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# ***Best Practices for GRAPE 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.

Produced by the USAID-funded  
Commercial Horticulture and Agricultural Marketing Program  
[www.CHAMP.af](http://www.CHAMP.af)



Ministry of Agriculture,  
Irrigation and Livestock

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# Grapes

*Grapes play an important role in the economy of Afghanistan and have been cultivated for centuries. Unfortunately, the vast majority of grapes are grown on earthen mounds, resulting in poor quality and high losses due to disorders and pests. Afghan grapes are well known in the region and offer promising sources of revenue for exporters.*

## Regions and Varieties

Grapes account for 48% of the total fruit-growing area in Afghanistan. In most districts, grapes are not grown for commercial potential but for family consumption. Grapes are cultivated from as far south as Kandahar to as far north as Takar and Faryab. Despite the large variety of cultivars available, three local varieties offer the best commercial return for export: Shindokhani, Kishmishi and Taifi. New commercial varieties are also being introduced, such as Thompson Seedless and Red Globe, and are beginning to make inroads into foreign markets.

## Producing for Export

### *Cultivation*

- Plant only improved varieties that are of a high quality, oriented for the commercial market and disease-free.
- Plant new orchards with a high planting density (2m x 3m) and a north/south orientation of the rows.
- Trellis the grape vines to keep the grapes clear of ground-borne pathogens and allow for better canopy development to protect the grapes.
- Add a 3- to 4-inch layer of mulch around the vine to keep the ground free of vegetation that would compete with the vine for nutrients. Keep the mulch several inches from the vine trunk to prevent trunk rot.
- Winter lime sulfuring is critical to prevent fungal diseases like powdery mildew the following year.
- Ensure that fruit is thinned and vines are trained properly while keeping the vineyard clean at all times.

### *Harvesting*

- Grapes should be harvested at the coolest time of the day, preferably before dawn, to keep the fruit as cool as possible. This will save energy expenditure when pre-cooling later.
- The grape cluster should be supported gently from below and the stem cut with shears, leaving at least 4cm of stem.
- Grapes should then be transferred to lined harvest crates. Too much rough handling will damage the bloom.



**QUICK-START GUIDE**





- Grapes should be placed in a shaded area until transferred to packing area.
- It is critical that the grapes are packed and cooled to storage temperature in the shortest time possible.

### ***Post-Harvest Handling***

- Grape clusters are trimmed to remove damaged and non-uniform berries while trying to retain a natural shape to the bunch.
- Grapes are packed in either plastic bags or clamshells that allow protection as well as airflow.
- The packs are then placed in a lined carton or crate and pre-cooled to 0°C and a dual release sulfur pad placed in the bag prior to closing.
- By maintaining a constant cold chain and with the use of sulfur pads, grapes can be stored for up to six months.

## **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***

- The ideal storage temperature for fresh grapes is at a very narrow range of -0.5° C to 0° C.
- Relative humidity should be kept at 90-95%.
- Grapes are non-climacteric, but storing them with other produce could accelerate ethylene uptake of the surrounding fruit.

### ***Ground + Sea Freight***

- If packed correctly with dual release sulfur pads, grapes can withstand long journeys as long as the temperature is kept between -0.5°C and 0°C.
- Use a sealed refrigerated container in order to protect from cross contamination and to maintain ideal storage conditions.

### ***Air Freight***

- Air freight is available on a daily basis to all target markets with at least 2 MT reserve. Bi-weekly freightliners out of Kabul can accommodate 20 MT.
- Freight needs to be kept at the target temperature or protected by thermal blankets.



## Target Markets

### *India*

- Afghan grapes are starting to be recognized by the Indian market and have a particularly strong market footprint later in the season.
- Grapes pre-packed into clamshells sell best and allow branding and product differentiation, especially Shindokhani.

### *Pakistan*

- Similar to domestic market at this stage: low input, low return.
- Mainly supplied in bulk (20kg).

### *Central Asia*

- Strong demand in early season, with preference for 7-10kg packages or clamshell packs.
- Longer distance requires greater attention to cold chain maintenance

### *UAE*

- Good demand for the full range of Afghan grapes, especially red and Shindokhani.
- Pre-packed into clamshells or 7kg export pack, there is strong competition from international suppliers. Pricing depends on packing and physical appearance of product.

***For more information, visit:***

***CHAMP.af***



# Part I

## Cultivation

### Introduction

The cultivation of domesticated grapes began 6,000-8,000 years ago in Southern Turkey, spreading to Northern Africa, Europe, Asia and North America. More grapes are grown in Afghanistan than any other fruits, comprising nearly half of the total fruits produced, thereby playing an important role in the agricultural economy. Each year grapes are exported (both fresh and dried) to countries such as Pakistan, India, England, Japan, Russia, Germany, France, the UAE and Central Asia.

Grapes in Afghanistan are consumed fresh, dried and in the form of grape juice. Grapes are grown in nearly every part of the country, with commercial production in the provinces of Kabul, Parwan, Kapisa, Kandahar, Helmand, Jawzjan, Herat and Ghazni.

The total area of grapevine cultivation in Afghanistan is estimated at more than 62,000 hectares with a total annual production of more than 610,000 metric tons<sup>1</sup>. Average farm yields are approximately 9,800 kg/ha.

### Regions and Varieties

More than 100 varieties of grapes are grown in Afghanistan, but commercial production focuses on three local varieties: Shindokhani, Kishmishi and Taifi.



*Shindokhani*



*White Kishmishi*



*Taifi*

- **Kishmishi White:** These grapes are light yellow in color. Mature in September, used as table grapes, raisin and for export.
- **Shindokhani:** These grapes are seedless, light yellow in color. Mature in September, used as table grapes, raisin and for export.
- **Taifi:** These are seeded grapes having red color and used as table

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<sup>1</sup> Source: *Afghanistan Statistical Year Book 2013-14*.

grapes. Best for export due to their long shelf life.

Other commercial varieties include:

- **Hussaini:** These are yellowish white in color. Mature in September and are commonly used as table grapes.
- **Askari:** These are light green in color. Mature in October and are usually exported.
- **Gholadan:** These are green in color and mature in the month of September. Commonly used as table grapes or for export.
- **Spen Manga:** These grapes have dark green color and mature in October. Commonly used as table grapes.
- **Naderi:** These are light red in color and mature in late September. Mostly used as table grapes.
- **Kishmishi Siah (Black) Bedana (Seedless):** These are light red in color, mature in late September and are mostly used as table grapes.

Exotic varieties like Thompson Seedless, Red Globe, Cardinal, Emperor, Fantasy, Crimson Seedless, Flame Seedless, Ruby, Ribier and Black Emerald are also making inroads into local and foreign markets.

### Climatic Requirements

**Temperature:** Grapes require hot, dry summers and cool winters, with temperatures ranging from 15° - 20° C. The optimum temperature for grapevine leaf photosynthesis is 25° - 30° C. Temperatures above 40° C. reduce fruit set and berry size, while temperatures below 15° C. during the dormant period will lead to bud damage.

**Altitude and Rainfall:** Grapevines thrive at elevations of 200-250 meters above sea level where the annual rainfall does not exceed 900 mm. Grapevines should not be grown in areas of heavy spring rainfall (during flowering and fruit ripening) as this can lead to powdery mildew.

**Atmospheric Humidity:** High humidity during the period of vegetative growth and fruit development can have a negative impact on grapevines by promoting more vegetative growth and smaller berries of low quality. High humidity during the 1-3 months after pruning can lead to fungal diseases.

### Botanical Characteristics

The grapevine is a vigorously growing semi-wood climbing plant. Grapes grow in clusters of 15 to 300 and can range in color from white-green, yellow, crimson, pink, red, black, dark blue, dark red and dark black. Grapes are non-climacteric (i.e. they do not continue ripening after harvest).

During the winter the vines lose all their leaves and the green shoot changes color from green to dark brownish woody canes. These matured canes will stay dormant in mild to cold winter conditions until the beginning of spring. In areas where the winter is not so cold, the vines will not go fully dormant; this is not good for grapevines because it hinders the build-up of reserves for the next growing season.

### Structure of the Grapevine

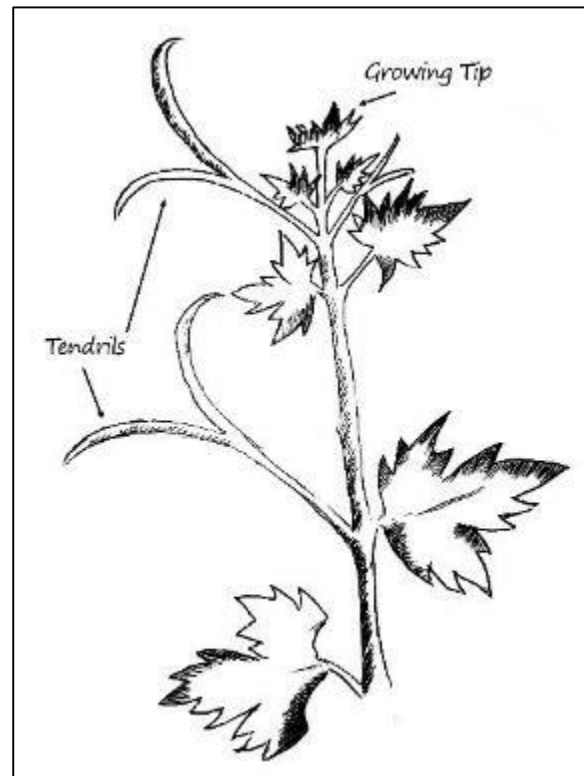
As the structure and growing patterns of grapevines are different from other perennial

plants, various terms and functions are described below.

**Tendrils:** These are slender structures produced by shoots that coil around smaller objects like trellis wires, small stakes and other shoots to provide support for the plant. Tendrils always grow opposite the leaves (except at the base of the shoot), skipping every third leaf. Flower clusters sometimes develop on the end of a tendril.

**Growing Tip:** Shoots have many points of growth, but the plant extends primarily from the growing tip. New leaves and tendrils unfold from the tip as the shoot grows. The growth rate of the shoot varies during the season. Grapevine shoots do not stop expanding by forming terminal buds as some plants do. They may continue to grow if there is sufficient heat, soil moisture and nutrients.

**Shoots:** The shoot is the green parts of the vine contain the leaves, buds, grapes and tendrils. A shoot matures into a cane when more than half of the shoot becomes woody (lignified). The *primary* or *main* shoot grows from a dormant bud that was formed during the previous growing season, carrying leaves and grape clusters. The *secondary* or *lateral* shoot grows from green secondary buds on the primary shoots but rarely produce fruit, instead increasing the leaf surface area to enable better cluster maturation.



**Canes or Long Bearers:** These are matured woody shoots formed when leaves fall from the vine during late autumn or early winter. The cane is pruned during the dormant season to manage vine size and shape, and to control the quantity of potential crop in the coming season.

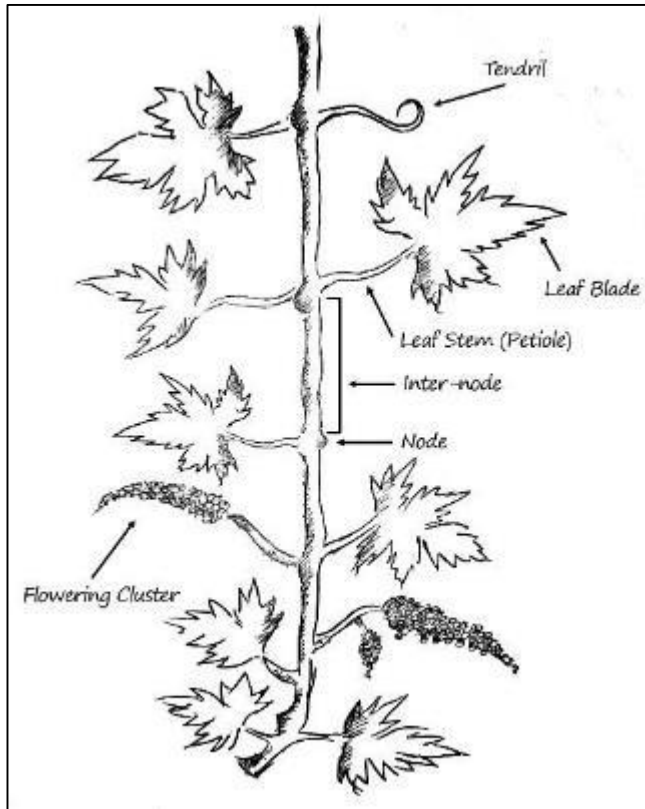
**Spurs or Short Bearers:** The spur is the lower section of cane, usually with two buds allowed to remain after pruning. Spurs are generally one-year-old dormant wood, similar to cane but shorter and capable of sending out shoots that will bear fruit bunches. Canes pruned to 1-3 nodes are called *fruiting spurs*. Canes pruned to four or more nodes (even as many as 15, depending on the vigor and thickness of the cane) are called *fruiting canes*.

Fruiting spurs are seldom used for table grapes production in temperate climates because the nodes at the base of canes often produce small, straggly clusters. Therefore, fruiting canes with 6 - 15 nodes are typically used for temperate climate table grape production. In Afghanistan, Kishmishi and Shindokhani grapes are typically pruned as long cane (8-15 buds/cane) while Taifi and Hussein grapes are pruned as short spurs (2-4 buds/cane).

**Renewal Spurs and Vine Space:** A vine must be trained to grow along a vineyard trellis. The portion of trellis reserved for the vine is called *vine space*. Grape vines are contained within this area through proper pruning, training and fertilization. The *renewal zone* is the area within the vine space from which fruiting canes or spurs emerge. The exact location and shape of a renewal zone depends on the vine training system used, but in most cases



the renewal spurs are lower than the foliage wires. Understanding the location of the renewal zone is important for focusing the pruning on the fruiting canes. There is no need to include the entire tangled structure of a vine to prune it properly. Pruning should be managed both to maintain the vine structure for the coming growing season and to preserve the form of the vine for future years by creating renewal spurs.



**Renewal Spurs:** These are canes in the renewal zone that are not chosen for fruiting but are pruned to one or two nodes in order to promote shoot growth to replace old fruiting canes in the future. Retaining sufficient renewal spurs makes pruning and other field operations easier in the subsequent years because it keeps the growth of the vine under control.

**Suckers/water sprouts/water shoots:** These are shoots that come out from two-year or older wood or from the main trunk in the side. These shoots do not bear fruit and should be removed throughout the year.

**Lateral Shoot:** This is a shoot that develops from a secondary bud between the stem and the leaves during the active growing season.

**Tendrils:** Slender structures that come out from the shoot and coil around smaller objects (i.e. trellis wires, small stakes and other shoots) to provide support for growing shoots. Tendrils grow opposite the leaves and thereafter skip every third leaf.

**Leaf Blade:** The broad and flat part of the leaf designed to absorb sunlight and carbon dioxide in the food manufacturing process of photosynthesis. The lower surface of leaf blades contains thousands microscopic pores called “stomata” through which diffusion of carbon dioxide, oxygen and water vapor occurs.

**Leaf-stem (Petiole):** Stem-like structure that connects the leaf to the shoot. The petiole conducts water and nutrients to and from the leaf blade and maintains the orientation of the leaf blade to perform its functions.

**Flower Clusters (Inflorescence):** Flower clusters develop opposite the leaves, typically at the third to sixth nodes from the base of the shoot, depending on the variety. The number of flower clusters on a shoot depends on the grape variety and the conditions of the previous season under which the dormant bud developed. A cluster may contain several to many hundreds of individual flowers, depending on the variety.

**Bud/Node:** A bud is a rounded organ in a cane from which shoots and clusters grow. A node is a bud or compound bud found in the woody parts of cane.

**Compound Bud:** This is composed of a primary bud, which typically produces two-thirds or

more of the fruit, a secondary bud, which produces up to one-third of the fruit; and a tertiary bud, which produces little or no fruit. At bud burst, the primary bud is typically the only bud that begins to grow. If the primary bud is damaged, then the secondary and tertiary buds are released from dormancy and grow in place of the primary bud. These secondary and tertiary buds generally have little or no fruit in comparison to the primary bud.

**Trunk:** The main stem or body of a vine between the roots and the head or cordons, supporting all above-ground growth.

**Cordon:** A permanent branch trained to grow horizontally along a wire.

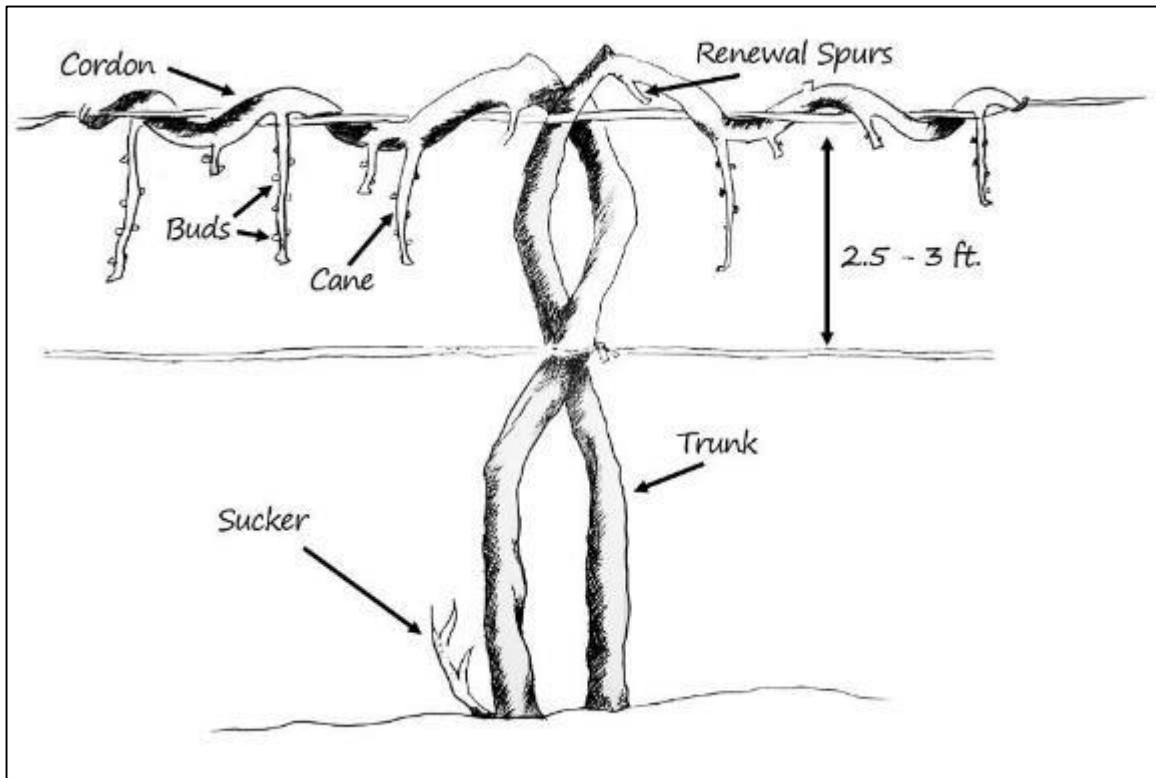
**Arms:** Old growths on the cordon from which spurs and canes grow.

**Berries:** Individual fruits, collectively called *clusters* or *bunches*.

## Growing Cycles

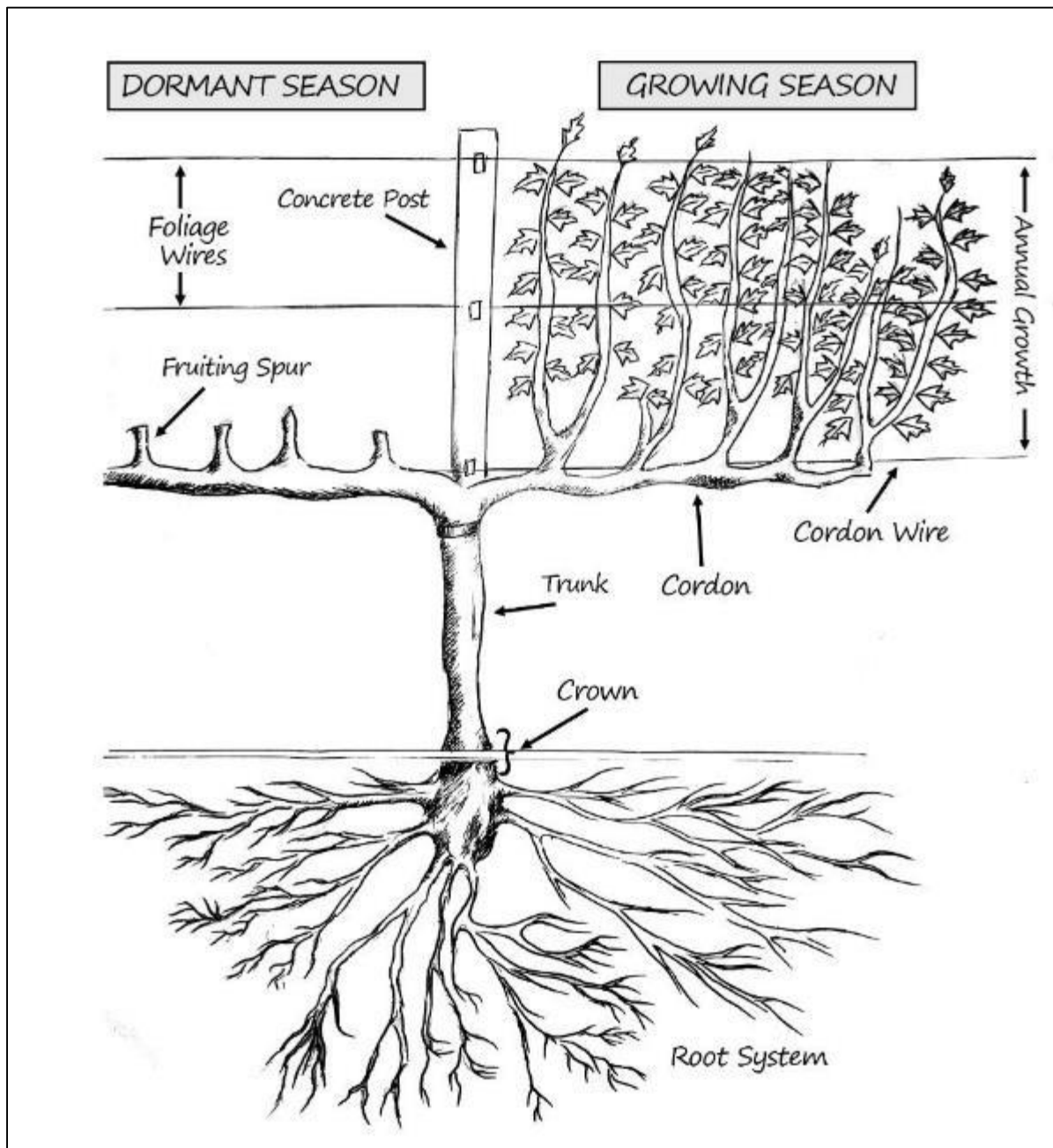
Understanding the growing cycle of a grapevine is important in determining the best management practices at each stage of growth. Bud break occurs in the spring, followed by a rapid shoot growth and canopy development. The flower clusters are first visible on young shoots after a few days of bud break and fruit development starts soon after the flowers open in the spring. Fruit ripening begins in mid-summer until it reaches the proper composition for harvest. Leaf drop begins in the fall, and the onset of deep dormancy occurs with the first fall/winter frost.

Grapevines grow in three annual cycles: the vegetative growth cycle, the fruit growth and development cycle and the cluster initiation or fruit bud differentiation cycle. The vegetative cycle is completed within one growth season while the remaining two are completed in the following growth season.



*Structure of a grapevine*





*Parts of a grapevine shown in dormant season and growing season when trained on an I-trellis system.*

# Orchard Establishment

## Variety Selection

Plant only improved varieties that are high quality and disease-free. As mentioned earlier, Shindokhani, Taifi and Kishmishi are the most popular commercial varieties grown in Afghanistan. Varieties of new plantings should be chosen using the following criteria:

- Suitability for growing zone
- Even ripening
- Good color
- Suitable size of fruit
- Resistance to powdery mildew
- Good shelf life
- Fruits with small and fleshy seeds
- Predictable market demand and market performance
- Winter hardiness

Always procure saplings from a reliable nursery (such as members of the Afghan National Nursery Growers' Organization). This will ensure that saplings are of a uniform variety and quality. When using one's own vines for propagation, healthy vines with these desired traits should be identified and marked during harvest for later use.

## Site Selection and Preparation of Land

The ideal site for vineyard must provide full sunlight, with access to good quality water throughout the growing season, protection from excessive winds and no late spring frosts.

Grapevines should be planted with a north-south row orientation for better exposure to sunlight and better air movement among the vines.

Grapes can be cultivated in a wide variety of soils including sandy loam, sandy clay loam, shallow to medium black soils and red loam, but respond best to sandy loam soil. The soil must be well drained, with no hard pan in the top 90 cm and a water table at least 6.5 meters below. Grapevines can grow successfully in a wide range of soil pH (4.0 - 9.5), but a range of 6.5 – 8.0 is ideal.

## Propagation and Planting

Most grapevines are sold as dormant rooted cuttings and are either grafted or self-rooted. Disease-free cuttings should be ordered as far in advance as possible (up to one year prior to planting) to ensure availability of correct planting stock. Plant in early spring. Care should be taken to prevent the roots from drying out or becoming damaged. If the cuttings are not planted immediately, they can be placed in cold storage until the time of planting.

### *Growing grapes from cuttings*

Vine cuttings should be taken either (a) when the vine is dormant during late winter to early spring or (b) in autumn after leaf drop and stored in cool moist place until spring. Cuttings taken in autumn will give one or two clusters in the first year. Cuttings are made from the new growth (canes) that grew during the growing season and can be taken after leaf fall until bud swelling in the spring. The best wood is the first 1-2 feet of the base of

the shoot where the buds are closest together, but any healthy, mature section of cane will suffice. Ideal thickness is pencil diameter up to  $\frac{3}{4}$  inches thick. Thicker cuttings can be hard to handle and thinner wood may not be mature enough to grow. Avoid wood that is soft and spongy, choosing wood that is dense and light green inside. Cuttings should be 30-40 cm long, having at least three buds, with the bottom cut off straight, just below the bud, and the top cut diagonally at least  $\frac{1}{2}$  inch above the bud to make it easy to identify the top so that the cutting is planted right side up. Roots grow from the nodes, hence it is better to have several nodes per cutting. Disinfect cuttings with a 5% hydrogen peroxide solution before growing them, to keep disease from spreading into the nursery.

Qualities of dormant cuttings include:

- Fully lignified (woody) with closed buds
- Bright brown or tan color (not blackened by bleached or soaking)
- Free of any external pathogens (mealy bug, mites, powdery mildew, etc.)
- Having an even size 5-12 mm diameter (measure just below the top node)
- Straight or with only slight curve

### **Quality Criteria for Rooted Nursery Vines**

A quality vine should be of an even size and vigor, with a trunk not less than 7 mm in diameter and not greater than 14 mm, straight or with a slight curve, free of insect pests and diseases. Vine should not be damaged or broken and should have at least one well-developed shoot with healthy buds and three healthy, undamaged, evenly spaced roots. The vine should be bright in color with no signs of dehydration and no sign of brown or black spotting or streaking in the cross sectional cut of the trunk, canes and roots.

### **Soil Preparation and Fertilization**

Grapevines need a minimum of 24-36 inches of rooting depth before encountering rock or hardpan. The deeper and more extensive the root system, the more capable the vine will be to withstand stresses such as drought, low fertility and low soil temperatures. Prepare the soil by tilling and fertilizing it with a well-balanced fertilizer containing nitrogen, phosphorous and potassium.

Cuttings should be planted early to mid-spring (February-March) and set directly in the nursery bed. Set cuttings about 5 cm apart in rows 3 meters apart. Stick cuttings into the loose soil so that the basal and center buds are buried in the soil and the top bud is just above the soil surface.

The rooted cuttings (saplings) should be transplanted to their permanent location as soon as possible, during early spring but before bud burst. Be sure to keep vines moist right up to planting; soaking dormant vine roots in water 2-3 hours before planting will increase their chance of survival. Dig a small hole about 200 mm in diameter and 200 mm deep. Immediately prior to planting, trim the excessive or damaged roots to fit the hole and cut the top growth back to only 2- 3 buds on the stronger cane and remove all other canes.

Stand the plant in the hole and fill the hole with topsoil, farmyard manure and/or green manure. If using grafted vines, make sure the graft union is approximately 150 mm above the ground line. Irrigate heavily in order to compact and press the soil well around the grape cuttings/vines. Install a stake at the base of the vine to provide support and stability.

As the new shoots begin to grow, watch for signs of pest damage. Train the shoots to



grow upright by tying them to sticks or bamboo. As the shoots grow, tie them to the stake until they reach the bottom wire. This will be the permanent cordon.

### When to Fertilize

- **After bud break:** Only if vineyard has poor growth or no irrigation was available after the previous harvest period. Too much fertilization at this point can result in poor fruit set (low yield).
- **After fruit set:** This is a very active period of berry growth, during which time fertilizing is important for large berry size.
- **After harvest:** During this time the grapevine builds reserves for the following season. Fertilization is important for growth the following spring.

Do not apply fertilizer after berry softening or during harvest period. Take care not to apply too much nitrogen at any point, which can result in fruit rot.

There are at least 35 different constituent elements in a grapevine of which carbon, hydrogen and oxygen form close to 99%. A vine has a relatively low nutrient requirement when compared to other crops owing to their deep root system. Macro elements (N, P, K, Ca, Mg) are required and used in large amounts. These should be applied to the soil for uptake by roots throughout the growth season. Micro elements (B, Zn, Mn, Cu, Fe, etc.) are required in small amounts and can be applied through foliar sprays. Applications of macro elements should be during periods of active root growth (i.e. after harvest and bud break). Applications must be done in tandem with irrigation to ensure infiltration to the root zone.

How much to apply is determined by soil analysis, leaf analysis and visual evaluations. Typical soil analysis will provide information about electrical conductivity, salinity, pH, concentrations of Ca, Mg, K, Na and micro-elements (Cu, Zn, Mn and B).

**Nitrogen application.** Determining the amount of available nitrogen in the soil can be determined through a visual evaluation of the vine. If the vine is showing poor vigor (i.e. shoot length 50-100 cm and smaller than pencil thickness) apply 270 grams urea/plant (90 grams at bud break stage, 90 grams after fruit set, 90 grams after harvest). If the vine is showing moderate (ideal) vigor (shoot length 110-150 cm, and diameter more than pencil thickness) apply a total of 210 grams urea/plant (70 g. at bud break stage, 70 grams after fruit set, 70 grams after harvest). If the vine is showing excessive vigor, no nitrogen is necessary.

**Phosphorus application.** Phosphorus is not required in large amounts like nitrogen and potassium. It is, however, very important for the transfer of energy inside the plant, especially between the green parts (shoots, leaves and bunches). Phosphorus is associated with the activation of new roots during the spring and therefore should be available for the vine during the early growing season. A vineyard requires 0.72 kg of pure phosphorus for the production of 1 ton of grapes. Use diammonium phosphate (DAP) (18% N, 19.8% P). Apply 25kg/ha after bud break and 25 kg/ha after harvest. Note that too much DAP can result in zinc deficiency.

**Potassium application.** Potassium is the most important metallic element in the vine after nitrogen and is very mobile inside the plant. It regulates the rate of water movement into the berries and its supply is therefore important during the berry enlargement stage. The largest proportion of potassium is found in the berry. It also

required for cane maturation after harvest and increases the winter hardiness of the plant to winter freeze. A vineyard requires 3.05 kg of pure potassium for 1 ton of grapes. In Afghanistan many farmers do not use this fertilizer, due to lack of information about its importance or because of its high cost (i.e. 3,000-3,500 Afs per 50kg bag as compared to urea – 1,000-1,200 Afs per 50kg bag). Use potassium chloride (50%) or K-sulphate (40%).

## Trellising

Trellising vineyards significantly improves the harvest yield of grapes, both in quality and in quantity. Trellising systems consist of concrete poles running parallel to the vines and steel wires fixed over the poles. This system, capable of supporting the load of the grapes, places the vines at a manageable height for the average-sized adult. With this technique, grapes grow in greater quantities and reach a higher quality. As trellised grapes stay off the ground, the harvested fruit does not contain dirt particles, resulting in a higher grading and ultimately higher market price. Trellised vines are exposed to more sunlight, which encourages growth and increases yields and quality. Trellising also protects plants from the effects of flooding and hail. The net result is a doubling of yields and an increase in quality.



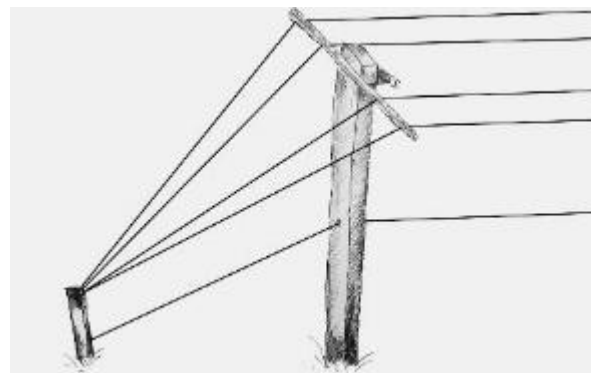
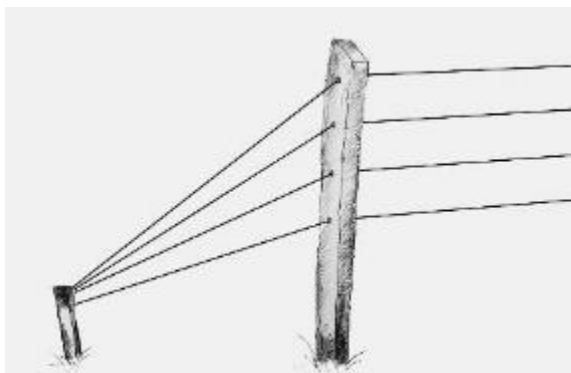
*In Afghanistan, grapes are traditionally grown on earthen mounds, putting the grapes in close contact with moisture and pests.*

In Afghanistan, trellising is typically constructed along the following two designs:

**I-Trellising** – In this system, three galvanized wires pass through the cement posts one on top of the other, like lines on a music staff. This system is suitable for low- to moderate-growth varieties like *taifi* and *hussaini* which require a short cane pruning system.

**T-Trellising** – In a T-trellis, five galvanized wires are attached to a horizontal bar at the top of the cement posts, running horizontally to each other as on a clothesline. This system is appropriate for high-growth varieties like *Kishmishi* and *Shindokhani*.

The trellis system should be installed before planting or as soon as possible after planting. Once the shoots reach the bottom wire they should be trained to follow the wire.



*I-Trellis vs. T-Trellis Basic Construction*

## Training Grapevines

Grapevine training is essential for quality production. There are a number of different training options depending on the growing habits of the particular grape variety, repeated damage from wind and freezing temperatures, degree of vineyard mechanization and availability of skilled labor. The training system should provide:

- Maximum exposure of leaf area to sunlight and air penetration.
- A desirable microclimate environment within the canopy, particularly in the renewal region of the vine.
- Uniform bud break.
- Efficient and easy vineyard operation with respect to fruit harvesting, pesticide application and pruning.

Regardless of the intended training system, the initial training of grapevines will have the following goals:

- **1st Year** – Promote vegetative growth, strong root systems and initial shoots.
- **2nd Year** – Promote more vegetative growth and reproductive growth, create at least one permanent trunk and a few strong shoots to harvest a very light crop on the vine.
- **3rd Year** – Develop equal parts vegetative and reproductive growth for first full harvest.

## Thinning

Too many clusters of grapes will result in lower fruit size and poor quality. Thinning is important for quality improvement of fruits as well as for maintaining balance between vegetative and reproductive growth of vines.

## Pruning

Proper pruning is essential for producing a better yield of high quality fruits and maintaining a balance between vegetative and reproductive growth. Pruning controls the size and structure of the vine, maintains balance between vegetative and reproductive growth, maximizes the yield potential and promotes the health of the plant. Pruning should take place when vines are dormant (January to early March).

There are two methods of pruning:

**Spur Pruning** – This method is best for varieties that show high enough fruitfulness on basal buds like *Taifi* and *Husseini*. Allow 12-15 cm spacing between spurs to allow enough sun penetration and optimal space for cluster development.

**Cane Pruning** – This method is best for low fertility cultivars such as Thompson seedless and *Kishmishi*. Vine structure consists of permanent trunk with annual renewal canes. For each cane that is pruned, one two-bud spur must also be left below the cane for renewal and control of growth under the wire. Prune the vine to remove 75% - 90% of the previous year's growth and to maintain the form of the vine in the location desired. Almost all varieties (except *Kishmishi* and *Shindokhani*) can be cut to reduce canes to short spurs. Leave three buds on each spur if the canes are fat (diameter of thumb), two buds on medium canes (index finger



size), and one bud for pencil diameter canes.

Generally 30-50 buds are left per mature vine regardless of the pruning system.

### Spring and Summer Management Practices

- **Suckering and Shoot Thinning:** Remove excessive green shoots from the canes/spurs after bud break. Single cane shoots should be 10-12 cm apart, spurs of 2-3 shoots should be 12-15 cm apart. Shoot length should be 15-20 cm. Remove any double shoots.
- **Before Bloom:** Remove lateral shoots and leaves around cluster. Shoot removal/thinning must be done early in the season and is important for long-term fruitfulness.
- **After Fruit Set:** Remove the tops of shoots before they become too long; longest shoots should be no more than 110 cm in length. Allow 25-30 clusters maximum per vine. Remove all shoots with clusters on inferior shoots.
- **Before Berry Softening:** Remove any new leaves around clusters.
- **Before Harvesting:** Remove the tops of shoots again at 110-120 cm shoot length to allow adequate sunlight penetration.

### Irrigation

During winter the vine is dormant, requiring minimal water. Keep moist to avoid risk of frost/freezing. From bud break to flowering, grapes require relatively little water due to lower spring temperatures and small leaf area, but it is critical that vines be kept moist during this critical period. Shoots are the only point of water demand. From flowering up to fruit set, when the berries are still the size of a pea, grapes require a good supply of water. This is considered the first phase of berry growth and influences fruit set and berry development (cell division) that determines final crop size.

During the 3-4 weeks after fruit set (while grapes are pea size up to the berry softening period), water is less critical because of the slower rate of growth, known as the “lag phase” of berry growth. During the ripening phase, when the berry has reached its full size, the fruit ripens and experiences an increase in sugar levels and a decrease in acidity. During this stage the water requirement is very high.

After harvest, the vines build nutrients for the following season. This is a period of active root growth. Adequate water needs to be provided to the plant, but any growth apart from leaves should be removed.

### Symptoms of water shortage

Below are the physical symptoms of inadequate irrigation:

- Growing tip pulls back
- Tendril orientation sags
- Leaf orientation moves away from sun
- Leaf petioles start to sag
- Yellow leaves in cluster zone
- Berries shrink

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.



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.

### **Weed Control**

Weed control is critical, as weeds compete for water and nutrients in an orchard. 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.

### **Insect Pests and Disease**

#### ***Powdery Mildew***

Powdery mildew is a fungal disease that weakens vines, inhibits bud production and damages fruit quality. The severity of the disease depends on weather conditions, cultivar susceptibility and tree vigor. The disease can cause extensive foliar infections in dry years, following a mild winter or on highly susceptible varieties.

Powdery mildew attacks young shoots, leaves, blossoms and fruit, with symptoms most noticeable on the leaves and fruit. Fungus grows on berries from pre-bloom until before berry softening. Symptoms start as yellow speckles on upper side of leaf that develops into grey fungal growth. Severe infections of young leaves late season will cause leaf drop, poor maturation of canes and reserve build up. Berries crack open during ripening, resulting in major crop losses.



Growing resistant varieties are the most effective strategy for avoiding powdery mildew. Primary infections can be controlled by removal of the infected flower and shoot buds. A canopy with adequate airflow and sunlight is one of the best preventions of powdery mildew.

Secondary infections and fruit infections can be controlled by foliar fungicide

applications. Fungicides are usually applied at 7- to 10-day intervals until about midsummer. This ensures that fungicide application coincides with rapid leaf development and the post-bloom period, and that the new growth does not remain unprotected for long.

Sulfur dust is the best treatment for powdery mildew. Sulfur should be applied only in the morning (moisture from dew will help promote leaf absorption) at a rate of 15-30 kg/ha. Do not apply on rainy/cold days. Treat every 14-21 days and begin as early in the season as possible to keep levels of the fungus low.

Wettable sulfur is the same as dusting sulfur, but mixed with water before application with a spray pump. Application of active ingredient should be a minimum of 3 kg/ha or 2-4 grams per liter of water. Apply at the following rates:

- Early season water volume: 300 liter/ha
- Mid-season water volume: 500 liter/ha
- Mature canopy water volume: 1000 liter/ha

**Note:**

- Do not apply when temperature is above 32° C. as this can result in burning.
- Do not apply directly on clusters after berries reach pea size. If disease is rampant, apply to soil surface.

**Anthracnose**

Anthracnose is a fungus which, like powdery mildew, must be controlled by a preventative program if the vineyard has a history of the disease. The fungus is associated with rainy weather during the spring period just after bud break and can lead to severe crop losses if not controlled.



The disease normally starts on the young leaves as small brown spots the size of pin heads (1-3 mm). These spots gradually become larger and have a purple edge. It grows and spreads across the entire surface of the leaf and results in necrotic areas. Scars or cankers with pitted centers gradually form as infections on canes mature. Frequently these cankers are deep enough to expose the inner wood of canes while the surrounding bark and wood become blackened and burnt in appearance. On the berries

the disease begins as a black spot surrounded by a purple ring. Because of its resemblance to a bird's eye it is also known as bird's eye rot. When bunches are infected before or during flowering, girdling may cause withering and shedding.

The main source of anthracnose is infected canes that were left in the vineyard after pruning. Only young and succulent vine tissues are susceptible to infection with resistance increasing as the tissues age. Cool wet weather during spring and early summer is particularly favorable for outbreaks of the disease. Hot and dry weather retard the spread of the disease.

The best control is a preventative program starting three weeks prior to bud break in vineyards with a history of anthracnose infection. Control programs rely on the routine application of fungicides so that vine foliage is protected over periods of active growth when conditions are



favorable for the development of the disease. Use a combination of dormant and spring applications: Lime sulfur (1:9 mixed with water) three weeks prior to expected bud break followed by two to three early spring applications of copper fungicides (such as Bordeaux mix, cupric hydroxide, copper oxychloride), dithianon and mancozeb or other registered chemical products at 14-day intervals.

### **Mealy Bugs**

Mealy bugs pose the greatest insect challenge for Afghan grape farmers. Infection by mealy bugs damages the crop by causing the grape bunches to become sticky. The insects secrete honey dew that is utilized by ants as nutrients. It is this honey dew that causes the stickiness of the clusters and makes them unusable. A black fungus which later grows on the honey dew makes identification of mealy bug infected vines easy to spot during the dormant season. Control of the insect is not easy and relies on a combination of chemical and biological control.



Mealy bugs feed on the plant sap and can be found on all green parts of the vine during the growing season. The insects are small, white and difficult to see at the start of the season. As the season progresses, they move to the larger leaves and eventually to the clusters. The main effect of the mealy bugs is leaf fall where the insects feed on the plant sap, resulting in severe loss of leaves, especially during harvest.

Mealy bugs also transmit leaf roll virus. Infection with leaf roll virus causes red coloration of the leaves of red and black varieties with a downward curling of the leaf ends. The leaves of white grape varieties do not show the red coloration, but display the curling symptom and become yellow. Leaf roll infected vines cannot photosynthesize normally and thus have difficulty reaching high sugar levels. In time, it causes reduced vigor and lower crop levels.

The most natural method of control is to create an environment in which the natural enemies of mealy bugs can easily attack the insect. Insecticides are not recommended, as they will also kill the natural enemies of the mealy bug. Insecticide applications should only be done during the dormant period on vines that have been positively identified with mealy bug infestation. Chemical control is only recommended if more than 2% of the plants in a vineyard are infected. Spraying in the growing season is only recommended if there is an extreme outbreak of the insects. Ants should be controlled because they protect the mealy bugs from their natural enemies. If ants are controlled properly, the natural enemies will have no difficulty in attacking the mealy bugs. Mealy bugs can also be controlled through the use of pheromone traps to attract and catch the males.

Limit weed growth in the vineyard, as mealy bugs may use the weeds as a habitat. Limit dust on the vineyard because dust limits the movement of the natural enemies of mealy bugs. You can reduce the spread of mealy bugs between vineyards by changing clothes and equipment before moving from one vineyard to the next.

### **Birds and Wasps**

In vineyards adjacent to forest or bushland, damage by birds can be the most difficult problem facing a grower. Damage is normally greater in isolated regions where there are not large

areas of grapes, whereupon the vineyard attracts the attention of birds throughout the immediate vicinity. The greatest incidence of bird damage is on the boundary rows near trees or bushes that provide refuge sites for birds. The removal of such shelter is a useful method of reducing bird damage.



Feeding on grapes normally starts as soon as the grapes ripen when there is some sweetness. Prevention relies principally on devices that keep birds away from vineyards, rather than killing them inside the vineyard. These can be visual (scarecrows, dead birds, models of predatory birds, streamers, flags or shiny mirrors) or acoustic (gas-guns, firecrackers, beating drums by laborers). Unfortunately, birds become used to these devices rather quickly. The best option is to vary the type of distraction, as well as the position, every few days so that the birds do not become accustomed to it.

The only sure method of limiting damage by birds is the physical protection of either the vineyard as a whole or the covering of the clusters with individual bags before they become attractive to birds. Normally only the boundary roads or the earliest ripening variety need to be covered because this is where most damage occurs. Covering of the individual clusters with bags will also give protection against bees and wasps.

## Maturity

### Determining Maturity

The maturity of grapes and readiness for harvest can be determined by the following means:

#### **Sugar Level**

Different cultivars have different inherent brix (sugar) levels – some are sweeter than others – so it is important to know the right level for your cultivar. Brix is measured in degrees; 1° of brix is equal to 1 g. of sucrose in a 100 g. liquid solution and represents the strength of the solution as percentage by weight. European markets prefer minimum brix of 17.5° while Pakistani/Indian markets require 22° to 25°. Brix can be measured with a refractometer.

#### **Color of Berries**

Green grapes such as *Kishmishi* or *Shindokhani* are ready for storage or transportation while still green. When the berries turn amber they are sweeter and good for local market sales but not for storage, as their shelf life is limited. When the berries have turned yellow they are only fit for drying due to their high brix levels and short shelf life. With red grapes the berry does not change color significantly during maturation, therefore color is not a good method to determinate maturity.

#### **Size of Berries**

The next important criteria when checking harvest maturity is berry size. This can be difficult as different varieties have varying sizes and shapes. Berry size is determined by using sizing rings, cards or veneer calipers. Berries should be evenly sized. An unevenly ripened bunch is one where the smallest berry is less than half the size of the average in the bunch. If the bunch has too many undersized berries, don't harvest until the smaller berries have matured.

# Harvest

When harvesting grape clusters it should be supported/cradled in the hand to prevent it from falling and being damaged. Use clean, sanitized pruning shears to clip the bunch from the vine allowing enough remaining stem to hold on to when trimming. When using crates or boxes to convey the grapes to the packing point you should at least line them with a protective layer such as heavy plastic to ensure no damage and remember to pack no more than two layers per crate to prevent crushing and impact injuries.

When harvesting, keep the grapes in the best condition possible. Loading harvest baskets/crates too full will result in crushing, bruising and also berries getting separated from the stalk through kinetic injuries when removing the grapes from the crate to pack. It is important to continuously sanitize all equipment involved in the harvest process as disease can easily be spread from one vine or vineyard to another through poor hygiene practices.

Keeping the grapes cool and preventing moisture loss is vital to maintaining quality. Therefore, once harvested the grapes should be kept in a shaded area preferably with a groundsheet or tarpaulin to prevent excessive moisture loss which will shorten the shelf life. When harvesting above 25° C. the time it takes and the energy expended to halt the natural senescence makes the harvesting both costly and delivers a lower quality product. Temperature can be measured by inserting a temperature probe such as those used in kitchens into the center of the berry.

Trimming of the grape bunches should focus on the following:

- Removing damaged or diseased berries or sections of the bunch.
- Ensure even color throughout the bunch.
- Trim the bunch to achieve the optimal shape for the variety, this can differ from conical to linear.
- Remove any insect nests such as spider webs.
- It is also important for any berries that are damaged accidentally by the scissors to be removed, as the wounds will allow access to the flesh of the berry by pathogens.

To retain peak condition, harvested grapes must be transported as quickly as possible to a facility where they can be pre-cooled rapidly to reduce its field heat. This fast cooling should be followed by storage at a constant temperature (0-1 degree C.), high humidity (90-98%), suitable air movement and atmospheric composition.

# Part 2

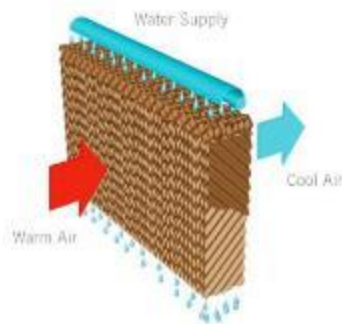
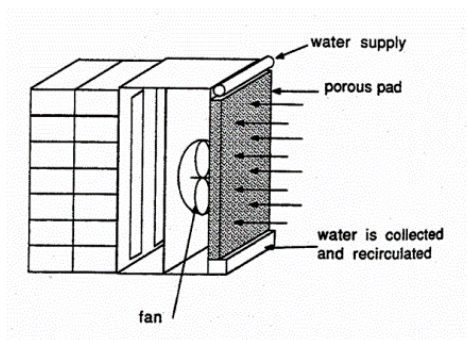
## Post-Harvest Handling

### Pre-cooling

Harvesting should be done when the grapes are at their coolest temperature, preferably before sunrise. Pre-cooling can be done using several methods, but avoid using water in any way as this will damage the bloom on the grape and cause it to be highly susceptible to rapid deterioration. The bloom on the grape is a waxy coating that looks similar to dust. This protects the berry from attack by pathogens while regulating moisture loss. Ideally grapes should be processed and then stored at between  $-1^{\circ}$  -  $0^{\circ}$  C. with a high relative humidity. Therefore it is critical to ensure that the grapes reach this temperature in the shortest time possible using mostly mechanical means.

#### Mechanical Pre-Cooling

When utilizing the forced air/mechanical cooling it is important to maintain a high relative humidity as the air will strip moisture from the product rapidly during cooling. If access to power and infrastructure and limited capital are constraints, the use of a refrigerated shipping container powered by a generator is an affordable alternative. The cooling is not as rapid but will enable the temperature to be drawn down and maintained until transportation. The shipping container can also be used as a fumigation chamber.



#### Field Packing

When packing at point of harvest try to create an environment that will prevent damage to the product either through cross-contamination or temperature abuse. Ensure that the packing area has been moistened to prevent dust and that a clean tarpaulin covers the work surface. Erect some sort of shade structure over the area to keep the area as cool as possible. Always ensure that staff and equipment are complying with good hygiene practices.

#### Post-harvest treatments

Dual release sulfur pads are used around the world to prolong the storage life of grapes. Recently this technology has been introduced into Afghanistan with varying levels of success. Sulfur pads should be used correctly, as they can cause as much damage as good. When using dual release sulfur pads there must be adequate airflow through the boxes and individual packs to prevent a build-up of sulfur that will result in the product smelling of rotten



eggs.

Each unit, whether it is a punnet or perforated bag, should be placed within a liner and closed to ensure that the product is not in direct contact with the pad on top. The liner is then folded over (not tied off) to allow for airflow. Initially the pad will release a flush of sulfur dioxide to kill any pathogens, a function created by the absorption of moisture when the pad is inserted. The pad then gradually releases small quantities of chemical over a period of up to six months preventing the regeneration of mold spores. Any extreme fluctuations in humidity or temperature will cause excessive sulfur release and can cause burns or other taints in the stored product.

### **Sorting and grading**

Sizing of the grapes can be carried out using sizing rings or calipers. Be sure not to pack unevenly sized grapes or grapes with different color development in the same case as the visual impact will reduce the value of the product. When sorting, pay attention to:

- Consistency of size and color
- Ripeness – not too hard, not too spongy
- Taste – no fermentation or sourness

## Part 3

# Target Markets for Grape Export

*Below are the specific market requirements for successfully importing grapes 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 grapes both for home consumption and for resale to other overseas markets. Pakistan also re-exports imported fruits from Afghanistan to other international markets.

### **Regional Markets**

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

- These traditional markets have similar requirements to local markets.
- Supply is generally in bulk or 7-10 kg cardboard boxes or 14 kg wooden crates of mixed grade product shipped unrefrigerated.
- 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 grape orchards direct from the farmers 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.
- Supply is generally in bulk or 7-10 kg cardboard boxes or 14 kg wooden crates of mixed grade product.

### **Supermarkets**

- Supermarket sales opportunities include Metro Cash & Carry, Hyperstar (Carrefour), Al Fatah and Chase-up Shopping. Most supermarkets source their product from wholesale markets.
- Vendor registration and relationship management is required.

- There are good opportunities for well graded, staged supply. Packaging from 3.5 - 4.5 kg clam shells (6 - 8 x 700g in a cardboard master box) and two layers of 7 kg cardboard boxes is acceptable with negotiation.

## India

The Indian market traditionally prefers *shindulkhani* grapes for their high level of sweetness. However, Afghan grapes face high competition from locally produced grapes and those imported from the U.S, Chile, South Africa and other locations. A premium price is paid for size, sweetness and quality. Afghan grape exporters are generally able to comply with all the requirements of Indian markets with regards to the factors (quality, sorting, grading and packaging) that generate higher return, though logistics/transport often pose challenges.

### **Fees**

There are no customs duties on fresh fruits. 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 (grapes): 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 (raisins): 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, including graoes. 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
- Country of Origin

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, below.

There are many other large wholesale markets worth exploring in India, including Mumbai, Kolkata, Bangalore and Chennai. Commission Agents traditionally work on a 6-10% negotiable 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 grapes, but a premium is paid for well processed grapes with high sweetness. Packaging can be in traditional 7 kg cardboard boxes, though 6-8 clam shells in a master box is preferred.

### **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 and coach the traders in the requirements of Indian fruit markets and co-ordinate 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' warehouse or cold storage, 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 supermarkets. These businesses are actively looking for consistent supplies of Afghan grapes 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.

***For more information on  
exporting to India, contact:***

**CHAMP New Delhi Trade Office**

**Attn: Nasrat Zaki**

**+91 (0) 8130 977 386**

**nasrat.zaki@abcpltd.in**

**www.abcpltd.in**



## **Supermarkets**

Grapes are competitively sought by supermarkets in India, with many retail chains showing interest in Afghan grapes with a high level of sweetness. 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 grapes 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. Packaging requirements must be negotiated with each supermarket. Premium fruit should be packed in 6-8 clam shells inside a cardboard master box (3.5 - 4.5 kg). Ideally, fruit should be in perfect condition.

## **UAE and Middle East**

Owing to high competition, the Dubai market has a low demand for Afghan grapes, but demand increases when the grapes have been properly processed, sorted, cleaned, graded and packaged according to the highest standards. The market generally prefers a sugar leved of no more than 17 brix. Premium pricing is paid based on size, color and grading of the fruit. Consistant grading and sorting will deliver good returns with only 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.

Fresh and dried fruits must be packed in a completely white box labeled with the product name, weight, origin, shipper and destination. For fresh fruits, this box 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.

Commision Agents traditionally work on an 8-10% negotiable commission, though there may be a number of handling fees that can push the commision above 14%. These should be discussed in advance before consigning produce.

The wholesale markets will accept green grapes with a large size and low sweetness. Packaging can be 7 kg cardboard boxes but 6-8 clam shells in a cardboard master box 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' warehouse or cold storage, 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**

Grapes are sought by many supermarkets in the UAE, with many retail chains actively seeking high quality Afghan grapes 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.

Supermarket customers require a variety of sizes and grades of grapes 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. Packaging must be negotiated with each supermarket, though packing in clam shells is highly preferred.

## **Other Markets:**

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

Afghan grapes have rarely had much success being exported beyond the immediate region (India, Pakistan and UAE) but may have a strong potential if properly sorted, graded,

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

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www.afgtradeuae.com**

cleaned and packaged. Premium prices are based on size, color and grading of the fruit. The largest and best graded grapes 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 juice.

Because of the extra distance and time to these markets, extra effort needs to be placed on post-harvest treatments, including proper cold chain maintenance. Because of the 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 six clam shells of 700 g. in a cardboard master box. The use of clam shells is now internationally preferred as it reduces impact and compaction injuries in transit and allows for fruit to be shipped sucessfully at higher humidity with reduced dehydration.

## Annex 1 – Table Grapes Crop Calendar for Afghanistan

| Main Activities                      | Sub Activities                         | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|--------------------------------------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Planning & Vine Mgt                  | Trellis Installation                   | ■   | ■   |     |     |     |     |     |     |     |     |     |     |
|                                      | Winter Pruning                         |     | ■   | ■   |     |     |     |     |     |     |     |     |     |
|                                      | Tying and canopy management            |     |     |     |     |     | ■   | ■   | ■   |     |     |     |     |
| Spring & Summer management Practices | Shoot Thinning/Suckering               |     |     |     | ■   | ■   | ■   | ■   |     |     |     |     |     |
|                                      | Leaf Removal                           |     |     |     |     | ■   | ■   | ■   |     |     |     |     |     |
|                                      | Crop/Bunch Thinning                    |     |     |     |     |     | ■   | ■   |     |     |     |     |     |
|                                      | Tipping and Topping                    |     |     | ■   | ■   | ■   | ■   |     |     |     |     |     |     |
| Planting & Early Care                | Soil preparation and leveling          |     | ■   | ■   |     |     |     |     |     |     |     |     |     |
|                                      | Fertilizer application (Base Dressing) |     |     | ■   |     |     |     |     |     |     |     |     |     |
|                                      | Planting                               |     |     | ■   |     |     |     |     |     |     |     |     |     |
| Pest & Disease Control               | Sulfur Powder/ Dust application        |     | ■   | ■   | ■   | ■   | ■   |     |     |     |     |     |     |
|                                      | Lime Sulfur Spray                      |     |     | ■   |     |     |     |     |     |     |     |     |     |
|                                      | Mealy Bug check                        |     |     | ■   |     |     |     |     |     |     |     |     |     |
|                                      | Pheromone traps Installation           |     |     |     | ■   | ■   | ■   | ■   | ■   |     |     |     |     |
|                                      | Monitoring                             |     |     |     |     | ■   | ■   | ■   | ■   |     |     |     |     |
|                                      | GA3 Sprays                             |     |     |     |     |     | ■   |     |     |     |     |     |     |
|                                      | Field hygiene - orchard sanitation     |     |     |     |     |     |     |     |     |     | ■   | ■   |     |
|                                      | Scouting                               |     |     | ■   | ■   | ■   | ■   | ■   | ■   |     |     |     |     |
| Fertilizer Application               | Soil Analysis                          |     | ■   | ■   |     |     |     |     |     |     |     |     |     |
|                                      | Base Dressing                          |     | ■   | ■   |     |     |     |     |     |     |     |     |     |
|                                      | Top Dressing - N                       |     |     | ■   | ■   | ■   |     |     |     |     |     |     |     |
|                                      | Foliar Feeding/Spraying                |     |     |     |     | ■   | ■   | ■   |     |     |     |     |     |
| Irrigation                           | Creating irrigation furrows            |     |     | ■   | ■   |     |     |     |     |     |     |     |     |
|                                      | Irrigating                             |     |     |     |     | ■   | ■   | ■   | ■   |     |     |     |     |
|                                      | Maintenance                            | ■   | ■   |     |     |     |     |     |     |     |     |     |     |
| Soil Mgt                             | Weeding                                |     |     |     | ■   | ■   | ■   | ■   |     |     |     |     |     |
|                                      | Alfalfa intercrop in trellised grapes  | ■   | ■   |     |     |     |     |     |     |     |     |     |     |
| Harvest                              | Harvest                                |     |     |     |     |     |     |     |     | ■   | ■   |     |     |
|                                      | Raisin Drying                          |     |     |     |     |     |     |     |     | ■   | ■   | ■   |     |



## Annex 2 – Grape Varieties and Production Areas in Afghanistan

| No. | Accession | Variety               | Origin   |
|-----|-----------|-----------------------|----------|
| 1   | 797       | ABJUSH                | PARWAN   |
| 2   | 853       |                       | KABUL    |
| 3   | 735       | AMIRI                 | HERAT    |
| 4   | 734       | AQA ALI               | HERAT    |
| 5   | 876       |                       | SARI PUL |
| 6   | 501       | ASKARI                | KANDAHAR |
| 7   | 715       |                       | HERAT    |
| 8   | 494       | AWI                   | HERAT    |
| 9   | 711       |                       | HERAT    |
| 10  | 216       | AYTA                  | LAGHMAN  |
| 11  | 500       |                       | HERAT    |
| 12  | 503       |                       | KANDAHAR |
| 13  | 553       |                       | KANDAHAR |
| 14  | 353       | AYTA QALAMI           | KANDAHAR |
| 15  | 393       | AYTA TOR              | KANDAHAR |
| 16  | 223       | BLACK EMERALD         | LAGHMAN  |
| 17  | 229       | CARDINAL              | LAGHMAN  |
| 18  | 869       | CHALL                 | JAWZJAN  |
| 19  | 237       | CHESHM-I-GAO          | LAGHMAN  |
| 20  | 225       | CRIMSON SEEDLESS      | LAGHMAN  |
| 21  | 738       | DEL KAFTAR            | HERAT    |
| 22  | 222       | EMPEROR               | LAGHMAN  |
| 23  | 536       |                       | KANDAHAR |
| 24  | 230       | EXOTIC                | LAGHMAN  |
| 25  | 548       |                       | KANDAHAR |
| 26  | 716       | FAKHRECHA             | HERAT    |
| 27  | 217       | FAKHRI HERAT          | LAGHMAN  |
| 28  | 724       | FAKHRI LUKA           | HERAT    |
| 29  | 722       | FAKHRI PUSTIGUL       | HERAT    |
| 30  | 720       | FAKHRI QALAMAK        | HERAT    |
| 31  | 224       | FANTASY               | LAGHMAN  |
| 32  | 221       | FLAME SEEDLESS        | LAGHMAN  |
| 33  | 554       | GERDAK                | KANDAHAR |
| 34  | 870       |                       | JAWZJAN  |
| 35  | 800       | GHOLADAN              | PARWAN   |
| 36  | 851       |                       | KABUL    |
| 37  | 497       | HUSSAINI              | HERAT    |
| 38  | 504       |                       | KANDAHAR |
| 39  | 799       |                       | PARWAN   |
| 40  | 854       |                       | KABUL    |
| 41  | 725       | HUSSAINI QALAMAK      | HERAT    |
| 42  | 887       | KALA ZAGH             | TAKHAR   |
| 43  | 236       | KANDAHARI             | LAGHMAN  |
| 44  | 849       |                       | KABUL    |
| 45  | 475       | KANDAHARI SORKH       | PARWAN   |
| 46  | 493       | KASNADARA             | HERAT    |
| 47  | 489       | KISHMISHI             | HERAT    |
| 48  | 798       |                       | PARWAN   |
| 49  | 4069      |                       | HERAT    |
| 50  | 241       | KISHMISHI GERD        | LAGHMAN  |
| 51  | 505       |                       | KANDAHAR |
| 52  | 864       | KISHMISHI SAFID       | JAWZJAN  |
| 53  | 852       | KISHMISHI SARDA       | KABUL    |
| 54  | 865       | KISHMISHI SIAH        | JAWZJAN  |
| 55  | 174       | KISHMISHI SIAH BEDANA | JAWZJAN  |
| 56  | 502       | KISHMISHI SORKH       | KANDAHAR |
| 57  | 728       |                       | HERAT    |
| 58  | 856       |                       | KABUL    |
| 59  | 733       | KHAE KAUK             | HERAT    |

| No. | Accession | Variety         | Origin   |
|-----|-----------|-----------------|----------|
| 60  | 509       | KHAIR GHULAMAN  | KANDAHAR |
| 61  | 4068      | KHALILI         | HERAT    |
| 62  | 875       | KHALILI ALA     | SARI PUL |
| 63  | 868       | KHURMAYI        | JAWZJAN  |
| 64  | 889       | KORAMGANI       | TAKHAR   |
| 65  | 4067      | LAL BAQOLI DANA | HERAT    |
| 66  | 2060      | LAL BIDANA      |          |
| 67  | 218       | LAL HERATI      | LAGHMAN  |
| 68  | 487       | LAL KATTA DANA  | HERAT    |
| 69  | 495       |                 | HERAT    |
| 70  | 506       | LAL MAIDA DANA  | KANDAHAR |
| 71  | 4070      | LAL SAFID       | HERAT    |
| 72  | 490       |                 | HERAT    |
| 73  | 4071      | LAL SIAH        | HERAT    |
| 74  | 736       | LAL SORKH       | HERAT    |
| 75  | 709       | LOGHI           | HERAT    |
| 76  | 888       | LOKH SHOTER     | TAKHAR   |
| 77  | 4072      | MAHAI MISH      | HERAT    |
| 78  | 498       | MAHALI          | HERAT    |
| 79  | 227       | MAHMODI         | LAGHMAN  |
| 80  | 885       | MALWAJI         | TAKHAR   |
| 81  | 717       |                 | HERAT    |
| 82  | 877       | MASKA           | SARI PUL |
| 83  | 726       | MASKA KANDAHARI | HERAT    |
| 84  | 737       | MASKA SORKH     | HERAT    |
| 85  | 492       |                 | HERAT    |
| 86  | 712       | MIR AHMADI      | HERAT    |
| 87  | 231       |                 | LAGHMAN  |
| 88  | 729       | MUNAQA          | HERAT    |
| 89  | 801       |                 | PARWAN   |
| 90  | 890       | PAISH PAZAK     | TAKHAR   |
| 91  | 226       | PERLETTE        | LAGHMAN  |
| 92  | 491       |                 | HERAT    |
| 93  | 4073      | PUSHANGI        | HERAT    |
| 94  | 558       | QALAMAK         | KANDAHAR |
| 95  | 557       | RAUCHA          | KANDAHAR |
| 96  | 300       |                 | FARAH    |
| 97  | 707       | RAUCHA SAFID    | HERAT    |
| 98  | 238       |                 | LAGHMAN  |
| 99  | 299       |                 | FARAH    |
| 100 | 486       | RAUCHA SORKH    | HERAT    |
| 101 | 714       |                 | HERAT    |
| 102 | 4074      |                 | HERAT    |
| 103 | 228       | RED GLOBE       | LAGHMAN  |
| 104 | 232       | RIBIER          | LAGHMAN  |
| 105 | 233       | RUBY            | LAGHMAN  |
| 106 | 730       | RUDA LAL        | HERAT    |
| 107 | 240       |                 | LAGHMAN  |
| 108 | 855       |                 | KABUL    |
| 109 | 874       | SAHIBI          | SARI PUL |
| 110 | 886       |                 | TAKHAR   |
| 111 | 2055      |                 |          |
| 112 | 499       | SAHIBI SPIN     | HERAT    |
| 113 | 891       |                 | KUNDUZ   |
| 114 | 488       |                 | HERAT    |
| 115 | 508       | SAHIBI SRA      | KANDAHAR |
| 116 | 721       |                 | HERAT    |
| 117 | 727       | SANGENAK        | HERAT    |
| 118 | 710       | SHAH ANGOR      | HERAT    |
| 119 | 866       |                 | JAWZJAN  |
| 120 | 2054      | SHAKAR          |          |
| 121 | 215       | SHANGLO KHANIE  | LAGHMAN  |

| No. | Accession | Variety                         | Origin   |
|-----|-----------|---------------------------------|----------|
| 122 | 219       | SHIR AHMADI HERAT               | LAGHMAN  |
| 123 | 2057      | SHOABI                          |          |
| 124 | 507       | SHINDULKHANI                    | KANDAHAR |
| 125 | 555       |                                 | KANDAHAR |
| 126 | 719       |                                 | HERAT    |
| 127 | 857       |                                 | KABUL    |
| 128 | 515       | SHINDULKHANI SORKH<br>KISHMISHI | KANDAHAR |
| 129 | 391       | SHINDULKHANI SRA                | KANDAHAR |
| 130 | 867       | SHOR KARA                       | JAWZJAN  |
| 131 | 140       | TAIFI                           | SAMANGAN |
| 132 | 858       |                                 | KABUL    |
| 133 | 863       |                                 | BALKH    |
| 134 | 392       | TANDYAN                         | KANDAHAR |
| 135 | 220       | TASHKANDI                       | LAGHMAN  |
| 136 | 234       | THOMPSON SEEDLESS               | LAGHMAN  |
| 137 | 239       | TORAN                           | LAGHMAN  |
| 138 | 510       |                                 | KANDAHAR |
| 139 | 2052      | TURKMANI                        |          |
| 140 | 723       | ZERJOME                         | HERAT    |

### Annex 3 – Grape Varieties by Province (Local Names)

| Province                                   | Local Name              |                    |                  |
|--|-------------------------|--------------------|------------------|
| <b>Sar-e-Pul<br/>Jozjan<br/>and Faryab</b> | Kishmishi, white        | Atumcha            | Haucha, red      |
|  | Kishmishi, Black        | Chall              | Haucha, white    |
|  | Taifi, white            | Pestan -i –Buz     | Maska            |
|  | Taifi, red              | Awgeli, white      | Kala- i –Zagh    |
|  | Shoretak                | Shahabi            | Obak             |
|  | Hussaini, common        | Turkmani           | Zaghak           |
|  | Hussaini, Kilk-i -Aroos | Fakhri             | Awqeli, red      |
|  | Soyebi                  | Maman Tuyeedi      | Garangani        |
|  | Shakar Angoor           | Gurda -i-Gau       | Zanhoorak        |
|  | Lal Yakdana             | Lal, red           | Lal, seeded      |
|  | Khalili, red            | Objosh             | Chashm-i-Gaw     |
|  | Khalili, white          | Ala Bara           | Jauz             |
| <b>Herat</b>                               | Lal, white              | Loghi, black       | Kasnadara, white |
|  | Lal, red                | Loghi, red         | Kasnadara, red   |
|  | Bauchi , white          | Fakhri, red        | Agali, red       |
|  | Bauchi, red             | Sangenak, white    | Shabi, white     |
|  | Khalil i                | Mir Hamadi, white  | Shabi, red       |
|  | Kishmishi               | Zerjumi, white     | Pushanki, red    |
|  | Hussaini                | Serkagi, black     | Soyebi, white    |
|  | Kilk -i -Aroos          | Qlamak, white      | Soyebi, red      |
|  | Askari, white           | Muskagi, white     | Ayati, white     |
|  | Askari, red             | Kha -i -Kauk       | Munaqi, black    |
| Pushanki, white                            | Chashm -i -Gau          |                    |                  |
| <b>Kandahar</b>                            | Kishmishi Girdak, white | Khalcheeni         | Tandau, red      |
|  | Kishmishi Girdak, red   | Soybi              | Askari           |
|  | Shindokhani, white      | Lal, white         | Raucha, white    |
|  | Shindokhani, red        | Lal, red           | Raucha, red      |
|  | Aita, common            | Lal, Yakdana       | Sabooni          |
|  | Aita, qalami            | Khair- i- Ghulaman | Kala Ghauchak    |
|  | Aita, black             | Khalili            | Qalami           |
|  | Hussaini                | Fakhri             | Taifi            |
|  | Toran, black Kandahari  | Herati             |                  |
|  | Tandau, white           | Sheikh Ali         |                  |
| <b>Kabul<br/>Parwan<br/>and Kapisa</b>     | Kishmishi               | Shindokhani        | Objosh           |
|  | Hussaini                | Khalili            | Munoqa           |
|  | Natta                   | Lal                | Kishmishi Siagak |
|  | Kandahari               | Chashrn-i-Gau      |                  |
|  | Gholadan                | Sayebi             |                  |



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