

Contributing Factors for High Yield in Rabi Maize

B. Ushasri ^{1*} and T. Suresh ²

¹ Dept. of Soil Science & Agril. Chemistry, S.V. Agricultural College, Tirupati, ANGRAU.

² Anbil Dharmalingam Agricultural College and Research Institution, Trichy, TNAU

ARTICLE ID: 19

Introduction

Maize (*Zea mays* L.) is called “Queen of cereals” as it is grown throughout the year due to its photo-thermo-insensitive character and highest genetic yield potential among the cereals. Globally, maize is grown in 184 M ha across 165 countries, with total production of 1016 Mt and average productivity of 5.52 t/ha (FAOSTAT, 2014). There are three distinct seasons for the cultivation of maize in India: Kharif, Rabi in Peninsular India and Bihar, and Spring in northern India. Maize is predominately a Kharif season crop but in past few years Rabi maize has gained a significant place in total maize production in India. Rabi maize is grown on an area of 1.2 million ha with the grain production of 5.08 million tonnes, with an average productivity of 4.00 t/ha. The predominant Rabi maize growing states are Andhra Pradesh (45.5%), Bihar (20.1%), Tamil Nadu (9.3%), Karnataka (8.5%), Maharashtra (7.7%), and West Bengal (5.3%). Cultivation of maize in Rabi season started in mid 60s in some pockets of Bihar and South India. Yield obtained during Rabi season is invariably higher (>6 t/ha) than the Kharif season yield (2-2.5 t/ha.) due to long duration of growth and least infestation of pests and diseases. Some of the important factors favouring maize cultivation in *Rabi* are briefly discussed below:

Better water management

In absence of erratic rainfall, the crop during *Rabi* season does not suffer from water logging, hence damage from pre-flowering stalk rots is less. As there is no leaching of fertilizers, their utilization is maximum leading to high yield. The important advantage is the possibility of undertaking various field operations at the most desired time. The *Rabi* crop does not suffer from overcast sky which is a regular phenomenon during *Kharif* season.

Mild and favourable temperature

Maize plants in *Rabi* season tend to be more efficient in view of lower photo respiration losses due to lower night temperatures as well as larger leaf surface for effective photosynthetic activities. The other advantage in *Rabi* season is availability of 7-9 or more hours of sunshine against 3-5 hours in *Kharif* crop season due to cloudiness. Moreover, the longer growing duration of the crop helps further raise in yield levels.

Better response to macronutrients

In view of more favourable growing conditions, response to application of nitrogen and other nutrients is better in *Rabi* than *Kharif* season. The losses during *Rabi* can be checked effectively through appropriate soil and water management practices. With better response from every unit of fertilizers, which is the major component of cultivation cost, it is possible to reduce the production cost during this season.

Less incidence of diseases and insect-pests

Due to low temperature and humidity in *Rabi* season, level of infection or infestation by various diseases and insect pests is quite low, resulting in higher yields.

Better plant stand

Because of better soil and water management and less damage from diseases and pest, establishment of desired plant population density can be assured in *Rabi* season.

Better weed management

In *Kharif*, weeds pose a major problem, particularly in years when continuous rain occurs, which fail to provide adequate opportunity for manual weeding. In *Rabi* season, due to effective water management and low temperature, weeds can be controlled effectively. This indirectly helps in improving the fertilizer- use efficiency.

Package of Practices for Increasing Productivity :

- 1. Choice of cultivars:** Only high yielding hybrids varieties are suitable for *Rabi* season.
- 2. Soil:** Maize can be grown on a wide range of soils ranging from sandy to clay. But it performs best on well drained aerated deep-loams and silt loams containing organic matter and nutrients. Highly saline, acidic, alkaline and water- logged soils should be avoided for cultivation of maize crop.
- 3. Date of Sowing:** The optimum date of sowing is important for winter maize so that the genotype grown can complete its life cycle under optimum environmental



conditions. Generally, sowing should be completed before the end of October, preferably by mid-October

4. **Plant density and seed rate:** A population of 90,000 plants/ha at harvest is desirable for realizing high grain yield in Rabi. A spacing of 60 cm between rows and 18 cm-20 cm between plants would provide the desired plant population density. For this purpose, 20-22 kg of seed would be needed to sow one hectare of land.
5. **Seed Treatment:** Seed treatment with fungicide and insecticides is necessary to protect the maize crop from seed and soil borne diseases and insect- pests.

Conclusion

In view of the changing farming scenario in the country, maize has been emerging as one of the potential crop that addresses several issues like food and nutritional security, climate change, water scarcity, farming systems and biofuels. *Rabi* maize cropping can provide insights on intensive agriculture and other strategies for meeting future food production challenges and will be one of the important cereals in food security of the country.

References

- Department of agriculture cooperation (DACNET) annual report 2012.
- Faostat., (2014). Production-Crops data. Food and Agriculture Organization of the United Nations. <http://www.faostat.fao.org/site/567>.