Chickpea *(Cicer arietinum L.)*

French: Pois chiche; Spanish: Garbanzo; Italian: Cece; German: Kichererbse
Local: Bengal gram, Chana, Homs

Crop data

Annual. Harvested part: seeds. Grown in dry climates, traditionally during the post-rainy season in South and Southeast Asia; during the winter rainfall season in West Asia, Middle East and South Mediterranean Region and in springtime in North America and North Mediterranean; benefits from deep sowing (10-12 cm) in unirrigated conditions.

Flowers 2-3 months after sowing.

Plants harvested 2.5-6 months after sowing (depending upon cultivars and latitude) at maturity for seed threshing.

Plant density: 150 000 (intended, but often much less due to poor seedling establishment) to 400 000 (irrigated) per ha; often intercropped with wheat, barley, sorghum, safflower or other pulses, but best results obtained with mustard or a chickpea-rice sequence.

Preferably grown on clay loam to sandy loam soils, well-drained, pH>7, but is often confined to poor lands and heavy black or red soils. Needs adequate soil moisture (15-40 %) during germination and seed development; excessive soil moisture at flowering reduces grain yield. It is generally unirrigated, but the area under irrigation is increasing due to responsiveness to appropriate water management.

Nutrient uptake/demand/removal

Nutrient uptake and removal - Macronutrients									
Yield kg/ha	**Plant part**	**Source**	**Location**	**kg/ha**					
				N	**P2O5**	**K2O**	**MgO**	**CaO**	**S**
1 373	Grain	Saxena,1984	Hyderabad	82	18	76	-	-	-
3 726	Grain	"	Hisar	200	32	201	-	-	-
1 500	Grain	Aulakh et al, 1985	India	91	14	60	18	39	9
1 150	Grain	Horton,1990	Australia	41	10	14	8	3	2

Nutrient uptake and removal - Micronutrients							
Yield kg/ha	Plant part	Source	Location	**g/ha**			
				Fe	**Mn**	**Zn**	**Cu**
1 500	Grain	Aulakh et al, 1985	India	1 302	105	57	17

Plant analysis

Plant analysis data (whole shoots) - Macro- and micronutrients								
Supply	Source	**% of dry matter**			**ppm dry matter**			
		N	**P**	**S**	**Mn**	**Cu**	**Zn**	**B**
Optimum	Robinson, 1986	-	0.26	-	120	4-35	12-500	-
Critical value (deficiency)	Reuter, 1986	2.3	0.24	0.15	-	-	-	40

Nutritional requirements:

Understanding of the mineral nutrition of chickpea is inadequate, but as marginal lands are often assigned to the crop or it has to rely on residual fertilizer from the previous crop, mineral deficiencies are commonly noticed.

It tolerates acid soils, but is very sensitive to salinity, alkalinity and high calcareousness. It requires quite high levels of soil N, especially under rainfed conditions if drought and deep sowing are reducing biological N fixation. It is well-adapted to high levels of available P, but requires fairly low levels of K. Deficiency symptoms of N, P, K and Mg appear initially in the older leaves. The crop is also susceptible to Fe, Zn, S, Cu and Mo deficiencies, symptoms generally appearing in young leaves.

Fertilizer recommendations

Fertilizers are generally applied at planting, broadcast and incorporated in the soil by a rough tillage as a basal NPKS dressing including some micronutrients, followed by a top dressing of N at flowering, when soil moisture is adequate. Rates depend on soil types and cropping system. Yield may be increased by seed inoculation if the crop is cultivated in new areas and/or after rice.

Preferred nutrient forms

N: preferably as urea. If inoculation is recommended, a suitable peat-based Rhizobium inoculant should be given.
P: better placed in the soil or as a foliar spray than broadcast. In a crop sequence, single or triple superphosphate, applied during the rainy season crop before chickpea, gives a better response than rock phosphate.
K: as chloride or sulphate, but preferably the latter if there is a risk of salinity.
S: should be applied separately if the regular macronutrient fertilizers are sulphur-free (e.g. urea, AN, TSP, DAP, concentrated NPK). Better broadcast and tilled in than placed. In irrigated soils, gypsum (18 % S) used to correct salinity problems is a good source of S.
Zn: as sulphate applied to the soil at planting.
Mo: as sodium or ammonium molybdate, preferably in seed coating.
Fe: as ferrous sulphate foliar spray if iron deficiency symptoms are identified.
Mn and/or Cu: in sulphate form as foliar spray or soil application.

Present fertilizer practices

- Australia
(NE Australia): 27-46 kg/ha P2O5 as double superphosphate, or 3-5 kg/ha N, 27-46 kg/ha P2O5 as monoammonium phosphate.

- India
(Tradional practices): Generally in rainfed areas no fertilizers or manures are applied to pulse crops; in some places farmers may apply a small amount of FYM (e.g. 8-15 t/ha) 3-4 weeks before sowing.
In irrigated areas, a small amount of mineral fertilizer (10-15 kg/ha N, 20-30 kg/ha P2O5) is either placed in the seed furrow or broadcast and mixed in.

(Improved practices): Irrigated areas, basal application of 18-20 kg/ha N, 40-50 kg/ha P2O5, plus K, Zn, S if required;
unirrigated areas, basal application of 10-15 kg/ha N, 20-30 kg/ha P2O5, followed by a foliar spray of 2 % urea at pod development.

- Nepal

20 kg/ha N as urea, 40 kg/ha P_2O_5 as single or triple superphosphate, 30 kg/ha K_2O as muriate of potash.

- Tunisia
45 kg/ha P_2O_5 as triple superphosphate broadcast and incorporated at planting. Occasionally 20 kg/ha N side-dressed, in the form of urea, near the plant at shooting.

Further reading

AHLAWAT, I.P.S.: Diagnosis and alleviation of mineral nutrient constraints in chickpea. In: Chickpea in the Nineties: Proceed. Second Intern. Workshop on Chickpea Improvement, 4-8 Dec. 1989, ICRISAT, Patancheru, India (1990)

DUKE, J.A.: Handbook of legumes of world economic importance. Plenum Press, New York, USA (1981)

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