

**Crops**

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Cereal crops (Table No 1)

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| Sr.No | Common name | Paddy (Rice) | Jowar (Great millet) | Maize (Makka, makki) |
| 1 | Botanical name | *Oryza sativa. L* | *Sorghum vulgare* | *Zea mays* |
| 2 | Origin | South India | India & Africa | America |
| 3 | Climate | Hot & humid climate | Tropical crop, warm climate | Warm & humid |
| 4 | Soil | Light to heavy, sandy loam alluvial, lateritic, yellow to heavy black soil | Clay loam, loamy soils, rich in humus, Black cotton soils | Deep, fertile , rich in organic matter, well drained, alluvial soils |
| 5 | Preparatory tillage | Ploughing, clod crushing & 2 to 3 harrowing, Bunds | Deep summer ploughing, 2 to 3 harrowings | Ploughing, 2 to 3 harrowings, ridges & furrows |
| 6 | Seed & sowing |  |  |  |
|  | i) Time of sowing | Kharif – June to first week of July  Rabi – October (T.N.,A.P., Kerala)  Summer – Feb-March | Kharif – June-July  Rabi – Sept-Oct  Summer – Feb-March | Kharif -June-July  Rabi –oct-nov  Summer – Jan-feb |
|  | ii) Method of sowing | Broadcasting – 80 to 100kg/ha  Drilling – 15,22.5 60to 80kg/ha or 30cm Row to row  Dibbling early – 15X15cm2  Mid late – 20X15 cm2  Late – 20X20 cm2  No of seeds/hill 5 to 6  Depth of sowing 5cm  ( Common 40-50 kg / ha Seed rate) | Broadcasting, drilling & dibbling, spacing  Drilling – 45 cm  Dibbing – 45X15 cm2  Seed rate 10 to 12 kg/ha  No of seeds/hill – 2 to 3  Depth of sowing – 5cm | Drilling, Dibbing  Spacing  Medium & full season – 75X25cm2  Early and very early 60X22cm2  Fodder 30 cm  Seed rate  Grain-15 to 20kg/ha  Fodder-75 kg/ha |
| 7 | Manures & fertilizers | FYM or compost 10 to 15 tons/ha  N P K  local var. 50 25 25 kg/ha  Improved and high yielding  100 50 50 kg/ha | FYM /compost 6 to 15 tons  N P K (kg/ha)  Rain fed 50 25 -  Irrigated 80 40 40  High 120 60 60  yielding (hybrids) | 12 to 15 tons/fym  N P K Kg/ha  Rain fed 90 40 40  Irrigated 120 60 40  Fodder 120 30 20 |
| 8 | After care | Weeding – 2, hoeings – 3 | Thinning & gap filling, 2 hoeings and 1 weeding | Gap filling, Thinning, hoeings, weeding |
| 9 | Water management | Semi-aquatic plant, requires abundant water, optimum water requirement 90 to 130cm | Rain fed crop, water requirement 40 to 45 ha.cm., 4 to 5 irrigation at 15 days interval | 4 to 5 irrigations |
| 10 | Harvesting | Ears are ripened and straw is green moisture content of grain is 14 to 16% | 100 to 120 days, matures in month of November or December | Sheaths of cobs turn brownish and seeds become hard and dry |
| 11 | Yield | Early – 35 to 40 q//ha  Mid late – 55 to 60 q/ha | Kharif rain fed 8 to 10 q/ha 12-15 q/ha fodder  Kharif irrigated 30 to 35 q/ha 40-50 q/ha fodder  Hybrids (irrigated) 40 to 50 q/ha 60-80 q/ha fodder | Rain fed 6.5 to 7.5q/ha  Irrigated 17 to 18q/ha  Hybrid 50 to 70 g/ha  Green fodder irrigated 35 to 50 tons/ha  Rain fed 15 to 20 ton/ha |
| 12 | varieties | Short duration-Karjat184, IR-28, Karjat 35-3  Medium duration – Jaya, sona, IR-8, TN-1, Padma, ACK-5  Long duration – Pankaj, Jagannath, Ratnagiri-68, Phalguna | Kharif – CSH 1,2,3,4,5, MSH-33,37  Rabi – CSH-7R, CSH-8R, , CSH-9R  Improved Swarna, PV-86, PV-504 (swati) Maldandi – 35-1 (Rahi)  Fodder – Nilwa, Dagadi, Hundi, Kalbondi | Hybrid – Ganga hybrid 1,3,5,101  Ganga safed-2, Deccan double hybrid.  Composite varieties-Hi-starch, Amber, Jawahar, African tall, Hunis. |

Cereal crops (Table No 1) contd…..

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| Sr.No | Common name | Bajara (Pearl millet) | Wheat |
| 1 | Botanical name | *Pennisetum typhoideum* | *Triticum species* |
| 2 | Origin | Africa | South west India & Afghanistan |
| 3 | Climate | Tropical, warm & Dry | Cool dry & clear weather |
| 4 | Soil | Poor sandy soil to medium soil, alluvial | Desert to heavy soil, loamy textured, fertile. Well drained |
| 5 | Preparatory tillage | Ploughing, 2 to 3 harrowings | 1 Ploughing, 2 to 3 harrowings |
| 6 | Seed & sowing |  |  |
|  | i) Time of sowing | Kharif-June to July | Rabi-Oct to Nov |
|  | ii) Method of sowing | Drilling, Broadcasting  Seed rate 4 to 5 kg/ha  Spacing 22.5 to 30cm | Drilling, Broadcasting  Sowing Direction- North, south  Seed rate  Normal 100kg/ha HD2189-125kg/ha  Spacing Irrigated-22.5cm  Rainfed-30cm |
| 7 | Manures & fertilizers | 8 to 10 tons fym/ha  N P K Kg/ha  Rainfed 12 - -  Irrigated 25 25 -  Hybrid 50 37 25 | N P K Kg/ha  Irrigated 120+160+60  Rain fed 50+25+25 |
| 8 | After care | 1 to 2 weedings, 2 to 3 hoeings | 1 to 2 weeding, 1 hoeing |
| 9 | Water management | Rain fed crop. 1 to 3 irrigations | 1 presowing, second at 20 to 25 days, late tillering flowering and grain formation In all 5 irrigation |
| 10 | Harvesting | 80 to 90 days | 100 to 130 days |
| 11 | Yield | Average .yield 7 to 8q/ha  Hybrid 20 to 25q/ha | Rain fed – 8 to 10q/ha  Irrigated 25 to 40q/ha |
| 12 | varieties | Hybrids –HB-1,3,4. NHB-5, MBJ 110, WCC-75, RH RBH-8209, ICTP-8203  Improved-WCC-75, RHR-1 (Sangam) CMS-7703 | Rainfed-N-59, Ajanta,NI-5439, MACS-9  Irrigated – HD 2189, HD4502 (Malvika), Sonalika, Kalyan, sona. |

**Pulse crop (Table no2)**

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| Sr.No | Common name | Red gram(Pigeon pea,tur) | Bengal Gram (Harbara, Chana) | Kidney bean (Matki) | Green gram (Mung) |
| 1 | Botanical name | *Cajanus indicus* | *Cicer arietinum* | *Phaseolus aconitifolus* | *Phaseolus aureus* |
| 2 | Origin | Africa | Afghanistan, Iran | India | India |
| 3 | Climate | Fairly moist and warm climate | Winter(Rabi) | Warm weather | Warm climate |
| 4 | Soil | Well drained, medium to heavy soils | Well drained light to medium | Sandy loam. Light to medium | Fertile, well drained. Black heavy |
| 5 | Preparatory tillage | Deep ploughing, clod crushing and 2 to 3 harrowings | 1 ploughing, 2 harrowings | 1 ploughing, 2 cross harrowings | 1 ploughing, 2 harrowings |
| 6 | Seed and sowing |  |  |  |  |
|  | i) Time of sowing | Later part of June or early July | Rabi season. 2nd week of Oct. | Kharif-June-July | Kharif, summer |
|  | ii) Method of sowing | Drilling  Dibbling 2 to 3 seeds/hill | Drilling | Drilling | Drilling |
|  | iii) Spacing | Early var – 45X20cm2  Midlate var – 60X30cm2  Late varieties- 75X30cm2 | 30cm | 30cm or 45X10cm2 | 22 to 30cm |
|  | iv) Seed rate | Mixed – 6 to 9kg/ha  Sole – 15 to 20kg/ha | 40 to60 kg/ha | Sole 15 to 18 kg/ha  Mix 4 to5kg/ha | 18 to 20 kg/ha |
| 7 | Manure and fertilizer | 6 tones/ha FYM  25kg/ha N 50 kg/ha P at the time of sowing | 10 tons/ha fym  Kg/ha N P K  Irrigated 25 50 0  Rain fed 15 30 0 | 6 to 10 tons/ha  N P K kg/ha  25 50 0 at sowing | 3 to 5 tons/ha  N-20kh/ha  P-20 to 25kg  K-0 at sowing |
| 8 | After care | 2 hoeings & 2 weedings | 1 to 2 weedings |  | 1 to 2 hand weeding |
| 9 | Water management | 1 to 2 irrigations | 2 Irrigation | Kharif No irrigation | Summer at an interval of 15 days |
| 10 | Harvesting | 120 to 125 days Early var130 to 170 days Midlate  180 to 190 days Late | 100 to 120 days | 125 to 135 days | Early 60 to 70 days  Late-100 to 110 days |
| 11 | Yield | Mixed 2 to 8 q/ha  Sole 10 to 12q/ha | Rain fed – 5 to 6q/ha  Irrigated- 10 to 12 q/ha | 8 to 10 q/ha | 5 to 6 Q/ha |
| 12 | Varieties | Early-type-21  Prabhat,BS-1  I CPL-67  Mid – BDN-1,2  T.Vishakha, Sharda  Late – C-11, P.T.301 | Chafa, N-59,N-31 Waragal, Deccan, B-P-N-9-3, Phule G-1,G-5 | MBS-27, No.88  Dhule No.3-5 | Jalgaon-781, Pusa-vaishakhi, Kopergaon, Tap-7, S-8,T-44 |

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| Sr.No | Common name | Black gram (Udid) | Cow pea (Chavli or lobia) | Soyabean | Pea (Watana) |
| 1 | Botanical name | *Phaseolus mungo* | *Vigna cataing* | *Glycine max* | *Pisum sativum* |
| 2 | Origin | India | Central Africa | Asia | South Europe |
| 3 | Climate | Warm season | Warm weather | Temperate crop, grows well in subtropical & tropical region | Cool season, Rabi 13 to 18oC |
| 4 | Soil | Light to medium | Well drained loam or slightly heavy | Light or sandy loam | Medium to heavy |
| 5 | Preparatory tillage | 1 ploughing, 2 harrowings | Clean & smooth seedbed | 1 ploughing and 1 harrowing | 1 ploughing, 2 harrowings |
| 6 | Seed and sowing |  |  |  |  |
|  | i) Time of sowing | Kharif, Rabi | Kharif – June-July  Summer-March-April | Kharif and Summer | Rabi 15th oct. |
|  | ii) Method of sowing | Drilling | Drilling | Drilling | Dibbling, Drilling |
|  | iii) Spacing | 30 cm | Grain 45X 8-10cm  (F) 30cm | 30X10cm or 45X22.5 cm | 20 to 30 cm apart |
|  | iv) Seedrate | 15 to 20kg/ha | (G) 25 to 30kg/ha  (F) 50kg/ha | 45 to 60 kg/ha | Drill 25 to 30 kg/ha  Dib. – 40 kg/ha |
| 7 | Manure and fertilizer | 3 to 5 tons/ha  N-20kg/ha  P-20 to 25 kg  K- 0 | 6 to 10 tons/ha  N-25 kg/ha  P-50kg/ha  K-0 at sowing | 8 to 10 tons/ha  N-25kg/ha  P-50kg/ha  K-0 kg/ha | 3 to 5 tons/ha FYM  N P K kg/ha  Rain fed 20 to 25: 25: 50  Irrigated  50 50 50 |
| 8 | After care | 2 hand wedding |  | 2 hoeings 1 weeding | 2 hand weedings |
| 9 | Water management |  | 1 to 2 irrigation |  |  |
| 10 | Harvesting | 60 to 90 days | 90 to 120 days. F-40 to 45 days | 2 irrigation  Early var 100 days  Late var 165 days | 2 to 3 irrigations  Early – 100days  Late – 120-125 days |
| 11 | Yield | 4 to 5 q/ha | 12 to 15q/ha | (sole) 10 to 15q/ha  Mix 3 to 4q/ha | Rain fed – 6to7 q/ha  Irrigated – 10 to 15q/ha |
| 12 | Varieties | Sindkheda no 1  D-6-7, Udid-55  T-9 | C – 152, No 5-19-4-1  No 2-1,  V -16,RC-19, K-11 VCM  (F) Barsati, Russian giant | Brag, Punjab-1, Clark, Soybean No.4, Monita, P.K.V.1, MACs-13, 57,58,124  PKV-472 | Boneville, NP-29,EC-93866, Type-163, Early gaint, Khaper kheda, English wonder |

Oilseed Crops (Table No3)

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| --- | --- | --- | --- | --- | --- |
| SN | Common name | Ground nut | Sun flower (Suryaful) | Safflower (Kardai, Kusum) | Mustard (Rai, mohari) |
| 1 | Botanical name | *Arachis. hypogaea* | *Helianthus anunsus* | *Carthamus tinctorius* | *Brassican juncea* |
| 2 | Origin | Brazil (South America) | North America | Abyssinia and Afghanistan | European |
| 3 | Soil | Well drained, light, loose, friable, sandy loam well supplied with Ca, and rich in organic matter pH-6.5 to 7.2 | Medium to heavy soils  pH 6.5 to 8.5 | Black cotton soil, loam and light alluvial soil | Well-drained soils |
| 4 | Climate | Tropical crop, requires long and warm growing season | Cool climate, warm weather. Warm & sunny days | Cool climate, drought, resistance | Cool climate |
| 5 | Preparatory tillage | Ploughing, 2 to 3 harrowings | Ploughing, 2 to 3 harrowings | Ploughing, harrowing | Ploughing, harrowing |
| 6 | Seed & sowing |  |  |  |  |
|  | i) Time of sowing | Kharif – June-July  Rabi- Feb-March | Kharif – June-July  Rabi- October  Summer – Jan Feb | Rabi season – Oct - November | Rabi season – Sept to Oct |
|  | ii) Method of sowing | Drilling & dibbling | Drilling & dibbing | Mixture with wheat and gram and Jowar | Grown on mixture and also pure crop |
|  | iv) Number of seeds/dib | 1 seed/dibble | Heavy soil with tall var 60X22.5-30cm2 | Seed rate (mix) 8 to 15 kg/ha  Pure – 20 to 25 kg/ha | Broadcasting & drilling |
|  | v) Spacing & seed rate  Spacing / Seed rate / Plant population | i) Bunch or erect 30X10cm2 90-100 kg/ha 3.33 lakh/ha  ii)Semi sprading 37.5X15cm2 80-90 kg/ha 1.80lakh/ha  iii) Sprading 45 X15-20cm2 60-80 kg/ha 1.50 lakh/ha Phule pragati 125kg/ha | Medium soil dwarf 45X15-22.5 cm2 or 45X30cm2  Seedrate – 10 to 12kg/ha | Border crop | Mixed– 2 to 2.5 kg/ha  Pure cropping- 4 to 6 kg/ha  Pure crop 45cmX10 to 15 cm |
| 7 | Manures & fertizers | 8 to 10 tones of Fym/compost/ha  N P K kg/ha  Irrigated 25 50 -  Rain fed 12.5 25 -  General 20 40 -  Or 100kg DAP/ha | 5 to 6 tons/ha fym or comput  N P K Kg/ha  Assured  rainfall 60 30 30  & irrigation  Dry land 50 25 - |  | 60 kg N per ha at the time of sowing |
| 8 | After care | Gap filling, 1 to 2 weedings |  | tops of the plants are removed to encourage branching | Thinning, two weedings and two hoeings |
| 9 | Irrigation | Rainy season crop , 2 to 3 supplementary irrigation  Summer – 8 to 10 irrigations | Medium water requirement. No irrigation for kharif |  |  |
| 10 | Harvesting | Growth period Erect 100days, semi spread – 120 days, spreading – 150 days | Maturity in 90 to 100 days | 120 to 125 days | Maturity – 75 to 100 days |
| 11 | Yield | Erect or Bunch type 15-20 q/ha  Semi-spreading 20-25q/ha  Spreading (Irrigated) 30q/ha  Oil content – 45 to 55 % | Rain fed – 10 to 12g/ha  Irrigated – 15 to 20 g/ha  Oil – 36 to 42 % | Mixed – 125kg seed/ha  Pure – 500 to 800 kg seed/ha  For dye purpose 100 to 150 kg of dried petals/ha  Oil – 28 to 30% | 350 kg/ha  Good condition – 1000 to 1200 kg/ha  Oil content – 25 to 33 % |
| 12 | Varieties | Bunch - Kopergam no 3,SB-11, Faiz pur 1-5  JL-24 (Phule pragati).  Sprading – Karad 4.-11, M-13, TNV-1, Jmv-3  Semi- sprading – uf-70-103, Kopergaon no 1, TMV-10, AK-8-11 | EC 68414, Morden, S.S.56. Surya, EC 69874  Hybrid – L.D.M, R.s.h.-1, L.D.M.R.S.H.3, M.S.F.H-1,8,17 | N-630,N-628,N-300, N-7, NP-30,18,CT-11 and 5-4 | Local varieties |

Cash crops (Table No 4)

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| Sr.No | Common names | Sugar cane | Cotton | Turmeric (Haldi) |
| 1 | Botanical name | *Saccharum officinarum* | *Gossiypium spp* | *Curcuma longa Linn* |
| 2 | Origin | India | Old world – India indo china and Tropical Africa, | Southern Asia |
| 3 | Soil | Medium to heavy, well drained pH-6.5 to 7.5 | Well drained fertile medium black to deep black | Loamy or alluvial soil, well drained, loose |
| 4 | Climate | Tropical crop, Av mean temp 20 to 26oC | Subtropical crop, Optimum temp – 21 to 27 o C | tropical crop, hot and dry climate |
| 5 | Preparatory tillage | Two ploughings, 2 to 3 harrowings | Deep ploughing, 2 to 3 harrowings | Deep ploughing, 2 to 3 harrowings |
| 6 | Seed- sowing | Season Time Duration in months |  |  |
|  | i) Showing season | Suru Jan-feb 12 months  Preseasonal Sept-Oct 15months  Adsali July-Aug 18 months | Kharif ,sowing time- June to July (Rain fed)  March to May (Irrigated)  Sowing method – Drilling, Dibbling, Broadcasting | Optimum time. 15th may to first week of June  Spacing – Ridges & furrows 60-75X 25-30 cm2Broad beds and flat beds 30X30 cm2 |
|  | ii) Seed rate  iii) Spacing | 25,000 sets/ha  120cm in heavy soil furrows  105cm in light soil | Rain fed seed rate spacing kg/ha  i) Desi cotton 15 to 20 45X20-25 cm2  ii) American cotton 10 to 12 60 to 75X30-45 cm2  ii)Hybrids 5 to 6 60X60 cm2  Irrigated  i) American 7.5 to 8 90X60 cm2  ii) Hybrids 2.5 to 3 90X60 cm2 | Mother set – 25 to 35 q/ha  Finger set – 15 to 20 q/ha  Depth of planting – 8 to 10 cm |
|  | iv) Planting method | Flat beds, ridges an furrows, long firrow, contour furrow, Trench, Rayungan |  |  |
| 7 | Manures & fertilizers | Crop NP K  Ka/ha kg/ha kg/ha  Suru 250 125 125  Preseasonal 350 170 170  Adsali 400 170 170  Rattoon 250 125 125 | Manure (T) NPK (Kg)  Rainfed  1)Desi & American 7.5 50 25 25  2)Hybrids 7.5 80 40 40  3)Irrigated vari 15 80 40 40  4)Hybrids 15 100 50 50 | 20 to 30 tons FYM/ha  N P K kg/ha  125 37 37 |
| 8 | After care | 3 to 4 hoeings for weed control  Earthing up is carried out when crop is 5 to 5.5 months old and 2 to 3 internodes are visible | Gap filling, thinning | 5 to 7 hand weeding, Light earthing |
| 9 | Irrigation | Total water required 140 to 160 acre inches. The interval between irrigations. Heavy 10 days during summer and 20 days in winter | Sensitive to deficient and excessive moisture.  Water required 2.5 mm/day- emergence & square formation  2.5 to 6.25 mm/day square to first bloom.  6.65 to 10 mm/day first bloom to peak bloom | 18 to 22 irrigations |
| 10 | Harvesting | Yellow color of whole crop, emergence of arrowheads in flowering var, swelling of eye buds, metallic sound of cane, sweet juice, Brix reading 21 to 240 |  | 8 to 9 months in Jan to March leaves turn yellow, dry and drop down. |
| 11 | Yield | Surui – 100 tons/ha  Preseasonal – 125 tons/ha. Adsali-150 tons/ha | Rain fed Desi – 7 to 8 q/ha,  American hybrid – 10 to 12 q/ha  Irrigated improved – 20 to 25 q/ha  (Laxmi, MCU-5,)  Hybrid – 25 to 30 q/ha | Raw turmeric – 15 to 18 tons/ha  2 to 3 tons/ha mother sets  Raw turmeric – 2.0 tons. Of dry polished turmeric |
| 12 | Varieties | Co-290, co-419, co-740, co-775, co-798, co-7219 (Sanjivani)  COM-7125 (Sampada) co-86032, co-8011 | Desi- AKH-4, AKA-2, AKA-8401,  American DHY286, AKH 081  Hybrid – PKV H-2, PKV-HY-3, H-4, H-6, Laxmi Varlaxmi, Savitri | Rajapuri and Karadi (Soni), Lakhandi, Duggiralo, selum, gadhavi, alleppy, Kasturi, Krishna |