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CULTIVATION AND NEW PRODUTION STRATEGIES OF MAIZE IN INDIA

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KEYWORDS

Introduction

Maize is considered a promising option for diversifying agriculture in upland areas of India. It now ranks as the third most important food grain crop in India. The maize area has slowly expanded over the past few years to about 6.2 million ha (3.4% of the gross cropped area) in 1999/2000. The cultivation area would grow further to meet future food, feed, and other demands, especially in view of the booming livestock and poultry producing sectors in the country. Since opportunities are limited for further expansion of maize area, future increases in maize supply will be achieved through the intensification and commercialization of current maize production systems.

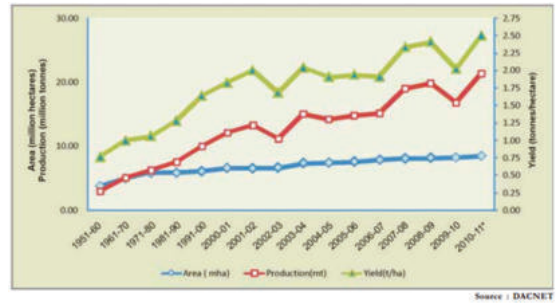
Changing Global Scenario

The changing global scenario is compelling policymakers to adhere to the regulations and obligations set by the World Trade Organization (WTO). The resulting new economic regime is expected to alter the economics of existing cropping systems, including maize, in terms of production, value added, and trade. The question often raised is how research and development efforts can efficiently contribute to intensifying maize production in upland areas while protecting the interests of poor maize producers. To answer the question, it is necessary to study and characterize maize production systems, and future policy and technology interventions need to be formulated accordingly.

In India, current consumption pattern of maize is poultry, pig, fish feed 52%, human consumption 24%, cattle feed and starch 11% and seed and brewery industry 1%. In recent years, the maize production has significantly increased, which is largely associated with significant genetic enhancement from the area of open pollinated varieties, composites breeding to double and three way hybrids and recent development in single cross hybrids. It has emerged as an important crop in the nontraditional season and non-traditional areas. Cultivation during winter is becoming a common in Peninsular India (Andhra Pradesh, Karnataka and Tamil Nadu), as well as in the north-eastern plains. Andhra Pradesh, Bihar and Tamilnadu are the three largest maize producing states with 2.322, 1.02 and 0.47 million tons respectively closely followed by Karnataka, Maharashtra and West Bengal. A sizable number of districts (110 districts), in the states of Andhra Pradesh, Karnataka, Bihar, Maharashtra, Uttar Pradesh, Madhya Pradesh, West Bengal, Orissa, Gujarat, Chhattisgarh and Tamil Nadu have potential for growing winter maize.

Figure

DECADAL GROWT OF AREA, PRODUCTION AND YIELD OF MAIZE



Though the crop favourably responds to better crop management both in *Kharif* and Rabi season, the erratic rainfall pattern of the south-west monsoon comes in the way of timely field operations of *Kharif* season. In absence of any major environmental impediments in Rabi, the desired field operations can be planned and executed at the most desired time. Moreover, the various environmental factors, including absence of any major disease and insect- pest in this season, helps in realizing better profits from every additional unit of monetary inputs. Some of the important factors favouring maize cultivation in Rabi are:

Water management

In absence of erratic rainfall, the crop during Rabi season does not suffer from waterlogging, 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.

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.

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.

Fewer incidences 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.

RABI MAIZE SOWING TIME IN DIFFERENT STATES OF INDIA

States	Suitable periods of sowing
Bihar	20 October- 15 November
Uttar Pradesh	20 October- 15 November
Andhra Pradesh	25 October- 20 November
Gujarat	15 October- 15 November
Maharashtra	20 October- 15 November
Tamil Nadu	20 October- 15 November
Madhya Pradesh	15 October- 15 November
Karnataka	15 October- 15 November
West Bengal & N E region	20 October- 10 November
Orissa	20 October- 10 November
Punjab	25 October- 15 November
Haryana	25 October- 15 November

Choice of cultivars
The success and the level of profit from Rabi crop depend to a great extent on the choice of maize hybrid/composite to be grown. Farmers should therefore be encouraged to sow only high yielding hybrids suitable for Rabi season. The use of F1 hybrid seed is essential for realizing high yield. The recommended hybrids, in general, have given 60% to 80% grain yield than the local varieties in most of the evaluation trials, with an average yield level of 6 tonnes or more per hectare.

Soils
Maize can be grown on a variety of soils ranging from sandy to clayey. 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.

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. The temperature during second fortnight of October to mid-November in most of the North India drop rather sharply, resulting in delayed germination and plant growth receives a major setback.

. New Production Technologies
(i) Soil management:
To improve soils, conservation agriculture is emerging as a big boost for maize production. Conservation agriculture is based on minimal soil disturbance (reduced or no tillage), combined with organic matter retention and diverse crop rotations. As well as reducing erosion and improving soil structure and soilwater dynamics, this approach also saves on labour, time, fuel and machinery wear.

(ii) Water management:
During the winter season less water is required at early stage of crop while, at later crop growth stages water requirement increases due to rapid increase in evapo-transpiration demand. Amongst the various irrigation scheduling approaches, climato-logical approach has been found to be better, since it integrates all the weather parameters giving them their natural weightage in a given climate-water-plant continuum A very scanty work has been done on irrigation water requirement of winter maize in relation to nitrogen dose and plant density.

(iii) Optimum date of sowing
The time of sowing is a non-monetary input, which plays significant role in production and productivity of any crop, important for winter maize so that the genotype grown can complete its life cycle under optimum environmental conditions.

(iv) Optimum plant density
It provides conditions for maximum light interception right from early periods of crop growth. Maize is an exhaustive crop requires all types of macro and micro nutrients for better growth and yield potential.

Conclusion
Maize is called 'queen of cereal' as it is grown throughout the year due to its photo-thermo insensitive character and highest genetic yield potential among the cereals. In India, maize is cultivated throughout the year in most of states of the country for various purposes including grain, feed, fodder, green cobs, sweet corn, baby corn, pop corn and industrial products. However with dramatic increase of maize demand in developing world, including India the current trend appears unable to keep pace.

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