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Cropping Pattern: Maize

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Abstract: The study was conducted on cropping pattern of maize in southern Rajasthan. The data were collected from 90 farm families selected randomly. Information regarding cropping pattern of maize was collected through structured interview schedule from the head of the family. Information of cropping pattern of maize was gathered from farm families of the land size categories i.e. large, small and marginal. Cropping pattern of maize revealed that majority of the respondents (66.66%) were taking only one crop of maize in a year. Hundred percent respondents from all categorized i.e. large, small and marginal were growing wheat as major crop in rabi season and maize in kharif season. The respondents were inquired about the intercropping system and it was found that during kharif season, maize was being sown along with pulse crops such as green gram/ black gram/ soybean/ cowpea/ arhar / groundnut/ cotton.

The results indicated that hybrid varieties of maize were used by 45.5% respondent and the variety being used were Mahi Kanchan, Mahi Dhawal, Ganga-11 and Ganga Safed-2. Majority of the respondents (45.55%) dependent on rain as method of irrigation. While rest 20% of the respondents were using their own well for irrigation.

Keywords: Intercropping, Kharif Season, Maize.

I. INTRODUCTION

Maize is an important cereals crop of India as it plays an important role in agricultural economy both as a staple food for large section of population, raw material for industries and feed for animals. It can be grown in a wide range of agro-climatic and tropical regions.

Maize ranks as one of the most important cereal grown in India. Traditionally maize was grown as a staple food destined primarily for home consumption. However, in recent years, significantly changes have occurred as the result of increasing economy and rising demand for diversified uses, especially feed and industrial uses (Singh et al., 1997).

Maize is grown in a wide range of agro-climatic conditions covering temperature, subtropical and tropical regions. In India, maize is grown in the states of Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh, Punjab, Karnataka, Himachal Pradesh, Manipur and Gujarat. Its cultivation in such diverse climates has resulted in its versatile nature and tremendous variability (Lal et al., 2001).

Maize is generally considered as kharif crop. However, because of its multifaceted problems and poor yield in kharif season have resulted in its introduction under winter and spring season. Its performance during the winter has been found better than rainy season crop. Encouraging results have also been obtained by growing the winter season maize in North Western India. Tribals conducted under All India Coordinated Maize Improvement Project revealed that yield potential of rabi maize was about twice that of the Kharif season maize (Dayanand and Jain, 1994).

Cropping pattern means the arrangement of growing crops in a region over space and time (Mandal and Bezbruah, 2013). It is also defined as the percentage of total cropped area under various crops in a specific area at a particular point of time. Chouhan (1987) reported that multiple factors which affect cropping pattern are terrain, topography, slope, soils, availability of irrigation facilities, uses of pesticides, fertilizers and mechanization. Kaur et al. (2022) found that geo-climatic condition and magnitude of irrigation are the main determinants in the percent share of crops among cropping pattern of Rajasthan. Intercropping is a systematic approach that make full use of nutrients and water resources achieves agricultural biodiversity and increases yield significantly in comparison with crop monocultures (Quin et al. 2013). Intercropping is found to play a crucial role in securing the grains supply and raising the income of farmers in developing countries, their by balancing higher food demands and lower water utilisation (Chen et al. 2015, Yin et al. 2017).

Cropping pattern of maize and its cultivation in different season require attention. Inter-cropping has been a popular farming practice from time immemorial. The concept, however, has changed over the years. In the early years of agricultural development, farmers adopted it chiefly as a risk covering practice in tradition bound agriculture to make up a part of crop losses particularly under rainfed and dry land farming situations. Recently with the technological improved in agriculture and consequent need for enhancement of crop production levels, necessitated by increasing populations pressure in the country, the concept of inter-cropping has assumed considerable significance. Scientifically the practice envisages simultaneous growing of two or more crops different in height, growth rate, nutrient requirement in such a way that they experience least competition, utilize environment factors more efficaciously and results in efficient utilization. Agroclimatic zone IV A and IV B has the largest area under maize in Rajasthan. The farmer of this region are usually advocated to intercrop legumes with maize however detailed information on this aspect is meagre.

II. METHODS AND MATERIALS

The study was conducted in purposively selected Banswara district of Southern Rajasthan. Banswara is one of the major maize producing tribal area of Rajasthan. Out of five tehsil of the Banswara district, Banswara tehsil located in command region having good irrigation facility was selected. From the list of villages six villages were selected randomly. Three farm families large, small, and marginal were randomly selected from these villages. Thus the total sample for the study comprised of 90 farm families i.e. 15 from each village. Information on cropping pattern of maize was gathered from families of three land size categories i.e. large, small and marginal.

III. RESULT AND DISCUSSION

Table 1 shows the cropping pattern of maize followed by the farm families. The results revealed that majority of the respondents (66.66%) were taking only one crop of maize in a year while remaining 33.33% respondents were taking two crops of maize in one year i.e. both during Kharif and Rabi season. Further analysis of data indicate that one crop of maize was taken by majority of small farmers (76.66%) followed by marginal (66.66%) and large farm families (56.66%). Likewise two crops of maize were taken by more number of large farm families (43.33%) and less by small families (23.33%). Hundred percent respondents from all the three categories i.e. large, small and marginal were growing wheat as major crop in Rabi season and maize in Kharif season. The respondents were also inquired about the inter-cropping system and it was found that during kharif season, maize was being sown along with pulse crops which included either green gram/ black gram/ soybean/ cowpea/ arhar/ groundnut/ cotton. The logic behind the inter-cropping was reported that production of maize was not affected by inter-cropping and at the same time yield of two crops can be enjoyed by the families.

Mohapatra et al., (1993) revealed that inter-cropping with two rows of maize with cowpea in paired rows (2:2) produce the highest maize equivalent fodder yield (28.2 t/ha) and dry matter yield (5 t/ha) then rest of the treatment. Rana et al. (2001) stated that the highest grain yield of maize 46.39 gm/ha was recorded in maize plus cowpea inter-cropping system at Palampur. The beneficial role of inter-cropping is also reported by other scientist Kalra and Babooji (1990) while evaluating economics of

inter-cropping found that grain yield of maize was significantly higher planting maize at normal spacing intercropped with green gram (17.85 q/ha), followed by black gram, groundnut and soybean (16.7, 16.1 and 14.5 q/ha respectively). Shivay et al., (1999) observed that grain yield of maize increased significantly when it was intercropped with black gram (32.5 gm/ha) and soybean (30.4 gm/ha) as compared to sole maize (27.2 gm/ha).

Dahiphale et al. (2015) reported that optimal food production for maize, soybean, mung, wheat, mustard, gram and barley in nine, eighteen, twenty one, twenty four and thirty canal running days. Verma et al. (2023) found that acreage of crops was continuously shifting from one crop to another crop throughout the period. Parihar et al. (2011) reported that maize based intercropping system in all maize growing areas were maize + pigeon pea, maize + cow pea, maize + mung bean, maize + urd bean, maize + soybean, maize + rice, maize + sugarcane. Kumar et al. (2013) reported that suitable crops for intercropping with Rabi maize were pea, lentil, onion, garlic and methi. Yin et al. (2018) found that intercropping maize and wheat with a straw covering soil surface can be used to enhance crop production. Bhandari et al. (2021) found that the majority of the people followed maize – rice – wheat, maize – maize, maize – rice – lentil, maize – mung bean – maize, maize – rice – wheat/ mung bean, maize – rice – cow pea, maize – mung bean – lentil, maize – rice – chick pea/ cow pea preference rank first, second, third, fourth, fifth, sixth, seventh and eighth respectively. Amir et al. (2021) reported that the dual cropping pattern were maize strip cropping with peanuts, maize strip cropping with mung beans, maize strip cropping with soybean and maize strip cropping with sweet potatoes. Du et al. (2022) indicated that maize, rice and soybean were the three major crops and the cropping pattern was dominated by continuous maize cultivation (21.25%), mixed cultivation (29.01%) and continuous maize soybean cultivation (24.48%).

Table 1 further shows the information on seed variety chosen for growing maize. The results indicated that hybrid variety was used by 45.5% respondent followed by respondents using both the local and hybrid varieties (33.33%) and rest 21.1% respondents only local variety. The hybrid variety used as seed included Mahi Kanchan, Mahi Dhawal, Gnaga-11 and Ganga Safed-2. The majority of the respondents from large category (60%) were using hybrid variety whereas most of the respondents from marginal (53.33%) were using local variety. Reason given for using hybrid variety was that of more production as compared to local variety. However due to higher cost and unavailability of hybrid seeds the respondents from marginal category were not able to take this benefit. Table 1 also depicts that majority of the respondents (45.55%) were dependent on rain as method of irrigation while rest 20% of the respondents were using their own well for irrigation. The results further showed that irrespective of farm categories majority of the respondents were relying on rain only for irrigation their land except that of marginal farm categories who were utilising both canal water and rain water at an equal level (40%).

S. No.	Variable	Large	Small	Marginal	N=90
1.	No. of times maize crop is grown in a year. <ul style="list-style-type: none"> • Once • Twice 	56.66 43.33	76.66 23.33	66.66 33.33	66.66 33.33
2.	Major crops grown during <ul style="list-style-type: none"> • Rabi- Wheat • Kharif – Maize 	100 100	100 100	100 100	100 100
3.	Along with maize other crop are grown <ul style="list-style-type: none"> • Rabi – Alone maize • Kharif – Maize + BG/ GG/ Soybean/ Cowpea/ Arhar/ Groundnut/ Cotton 	100 100	100 100	100 100	100 100
4.	Variety used as seed <ul style="list-style-type: none"> • Local variety • Hybrid Variety • Both 	10 60 30	20 43.33 36.66	53.33 33.33 33.33	21.11 45.55 33.33
5.	Variety more production per hectare <ul style="list-style-type: none"> • Local variety • Hybrid Variety • Both 	- 100 -	- 100 -	- 100 -	- 100 -
6.	Method of irrigation <ul style="list-style-type: none"> • Rain • Well • Canal • River and Pond 	50 23.33 26.66 -	46.66 16.66 36.66 -	40 20 40 -	45.55 20 34.44 -

BG- Black gram, GG- Green Gram.

Table 1: Percentage distribution of respondents according to cropping pattern of maize.

IV. CONCLUSION

Majority of the respondents were taking only one crop of maize in a year. Inter-cropping of maize with pulse crops, groundnut and cotton and use of hybrid variety of maize was a common practice.

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