DACAAR

Supporting Community Driven Development in Afghanistan

Saffron:

Afghanistan's Red Gold

Soft copy of this publication is available online at:
http://www.dacaar.org/resources

DACAAR is an apolitical, non-governmental, non-profit humanitarian/development organisation that has been working to improve the lives of the Afghan people since 1984.
DACAAR works in rural areas and aims at improving rural livelihoods through sustainable activities that engage Afghan communities to be agents of their own development process.
DACAAR employs a holistic approach to all rural development activities in order to ensure long-term viability of projects.
Approximately nine million Afghans across 28 of Afghanistan's 34 provinces have benefited from DACAAR development activities since its establishment. More information can be accessed on www.dacaar.org

For requests please contact:
DACAAR Main Office Kabul:
Paikob-e-Naswar, Wazir Abad, District 10, P.O. Box 208, Kabul, Afghanistan
Tel : +93 (0) 20 223 0752
+93 (0) 20 223 0753
Mobile: +93 (0) 700 288 232
E-mail: dacaar@dacaar.org

DACAAR Secretariat in Denmark:
c/o Danish Refugee Council, Borgergade 10, 1300 Copenhagen K, Denmark
Tel: +45 33 735 000
E-mail: copenhagen@dacaar.org

Saffron

Afghanistan's Red Gold

Table of Contents:

List of Annexes

Acknowledgement

The preparation of this Saffron Manual for Afghanistan was made possible through the concerted efforts of DACAAR staff members involved in saffron cultivation and promotion. Layout and presentation was done by the Public Information Unit (PIU). In particular, the development and completion of this manual was led by Mohammad Hashim Aslami (NRM Specialist), Erwin O. Nacuray (NRM Advisor), and Dr Arif Qaraeen (Director).

The manual was prepared by DACAAR as part of its activities under the Research in Alternative Livelihoods Fund (RALF) 02–02 Project "Research in Production and Marketing of Saffron as an Alternative to Opium Poppy Cultivation" – a project funded by the United Kingdom's Department for International Development (DFID) through the International Center for Agriculture Research in the Dry Areas (ICARDA).

Foreword

There exists a variety of hypotheses about the origins of saffron. Chemical tests have indicated that saffron has been grown in Afghanistan as early as 2000 years ago. Research conducted by the Ministry of Agriculture, Irrigation and Livestock (MAIL) has further revealed that cultivation of the crop was restarted by a group of farmers in Herat province around 80 years ago.

In 1973, the Afghan Government established the Ordo Khan Farm in Herat province as a research centre for saffron trial planting. However, no information has yet been revealed on the result of these initial production trials. In 1991, after the return of many refugees from Iran to Afghanistan, some returnees, who had worked in saffron fields in Iran, brought back saffron corms – also referred to as bulbs or onions – which they planted in Ghorian district, Herat province.

In 1998 DACAAR initiated saffron planting trials with four local farmers in semi-arid villages of Pashtoon Zarghon district, Herat province. By 2007, due to good results and high economical returns, more than 300 farmers were growing saffron in the district. As a result of DACAAR's positive experiences with saffron, the Ministry of Agriculture in 2002 and a couple of other NGOs began to distribute saffron corms to farmers and other saffron growers in Herat, Mazar-e-Sharif, Baghlan, Kabul, Wardak, Bamyan and Logar provinces.

This user manual on saffron planting, maintenance, harvesting and processing has been prepared by DACAAR with the aim of supporting the promotion of saffron as a high-value spice in Afghan agriculture. The manual was developed based on DACAAR's field experience with saffron cultivation and it is intended to serve as a guide for farmers, trainers, agriculture extension workers and policy makers alike.

Arif Qaraeen, Director

What is Saffron?

Saffron is the most precious and most expensive spice in the world. It is derived from the stigma of the flower of the saffron crocus (Crocus sativus L.), which is collected and dried to produce the spice.

The saffron plant (20-30cm tall) has a fleshy bulb called corm or onion which is about 5 cm in diameter and has a maximum weight of 8g. The plant has narrow leaves, which are around 6-10cm long and 2-3mm wide. Its petals are light purple in colour and sometimes have red or white stripes.

Uses of Saffron

Economically, the most important part of the saffron plant is the stigma. Rich in aroma and colour, the stigmas can be dried or crushed into a powder and used as:

- spice or colouring in food preparation
- ingredients for the pharmaceutical, cosmetic and perfume industries
- dye for textile production

Recent research into the plant's anti-cancer properties suggests a positive healing effect of saffron on cancer patients.

Saffron leaves are commonly used as animal feed with five jerib of saffron producing about 1.5 tons of leaf dry matter on a yearly basis.

Saffron Plantation Establishment

Site Requirements

Saffron is one of a few crops able to thrive under the highly varied climatic conditions found in Afghanistan. For optimal growth and production, saffron requires the following conditions:

Climate and temperature: The saffron plant grows particularly well in temperate and dry climates, making Herat province in western Afghanistan particularly suitable for saffron production. However, because saffron's vegetative growth coincides with cold weather and freezing condition, it can tolerate temperatures ranging from a minimum of -18°C to a maximum of +40°C. Throughout Afghanistan, where hot summers often follow winters with heavy snowfall, the saffron plant can therefore still be grown as an alternative to other crops.

Moisture: The annual rainfall requirement for saffron is about 300 mm with the majority of this required during the months of March and April. In this short irrigation period, the plant requires between 15 and 20 litres of water per m2 of field.

Soil: Saffron can be grown in a wide range of soils characterised by moderate water holding capacity and good water infiltration. For optimal production, however a sandy loam soil, rich in calcium and high in organic matter is preferred. Saffron is a low nutrient requiring plant, fertile soils with high nutrient contents are not ideal and may result in excessive vegetative growth with little flower production. The optimal soil pH value is 7-7.5. Soils with high moisture content, which are prone to water logging or flooding, are not suitable as this can lead to fungal infections and as a result corm decomposition.

Land Preparation

The following steps should be carried out before planting saffron corms:

- The field should be ploughed at least 20 - 25 cm deep
- The land should be levelled
- Weeds, dead plant material, stones and other hazards should be removed from the field.
- Suitable ridges or small plots should be made

Soil preparation should be carried out in autumn or winter and it is recommended that 4-6 tons of well-decomposed animal manure is spread on each jerib of field. In late March or early April, a second shallow tillage should also be carried out.

Planting Method and Planting Density

Planting methods for saffron vary from country to country. However, the following methods are applicable to Afghanistan:

Ridge planting method (Herat province, Afghanistan)

1. Ridge Planting Method

The 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 also provides better protection against high temperatures as well as pests and diseases.

When employing the ridge planting method, the following should be observed:

- Ridges should be around 30 cm in height.
- The distance between ridges should be 75 cm when prepared by a machine or tractor and 50 cm when prepared manually.
- There should be a minimum of 1,000 kg corm per jerib and a maximum of 2,600 kg corm per jerib (planting rate).
- There is no specified planting distance between corms.
- The planting depth of the corms should be 20-25 cm below the surface of the ridge.

2. Flatbed Planting Method

When employing the flatbed planting method, the following guidelines should be observed:

- Plant density should be 50 plants per m^2.
- Planting rate should be 1,000 kg corm per jerib or 0.5 kg per m^2.
- In a levelled field, the rows should be 20 cm apart with 10 cm between each plant. Alternatively, 40 cm between rows and 5 cm between plants is also acceptable.
- The corm should be planted 15 cm beneath the surface.

Flat bed planting method
(Herat province, Afghanistan)

3. Traditional Planting Method

Traditionally, saffron corm is planted in a pit. When using this method, the following guidelines should be observed:

- The distance between pits should be 25 cm.
- The pit radius should be around 20-25 cm.
- The depth of the pit should be 20-25 cm.
- 3-15 corms should be planted per pit.

Traditional pit planting method (Herat province, Afghanistan)

Corm Preparation before Planting

Corm Selection: Corm for planting should come from 2 to 4 year old saffron corm banks or saffron multiplication fields. The corm should not have any injuries and should weigh approximately 8g or more with a diameter of 3 cm. Where this is not possible, corm with a weight of 6g and a diameter of 2.5 cm may be used.

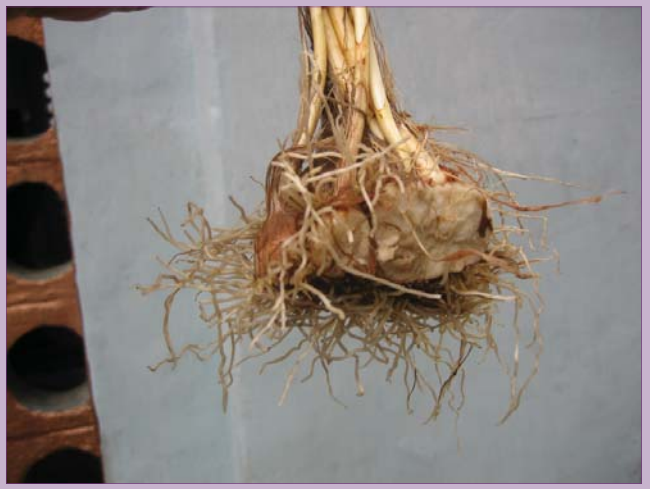
Corm storage: Corm should be replanted as soon as possible after it is removed from the field. Corm storage before planting is not recommended as it may reduce the flowering potential of the plant. However, in cases where immediate planting is not possible, corms should be stored in a cool and dry space (3 to 5°C) with good ventilation. Corms should be stored for no longer than one month.

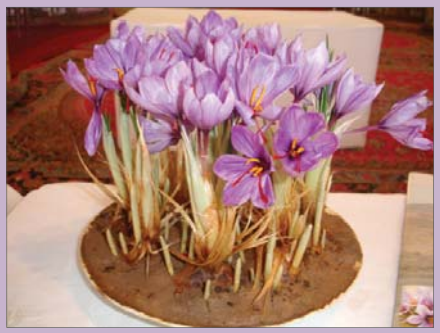
Corm packaging and transport: Saffron corm packaging and transportation to new fields should be done very carefully. Depending on availability, solid plastic or waterproof carton boxes are suitable. While the size of ideal packaging material will depend on corms size and mode of transportation, a general recommendation is a maximum load of 15 to 17 kg for a standard European fruit box (length: 80 cm, depth: 50 cm, height: 16 cm).

Corm treatment: It is not recommended to apply fungicide on corm before planting because the mercury content of the treatment may reduce the quality of the spice. However, if fungicides, such as Vitavax or Ceresan are applied, the manufacturer's instructions should be strictly observed (300 - 500g for every 100 kg corm is usually recommended). Wearing of breathing mask and rubber gloves during application is a must. The untreated corms should be placed on a plastic sheet and the powder fungicide spread evenly on top of them. The corms should then be carefully rolled to further spread the fungicide powder on the surface of the corms.

Planting of Saffron Corm

Regardless of the planting method, in Afghanistan, saffron should be planted from late May through to early October. Recent research results from Khurasan province in Iran, which has similar climate conditions to Herat province, suggest that the best production results are achieved, when saffron corms are planted in the period between April and June.





Care and Maintenance of Saffron Plantations

Immediate Care after Corm Planting: For maximum production output, care must be exercised immediately after planting the corm. Unless absolutely necessary, do not walk inside the field, once the corm has been planted, and do not allow children nor animals into newly planted fields. Saffron corms are extremely sensitive and stepping on the corm may reduce its survival rate.

Fertilizer Application: Saffron requires a limited amount of nutrients compared to other crops. It is estimated that for every 1 kg of dried saffron no more than 12 g of nitrogen, 3 g of potassium and 22 g of phosphorous are removed from the soil.

Application of too much fertilizer is not recommended as this will result in excessive vegetative growth, which will negatively affect the corm's quality and flower development. It is recommended that only well-decomposed animal manure is applied as fertilizer, at a rate of 4 to 6 tons per jerib. Application should take place before ploughing and planting.

Irrigation: Saffron is a suitable plant for semi-arid regions like Afghanistan where water scarcity is widespread. Irrigation is not needed during the saffron corm's dormancy period, which usually lasts for five months from early May. This coincides with general limited water availability, thus avoiding competition for irrigation water with other crops.

It is essential to irrigate the saffron corm at the end of its dormancy period, which occurs in late September. This will induce the growth and flowering period.

The next growth period for saffron typically comes about in winter and spring when there is usually sufficient rainfall. A second round of irrigation should only be undertaken if rainfall has been insufficient and should be carried out following the flower harvesting, at the emergence of leaves.

Although saffron yields may be increased by watering saffron during the summer months, this is not recommended due to the high risk of fungal infections as a result of water logging.

Saffron Corm Thinning: With each season the new saffron corms grow on top of the old corms and as a result they normally protrude 1-3 cm above the soil level. Protruding corms are easily damaged by frost, which adversely affects plant growth. Once every 4 to 7 years, it is, therefore, necessary to remove some corms from the mother plant. Such 'offspring corms' can profitably be used as planting material when establishing new saffron fields. Care should however be taken when removing corms from the mother plant by digging carefully, using a shovel.

Weed control: Weed control is a critical part of saffron cultivation. Farmers have to weed regularly at the following times:

- After each irrigation.
- After the flowers have been harvested.
- Additional weeding may be required to control spring and summer weeds.

Care should be taken during weeding, not to step on the ridges, especially when using the ridge planting method. Anyone working in the field should only walk between the ridges. All weeds should be taken out of the field in a basket. The weeds can then be fed to animals or kept as compost for the establishment of new saffron fields.

Breaking of Soil Crust: In the second year, and after the first irrigation, the top soil should be broken in order to facilitate the emergence of flowers. The dry crust on the soil surface should be broken up to 5-10 cm deep.

Pests and Diseases Control: The taste and smell of saffron corm is attractive to a variety of pests and wild animals. Farmers should therefore regularly check their fields for any damage.

Below are some of the common pests and diseases relating to saffron, and their recommended solutions:

- Rodents – Rodents such as rats and mice can cause damage in saffron fields by digging holes and tunnels in the ground and eating the corms. Traps and bait should be used to control this problem but caution should be taken to ensure that poisonous bait is not accessible to domestic animals.

- Rabbits – Rabbits normally eat the succulent leaves and flowers of saffron. The use of wire net fences has proven very efficient in limiting this problem.

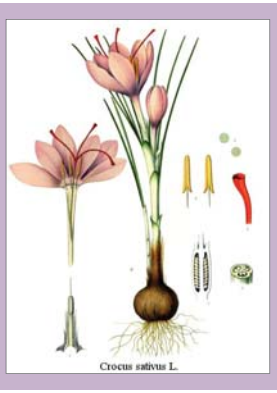
- Snails – As with rabbits, snails also attack the saffron's green leaves. Letting ducks and geese into the field to eat the snails will reduce this risk.

- Birds – As mentioned earlier, new corms often grow on top of old corms leaving them exposed to birds, who feed on them. Corm thinning or covering the exposed corms with soil is recommended to limit this hazard. Birds will also eat corms left for storage in open fields. Where possible avoid storing corms in the field before planting. If this cannot be avoided, make sure that corms are covered to prevent birds from eating them.

- Insects – White worms which live in the soil also eat saffron corm. Signs of this pest include discoloration or yellowing of leaves, wilting, and finally, the shrivelling up of the plant. Should this occur, the infected plant should be dug up, separated from the remaining good corm and burnt.

■ Fungus – Apart from fungus infections on the corms stored as planting materials, fungus infection can occasionally occur on living saffron plants. As of yet though, no viable solution to this problem has been identified.

■ Domestic animals – Saffron's green leaves sprouting in the summer months make it an attractive target for hungry domestic animals such as goats and cows. It is, therefore, essential that saffron fields are fenced. It is highly recommended to use living fences such as legume trees or shrubs around the edge of the field. Not only will such fences protect the saffron, but with regular trimming the leaves can be used to feed animals or as compost, and the branches can be used as fuel wood.



■ Diseases – At the time of writing this manual, diseases relating to saffron are rarely seen in Afghanistan. So far virus infections, such as the tobacco rattle virus (TRV, a tobravirus), have only been observed in ornamental saffron species in Europe.


Bird damage to saffron corm


Tobacco rattle virus (TRV)

Unidentified fungus infection on saffron corms

Saffron Flower Harvesting

Saffron plants flower daily for three weeks starting in October. As each flower lives for only 48 hours, a vast amount of labour is required in a relatively short period of time for harvesting and on-farm processing. The high value of saffron is attributable to this urgency and labour intensiveness of saffron harvesting.

Saffron flowers should be picked in the early morning, before the sun has risen completely and as soon as the petals open, to avoid a considerable reduction in the quality of the final saffron product. The timing of the harvest, along with speedy processing, are important as wilting of the flowers makes the post-harvest process next to impossible.

The flowers should be picked from the plant, using clear fingernails. The flower should then be placed in a clean basket to avoid contamination of the stigma. A good flower picker can collect as many as 3,000 flowers per hour.

After collection, the flowers should be transported to a farmhouse or some other storage facility and kept in a clean and shady place until further processing. If necessary, the saffron flowers can be stored at 4-5 °C, with the layer of fresh flowers not exceeding 10 cm. Under these conditions, saffron flowers can be stored for up to seven days.

Post - Harvest Processing

Separation of Stigma from Saffron Flowers

To ensure the highest possible quality of the final saffron spice product, post-harvest processing should take place immediately after the saffron flower has been picked. During the processing, the bright orange-red stigmas are separated from the flowers. It takes around 450,000 stigmas to make up one kilogram of saffron spice. Workers must process between 150,000 and 170,000 flowers to produce one kilo of saffron spice. 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. This means that the stigmas must be separated from the styles by hand, whilst the saffron flower is still fresh.

The following conditions must be met, when separating the stigma from the saffron flower:

- The separation should take place in a clean environment.
- The processing area should be free from dust.
- Hands should be kept clean at all times and washed thoroughly with antibacterial soap before embarking on the separation work.

Some buyers, however, prefer for the styles to remain intact and for the flowers to be arranged in bunches. This is to ensure that the saffron is pure and free from adulteration. In the past, some suppliers have mixed pure saffron with cheaper materials and red dye to pass it off as pure saffron. If buyers are able to see the styles, they can confirm that the saffron is pure. The buyers can then separate the styles from the stigmas themselves and sell the saffron under their own labels.

Saffron flower harvesting (Herat province, Afghanistan)

Separation of stigma from flowers (Herat province, Afghanistan)

Saffron stigma arranged in bundles and ready for drying

Drying of Saffron

The stigma must be dried immediately after separation to maintain the quality. Specific environmental conditions must be ensured to guarantee the right moisture content levels. When conditions are too moist, the stigma risks to become infected with fungus, especially those causing aflatoxins. On the contrary, if conditions are too dry, the stigmas will break easily and turn into powder. This will cause a reduction in weight to below trade requirements, resulting in farmers losing money.

In Afghanistan, most saffron is air dried. It takes up to a week to dry saffron using this method. The following measures must be adhered to when saffron is air dried:

- The drying area must be free from dust and direct sunlight.
- Birds should have no access to the area.
- Stigmas should be placed in a drying container such as a basin, a tray or a big plate.
- The container should then be covered with a thin cloth or screen to prevent contamination. When covering the container, make sure that there is good aeration.

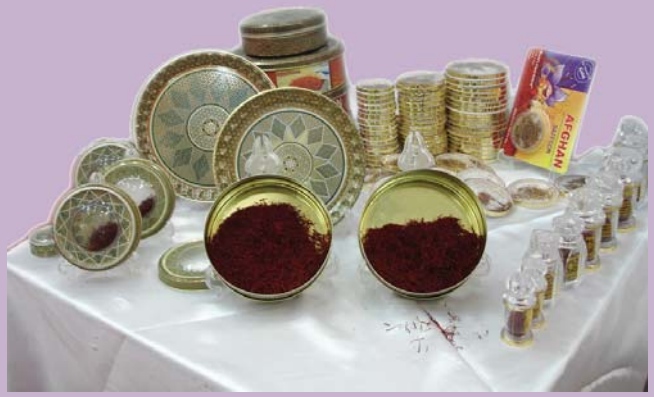
Simple electric driers were recently introduced in Herat province with good results. Drying with electric dryers takes minutes rather than days. It is also much easier to control the moisture level of the saffron, which should ideally be 12 to 14 percent.

Kilns dryers can also be used. While guaranteeing a higher quality of dried saffron due to better temperature and humidity control, unfortunately due to their high cost, kilns dryers are not currently used in saffron production in Afghanistan.

Packaging and Storing of Saffron

Ideally, saffron should be packed in air-tight, light protected containers such as tin cans or dark glass containers. Some buyers, however, prefer saffron to be packaged in clear glass containers to allow for easy quality assessment of the saffron, without having to remove it from the container. When packaging saffron in clear glass containers, it should be stored in a dark place until sold. This will prevent any deterioration in the quality of the saffron.

Most plastic bags and solid plastic containers are not recommended for packaging saffron. Although bags and containers can also be sealed, the aroma of saffron can still escape, leading to a reduction in the quality of the spice.



List of References

- Amir Qasimi, T. 2004. Saffron Red Gold of Iran. Ayendigan Publication.
- Asif, M. Saffron. DACAAR Saffron Article.
- Aslami, H.M. 2006. Saffron from Planting to Harvesting to Processing. 1st National Conference on Saffron, Heart, Afghanistan.
- Aslami, H.M. 2006. Saffron Production, Marketing and Processing. Holland Training Course Notes. GES Company and Agro ECO Institute.
- Aslami, H.M. 2007. Local Market Improvement for Export: The Case of Afghan Saffron . 2nd National Conference on Saffron. Heart, Afghanistan.
- Dadkhah, R.M., Ehtesham, M. Fakrat, H. 2003. Iranian Saffron: Unknown Jewel. Shahr-e-Ashub Publication.
- GENET, J.P. 2005. Saffron. French Cooperation with MAAI.
- Hashim Maryam, and Miri Saed. 2007. Iran saffron comprehensive book. Haft Kharwaran Publication.
- Info@growingsalesexchange.com. Fact finding mission about saffron culture in Afghanistan
- Kafi, M. 2000. Saffron (Crucus sativa) Production and Processing. Ferdowsi University of MASHHAD.
- Kafi, M. Koochiki, A. Rashi, M.H., Nassiri, M. 2006. Saffron (Crucus sativa). Science Publisher.
- Molafilabi, A., Dawery, K. 2006, ministry of science, research and technology. Khurasan Science and Food industry research center.
- Molaphilabi, A. 2005. Saffron Technology (presentation).
- Proceedings of the 3rd National Symposium on Saffron. 2003. Mashhad, Iran. Mashhad Khorasan Science and Technology Park.
- Sharma, Aslami. 2007. Saffron Meeting: Problem Analysis and Problem Solving, DACAAR Herat Provincial Office.
- www.moranjan.com
- Wyeth, Peter. 2007. A Strategy for Promoting Afghan Saffron Exports. Washington State University.

ANNEXES

Annex 1

Why should Saffron be grown in Afghanistan?

Saffron is a suitable crop for Afghanistan for the following reasons:

1	Low water requirement	It is usually only necessary to irrigate saffron once or twice a year
2	Labour intensive	250 annual person-days per hectare
3	Simple machinery	All activities are possible by hand
4	Easy transportation	Compared to other crops, saffron is not bulky to transport to markets
5	The income cost ratio is higher than other crops	Farmers can expect to earn at least 1,000 USD per jerib annually – or 5,000 USD per hectare
6	International market	The demand is increasing each year
7	Short growing season	There is only one month of labour required each year
8	Irrigation times	The saffron growing season does not coincide with other crops and therefore does not deprive other crops from their water requirements
9	Seven years production cycle	Land preparation and cultivation is only required in the first year of the cycle
10	Low risk compared to other crops	Saffron is drought resistant and there are no specific saffron diseases in Afghanistan
11	Gender	80 percent of activities can be carried out by women
12	Long storage time	Saffron can be stored for up to two years after drying
13	High productivity	Afghanistan's soil and climate are conducive to high saffron yields

Annex 2

The Situation of Saffron Growing in Afghanistan, 2008-2009

- Total area under saffron cultivation: 212 ha
- Estimated total number of saffron farmers: 1,500
- Total estimated production: 600-800 kg
- Average yield: 7 kg/ha
- Maximum yield: 24kg/ha
- Number of saffron associations: 7
- Number of female saffron grower associations: 2
- Afghan saffron markets: Afghanistan, Iran, India, Dubai, Pakistan, United States and Europe.[1]
- Saffron price: 3,000 to 5,000 USD/kg in local (Herat) markets (June 2008)
- Saffron price: 6,000 to 8,000 USD/kg in European and American markets (2008).
- Current registered private companies involved in saffron production and marketing: 3
- Facilities (provided by DACAAR in Herat): Saffron quality test laboratory at Herat Department of Agriculture equipped with 16 electric dryers. Harvesting and separation tools (basket, gloves etc.), which are distributed to saffron grower associations.
- Estimated accumulative cash income for Herat saffron farmers: 520,000 USD (2008).

1-Afghan saffron is exported to the United States and Europe through transit locations such as Iran or Dubai, and is usually branded as originating from these countries

Annex 3

The Quality of Saffron in Afghanistan

Saffron quality tests, conducted in Afghanistan, show that Afghan saffron is of superior quality. This is attributed to Afghanistan's favorable climatic conditions, which are ideal for the growth and production of saffron.

Saffron quality test results, comparing saffron from Afghan corm with saffron from Dutch corm (Pashtoon Zarghon district, Herat province, Afghanistan, 2006)

Character	ISO 3632 Standard value	Local saffron dried in open air		Local saffron dried on local dryer		Holland saffron dried in electric kiln	
		quality	Grade	quality	Grade	quality	Grade
Moisture content	12%	9.72 %	II	7.46 %	I	9.88 %	I
Flavour (picrocrocine)	70	74.88		100.06		85	
Aroma (safranal)	20 - 30	42.31		35.01		36.62	
Colour strength (crocin)	190	195.39		278.36		210.83	

Branch saffron sample (Herat Province, Afghanistan)

	ISO 3632 Category I	With styles	Stigmas only
Picrocrocine (flavour - bitterness)	70	60.05	88.67
Safranal (aroma)	20-50	25.42	35.03
Crocin (colour)	190	141.12	244.195

Saffron is graded by quality according to laboratory measurements of certain characteristics, including *crocin* (colour), *picrocrocin* (flavour), and *safranal* (fragrance) content. Other analyses include floral waste content (i.e. the saffron spice sample's non-stigma floral content) and measurements of other extraneous matter such as inorganic material ("ash").

Annex 4

International Saffron Standards

With saffron being such a highly priced spice product, it is important for national and international quality standards to be met. These standards apply to a number of characteristics, including colour strength, flavour, aroma and smell, all of which can be measured using a spectrophotometer. The testing standards for saffron have been established by the International Organization for Standardization (ISO).

Similarly, there are standards that must be complied with when it comes to the packaging of saffron. When importing foods and drugs, including saffron, many countries require containers to be labelled with the following:

- The package contents (saffron and its quality classification)
- Any additives (presumably none in the case of saffron)
- Net weight of contents
- Name, address, telephone, e-mail of importer (i.e. who to contact if there is a problem with the saffron)
- A lot number to identify the source of the saffron, as close to origin as possible (to trace the cause of any problem)
- An expiration date (which will vary depending on the type of container)
- In the United States, some importers prefer to receive saffron in bulk and package it themselves in their own containers with their own labels. Others prefer to receive the saffron already packed so they do not have to be registered as a packing agency and have the expense this entails. The easiest way to accommodate both is to have a logo or emblem that designates the saffron as coming from Afghanistan. This can then either be incorporated in the importer's label or put as a separate label on the outside of the container. Either approach can to be taken, depending on the preference of importers.

Annex 5

Afghanistan's Saffron Marketing Strategies

Promoting saffron at the national level

- Raising public awareness about the various usages of saffron.
- Introducing new saffron products to families, restaurants, etc.
- Media coverage.
- Surveys and research on consumer preferences for new saffron products.
- Improving distribution systems for local markets.

How to reach the international market

- Ensuring high productivity through good corm selection and other best practices.
- Safeguarding the high quality production of saffron through following best practices in cultivation, processing, and packaging in order to obtain good market prices.
- Obtain organic and fair trade certification (optional).

Annex 6

Summary of the key Problems and Constraints facing Saffron Farmers in Afghanistan

1. Marketing of Afghan saffron

- No recognition or branding of Afghan saffron as such in the international market place and currently most is exported through Iranian channels. However, there is strong interest amongst international buyers (particularly Holland, the United States, Australia and Italy) to buy Afghan saffron, provided a guarantee of quality can be assured.
- Lack of quality assurances for international buyers due to no ISO compliance.
- Lack of knowledge of market dynamics, pricing structures and marketing approaches (strong need for a detailed study).
- Lack of skills in marketing.
- Lack of competition among Afghan exporters.

2. Lack of production capacity

- High prices and low availability of corm. The increasing interest in saffron corm has led to an artificial increase in corm prices. At present, input expenditures alone are close to USD 5,000 per hectare, making the growing of saffron prohibitively expensive for many farmers. 'Corm banks', government loans to farmers to buy corms and subsidized corm schemes are among the viable solutions to overcome this problem.
- Lack of government support. Some organisations purchase saffron corms through private companies, which import the corms illegally from Iran without the proper quality controls or certificates. This creates an incentive not to buy local Afghan corms, as these tend to be more expensive, while of better quality.
- Because of the strong demand for corm, some farmers are now making short-term gains by producing corm rather than saffron. In the long run, this may lead to a reduction in overall saffron production output, should farmers remain untrained in corm quality control.
- Some of the farmers, who are receiving corm from non-governmental organisations, are not properly trained in saffron cultivation, particularly in bed preparation (raised beds), row spacing, timely irrigation or adequate fertilization.

The above mentioned challenges create the need for a number of reforms of the saffron sector in Afghanistan, including:

- Producers need to be organised into local, provincial and national associations to improve their access to technical support.
- Farmers should be trained in how identify good quality corm. Without this basic training, saffron cultivation becomes

a high risk investment as farmers may lose their initial investment should the final product not meet international standards.
- Corm imports should be subject to regulation. This would serve the same purpose as corm selection training.
- More training is needed for farmers in the area of post-harvest management. This is a key issue, as most processing and drying is conducted at the village level.

3. Lack of industry standards

- Farmers are not aware of the international standards for quality and hygiene that are required when selling produce directly to international customers.
- A grading system based on the quality of the saffron should to be established.
- Unless these standards are met by farmers soon, it is likely that large private trading companies will move into saffron production and entirely dominate the market for saffron in Afghanistan.

4. Lack of local storage or packaging capacity

- There is currently a lack of the packaging equipment needed when sending products abroad. The price of saffron fluctuates according to the season – for instance, prices are highest just prior to harvest (up to USD 8,000 per kg). Without adequate packaging to properly store saffron farmers cannot take advantage of these seasonal price rises. Additionally, not being able to package the saffron in small attractive packages means that local exporters cannot add the maximum value to the final product.
- A key problem cited by farmers and local exporters is the high cost of industrial packaging machines which are capable of producing the necessary packaging needed for western markets. To overcome this challenge, partnerships with donors and the private sector may need to be developed in order to establish a packaging factory. Current production levels are however likely to be too small to attract such localized investment.

5. Coordination between all industry stakeholders

- An increased level of coordination among all value chain actors in Afghanistan's saffron industry is needed. The current market outlooks show that foreign companies are beginning private sector operations in Herat. China is now also moving into saffron production. Unless the Afghan saffron industry is able to reorganise itself in a relatively short period of time, it is clear that the industry will be unable to compete in this new environment.
-
- To achieve this level of coordination, it will be essential to establish both provincial and national level Saffron Promotional Centres and to organize more of the saffron industry into producer associations. Secondly, it will be necessary to coordinate regular meetings between interested stakeholder groups and to establish provincial and national level coordination committees.

Annex 7

Saffron Development Priorities in Afghanistan

- To increase production to at least 5,000 kg per year.
- To improve the quality of saffron produced in Afghanistan.
- To raise awareness of the different uses of saffron among the Afghan population.
- To improve farmers' access to local markets.
- To conduct research on key aspects related to saffron production, processing and marketing.
- To build the capacity of universities, MAIL and private sector in relation to saffron production, processing and marketing.
- To establish national quality standards.
- To acquire ISO and organic certifications in relation to saffron.
- To improve access to international markets.
- To ensure the support of the Saffron National coordination committee to farmers.
- To encourage coordination among all value chain actors in the Afghan saffron industry.

Annex 8

Cost of Input and Income from Saffron (2007)

Inputs/Expenses *(per 5 jerib/1 hectare) for 5 years*

Items	Estimated cost (AFS)
Land preparation	12500
Animal Manure	36000
Corm (planting materials)	300000
Planting of corm	16633
Corm treatment	10000
Weeding	90500
Breaking soil crust	29000
Flower harvesting	10500
Irrigation	18000
Processing (spice separation, drying, etc)	90250
Total	613383

Income (per 5 jerib/1 hectare) for five years

Items	Estimated Amount (Afs)
Saffron spice	1200000
Corms	82500*
Dried leaves (livestock feeds)	10000
Total	1292500

* At the end of the fifth year, one hectare of saffron will produce about 22,000 kg of corms, but according to past experience, only about 50 percent of this amount will be useable for planting or selling.

Net Income for 5 years (total income – total input): 1,292,500 AFS – 613,383 AFS = 679,117 AFS

Net Income per year:135,823 AFS

Annex 9

Saffron production and prices in Afghanistan (2004 -2008)

Year	Production Area (Hectares)	Production Rate (Kg)	Price ($/kg)
2004	16	60	200
2005	40	150	350
2006	83	240	450
2007	161	400	1,200
2008	212	200	2,500

For further information about saffron planting, maintenance, harvesting and processing, please contact:

DACAAR Herat Provincial Office

Address:
Near Check Post # 1, Herat City, Afghanistan
Telephone Number:
+93 (0) 40 222 966

Or

DACAAR Rural Development Programme

Address:
Paikob - e - Naswar, Wazirabad
P.O. Box 208, Kabul, Afghanistan
Telephone Number:
+93 (0) 20 220 17 50
Website:
www.dacaar.org

DACAAR:
Paikob-e-Naswar
Wazirabad
PO Box 208, Kabul
Afghanistan

Phone: (+93) (0) 20 22 01 750
Fax: (+93) (0) 20 22 01 520
Mobile: (+93) (0) 70 02 88 232
Email: dacaar@dacaar.org
Website: www.dacaar.org

Design by Qasim Rasouli@PIU.DACAAR