**UNIT :- 2 LEGUMES**

1. Legumes are next only to cereals as source of food. 2. They are also the important part of people diet after cereals. 3. A legume is a [plant](https://en.wikipedia.org/wiki/Plant) of the family [Fabaceae](https://en.wikipedia.org/wiki/Fabaceae)/Leguminosae. 4. The [fruit](https://en.wikipedia.org/wiki/Fruit) or [seed](https://en.wikipedia.org/wiki/Seed) of such a plant is also called pulse, especially in the mature, dry condition. 5. The legumes include [beans](https://en.wikipedia.org/wiki/Beans), [peas](https://en.wikipedia.org/wiki/Pea), [chickpeas](https://en.wikipedia.org/wiki/Chickpeas) (gram), [lentils](https://en.wikipedia.org/wiki/Lentil) (masoor), [peanuts](https://en.wikipedia.org/wiki/Peanut), and [tamarind](https://en.wikipedia.org/wiki/Tamarind). 6. Legumes are a type of [simple, dry and dehiscent fruit](https://en.wikipedia.org/wiki/Fruit#Simple_fruit) and usually [dehisces](https://en.wikipedia.org/wiki/Dehiscence_%28botany%29) on two sides. 7. Legumes have symbiotic [nitrogen-fixing](https://en.wikipedia.org/wiki/Nitrogen_fixation) bacteria in structures called [root nodules](https://en.wikipedia.org/wiki/Root_nodule).

**DISTRIBUTION/OCCURRENCE**  1. Legumes are widely distributed as the third-largest [land plant](https://en.wikipedia.org/wiki/Land_plant). 2. The major legume producing countries are [Poland](https://en.wikipedia.org/wiki/Poland), [United Kingdom](https://en.wikipedia.org/wiki/United_Kingdom), Uganda, Italy, Australia, Pakistan, West Indies, India etc.

**PLANTING/CULTIVATION** 1.Grain legumes are cultivated for their seeds. 2. Environmental factors effect the germination. 3. The legumes grow easily and matures rapidly.

**PRODUCTION/YIELD** 1. Seed viability (growth) decreases with longer storage time. 2. The life of the seed will last longer if the storage temperature is reduced by 5 degree Celsius. 3. The storage moisture content will decrease if temperature is reduced by 1 degree Celsius.

**NUTRITION** 1. Legumes are highly nutritious and a good source of [protein](https://en.wikipedia.org/wiki/Protein_%28nutrient%29), [dietary fiber](https://en.wikipedia.org/wiki/Dietary_fiber), [carbohydrates](https://en.wikipedia.org/wiki/Carbohydrate), starch, minerals, fat, vitamin etc. 2. These proteins of legumes gives us an essential balance to the carbohydrate rich cereals.

**USES** 1. Legumes are grown primarily for human consumption and for [livestock](https://en.wikipedia.org/wiki/Livestock) food. 2. They play an important role in [crop rotation](https://en.wikipedia.org/wiki/Crop_rotation). 3. It is used for the production of oils for industrial uses.

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 **ARHAR** English name :- Pigeon pea Botanical name :- Cajanus cajan **CLASSIFICATION** Class :- Equisetopsida Order :- Fabales Family :- Leguminoaceae/Fabaceae Genus :- Cajanus species :- cajan

1. Arhar is the most common pulse eaten all over India. 2. It is a perennial [legume](https://en.wikipedia.org/wiki/Legume) which can grow into a small tree. 3. It is generally used as dal. 4. Its production is about 4% of the total pulse production in the world. 5. It is a major source of [protein](https://en.wikipedia.org/wiki/Protein) for the population of the Indian subcontinent. 6. It is generally eaten with rice or [roti](https://en.wikipedia.org/wiki/Roti) (flat bread) and has the status of [staple diet](https://en.wikipedia.org/wiki/Staple_diet). 7. About 63% production of Arhar comes from India.

**DISTRIBUTION/OCCURRENCE** 1. Pigeon pea is widely cultivated in all tropical and semitropical regions of Worlds. 2. It is an important [legume](https://en.wikipedia.org/wiki/Legume) crop of rainfed in the semiarid tropics. 3. The Indian subcontinent, Eastern Africa and Central America are the world's three main Arhar producing regions. 4. The countries which produces Arhar are Uganda, America, Italy, Australia, Pakistan, West Indies, India etc. 5. In India, the main Arhar producing states are Maharashtra, Madhya Pradesh, Karnataka, Uttar Pradesh, Gujarat, Bihar, Bengal, Assam, Maharashtra, Tamil Nadu and Jharkhand. 6. In India, it is generally grown as a mixed crop with Jowar, Bajra, Cotton etc.

**NUTRITION** 1. Pigeon peas contain high levels of [protein](https://en.wikipedia.org/wiki/Protein) and the important [amino acids](https://en.wikipedia.org/wiki/Amino_acid) [methionine](https://en.wikipedia.org/wiki/Methionine), [lysine](https://en.wikipedia.org/wiki/Lysine), and [tryptophan](https://en.wikipedia.org/wiki/Tryptophan). 2. Seeds of Arhar are also rich in iron, iodine, calcium, phosphorus, essential amino acids like lysine, threonine, cystine and arginine etc.

**BOTANICAL DESCRIPTION/STRUCTURE** 1. It is an annual or perennial [legume](https://en.wikipedia.org/wiki/Legume) which can grow into a small tree. 2. The two varieties of this are recognized, the late maturing variety and the early maturing variety.

  **Root** :- 1. The root system of Pigeon pea consist of a central tap root system. 2. The tap root has numerous lateral and secondary branches. 3. The strong and deep tap root makes the plant drought resistance. **Stem** :- 1. The Arhar plant is an erect shrub reaching a height of 3 – 10 feet. 2. It is deeply rooted. 3. The main stem is very much branched. **Leaves** :- 1. It has slender, pointed trifoliate leaves. 2. The leaves are alternate along the stem. 3. The alternate leaves are elongated and lanceolate. 4. The length, shape and size of leaf and leaflets vary with varieties. 5. The petiole is 1 – 8 cm. long. **Inflorescence/Flower** :- 1. The inflorescence is axillary raceme. 2. In the late varieties, the flowers are usually grouped together at the end of the branches. 3. In the early varieties, the flowers are produced at several points along the branches. 4. The process of flowering continues in each plant upto the time of harvest. 5. It has yellow or yellow and red flowers. 6. The flowers are large and grow 5 – 9 on each peduncle.

**Fruit** :- 1. The fruits of Pigeon pea is a pod. 2. Pods are straight sickle shaped, pointed with a bit of reddish mottling. 3. They vary in colour from green to dark. 4. The mature pods are purplish black. 5. Several pods are produced in clusters on an upright stem. **Seed** :- 1. The seeds in the pod vary in number. 2. The seeds also vary in colour may be brown, white, purplish black. 3. The seeds measure 0.5 – 0.8 mm. in diameter.

**CULTIVATION/PLANTING** 1. Pigeon pea is widely cultivated in all tropical and semitropical regions of Worlds. 2. It is usually sown as a mixed crop [cereals](https://en.wikipedia.org/wiki/Cereal), such as [sorghum](https://en.wikipedia.org/wiki/Sorghum) (type of grass), [millet](https://en.wikipedia.org/wiki/Pearl_millet) (bajra), [maize](https://en.wikipedia.org/wiki/Maize) or with other legumes, such as [peanuts](https://en.wikipedia.org/wiki/Peanut). 3. The crop is cultivated on marginal land by poor farmers, on traditional method for long-duration (5 – 11 months). 4. The Short duration Arhar (3 – 4 months) suitable for multiple cropping have recently been developed. 5. The use of fertilizers, irrigation, and pesticides is minimal. But sometimes water is given in order to protect the crop from damage of frost. 6. It is drought-resistant and can be grown in areas with less than 650 mm. annual rainfall. 7. It grows well on land ploughed 2 – 3 times and well drained seedbed. 8. The seeds are sown on seedbed at 2 inches depth with row to row distance of 4 – 5 feet. 9. Three systems of sowings are practiced for pigeon pea. The common is flat sowing, the other methods are broadbed - furrow (BBF) for early maturity and ridge-and-furrow for the late maturity group.

**HARVESTING** 1. When the plants are ripe, the stalks are cut as near the ground as possible. 2. They are then tied in bundles and taken to the threshing floor and allowed to dry for few days. 3. The leaves and pods are then stripped (removed) from the stem and heaped in a pile. 4. These are usually threshed by allowing bullock to tread on them.

**ECOLOGICAL FACTOR** It is drought-resistant.

**Climate** :- 1. It is a crop of tropical areas mainly cultivated in semi–arid regions of India. 2. It can be grown in areas with less than 650 mm. annual rainfall. 3. It grow with a temperature ranging from 260C – 300 C. in the rainy season (June – October) and 170C – 220 C. in the post rainy (November – March) season. 4. The crop needs a moist climate during the period of its vegetative development. Due to this reason, it is commonly sown with Kharif crop. 5. During the flowering and ripening stages of fruit it needs bright sunny weather for sufficient setting of fruits. **Soil** :- 1. It grows well on semi–arid land. 2. The crop can be grown in all kinds of soil, but it is successfully grown in black cotton soils. 3. The light and moist soil is suitable for it. 4. The soil is well drained with a pH ranging from 7.0 – 8.5. 5. The soil should be deficient in lime.

 **SOME VARIETIES OF ARHAR** 1. Several varieties of dwarf pigeon peas (Arhar) have been developed which can be harvested by machine, instead of by hand. 2. Some of the varieties are :- Kudrat – 3, Chamatkar, Karishma, Pusa – 9, Bahar, BDN – 2, GT – 100, Manak, Paras, Durga, COH – 2, Vamban – 1, Narendra, Amar – 1, Amar, Azad, Type – 7, Sweta, B – 517, S – 20 etc.

**USES**   1. It is the staple meal for most people in [India](https://en.wikipedia.org/wiki/India) and the Indian subcontinent. 2. In combination with [cereals](https://en.wikipedia.org/wiki/Cereals), it make a well – balanced meal/diet extensively as dal. 3. It is an important source of protein in a mostly vegetarian diet. 4. The fresh young pods are eaten as a vegetable in dishes such as [sambar](https://en.wikipedia.org/wiki/Sambar_%28dish%29). 5. In [Ethiopia](https://en.wikipedia.org/wiki/Ethiopia), not only the pods, but also the young shoots and leaves are cooked and eaten. 6. The woody stems of Pigeon peas can also be used as firewood, fencing, roofing, basket making etc. 7. It is used to feed all kinds of livestock. 8. They contain a significant amount of vitamin C and fat content.

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