

Cowpea: As a Future Food Legume in Relation to Changing Climate

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INTRODUCTION

Legumes form an integral group among vegetable crops. They are not only nutritious but also have a low glycemic index (GI). Regular consumption of legumes helps to control type 2 diabetes, cholesterol levels, hypertension and obesity. Among these leguminous vegetables, cowpea is an important crop grown for its immature pods and seeds. Cowpea (*Vigna unguiculata* L.) is the second most important pulse crop in the world after dry beans (*Phaseolus vulgaris* L.) as well as one of the most versatile *kharif* and summer crop grown in india for green vegetables pods, grain forage and green manure purpose. Cowpea is one of the most ancient crop known to man. It is warm season crop, well adopted to many areas of the humid tropics and sub-tropical zones. It is tolerant to heat and dry condition but is susceptible to frost.

Cowpea belongs to family Papilionaceae and sub family Fabaceae with a chromosome number of $2n=2x=22$. Its primary center of origin is in Africa. It is a warm season, annual and herbaceous legume. Cowpea is consumed as whole grain as well as dal or to make flour in variety of ways for table purposes. Green tender seeds are used as vegetable. Cowpea green pods are good source of protein, fiber, minerals, calcium and vitamins particularly vitamin A and C. It contains 60.03 g Carbohydrates, 23.52 g proteins and 1.26 g fat, 10.6 g fiber per 100 g of edible portion. Green tender fruits contain 100 mg calcium, 424 mg phosphorus and 8.27 mg iron per 100 g fresh pods. The common names are 'Black-eye-pea', 'Southern pea', 'China pea' and 'Marble pea'. In Gujarati languages, the famous names are 'chola' or 'chorap'.

In India, cowpea is known since *Vedic* times. It is grown widely throughout the year for all forms- green tender pods, dry seeds, fodder, green manure and cover crops both as sole and mixed crop. Cowpea fixes atmospheric nitrogen up to 240 kg per ha and leaves about 60-70 kg residual nitrogen for succeeding crops. Cowpea is used as dual



purpose, food at both the green shell and dry stage. The vegetable cowpea is cultivated for its fresh pods and leaves. Cowpea seed is valued as nutritional supplement to cereal as a vegetable crop. Green vegetable cowpea is a source of cheap protein and an environmentally friendly crop. The tender green pods, an important food source in India and Africa are prepared as a snap bean, often being mixed with other foods. Green tender seeds are boiled as a fresh vegetable or may be canned as frozen. Dry matured seeds are also suitable for boiling and canning.

Short-duration cowpea is a wonder crop which gives 2-3 crops a year between February and October and fits well in multiple systems. It can be sown singly between the time gap of two main crops or as an intercrop with other crops like wheat-rice and maize, sugarcane, etc. It is a drought hardy and dual-purpose crop whose pods can be used as vegetable and grain as dal or processed in different nutritious products which are rich in zinc, iron and some other nutrients. Cowpea also helps in improving fertility of soil as Rhizobium bacteria present in its root nodules fix nitrogen of the environment in the soil. As malnutrition is spreading day by day at the cost of declining per capita availability of proteins due to well adopted 'wheat-rice' and 'rice-rice' cropping systems and legumes remained as an option for marginal land holders only. Cowpea contains good amount of protein i.e. 22-24% and carbohydrate i.e. 54-56%, also called as poor man's meat. So, there is urgency and challenge to agricultural research in India to produce ample amount of legumes which is going to be a rich source of vegetarian's dietary proteins in near future. The only way to make the space of cowpea in the well adopted cropping systems is to develop short duration and high yielding cultivars of cowpea which can occupy the field from March to June i.e. after harvesting of wheat and before transplanting of rice.

In India, area under cowpea is 654 lakh hectares with a production of 599 lakh tonnes with productivity of 916 kg per ha (Josji *et al.*, 2018). In India major cowpea growing states are Maharashtra, Karnataka, Tamil Nadu, Gujarat, Madhya Pradesh and Andhra Pradesh. In Gujarat, it is mainly grown in Sabarkantha, Banaskantha, Mehsana, Patan, Ahmedabad, Kheda and Anand districts and commonly known as "Chowli" in this area.

Land preparation

Well drained loamy or slightly heavy, acidic soils are best for cowpea cultivation. In hard soil, one deep ploughing, followed by two or three harrowing and planking are sufficient. In normal soil only two harrowing & planking is enough.

Sowing of Seed

The time of sowing varies according to type of crop.

- Kharif crop** - With onset of monsoon ranging from early June to end of July.
- Rabi - October** - November (southern India)
- Summer**- 2nd to 4th week of March (grain), February (Fodder)
- Green Manuring**- Mid June to 1st week of July

Seed Rate-

During *Kharif* season 20 - 25 Kg/ha for grain purpose and 30 - 35 kg/ha for fodder and green manure is required. During summer 30 kg/ha for grain and 4 - kg/ha for fodder and green manuring is required and 20-25 kg/ha for green pod purpose.

Spacing-

Row to row - 30 (Bush type) to 45 cm (spreading type)

Plant to Plant - 10 (Bush type) to 15 cm (spreading type)

Method of Sowing-

Sowing of cowpea is done by broadcasting, line sowing and dibbling of seeds based on their purpose and season. Line sowing has been better over broadcasting method of sowing. However, for fodder and green manure crop broadcasting method considered better. Sowing depth of 3 - 5 cm should be maintained.

Seed treatment-

Treat the seed with Thiram (2gm.) + Carbendazim (1gm.). It is also desirable to treat the seed with *Rhizobium* and PSB culture @ 10 ml/kg seed.

Manuring-

Apply FYM/compost - 5 - 10 t/ha as basal with last ploughing. 15 - 20 kg N/ ha as starter dose in poor soils (organic carbon <0.5%), 50 - 60 kg/ha P²O⁵ and 50 - 60 kg. K²O/ha. Castor cake apply 0.75 – 1 tn/ha. Phosphorus and Potassic fertilizer should be give according to soil test value.



The application of organic manures viz., FYM and castor cake may serve the source of major (N, P and K) and micronutrients (Fe, Mo and Zn etc.). Addition of organic manure in the soil is not only act as source of nutrient, but also influences its availability. It improves physical and chemical properties and health of soil such as aggregation, aeration, permeability, water holding capacity, slow release of nutrients, increase in Cation Exchange Capacity (CEC), stimulation of soil flora and fauna etc. Further, the liquid organic manures meet the nutrient requirement of crops during standing condition with greater nutrient use efficiency and also correct its deficiency as and when noticed under organic production system.

Intercultural Operation

For higher yield, crop should be free from weed up to 25 to 30 days after sowing. It covers the land very soon and it's beneficial.

Irrigation

For summer crop, irrigation is most critical among all inputs followed by weeding and fertilizer. Generally, crop required 5-6 irrigation depending on soil, prevailing weather conditions etc, at an interval of 10-15 days. Light irrigation is required at flowering and pod filling stage.

Harvesting

Green pods for use as vegetable can be harvested 45 - 90 days after sowing depending on the variety. For grains, the crop can be harvested in about 90-125 days after sowing when pods are fully matured. The crop should be then dried and threshed and grains should be dried in sun before storage. For fodder, the cutting of the crop depends upon the need and the stage of growth of the component crop sown with it. Generally it should be done 40 - 45 days after sowing.

Yield

A good crop of cowpea yields about 12 - 15 q/ha of grain and 50 - 60 q/ha of straw per hectare. If the crop is raised for fodder purpose 250 - 350 q/ha of green fodder is obtained per hectare. If the crop is raised for green pod purpose 80-10 q/ha of green pods is obtained per hectare.

Apart from all the benefits of cowpea, a series of food products have been made by cowpea such as akara, bhujia, dahi bara, ladoo, biscuits, boondi, cake, curry, mathary, sev



and papad. Various varieties of cowpea will be a boon for different regions of country and will definitely pave the way for growth and development of the country. Therefore, the urgent need of this era is to develop new varieties of cowpea suiting different agro-climatic conditions of India.

Introducing cowpea as additional crop in various cropping system and thus, increasing the availability of much needed pulses will surely led to enhanced pulse production to cope with increasing malnutrition along with improved soil health status in different areas of the country. Cowpea are drought tolerant and prevent soil erosion due to their deep root and good ground cover, because of these good characters, pulses are called as “Marvel of Nature”.

