Sunflower

Sunflower is an important, edible oilseed crop with wider adaptability of soil and climate. The crop has high yield potential and oil quality. Sunflower is cultivated in Karnataka, Andhra Pradesh, Maharashtra, Telangana and Tamil Nadu, which contribute to more than 90% area and 80% production of the country. The crop has proven high potential in non-traditional areas of Punjab, Haryana, Bihar, West Bengal, Uttar Pradesh, Orissa and Chhatisgarh in spring and *rabi* seasons. It is grown over an area of 5.89 lakh ha with productivity of 736 kg/ha in India. Nearly 33% of sunflower area is in *kharif* and the rest in *rabi*/summer and spring seasons. The crop has demonstrated, high realizable productivity of more than 1500 kg/ha in the country with the adoption of available improved production technologies, indicating the possibility of increasing national production by 90% over the current production.

Crop rotation: Follow a minimum of 2 or 3 years rotation with non-sunflower crops preferably with legumes. Continuous cultivation of sunflower season after season not only depletes soil fertility but also leads to build up of diseases and decline in seed yield.

Soils: Prefer well drained and fertile soils for cultivating sunflower. Low lying and marginal fertility soils are not suitable for sunflower cultivation.

Tillage and seed bed preparation: For better germination, establishment and growth, well prepared seed bed is required. In light soils, 1 or 2 ploughings followed by planking and harrowing are necessary. In medium to heavy soils, 1 or 2 harrowings should be done immediately after rains or when soil moisture is favourable. Final seed bed should have fine tilth.

Sowing time & seed rate: Though sunflower can be grown in all seasons, sowing time should be decided to avoid continuous drizzle, cloudy period or temperature more than 38°c during flowering period. In traditional areas during *kharif*, sunflower can be sown from 2nd fortnight of June to middle of July in light soils and up to 2nd fortnight of August in heavy soils. During rabi, sunflower can be sown from September to end of November. In non-traditional areas, it can be sown from January to February end in spring season.

Seed rate and spacing: Use 5-6 kg/ha seed for rainfed crop and 4-5 kg/ha for irrigated crop. Sow by dibbling the seed with a spacing of 60 x 30 cm in heavy soils and 45 x 30 cm in light soils. Follow ridge and furrow system.

Cultivars: The recommended hybrids for different states are as follows:

State	Hybrids
All India	DRSH-1 and KBSH-44
Andhra Pradesh & Telangana	APSH-66 and NDSH-1
Karnataka	KBSH-41, KBSH 53, RSFH-1 and RSFH-130
Maharashtra	LSFH-35, MLSFH-47 & LFSH-171
Tamil Nadu	TCSH-1, TNAUSFH CO-2, PAC-36 and PAC-1091
Punjab	PSFH-118, PSFH-569, PAC-36 and PAC-1091
Haryana	KBSH-1, PAC-36 and HSFH-878

Seed treatment: Treat seed with thiram or captan @ 3 g/kg of seed to protect from seed borne diseases. In areas of known downy mildew incidence, treat seed with metalaxyl @ 6 g/kg of seed. Thinning of excess seedlings to retain one seedling per hill is essential and can be done at 10-15 days after germination for realizing higher yield, easy intercultural operations and management of insect pests and diseases.

Fertilizer management: For adequate and balanced fertilization, incorporate 7 t/ha of well decomposed FYM/compost 2-3, weeks prior to sowing. It is desirable to apply fertilizer based on soil test values. In general, 60:60:30 NPK/ha is recommended for rainfed crop and 60:90:30 NPK/ha for irrigated crop. Apply 50% N + 100% PK as basal and remaining N in two equal splits at 30 and 55 days after sowing (DAS) for irrigated crop. Prefer SSP as source of P that also meets S requirement. Apply sulphur @ 25 kg/ha in the form of gypsum in deficit soils. Boron is an essential micronutrient for sunflower, which increases seed filling and yield. Apply borax @ 2 g/l as directed spray to capitulum at star bud stage. First dissolve borax in small quantity of hot water and make up the volume to 500l/ha.

Weed management: First 4-6 weeks after emergence are the most critical for weed competition. Perform two hoeings and one hand weeding at an interval of 15 days starting from 15-20 DAS. In areas of labour shortage, pre-emergence application of Alachlor or Pendimethalin or Fluchloralin @ 3-5 ml/l followed by one hand weeding and hoeing at 35 days is recommended for effective weed control.

Irrigation management: Provide irrigation at 8-10 days interval in light soils and 15-25 days in heavy soils. Do not miss irrigation at critical crop growth stages i.e. bud initiation (35-40 DAS), flower opening (55-65 DAS) and seed filling (65-80 DAS) for realizing maximum yield. Moisture stress at these stages causes significant yield reduction.

Intercropping systems (ICS): Pigeonpea + sunflower (2:1/1:1/1:2), groundnut + sunflower (5:1/3:1) and soybean + sunflower (2:1) are remunerative ICS.

Groundnut + sunflower ICS

Management of diseases: The major diseases are Alternaria leaf spot, Necrosis, Downy mildew and Powdery mildew.

- Seed treatment with Carbendazim (12%) + Mancozeb (63%) formulation @ 3 g/kg seed, followed by two sprays of Propiconazole @1 ml/l at 45 and 60 DAS for control of Alternaria.
- Seed treatment with Imidacloprid 70WS @ 5 g/kg and two sprays at 30 and 45 DAS. Raising 2-3 rows of barrier crops with sorghum/bajra reduces the incidence of Necrosis. Remove infected plants and destroy them.
- Downy mildew: Crop rotation of three years with groundnut/castor/sorghum/maize; grow resistant hybrids like DRSH-1 and seed treatment with Metalaxyl 35SD @ 6 g/kg seed.
- Powdery mildew: Spray Propiconazole/ Difenoconozole @ 1 ml/l at 45 and 60 DAS. Spraying wettable sulphur @ 3 g/l or Calixin 1 ml/l is also effective in reducing the disease incidence.

Management of insect pests: The major insect pests are sucking pests (leaf hoppers, thrips and white flies), leaf eating caterpillars (tobacco caterpillar, Bihar hairy caterpillar and green semilooper) and capitulum borer. Yield losses range from 20 to 50%.

- Treat the seed with Imidacloprid 70WS @ 5 g/kg seed for protection against sucking pests.
- Follow hand collection and destruction of early instar larvae of tobacco caterpillar and Bihar hairy caterpillar.
- Spray NSKE 50 g/l or SlNPV (250 LE/ha) against tobacco caterpillar. When defoliation is more than 10%, spray Profenofos @ 1 ml/l against defoliators.
- When more than one larvae are noticed at star bud stage, spray HaNPV (250 LE/ha) or Profenofos @ 1 ml/l for controlling capitulum borer.
- Sow the crop on ridge slope to reduce cutworm damage.

Pollination: Maintaining 5 bee hives/ha provides optimum pollination for higher seed yield, besides yielding valuable honey. Avoid insecticidal spray during flowering period as it affects the visit of honey bees.

Bird control: When sunflower is raised in isolated areas, birds particularly parrots pose serious problem. It is desirable

to take up sunflower cultivation in large contiguous blocks. Crop should be protected from bird damage during the period from seed filling to harvest through effective bird scaring particularly in the morning and evening hours. Tying of bright reflector ribbons above the crop will supplement bird scaring.

Harvesting and storage: The right time of harvesting is when the back of the head turns to lemon yellow color and the bottom leaves start drying and withering. The crop can be harvested at maturity when all leaves dry. After separation of heads, they should be dried for 2-3 days to facilitate easy separation of seed. The harvested heads can be threshed by beating with sticks manually or using power operated threshers. Dry the seeds before storage to bring the moisture content to below 10%. Sunflower thalamus serves as good animal feed to enhance the milk yield from milch animals.

Yield potential: Rainfed: 800-1000 kg/ha
Irrigated: 2000-2500 kg/ha

A farmer with bumper harvest of sunflower (DRSH-1)

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Sunflower Management Practices

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