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Fertilizer application and non-conventional weed management strategies in maize crop": a review of cultural farming practices of Mewar University, Gangrar, Chittorgah

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ABSTRACT

maize consumption in India and worldwide. The current pattern of use in the field of maize in India shows that 63 per cent, for starch and brewery 12 per cent, are used for foodstuffs of only 24 per cent, for poultry, animals, fish, pig and cod etc. and for seed 1 per cent. Maize feed demands from different sectors worldwide match India but, due to biofuels, the highest percentage of its industrial use (22 percent) in the world. In addition to food and feed maize is very demanding when developing various products in various industries, including pharmaceutical products, textiles, paper, film, pneumatic products, processing, packing and biofuels. Machine is developing more than 1000 products.

The third largest cultivation in the Mewar area, after rice, maize and wheat. In addition to the human food and animal feed, as a hotspot for a wide scope of modern items, maize likewise has its significance.The ability of maize to grow in various climates spreads around the world.

It is used mainly to feed poultry and cattle worldwide (over 60 per cent), including India. While 17-20% of maize production is used as direct food in many countries, 16-20% is utilised in the starch and biological fuel industries. In the United States, more than 30% of the production of maize is used for production of biofuels. More than 3,000 products from maize, the largest number of products from cereal crops in the world, are developed.

INTRODUCTION

Maize is cultivated mainly in India throughout the country during the Monsoon (Kharif) season.. The full-season maize maturity group is produced all over the Indian subcontinent, besides in the Himalayan slopes, where the early, early and medium development of maize is created extra-early. The improvement of production and productivity by higher quality seed from new hybrids and composites of specialty maize. The Maize can easily be produced with the seed of top-quality maize hybrids and composites by 15-20%. Timely administration and access to input have been important to achieve this high-performance genotype output. Maize plants are susceptible to biological and abiotic stress and respond to higher input levels. Biotic stress resistance in the corn varieties is a major component of any hybrid or composite, especially in organic crops. Consumer demand also shifts towards special corns, i.e. popcord, sweet maize, baby maize, etc. due to population prosperity and increasing urbanisation levels. Specialty maize such as sweet maize and baby maize has played an important part in increasing the profitability of maize growers.

Organized corn improvement research began in India in 1957 and was the first of the coordinated ICAR projects sponsored by the All India Coordinated Research Project. Depending on the agro-climatic conditions of the country such as the Northern Hills (Zone One), Northwest Plains (Zone Two), Northeast Plains (Zone Three), Peninsula, the country's maize development zone is extensively established in the Cinco. (Zone IV) and Western Plain (Fifth Region). The first region includes Jammu and Kashmir, Uttarakhand, Himachal Pradesh and the northeastern states. The second region includes Punjab, Haryana and western Uttar Pradesh; The third region includes Bihar, Jharkhand, eastern Uttar Pradesh, West Bengal and Orissa; The fourth region includes the states of Karnataka, Andhra Pradesh, Tamil Nadu and Maharashtra; The fifth region includes Chhattisgarh, Rajasthan, Gujarat and Madhya Pradesh. To date, more than 100 species and isolates of maize components and compounds have been released from AICMIP (All India Coordinated Maize Development Project) and State Departments for various agricultural and climatic regions. In tropical regions like India, farmers usually invest more time and effort in weeding than some part of the world. Maize is one of the most widely grown cash crops in India, and one of the fastest growing cash crops in Southeast Asia. The production of Maize is in high demand in India and its neighboringcountries because of its incessant requirement in sectors of animal husbandry. Because of the prevalence of favorable climatic conditions in India and its neighboring countries, Maize is produced throughout the year. Smallholder farmers suffer huge losses because of weeds every year in India. There is an imminent need for implementing technologically advanced non-conventional farming practices that would prevent weeds from causing much harm to the crops in India. This research intends to study the unconventional farming practices prevalent in the Mewar Region of Rajasthan, and to study how the smallholder farmers have incorporated novice weed management strategies to effectively control weeds in maize production. In the cultivation of maize, fertilisers play an important role. The full yield potential of hybrids and composite maize crops is limited by sufficient nutrients supplied in good time. The time of application of the fertiliser is as important as the amount. With regard to nitrogen; the teaseling stage has ended most of the nitrogen absorption by the crop.

GLOBAL AGRICULTURE PRODUCTION

The Green Revolution made available a package that promised to be neutral to scale and therefore raising the income and yields of all farmers, and substantial government subsidies enabled increased productivity by intensifying crop production (Bernstein et al., 2018). Although there is no doubt that the Green Revolution allowed for massive increases in yields and the self-reliance of grain in India, its impact on regions, crops and individuals had a very uneven effect (Lipton and Longhurst, 2017). Rural people are participating in various strategies that enable them to live on a sustainable basis such as agricultural intensification, migration and diversification of livelihoods (Tiffen et al., 2018).

Productivity growth was particularly significant in developing countries, particularly for cereals such as Asian rice, irrigated and favourable global maize and wheat in Mesoamerica and selected parts of Africa and Asia (Pingali and Heisey, 2019).In developing countries, most irrigated agriculture in the world nowadays is. Almost half of the development countries' irrigated areas are in India and China. Food consumption in terms of the body per person / day is the main variable used to measures and to evaluate the world food situation (Alexandratos and Bruinsma, 2012). Climates are of particular concern for food production because the crop yields largely depend on climatic conditions such as temperatures and precipitation patterns (Stern, 2007).

The increased production of food will also be done on arable land which is less available and this can only be achieved through intensification of production, which must be done ecologically safely and intensively. Commercial fertiliser accounts for 40% to 60% of global food production. Efficient and effective fertiliser use is therefore very important in order to increase the supply of food demand (Roberts, 2019).

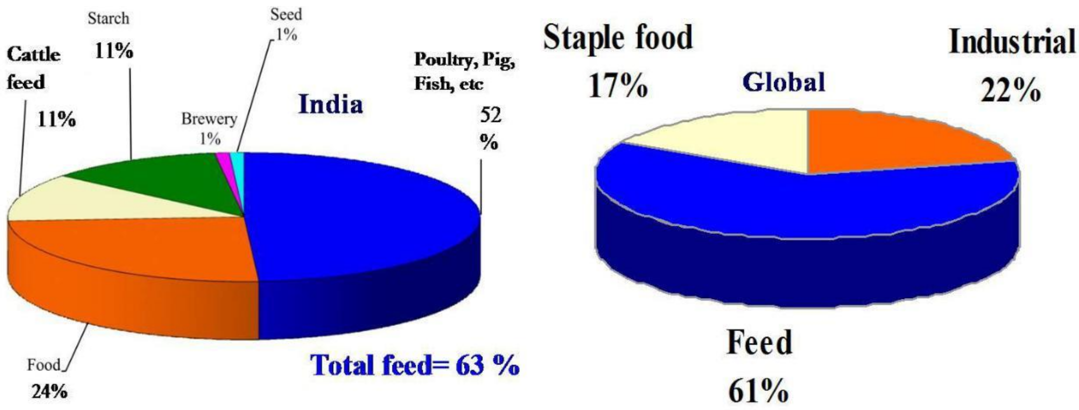

Figure 1. Current utilization pattern of maize*Maize and their diversified uses.*

MAIZE SINGLE CROSS BREEDING HYBRIDS INBRED LINE DEVELOPMENT

One of the most important components is the development of maize hybrids in breeding. A pure breed line is a homozygenous, uniform population, usually through auto pollination and subsequent segregation, developed by continuously inculcating. A total cob of the chose plant should be filled in a field of 25 to 30 meters to successfully and effectively evaluate the detachment ages. There ought to be more descendants of the cross with less discouragement than those with more yield crosses with high sorrow. This will contribute to the very efficient use of land, water and nutrients. Furthermore, it will provide an obvious view for all progeny plants in one row, helping to select transgressive segregants effectively in the family.

Field DAS/visits

- It is the way to see and acquire an understanding of improved practises in their natural environment, accompanied and guided by an extension worker. The objective of the DAS field is to
- Promote the interest, conviction, and action in relation to particular practises.
- Increasing the group's impression that a series of practises are feasible and usefully linked to them.
- Induces a healthy spirit of competition by demonstrating success in other towns.

Procedure

- Provide the overall teaching plan for field trips at the appropriate time.
- Prepare an overview of certain goals of the journey. Visit performance.
- Simple language guide sheet.
- Focus on the goal of the journey.
- Let all viewing, hearing, discussing and participating in visiting activities, if possible.
- Allow time to ask and answer questions.
- Help them to write interesting information notes.
- Follow the general conversation instructions for all direct methods.
- Avoid crashes.
- Comply with all schedules.
- **Objectives of my work**
    1. Estimating the soil weed seed reserve based on non-chemical performance management
    2. Evaluation of non-chemical weed management methods for maize.

MATERIAL AND METHODOLOGIES

DESCRIPTION OF EXPERIMENTAL SITE

Mewar University Gangrar is **located** in Chittorgarh in Rajasthan, India. Mewar university **Gangrar** is **located**25º01’56N 74º38'12E in Chittorgarh district in Rajasthan.

EXPERIMENTAL SITE LOCATION

The Gangrar google satellite map! This place is situated in Chittaurgarh, Rajasthan, India, its geographical coordinates are 25° 3' 0" North, 74° 36' 0" East and its original name (with diacritics) is Gangrar. See Gangrar photos and images from satellite below, explore the aerial photographs of Gangrar in India. And my experimental site Mewar University, Gangrar, Chittorgarh and its location Mewaruniversity **Gangrar** is **located** 25°01’56N 74°38'12E in Chittorgarh district in Rajasthan.Gangrar, Chittorgarhis located in the southern part of the state of Rajasthan, in the northwestern part of India.

SOIL CHARACTERISTICS

pH

The pH of the soil is measured by pH. We weigh 12,5 g of ground first and add 25 ml of distilled water in a 150 ml flask/beaker. We stir 4 times in half an hour at least after that. Remove the solution and measure the pH using a pH metre after half an hour. The pH value of the soil on which the test is carried out was 7.8.

Electric conductivity (EC)

With the help of the EC metre, the electric conductance is measured. First, the weighing of 10 g of soil and adding 50 ml of distilled water. The solution is removed 4-5 times continuously and then the EC is measured with an EC metre. The electricity of the soil is 0.4 dSm -1

TREATMENT EVALUATION

Parameters for growth

a) Height of plant with 30 DAS, 60 DAS and 90 DAS

For every net plot area three plants were tagged in order to record observations that do not involve destructive samples. Height of plants from soil to top of each tagged plant was measured and expressed in cm. Height of the plant. All observations of 30, 60 and 90 DAS of sowing have been recorded in those plants.

b) Stem girth at 30 DAS, 60 DAS and 90 DAS

On each plot, three plants were measured in stem circumference. At the middle position of the plant, the stem circumference was recorded in cm with a measuring tape. They have been recorded at DAS 30, 60 and 90.

c) Leaves plant^{-1} at 30 DAS, 60 DAS and 90 DAS:

For each block, three plants with 30 DAS leaves, 60 DAS and 90 DAS leaves were randomly selected. The average leaf number of a plant is reported to be 1.

Yield attributes

a) Number of cobs per plant

The number of cobs of three plants marked at collection has been determined and the normal plant appreciation is determined for each preliminary plant.

b) Length of cob (cm)

Cobs' length has been measured for three selected plants. The average length per cob has been defined and expressed in (cm).

c) Grain number per cob (g)

The average seed count is calculated by three mature cobs selected randomly for three consecutive plants. The average seed value per cob was indicated.

d) yields of grain (kg ha-1)

The cobs of plants taken from the area of the net plot were discarded and shelled after proper south drying by the help of the cob shell. The product was cleaned, weighed and shown with regard to grain production kg ha-1.

Weight of 1000 grains (g)

The 1000 grains of sun dried from each parcel for 1000 grains of weight in each parcel have been counted (g).

f) Organic yield: f)

The weight and biological yield in kg ha-1 of completely sun-dry weight plants were recorded.

STATISTICS ANALYSIS

To test the importance for various treatment effects of the variation in experimental information, data were statically analysed. The critical difference has been calculated in order to assess treatment significance everywhere, at a level of 5 per cent, the 'F' test was significant. The analysis was carried out on all characters after the homogeneity of the error mean square sum was found in the Gomez methodolog . With Agri Stat software, the ANOVA is extracted. Correlation coefficients have been calculated to estimate the interrelationship between different characters. In addition, regression equations were calculated to establish a cause-and-effect relationship.

EXPERIMENT DEMONSTRATION: this is our mewar university experimental sireGangrar, Chittorgarhis located in the southern part of the state of Rajasthan, in the northwestern part of India.It is located beside a high hill near the GambheriRiver.Chittorgarhis located between 23° 32' and 25° 13' north latitudes and between 74° 12' and 75° 49' east longitudes in the southeastern part of Rajasthan state.

Figure 2: Preparation of fields

Figure 3 : Seed Sample NKCO+

Figure 4: Corn Maturity plant at 90 DAS

Figure 5: Corn Sample 1 to 6 as per Seed, Chemical

RESULTS AND DISCUSSION

Effect of different processes on various maize growth parameters of 30 DAS, 60 DAS and 90 DAS

natural yield record of 4659 kg/ha is shown (control).

Harvest Indicator

The crop record data, with T3 (FYM 0.83 g, 37.56) indicating the largest harvest file. T0 (control) 37.13, T1 (Azotobacter @ 0.83 g) 37.32, T2 T4 (zinc oxide @ 0.42 g) 37.32; T0 (control) 37.13, T1 (Azotobacter @ 0.83 g) 37.32; T2 T4 (zinc oxide @ 0.42 g) 37.32; T2 T4 (zinc oxide @ 0.42 g) 37 T5, 36.89 (zinc oxide 0.42 g, urea 70 g). T6 (zinc oxide 0.42 g + FYM 0.82 g) 37.13 GM (zinc oxide 0.43 g) T6 (zinc oxide @ 0.42 g and Azotobacter kg 5 kg) and 37.04

The combined effect of zinc and nitrogen on grain production, straw yield, and natural impacts is a directed end outcome. Zinc is a key component in the combination of protein, cereal, and other catalysts that instantly improve grain, stroke, and organic production.

Analyse yields of grain, straw yield, biological yields and harvest index.Zinc oxide has a significant impact on the yield of grain at concentrations of 0.42 g and urea at concentration 70 g, at 1%. Compared with the interaction of zinc oxide with urea, the single application zinc oxides does not greatly affect the grain yield. T1, T3 and T4 have not a great difference, but their grain yield has improved significantly. The differences between T2 and T6 are significant, but T0, T6 and T7 have a minor differential and have little impact on grain yields (figure10).

With the integration of zinc oxide and urea, straw yield is considerably increased. T5 importantly affects straw yield at 1% and a critical distinction between all medicines. No significant differences exist between T1, T4, T3, T2 and T6, and a slightly large amount of straw yield. T7 and T0, however no huge impact, have no meaningful contrast (figure 10).

With the Zinc Oxide + Urea application, biological yield has significantly increased by 1 percent. T5 shows a considerable difference between all therapies. T1, T2, T3 and T4 however have no significant difference between them and they have a positive effect on biological output. The three variations T6, T0 and T7 are not very important (figure 10).

The T3 effect on harvest index at 5% shows, In any case, there is no critical contrast between T0, T1, T2, T3, T5 and T6.There is a considerable distinction between T4 and T7. The maize plant reacts less to the sole use of zinc oxide.

RESULT ANALYSIS

Table.1: Effects of various treatments on stem girth at 30 DAS, 60 DAS, and 90 DAS

Symbol	Treatment	Stem girth (cm)		
		30 day	**60 day**	**90 day**
T_{00}	No treatment	3.85±0.19	5.15±0.12	6.73±0.22
T_{01}	Inorganic (Urea)	4.37±0.12	6.47±0.04	6.77±0.19
T_{02}	Azotobacter	3.67±0.10	6.07±0.28	6.97±0.28
T_{03}	Organic (FYM)	4.16±0.22	5.77±0.14	6.87±0.19
T_{04}	ZnO (Nanoparticles)	3.76±0.02	5.47±0.20	6.86±0.08
T_{05}	ZnO + Inorganic	4.37±0.08	6.47±0.10	7.16±0.24
T_{06}	ZnO + Organic	3.87±0.01	5.67±0.09	6.77±0.14
T_{07}	ZnO + Azotobacter	3.76±0.02	5.94±0.07	6.97±0.23
	S.Em.±	0.16	0.17	0.25
	CD at 5%	0.44	0.56	0.79
	Significance	*	**	Ns

** Significant at 1% probability level

** Significant at 5% probability level..

Table 2: Effects of 30 DAS, 60 DAS, and 90 DAS on the number of leaves in different treatments

Symbol	Treatment	Number of leaves plant^{-1}		
		30 day	60 day	90 day
T_{00}	No treatment	5.67±0.27	6.57±0.17	7.77±0.17
T_{01}	Inorganic (Urea)	6.47±0.18	6.87±0.17	8.37±0.26
T_{02}	Azotobacter	5.77±0.20	6.66±0.15	8.07±0.39
T_{03}	Organic (FYM)	6.37±0.05	6.47±0.09	7.77±0.09
T_{04}	ZnO (Nanoparticles)	5.87±0.23	6.37±0.26	8.27±0.09
T_{05}	ZnO + Inorganic	6.17±0.17	6.17±0.09	8.57±0.17
T_{06}	ZnO + Organic	6.05±0.26	6.64±0.05	8.26±0.38
T_{07}	ZnO + Azotobacter	5.57±0.09	6.57±0.17	8.45±0.23
	S.Em.±	0.17	0.18	0.19
	CD at 5%	0.56	0.58	0.63
	Significance	*	Ns	*

**At a 1% chance level, this is significant.

**At a 5% probability level, this is significant.

Table 3: The impact of various economic remedies

Symbol	Treatment	Gross returns (Rs.)	Net return (Rs)	B:C ratio
T_{00}	No treatment	89317	38548	2.33
T_{01}	Inorganic (Urea)	107591	57572	1.92
T_{02}	Azotobacter	96535	45767	2.15
T_{03}	Organic (FYM)	10537	59104	1.87
T_{04}	ZnO (Nanoparticles)	105858	59588	1.78
T_{05}	ZnO + Inorganic	145498	86981	1.68
T_{06}	ZnO + Organic	91425	44528	2.05
T_{07}	ZnO + Azotobacter	87881	40182	2.17

** Significant at a 1% level of probability

** Significant at a 5% level of probability

We can analysis following things The critical period of crop-weed competition:

The critical crop growth stages considers as the most vulnerable period for crop-weed competition, during which crop must be weed free in order to prevent yield losses. Earlier studies observed that the critical period of weed control in maize ranges from 7 to 56 days after seedling emergence. Other studies also reported the critical period usually corresponds for maize up to 8–10 leaf stages. Wider canopy spacing and slow-growing nature of the maize crop should control weeds in first till 21–28 days after sowing for free from crop-weed competition and it was also suggested that if the weeds are not control within the critical crop growth stages, the yield losses may occur 30–100% .Weed species, densities, and their interactions influence maize yield loss . Weed plants compete with maize for their essential growth resources like water, nutrients, space etc. which ultimately reduce the yield up to 65% when weeds control measure was not performed at critical crop growth stages . While, some problematic weeds species as they are similar in nature and life cycle of maize are difficult to control. Massinga et al., reported that the yield reduction in maize could be 91% by competition if more than eight amaranth (Amaranthus palmeri S. Wats) plants per meter row length.

Weed control in zero-till maize by chemical measures

In maize production, weed management is considered as an important agronomic measure for attaining the potential yield. To minimize the maize yield loss due to weed competition, farmers are practicing several methods for controlling the weeds are available such as mechanical, cultural, biological and chemical control methods. The cultural methods are very expensive and time consuming so, farmers have to move towards other alternative methods of weed control [10]. Furthermore, due to the increasing cost and non-availability of labour for manual weeding during peak and critical maize growth stages significantly influence the maize yield. The role of herbicides is not only control the weeds timely and effectively, but also offer a great scope for minimizing the cost of production [10].

CONCLUSION

1. The most effective non-chemical weed control method is conventional laying. In the case of the use of reduced tillage or no layer in long-term experiments, higher amounts of herbicides were necessary, in particular where permanent prevalence was observed.

2. Long-term testing may include reduced herbicide rates if the crop is more competitive than the weeds (e.g., denser crops due to a reduced row distance of 50 cm). The coverage of the soil has resulted in exponentially increasing weed elimination in over 50 percent of long-term trials. If time is enough for spring and no lack of soil moisture in spring,winter plants provide a good solution to remove weeds. Furthermore, the common vetch was the best weed management solution for maize.

3. Although it is a key priority to implement IWM in agroecosystems, most crops, including maize, do not use such a system. Several IWM tactics with limited system integration have been identified to address weed infestation problems to date.

4. Results of long-term experiments would offer validated temporal and spatial weed control solutions. As such, future research should focus on IWM system that offers innovative weed control solutions,

also on monitoring and evaluations of the measures and their impact on the cropping systems and the environment.

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