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# ***Best Practices for ALMOND Production and Marketing in Afghanistan***

Aimed at farmers, extension workers, exporters and members of the business community, the guide offers tips on cultivation, harvesting and marketing techniques to improve sales of Afghan produce on international export markets.

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Ministry of Agriculture,  
Irrigation and Livestock

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# Almonds


*Almonds are native to the Middle East and South Asia and have a rich history in Afghan culture. They are believed to have been domesticated first in South Asia, spreading through the Middle East via the Silk Road into Europe and beyond. The tree bears a fruit called a drupe consisting of an outer hull and a hard shell with the seed inside. Almonds are generally cross-pollinated, therefore the common honeybee plays a vital role in the production of the nuts. In Afghanistan almond trees flower in late winter to early spring and ripen in July to August depending on variety and location of production. The most serious threat to almond yields is frost occurring with unseasonable cold spells during flowering.*

## Regions and Varieties

While almonds are grown throughout the country, commercial production occurs in Samangan, Kunduz, Balkh, Uruzgan, Zabul, Jawzjan, Ghazni and Herat provinces. Generally speaking, almonds are either soft-shelled or hard-shelled. Several varieties are grown in the country, but primary export varieties are Sattarbai, Majidi, Abdul Wahidi, Qambari, Khairodini, Qaharbai, Qaghazi and Sangi. Recently, new exotic varieties such as Nonpareils and Carmel have been introduced by NGOs to improve yields and quality.

## Producing for Export

### *Cultivation Guidelines*

- When establishing new orchards, plant only disease-resistant varieties that have proven high yields.
  - Plant new orchards with a planting density of (5m x 5m) with north/south orientation of rows. Plant three to four varieties, with each variety as an independent row to help facilitate cross-pollination.
  - Add a 3- to 4-inch layer of mulch around the tree to keep the ground free of vegetation that would compete with the tree for nutrients. Keep the mulch several inches from the tree trunk to prevent trunk rot.
  - Prune trees into an open center canopy system to achieve and maintain high yields, improve the quality of fruit, facilitate better ventilation inside the canopy and control pests and disease.
  - Fertilize trees with 0.5-2 lbs of urea twice during the spring season to restore the nutrients in soil, and once in late
- 





## QUICK-START GUIDE

summer after harvesting to provide the tree with nitrogen for early spring growth.

- Many frost prevention methods are available, but the most feasible method for Afghan farmers is to maintain orchard soil moisture. The moisture within the soil will help retain heat.

### ***Harvesting***

- Ensure that the orchard floor is clean of debris and weeds that may harbor insects or pathogens prior to harvest. Harvest should occur no later than when 90% of the drupes have split. It is advisable to start when 75% have split to prevent predation by birds and insects.
- First pluck the ripe almonds that can be easily reached so that they fall onto a tarpaulin spread on the ground.
- Then shake the branches to loosen the drupes that are in the higher reaches of the tree, taking care not to damage the limbs by applying too much force.
- A long stick wrapped with rubber or a hooked pole can be used to shake the higher branches to release the more stubborn nuts without causing impact damage or weakening the limbs.

### ***Post-harvest handling***

- Place the almonds on a clean plastic sheet or other non-porous surface and cover with a small gauge net to protect from pests while the nuts dry. Check the nuts twice daily to see if they are ready. A dry nut will rattle in the shell.
- The flesh of the almond must be brittle. If it is rubbery then it needs to dry further.
- As there are both hard and soft-shelled almonds grown locally, the method of shelling is dependent on type. Soft-shelled almonds can simply be rubbed between the fingers to remove the shell whereas hard-shelled almonds are mostly processed using a small hammer; in Afghanistan this is generally done in the home by women.
- Sorting and grading ensures that broken kernels and other detritus are removed.
- Once graded and sorted, the almonds are either packed in bulk for sale to processors or can be value-added by roasting, salting and packing as retail units.
- Almonds can be further processed for both oil and almond flour, a nutrient-rich alternative for wheat and suitable for consumers who are gluten intolerant.

## Packaging and Shipping Requirements

### *Labelling*

Identity: Commodity, variety, size (grade description)  
Responsibility: Exporter, packer, province, country  
Quantity: Weight, number of packages if not bulk packed.

### *Cold Storage*

- If stored under ideal cold storage conditions (<5° C and <65% relative humidity), whole natural almonds can be stored for about 24 months with no significant loss in quality.
- Store almonds in tightly sealed containers at room temperature between 20° C and 25° C for up to 8 months.
- Store almonds away from any insects or pests and ensure that the kernels are not exposed to heavy odors as the flesh easily absorbs flavors.

### *Ground + Sea Freight*

- Due to the potential shelf life and cost implications, most Afghan almonds are shipped by road and then by sea to foreign markets.
- Use a sealed refrigerated container in order to protect from cross contamination and to maintain ideal storage conditions.

## Target Markets

### *India*

- The Indian market has strong demand for the full range of Afghan Almonds, and the market is well developed.
- Afghan almonds are competitive due to zero import duties in India and name recognition.
- Prefers large and longer kernel sized varieties of almonds in bulk.

### *Pakistan*

- Similar to Afghan domestic market.
- Low return, but low input is required.
- A high volume market for lower quality almonds.

### *Western Markets*

#### *(North America, Australasia, Asia and Europe)*

- Because of the extra distance and time to reach these markets, extra effort needs to be placed on post-harvest treatments.
- Ideal packaging for these markets is 250-500 grams pouches within 10kg cardboard boxes.

# Part I

## Cultivation

### Introduction

Almond (*Prunus dulcis*) is a species of tree native to South Asia and Middle East. While commonly thought of as a nut, the almond is actually a seed found within an outer hull and a hard/soft shell. Almonds are recognized for reducing the risk of heart attacks, preventing diabetes, and reducing obesity, among other benefits. Almonds are cultivated in many parts of the world, with the five leading countries being the U.S., Spain, Australia, Iran and Morocco. Afghanistan ranks tenth in the world, with an annual production of 62,000 MT.

### Climatic Requirement

Almonds are grown in most parts of Afghanistan. They require 400 - 900 winter chilling hours (temperatures between 32-45<sup>o</sup> F.) as a dormant period. Almonds thrive in loamy, uniform soil that is deep and well drained, though they can grow in poor soil as well. Ideal soils provide the optimal combination of water retention and root zone aeration. Almond trees will generally bear nuts after the third year and will reach commercial production after the fifth year when grown in optimum conditions.

### Botanical Characteristics

The almond tree is a deciduous tree grown for its edible seeds. The tree has brown or gray bark and either an erect or weeping growth habit depending on the variety. Almond leaves are 7.5-13 cm long with a serrated edge and grow alternately on the branches. The tree produces white to pale pink flowers and hairy green fruits, which are oblong in shape. The fruit is a drupe, containing a single seed surrounded by a hard brown shell. At maturity, the flesh of the fruit becomes leathery and splits to reveal the nut inside. Nuts generally measure 3.5-6 cm in length.



*Almond flower*

Almond trees can reach heights of 4-10 m and have a commercial lifespan of between 30 and 40 years depending on rootstock and optimal climatic conditions.

### Regions and Varieties

Afghanistan produces both soft-shelled and hard-shelled almonds with significant export potential. The growing conditions of Afghanistan are ideal for the development of almond production in a wide number of provinces, in particular Kunduz, Baghlan, Samangan, Balkh, Saripul, Ghazni, the Ghorband Valley of Parwan, Zabul, Uruzgan, Helmand and Kandahar provinces.

Afghanistan is home to a wide variety of cultivars. Major local varieties include:

- **Satarbai:** These cultivars are early-flowering, soft-shelled and medium-sized with a

red brown kernel with elliptical shape. It is available in many provinces but extensively grown in the northern region of the country. This is a market-oriented variety with premium quality.

- **Abdul Wahidi:** This variety flowers early and has a hard shell. The kernel is elliptical and light brown.
- **Qambari:** This soft-shelled variety is medium in size, elliptical and red brown in color.
- **Qaharbai:** These cultivars are early-flowering and the shell of the nut is semi-hard. The kernel is narrow, elliptical, medium in size and yellowish brown in color.
- **Khirudini:** This variety is early-flowering and hard-shelled. The kernel is light brown in color, large and crescent-shaped.

### Imported varieties

- **Nonpareil and Carmel:** These high-yield varieties are semi-soft to semi-hard shelled. Nut is medium-sized and flat and used for domestic consumption or processed for confectioneries.
- **Genco, Supernova and Tunono:** These almonds are late flowering and high yielding. Nut is medium-sized and flat and processed for confectioneries or used for direct consumption.

## Orchard Establishment

### Variety Selection

Plant only improved varieties that are high in quality and disease-free. Varieties of new plantings should be chosen based on:

- Suitability for growing zone
- Even ripening
- Good color
- Suitable size of fruit
- Fruits with small and fleshy seeds
- Predictable market demand and market performance

### Site Selection and Preparation of Land

Select land with permanent access to quality irrigation water. Winter temperatures should not drop below -25 °F during bud swell, - 27°F during bloom and 29°F during small nut formation.

Full sunlight nearly all day long is essential; without at least 6-8 hours of direct sunlight each day the trees will produce long thin branches with little fruit. Make sure the ground is firm, moist and exposed to sunlight by removing ground cover or keeping it low and not cultivating the soil during cold months.

Soil should be well-drained, fertile, sandy and loam/alluvial with good moisture and nutrient-holding capacity. Do not plant in salty (saline) or alkaline soils. Plant new orchards with



north/south orientation of the rows for better exposure to sunlight. This will help trees bloom later and reduce the danger of frost at early stages of growth.

Summers should be fairly dry; areas of heavy summer rainfall will result in fruit that is soft and will rot easily in storage. To maintain dormancy in winter, do not fertilize or prune in late summer or fall. Keep the ground around the tree clean and free from weeds and ground cover.

### **Propagation and Planting**

Almond trees are propagated mainly by budding and grafting. The rootstocks are raised from the seed of the selected varieties suitable for this purpose.

Budding is carried out in spring or fall when the bark separates easily from the wood of the understock. It involves combining a bud from one variety to the rootstock of another. The bud is taken from a parent with desirable characteristics and grows to produce a new tree. Trees may also be propagated by grafting. Cuttings are taken from trees during dormancy and grafted to a suitable rootstock in the spring.



*Budded almond saplings in nursery*

In light of Afghanistan's climatic conditions, during summer season successful budding depends on the fertility of the soil and the availability of soil moisture. A proper ratio of the two will facilitate the flow of nutrients in the initial budding stages and avoid evapo-transpiration.

Almond saplings are normally planted during winter dormancy, preferably in the early spring to avoid the risk of freezing. Saplings should be planted soon after purchase or kept moist through covering the root system with wet soil or sawdust. A good rooted sapling has a trunk diameter of 12-16mm, which will establish faster than saplings with greater or lesser trunk diameter.

The planting distance between saplings is associated with the region and climatic conditions, the variety, type of soil and other factors. However, in Afghanistan the common planting distance for almonds is 5m apart, with rows situated 6m apart. A total of 66 saplings can typically be planted on one jerib (2,000 sq. m.) of land. Plant the sapling at a depth similar to their normal position in nursery. Plant the sapling so that the budding/grafting point remains 25 cm above the ground level to avoid collar rot. The protruding notch of the union should be oriented toward the northeast to reduce the likelihood of sunburn.

When the saplings are planted, use a wooden stake to keep the saplings straight and avoid excessive wind shaking the newly planted sapling.

### **Training and Pruning**

Proper pruning and thinning provides better sun penetration and larger almond yields. Each tree has a limited capacity to supply nutrients to foliage and fruit. With adequate pruning and thinning of underdeveloped or poor quality fruit, those nutrients can be more beneficial to a smaller number of fruit, producing better yields.



Prune young trees to develop a tree structure that develops limbs to support a heavy nut load. Training should be carried out during the first 1-5 years after planting and should be completed before commercial quantities of nuts are set.

Almonds are usually trained to a vase or modified vase system where the center is open and has 3-4 main scaffolds with no central leader. Exposed limbs on young trees easily sunburn and should be protected with a 50:50 mix of white non-toxic interior latex paint and water. Pruning is best done during the dormant season. This is also the best time to prune out diseased limbs or narrow crotch angles. Pruning can also be done during the summer to control vigorous shoot growth.

Do not eliminate all of the lower limbs. Such pruning eliminates productive limbs and forces the tree to grow higher. The main branches should be distributed radially around and vertically along the trunk, forming a symmetrical crown typical for the species.

### **Pollination**

Pollination is the process of transferring mature pollen grains from the male anther to the female stigmas of the flower. If this does not happen, the flowers will drop or small fruits will develop and drop early. Almonds require cross-pollination. Pollinators (honey bees) are absolutely essential, especially since cool, wet weather can occur during the early blooming period, and bees prefer warm, dry days with minimal wind. In almond orchards, bees need to be present when the flowers open. If other flowers are present in the orchard, the bees may be drawn to them, as the almond flower is not very attractive compared to other flowers.

### **Irrigation**

Water is an essential component of plant tissue, influencing and controlling the growth and development of trees. The roots from the soil absorb water, and nutrients dissolved in water are taken up to all parts of the plant through the process of translocation. Plants utilize water in a variety of processes such as transpiration, cell division and photosynthesis. An adequate water supply during the growth stage has a direct bearing on fruit quality and yield.

Even though almonds are to some extent drought resistant, irrigation is of vital importance and it is considered as one of the most critical cultural operations in areas where rainfall is sparse, as in some parts of Afghanistan.

Irrigation scheduling should be based on knowing the moisture content in the soil, the growth stage of the plant, air temperature, wind speed, rainfall and the appearance of the leaves. Soil moisture can be measured by a number of methods such as tensiometers, neutron moisture probes, gypsum blocks or a soil probe. To test the moisture of the soil by hand, take a handful of soil 30cm below the surface and clench it in your fist (fig. a). If the soil holds its shape when the hand is unclenched (fig. b), the soil is sufficiently moist. If the soil crumbles (fig. c), the soil is too dry.



*Trained almond saplings with trunks painted to withstand winter temperatures.*



A.

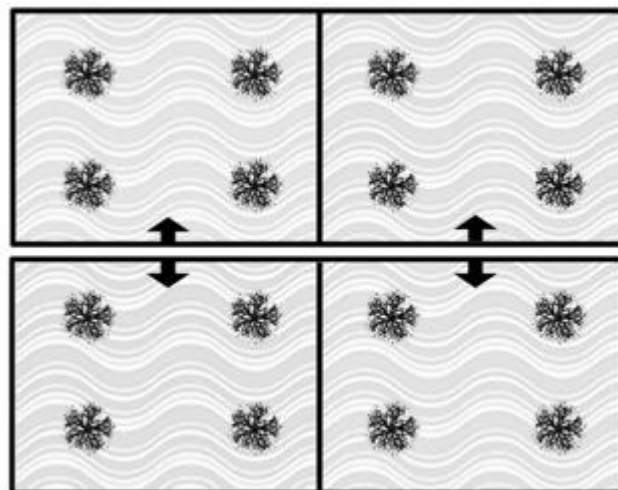
B.

C.

The amount of water for irrigation depends on water holding capacity of the soil, the amount of rainfall and the rate of transpiration of the trees. Seven different irrigation methods are outlined below.

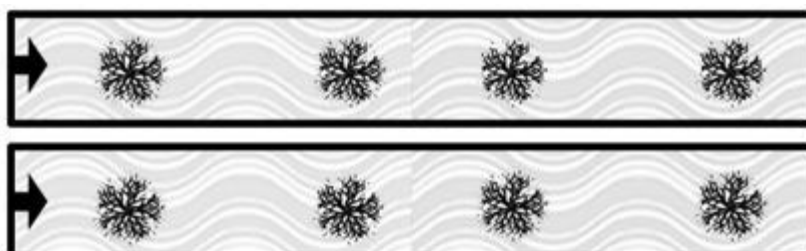
### ***Flood Irrigation***

This type of irrigation is used in areas where the surface is flat and local water sources are sufficient to irrigate the trees. Water enters a square enclosed area and irrigates a group of trees. While cheaper and easier than other methods of irrigation, flood irrigation results in high water loss through evaporation and leaching.



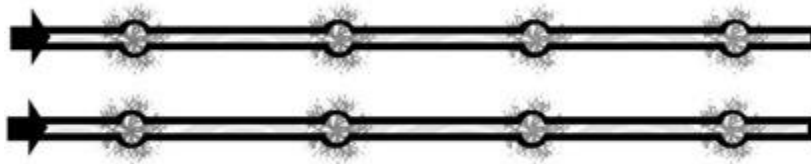
### ***Furrow Irrigation (Channel System)***

In this method, trees are planted in long parallel channels connected to a water source. The water flows from one end of the channel to the other. Several channels can get water simultaneously depending on the capacity of the water source.



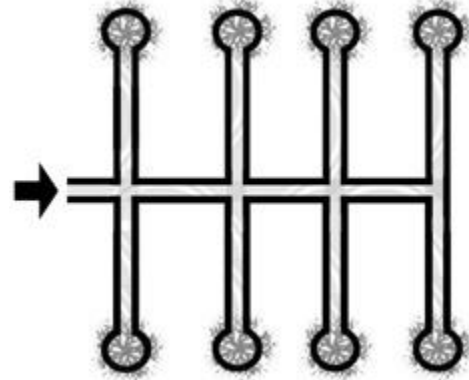
### **Basin Irrigation**

Basin irrigation is similar to the channel system, except that the channel linking the trees is smaller, with rings circling each tree. Basins are made around each tree -- 50cm radius the first year, increasing to 1m or larger as the tree canopy grows and the tree's water needs increase. One disadvantage of this method is that manure and fertilizer tends to accumulate in the trees at the end of the line.



### **Modified Basin Irrigation**

This is the most popular and efficient method of orchards on level ground. A central water channel feeds pairs of trees branching on either side. As above, small basins are prepared around each tree – 50cm radius the first year, increasing to 1m or larger as the tree's size and water needs increase. This system has many advantages. It uses less water and does not move nutrients from one tree to another. Weeds can be more easily controlled, as water does not reach outlying areas beyond the channel. The disadvantage is the labor and costs involved in preparing each of the circular basins, extending them as the tree grows and cleaning debris from the central channels.



### **Weed Control**

Weeds can greatly out-compete trees for nutrients, especially nitrogen. Fertilizer is drawn away from the tree and absorbed by the weeds. Weeds also divert much of the water that is crucial to the tree during the hot summer months. Weeds are also a potential host for pests. Weeds can be controlled by intercropping between rows, mowing or application of a weed-controlling chemical. Pre-emergent weed killers should be used only after germination. Glyphosate can be used throughout the growing season. In Afghanistan, fruit growers typically use mechanical means of control, i.e. softening the soil and removing the weeds with a shovel or tractor.

### **Fertilization**

Nitrogen, phosphorous and potassium are the major nutrients required for proper almond growth. Nitrogen (urea) should be applied by hand during the first two years, the amount increasing each year up to the tenth year. Trees can be given a mixture of 50g nitrogen, 50g phosphorous and 65g potassium during the first two years. After that, fertilizer should be increased annually until the trees are ten years old, at which point the trees are fertilized with roughly 1kg nitrogen, 1kg phosphorous and 1.3 kg potassium. Trees should thereafter be fertilized at this amount. These dosages should be applied three times per year (after harvesting, before the development of the first bud sprouts of the season and after fruit set).

Weeds need to be removed before application of the fertilizer by hoeing the top surface of the soil. Then the recommended dose of fertilizer should be broadcast under the canopy of the tree, leaving about 50cm from tree trunk in older trees. The applied fertilizer should be mixed well with the soil (10-15cm deep) or a 10-15cm deep channel should be prepared with fertilizer and then filled with soil.

## Maturity

Fruiting begins in trees 3-4 years old with maximum production in 5-8 years. If properly managed, almond trees can produce for 50 years or more. Most almond varieties mature in July depending on climatic conditions. Once mature, the hull splits and the nuts physically separate from the tree. Almond trees are harvested when the hulls in the interior of the canopy are open, since these split last. Delaying harvest increases the risk of navel orange worm infestation.



*Almonds at maturity*

## INSECT PESTS

### Aphids

Aphids are tiny sucking insects, many generations of which can be produced during a single season. Colonies develop in the spring and affect the growth of leaves and shoots. The symptoms of aphids are seen in leaves, fruits and shoots. Leaves are curled downward and sticky with honeydew secreted by the aphids.



Honeydew may also drip onto the fruit causing russet spots and black sooty mold. This results in slow plant growth, affecting quality and yields. Almond trees fertilized with too much nitrogen are more susceptible to attack by aphids.

Aphids have many natural enemies such as lady beetles, lacewings, syrphid flies, predaceous midge larvae, and predatory bugs, which can often keep aphid populations under control if they are not disturbed by broad-spectrum insecticide treatments. Proper pruning will improve the efficiency of these natural predators, as an open tree canopy discourages the build-up of sucking pests.

In case of sporadic attack by aphids in the spring, liquid detergent sprays are effective. For heavy infestations, especially attacks on new shoots after winter dormancy, use of insecticides is recommended. As aphids normally appear in colonies, partial spray of the canopy with appropriate insecticide should produce satisfactory results.

### Scales

Scales are sucking insects that appear as circular white spots on the trunk, branches and leaves of almond trees. In case of heavy infestation by scales the leaves turn yellow, and the tree may defoliate





prematurely during the summer; the fruit may drop and the branches die. Scale insects prefer shady humid environments and are therefore most common in the lower part of the canopy.

One of the most effective control measures for scale insects is to encourage light penetration and good ventilation by adequate pruning of the trees. In case of heavy infestation, farmers are recommended to use a spray consisting of agricultural mineral oil and water.

### ***European red mite***

European red mites are green when they first hatch, but with feeding turn red with white spots on the back. These mites overwinter as eggs at the base of buds, spurs on newly developed branches, bark cracks and in wounds.



Red mites cause leaf stippling in the initial stages of infestation. In the case of persistent feeding, leaves will appear pale, bronzed and burned at the tips and edges. Almond trees can tolerate high infestations if the tree is not under stress due to shortage of water or other factors. Small populations, in fact, can be useful, serving as alternative food sources for mite predators (for example, it can build up the natural enemies of spider mites early in the season). The population of red mites is often correlated with

temperature; as temperatures rise, the population declines.

European red mites can usually be controlled by natural predators. In initial stages of high infestation, wash the infested trees with high-pressure water then at the base of the trees apply a small quantity of sulfur powder sprayed as a mist. The pest can be prevented by application of an oil spray during the dormant season. In case of high infestation, apply ovicide in spring to control mite eggs before they hatch. Most Afghan farmers use Difofol, Agrifol, Amitraz and Talstar as miticides.

## **DISEASE**

### ***Bacterial Canker***

Bacterial canker is one of the most common diseases affecting stone fruits, including almonds. The symptoms first appear in spring during periods of mild temperatures and high humidity, causing limb dieback with rough irregular cankers. There may also be spots on leaves, flowers and shoots. In some cases, cankers do not form, but the bark exudes a sour smelling sap. Canker is spread by splashing rain. It proliferates during periods of high moisture and low temperatures in spring. The disease is worse in low (cold) or sandy spots with high populations of nematodes. Nitrogen-deficient trees are most prone to bacterial canker as are young trees that are 2-8 years old. The disease rarely occurs in the first year of planting and is uncommon in nurseries.



The disease that causes bacterial canker is present on the surfaces of many plants. Consequently, management of this disease should focus on preventing conditions that predispose trees to the disease. Before planting, properly break up hard-pan areas beneath the topsoil. Maintaining proper nutrition, particularly nitrogen, will reduce the incidence of bacterial canker.

### **Shot hole**



Shot hole is another common disease facing Afghan almonds. The disease appears as spots on the leaves, flowers, fruit and twigs. Leaf lesions start as tiny reddish dots that enlarge into spots. Generally in young leaves the spots fall out and appear as a gunshot hole. Fruit is usually affected with spotting on the upper surface. High infection of newly developed fruits may cause fruit drop.

Shot hole can be prevented by application of dormant winter oil and Bordeaux mixture, heavily diluted, and through the pruning and destruction of infected tissues, twigs and branches. Copper sulphate and copper oxychloride are recommended in cases of severe infection.

### **Anthracnose**

Symptoms of anthracnose occur on blossoms, fruit, leaves and woody tissues of almonds at various stages of development from fruit set until shell hardening. Symptoms of blossom blight anthracnose are similar to brown rot blossom blight. Leaves on infected spurs die and may remain attached to branches or fall out, leaving a bare twig. Infected nuts show round, orange, sunken lesions on the hull. Young infected fruits occasionally drop from the trees. Later in the season the affected fruits can become mummified and overwinter on the trees.

Fungicide treatment and cultural practices (such as pruning infected branches and keeping leaves dry when irrigating) are the most important control method for controlling anthracnose. Orchards with a history of infection should be sprayed with fungicides (Captan or Manab) when the trees are 5-10% in bloom, repeating at 10-14 day intervals. Dead infected branches and mummified fruits should be destroyed.

## **Harvest**

Orchards should be cleaned before beginning the harvest to ensure that the almonds are not contaminated by detritus and dust that may harbor pathogens or insects. Dampen down the area and lay a tarpaulin under the tree to catch the nuts as they are harvested, as many will drop to the ground.

Pluck the ripe fruits that you can easily reach, letting them drop onto the tarpaulin. Shake the branches to loosen the drupes that are in the higher branches. After that is done, a long stick wrapped with rubber can be used to tap the more stubborn nuts or a hooked pole to shake the higher branches without causing impact damage. In more developed economies



*A tarpaulin is used to catch falling almonds and keep them from touching the ground.*

machinery is used that place a tarpaulin around the base of the tree while a clamp is placed on the main trunk. The machine then shakes the tree and gathers the nuts in a hopper making it faster and more hygienic as there is less chance of contamination.



*A hooked pole allows farmers to reach high branches and shake stubborn almonds free.*

## Part 2

# Post-Harvest Handling

### Drying

Place the almonds on a clean plastic sheet or other non-porous surface and cover with a small-gauge net to protect from animals. Check the nuts twice daily to see if they are ready. A dry nut will rattle in the shell. The flesh of the almond must be brittle; if it is rubbery then it needs to dry further. Depending on the climate and weather, nuts can take anywhere from two days to a week to dry fully.

It is important that the almonds be fully dried. If packed before this point, almonds can become rancid or contaminated with mold due to the available moisture encouraging pathogenic development.



### Grading

In-shell almonds should possess similar varietal characteristics and be free from loose dirt and other foreign material. The shells must be clean, fairly bright, uniform in color and free from damage caused by discoloration, adhering hulls, and broken shells. The kernels should be well dried, free from decay, rancidity, and damage caused by insects, mold, gum, skin discoloration, shrivelling, brown spot or other factors.



Shelled almonds should be free of shell debris and foreign material, and insect or fungal damage. The kernel skin should be intact and should show no shrivelling, discoloration or mechanical damage. Double, split or broken kernels will negatively impact the aesthetics and result in poor value.





## Hulling and Shelling

Soft-shell almonds have a crumbly woven structure and are easily broken by just pressing with one's fingers. The hard-shell varieties need more effort and can be either hand processed or mechanically processed. In Image A below, a nutcracker holds the shell in place and allows for a gradual application of pressure.

The more traditional method is using a small hammer (Image B). The almond is placed on a hard surface with the rounded end below and then tapped until the shell cracks. This has been an important source of income for generations of women in Afghanistan. Hand-held nutcrackers such as the one shown in Image C can also be used, but this is usually in a social context and not for high volumes of shelling.



A.



B.



C.

For commercial scale shelling, machinery is available that can process high volumes and sort at the same time. This is usually connected to packing lines that automatically form and fill the packaging.

## Packing

There are many different formats for packing almonds, and these are mostly market-driven. For more sophisticated markets where the product is going directly to the end user without further packing or processing, the practice is to pack smaller quantities in more visually attractive packaging. This can vary from single-serve 50g packs to 5 kg or 10 kg bulk packaging for food processing or catering. The method of packing can include vacuum

packing or modified atmosphere packing where the air in the bag is replaced with an inert gas.



Local market resale will mostly be packaged in bulk, as vendors will sell by weight and repackage at the point of sale. For long distance and export transportation, almonds generally are packed in woven polyethylene 50 kg bags or plastic drums in order to maximize packing space in the transportation vehicle.

It is important that the almonds are transported in a sanitary manner and not co-shipped with other products, as they are highly susceptible to damage from moisture, heat and odors.



## Storage

If stored under ideal cold conditions (<math><5^{\circ}\text{C}</math> and <math><65\%</math> relative humidity), whole natural almonds can be stored for up to two years with no significant loss in quality. Almonds should be kept in tightly sealed containers at room temperature between <math>20^{\circ}\text{C}</math> and <math>25^{\circ}\text{C}</math> for up to 8 months. Store almonds away from any insects or pests and ensure that there are no strong chemicals or other items that could cause an aroma taint, as almonds absorb odors easily.

## Processing

Almond flour is made from blanched ground almonds whereas almond meal is made with the skin still intact giving it a richer color and courser texture. Almond flour and meal are good alternatives for people who are on a carbohydrate-restricted diet. It reduces the incidence of post-meal rises in blood sugar and is therefore a good alternative for diabetics. When storing almond flour it is best kept refrigerated or frozen in a sealed container as it will oxidize rapidly and spoil.



*Almond flour*



*Almond meal*

Almond milk has not yet made an appearance in Afghanistan, though in time the private sector may attract consumers among the lactose intolerant. It is made by blending blanched almonds with potable water and has zero cholesterol and low sodium levels.



Almond oil constitutes 36-60% of the kernel mass, depending on variety. In the Far East, almond oil is used widely as carrier oil during massage due to its emollients that moisturize the skin. The oil can also be used as a replacement for olive oil in cooking (such as salad dressings and stir-frying). It is not recommended for deep frying as it has a relatively low flashpoint and degenerates quickly under sustained high temperatures. Almond oil is particularly useful for hair care, helping to strengthen and thicken hair as well as preventing dry scalp disorders.

## Part 3

# Target Markets for Almond Export

*Below are the specific market requirements for successfully importing almonds into Pakistan, India, UAE and the Middle East, and other overseas markets (Europe, Central Asia, Canada and Australasia).*

## Pakistan

Pakistan offers opportunities for Afghan exporters looking for market opportunities within easy shipping distance from Afghanistan. Returns, however, are lower than other international markets. Pakistan imports Afghan almonds both for home consumption and for resale to other overseas markets.

### **Regional Markets**

#### ***Peshawar and Quetta***

- These traditional markets have similar requirements to local markets.
- Supply is generally in bulk, sacks or any kind of wooden/cardboard boxes of mixed grade product shipped in open trucks.
- There is a low level of input, thus low returns to the exporter, with much of the product being transhipped or re-exported.
- Many Pakistani traders purchase entire almond orchards direct from the farmers or middlemen, leading to high yield losses.

#### ***Islamabad, Lahore and Karachi***

- These markets offer opportunities for higher returns.
- They are run by wholesale commission agents who generally monopolize trade in certain products.
- Packaging should be in large sacks or 10kg cardboard packaging with mixed grades.

### **Supermarkets**

- Supermarket sales opportunities include Metro Cash & Carry, Hyperstar (Carrefour), Al Fatah and Chase-up Shopping.
- Vendor registration and relationship management is required.
- There are good opportunities for well graded, staged supply. Packaging from 250-500-1000 grams pouches in a master box (10kg cardboard cartons) is acceptable with negotiation.



## India

Almond consumption is on the rise in India. Total almond demand is expected to be about 18% higher in 2015 than in the previous year. With domestic production accounting for less than 5% of demand, international exports are in high demand. Demand for nuts typically peaks during the festive season (September-January).

The Indian market traditionally prefers large and longer kernel sized varieties of almonds in bulk (only about 5% of retail sales are in packaged form). There is a recognition and premium price paid for almonds imported from the U.S. and other countries based on size, color and grading of the almonds however, Afghan almonds are competitive due to zero import duties in India and name recognition. Consistent grading and sorting will thus deliver good returns, with A grade delivering a significant premium.

### **Fees**

There are no customs duties on fruit imports. The following customs clearance fees are assessed at the Wagah border crossing (ground shipments) or at the airport:

Ground shipments:

- Fresh fruit: 5-8 Rs per kilo
- Dried fruit: 40-45 Rs per kilo

Air shipments:

- Fresh fruit: 30-35 Rs per kilo (incl. 11 Rs handling fee) for shipments up to 2 MT. For more than 2 MT, the fee is 20-22 Rs.
- Dried fruit: apx 100 Rs per kilo (incl. 11 Rs handling fee) up to 2 MT. For more than 2 MT, the fee is 80-85 Rs.

The boxes must be labeled with the following information:

- Product name
- Package weight (net and gross)
- Date packed
- Date of expiration ("Best before [date]")
- Importer and exporter name, address (in India and Afghanistan), phone number and/or point of dispatch

### **Documentation**

A quality certificate is required for all products. This can be obtained from the Export Promotion Agency for Raisins, Fresh Fruit, Dry Fruit and Vegetables. A phytosanitary certificate for all products is required as well as a declaration form showing that the produce has been tested and is free from contaminants. This can be obtained from the MAIL Quarantine Dept. If additional tests are required, this will be mentioned on the import permit issued by the Indian government.

Other documents:

- South Asia Free Trade Agreement certificate of the origin country

- Invoice
- Waybill (if shipped by air)
- Product/packaging list

All documents must be scanned and sent to the importer before dispatch of the consignment.

### **Wholesale markets**

Delhi is home to India's largest wholesale market and has a large number of commission agents available. For a list of reputable agents, please contact the CHAMP New Delhi Trade Office, listed below.

There are many other large wholesale markets worth exploring in India, including Mumbai, Kolkata, Bangalore and Chennai. Commission Agents traditionally work on a 10% commission, though there are often a number of handling fees that should be discussed in advance before consigning produce.

The wholesale markets will accept any form of graded and sorted almonds, but a premium of up to 50% is paid for larger sized almonds. Packaging can be in traditional sacks or 10kg cartons, though this can often result in compression damage. Well sorted, graded and treated product packaged into 250-500-1000 gram pouches and shipped in 10kg cardboard boxes will attract premium prices.

### **Facilitated Trade**

CHAMP operates a New Delhi Trade Office through the Afghan Business Centre (ABC). The trade office can link Afghan exporters with Indian buyers, commission agents, supermarkets, and importers. It can coordinate the export of fruits with Afghan exporters, coach the traders in the requirements of Indian fruit markets and coordinate with Indian brokers in order to release the shipments from Indian customs authorities (air customs, border customs and inland customs).

The trade office will also provide transportation arrangements in order to deliver the cargo from customs to the importers' warehouses or cold storage facilities, while overseeing commission agents during sales. It will provide sales reports to the exporter, including shipment conditions after arriving at the market. It will also document the quality of the produce by taking pictures and providing recommendations to exporters for future shipments.

The trade office will coordinate with importers to release or transfer the pre-negotiated payments, providing specific transaction details. It can also coordinate lodging arrangements for Afghan exporters during their visits to India and assist them with language barriers.

This service, provided with a small service fee, assists in making the market transactions more transparent and reduces barriers to new entrants in the Indian market.

### **Channel Importers**

There are a number of larger wholesale businesses, some with a national footprint. These businesses can offer a strong link to many of the major Indian customers, including

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exporting to India, contact:***

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**Attn: Nasrat Zaki**  
**+91 (0) 8130 977 386**  
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**[www.abcpltd.in](http://www.abcpltd.in)**

supermarkets. These businesses are actively looking for consistent supplies of Afghan almonds to complete the 12-month supply chain for their customers.

These channel importers are looking for higher quality and predictable supplies to integrate into their customers' supply chains. They may have a higher cost of doing business, but will often return more consistent and higher prices. Contact the New Delhi Trade Office for more information.

### **Supermarkets**

Almonds are competitively sought by supermarkets in India, with many retail chains showing interest in Afghan almonds. These supermarkets require not only a high standard of grading and packing, but also significantly higher levels of sophistication in building lasting relationships with exporters.

To deal directly with supermarkets, exporters must invest extensive effort into planning for the seasonal supply. The first step is gaining vendor registration through meetings and showing samples while communicating potential supply windows. If the quality, price and supply windows match up, then a relationship can be established.

Supermarket customers require a variety of sizes and grades of almond depending on their individual market dynamics and the volume of fruit that needs to be sold. With planned timing and good communication, volumes can grow to be very significant.

Supermarkets will embrace quality branded products and pay a premium, especially with the addition of promotional branding and point-of-sale material. Larger volumes of smaller sized almonds can also be channelled into this market with good planning and by mostly targeting the importers using the almonds as raw material for their products e.g. cosmetics, bakeries chocolate and much more.

Packaging requirements must be negotiated with each supermarket. Premium product should be packed in 250-500 grams pouches delivered in 10kg cardboard boxes.

## **UAE and Middle East**

To date, the Dubai market has shown little demand for Afghan almonds, as Afghan almonds generally contain more oil and are not well sorted, with bitter almonds and a variety of kernel sizes combined together. Hence there is strong competition from other countries. Premium pricing is paid based on size, color and grading of the product. Consistent grading and sorting will deliver good returns, with A grade being in high demand in the market.

### **Fees**

There are no customs duties on fresh or dried fruits. Each shipment will be assessed a municipality charge of 50 AED. Approximately one-third of shipments are inspected by customs agents. When a shipment is inspected, the shipment is assessed 150 AED.

The product must be packed in a completely white (no chemical colors) box labeled with the product name, weight, origin, shipper and destination. For both fresh and dry fruits, this box/brand must be registered each year for a fee of 300 AED.

### **Wholesale markets**

Dubai is the largest wholesale market in the region and has a large number of commission

agents available. For a list of reputable agents, please contact the CHAMP Dubai Trade Office.

Commission Agents traditionally work on a 10% commission, though there may be a number of handling fees that can push the commission above 14%. These should be discussed in advance before consigning produce.

The wholesale markets will accept well graded and sorted almonds, though a premium of up to 50% is paid for well processed and larger kernel sizes. Packaging can be in traditional 10kg cartons, though these may lead to damage due to compression injuries. Well sorted, graded and treated product packaged into 250-500-1000 gram pouches and shipped in 10kg cardboard boxes will attract premium prices.

### ***Facilitated Trade***

In Dubai, CHAMP operates a trade office that facilitates sales of Afghan products, conducts promotion activities, arranges business-to-business meetings and facilitates proper documentation for the export of products from Afghanistan. The Dubai Trade Office also focuses on acting as an interface between Afghan traders and businesses in the Dubai market.

The trade office can coordinate the export of fruits with Afghan exporters and coach them in the requirements of UAE fruit markets. They can also coordinate with UAE brokers to release shipments from UAE customs authorities. The trade office will also provide transportation arrangements in order to deliver the cargo from customs to the importers' warehouses or cold storage facilities, while overseeing commission agents during sales. It will provide sales reports to the exporter, including shipment conditions after arriving at the market. It will also document the quality of the produce by taking pictures and providing their recommendations to exporters for future shipments.

The trade office can coordinate with importers to release or transfer payments by providing specific transaction details. It will also coordinate lodging accommodations with Afghan exporters during their visits to Dubai. This service, provided with a small service fee, assists in making the market transactions more transparent and reduces barriers to new entrants in the UAE market.

### ***Supermarkets***

Almonds are sought by many supermarkets in the UAE, with some retail chains seeking quality Afghan almonds for their customers. The supermarkets require not only a high standard of grading and packing, but also significantly higher levels of sophistication in building relationships with exporters.

To deal directly with supermarkets, exporters must invest extensive effort into planning for the seasonal supply. The first step is gaining vendor registration through meetings and showing samples while communicating potential supply windows. If the quality, price and supply windows match up, then a relationship can be established.

***For more information on exporting to the UAE, contact:***

**CHAMP Dubai Trade Office**

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Supermarket customers require a variety of sizes and grades of almonds depending on their individual market dynamics and the volume of fruit that needs to be sold. With planned timing and good communication, volumes can grow to be very significant.

Supermarkets will embrace quality branded products and pay a premium, especially with the addition of promotional branding and point-of-sale material. Larger volumes of smaller sized almonds can also be channelled into this market with good planning and mostly targeting the importers using the almonds as raw material for their products (e.g. cosmetics, bakeries, chocolate, etc.).

Packaging requirements must be negotiated with each supermarket. Premium product should be packed in 250-500-1000 gram pouches within 10kg cardboard boxes.

## **Other Markets:**

### **Europe, Central Asia, Canada and Australasia**

Afghan almonds have little reputation or brand recognition outside the immediate region, though there is often demand by Afghans living in Australia, Canada and other countries in Europe occasionally supplied by Afghan traders. Premium prices are based on size, color and grading of the fruit. The largest and best graded almonds will often attract a premium price that is required to make the extra effort worthwhile. There may also be secondary markets for fruit processed into other products (e.g. cosmetics, bakeries, chocolate, etc.).

Because of the extra distance and time to these markets, extra effort needs to be placed on post-harvest treatments. Because of the time, distance and cost to get to these markets, demand should be created in advance and a partnership developed with the channel importer to develop a transaction that is profitable for each party and which will mitigate the risks involved.

The ideal packaging for these markets is 250-500 gram pouches within 10kg cardboard boxes. The use of palletized crates will reduce impact and compaction injuries in transit and allow for fruit to be shipped successfully.

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