

Crop 13
Redgram
Cajanus cajan

Grain legumes - Importance of pulses

- India ranks first both in area and production
- Due to hardy nature they find place all over
- Their productivity is less due to
 - Unfavorable soil
 - Less important managements
 - Inherent genetic potential
 - Economic volume may be less but energy required to produce is higher
 - Biological produce is high but HI is poor
 - 1 gram of protein \neq 1gram of carbohydrate
- Pulses may be classified as
 - Kharif pluses
 - Cultivated with warm temperature
 - May require higher water and irrigation
 - Redgram, blackgram, greengram, cowpea, horsegram, mothbean etc
 - Rabi pulses
 - Requiring mild temperature
 - Relatively with residual soil moisture
 - Chickpea, Lentil, Peas,
 - Soybean which is mostly a crop as the second category

Pigeon pea

- Redgram, Congopea, no eye pea, *arhar*, *tur* *Cajanus cajan*
 - Most important pulse in area & production next to chickpea
 - Highly nutritious – protein 21%
 - It is grown all over the world –tropic & sub-tropics
 - For grain, green manure, fodder and forage
 - As sole, inter & mixed crop
- Area
 - India ranks 1st – 90% area, 85% production
 - Other countries with PP
 - Malawi, and Uganda + some eastern African countries
 - Nepal, Myanmar in Asia
 - Dominican Republic in USA
- Area production & Productivity in India

State	Million ha	Million t	t/ha
Maharashtra	1.05	0.71	0.68
UP	0.50	0.56	1.13
Karnataka	0.44	0.22	0.49
MP	0.41	0.34	0.83
Gujarat	0.41	0.39	0.95
AP	0.36	0.14	0.38
TN	0.14	0.12	0.86
Haryana	0.05	0.05	1.15
All India	3.61	2.70	0.75

Irrigated area = 0.18

- Origin
 - A crop of India
 - Introduced to Africa
- Varieties of India are classified into 2 groups but with some intermediaries
 - *Cajanus cajan* var. *falvus* (tur)
 - Short duration
 - Annuals, yellow flowers, fewer plain pods
 - Cultivated in Southern India
 - *Cajanus cajan* var. *bicolor* (arhar)
 - Long duration, flowers yellow with purple streak
 - Std petals bears red veins on dorsal side
 - Pods are dark colored with 4-5 seeds
 - It is also found suitable for forage, as cover crop, shade and hedge crop
- Climate
 - Highly drought resistant
 - Moist & humid conditions for vegetative period
 - Drier condition for flowering and pod setting
 - Rains during flowering – poor pollination – infestation of pod borer
 - Temp of 18 – 27°C is desirable
 - However there are vars to tolerate <10°C & >35°C
- Soil
 - Well drained medium heavy loams
 - There are cultivars tolerant to
 - water logging
 - frost and
 - salinity
- The plant
 - Perennial but grown as annual
 - Stems are woody, branchy can go up >4m
 - Deep tap rooted
 - Leaves alternate pinnately tri-foliolate

- Pods compressed, 2-9 seeds, un-shattering
- Seeds weigh 100mg (100g /1000 seeds)
- Varieties
 - Grouped as short (100-150), medium (150-180) and long (180-300)days
 - N Hilly zone (hills of HP, J&K, UP)
 - T21 - SD, UPAS 120 – SD, ICPL 151-SD (Short Duration)
 - NW Plains (Delhi, Punjab, W.UP, N.Rajasthan & Haryana)
 - T21 - SD, UPAS 120 – SD, ICPL 151-SD
 - NE plains (C&E UP, Bihar, WB, Assam)
 - T21 - SD, UPAS 120 – SD, Bahar – LD (Long duration), SMR (Sterility mosaic resistant), AR (Alternaria resistant)
 - Central Zone (MP, Rajasthan, Maharastra & Gujarat)
 - T21 - SD, ICPL 151 –SD
 - Southern (Orissa, AP, Karnataka & TN)
 - SA1 –LD, ICPL 87 – SD, KM7 –MD
 - For TN alone: COH 1 – SD, CO 6- MD, COH 2- SD, Vamaban 1 - LD

Management

- Field preparation
 - Fine seed bed with friable soil with optimum moisture – for germination & growth
 - Deep rooted crop – one deep pluogh fallowed with harrowing
 - Raised bed (2.7m wide), Ridges & furrow, Flat sowing & making furrows at 2.7m
- Seeds and sowing
 - A seed requirement:
 - 8-10 kg for LD
 - 10-12 kg for MD
 - 12-15 kg for SD
 - Mixed crop 50% of the above
 - Optimum population is 111, 000 plants /ha
 - 45 x 20 or 15 for SD
 - 45 x 30 for MD
 - 90 x 30 for LD
 - Two seeds per hole
 - Shallow placing
- Nutrient management
 - Good response to biofertilizers
 - Responds to N up to 25 kg as starter dose
 - Good response to P up to 60 kg
 - Applied K did not improved the yield since
 - The crop is deep rooted and
 - Most Indian soils are richer in K
 - There is response to sulphur up to 20kg
 - Response to Zinc on water logged saline soils
 - **Blanket recommendation**

- Rainfed:
 - 12.5 : 25 : 0 kg N:P:K /ha
 - Irrigated/well assured rainfall:
 - 25 : 50 : 0 kg N:P:K /ha
 - 20 kg sulphur as gypsum along with DAP 20kg as foliar may be given
 - Zinc application up to 20 kg for deficient soil
- Water management
 - Deep rooted system helps to draw moisture from deeper
 - Branching, flowering and pod-filling are crucial
 - Irrigation at 0.4 IW/CPE ratio
 - Root penetration is better at 0.4 than 0.6
 - Avoid water stagnation at any stage
 - 2 irrigations + life irrigation is sufficient
- Weed management
 - Being initial sluggish growth weed is problem
 - Crop weed competition is for 7-8 weeks
 - May be managed by quick growing short duration crops as intercropping
 - Mulching in between the rows can reduce weeds
 - Inter cultivation / hand weeding is must
 - PE application of Fluchloralin 0.75 kg or Pendimethalin 0.75kg on 3rd day after sowing
- Cropping system
 - It is basically an intercrop with short duration crops
 - With cereals : Sorghum + pp; FM + pp; Maize + pp
 - With pulses: pp + greengram / blackgram / soybean
 - With other crops: pp + groundnut / castor / sesame / cotton / sugarcane / sunflower
 - In sequential cropping
 - Pp –wheat / mustard – greengram
 - Pp – potato – blackgram / greengram
- Harvesting
 - Indeterminate growth no-synchronized maturity
 - When 70-80% pods turn brown cut & dried
 - Threshing may be passing stone roller / beating against hard surface
 - Seeds may be stored at 10-12% moisture
 - Splitting of cotyledons involves two steps
 - Loosening the husk from the cotyledons
 - And removing the husk and splitting them using rollers as dal