

Introduction

- Maize (Zea mays L.) is one of the important food crop in Pakistan after wheat and rice
- About 64% of maize is grown under irrigation, the rest is rain fed

Uses

- Food for human consumption.
- Feed for live stock and poultry.
- Raw material for agro-based industries.









World Maize Production (Million Metric Tones)

USA	280
China	131
Brazil	35
Mexico	21
Argentina	20
Indonesia	15
France	13
India	12
South Africa	12
Italy	11
Total	692



Average area, Production and Yield of Maize (Agri Stat 2004-2005)

Province	Area (000 ac)	Production (000 mds)	Yield (md/ac)
NWFP	1232.09	21387	17.35
Punjab	1173.77	48440	41.27
Sindh	7.41	40	5.39
Balochistan	12.84	132.5	10.31
Pakistan	2426.12	69925	28.82



Maize Area in Punjab

District	Acreage	District		Acreage	
Attock	42550	Lahore		22690	
Rawalpindi	144970	Kasur		39000	
Jehalum	9020	Okara		245170	
Chakwal	3750	Sahiwal		111090	
Sargodha	67880	Pakapttan		198870	
Khushab	2740	Multan		16110	
Mianwali	1520	Lodharan		1820	
Bhakkar	2530	Khanewal		35460	
Faisalabad	659 <mark>60</mark>	Vehari		41260	
T T Singh	49870	Muzzafer Ga	rh	9620	
Jhang	117780	Kayyah		2030	
Gujrat	3650	D G Khan		2330	
The Punjab	1309680	Nankana Sal	nib	18340	



Production Technology



Soil

Maize grow well on deep, medium textured soils high in organic matter, well drained with good water holding capacity. The pH range for a good crop is 6.5 - 7.5. Moisture is 30 % of wt. for emergence.



Production Technology



Sowing

It is preferably to sow the seeds in ridges or furrows in irrigated areas. Row to row distance should be 2.25 feet. Plant to plant distance is 8 inches. Direction of rows should be East-West to give more sunlight and even germination.



Seed Rate For both Rabi and Kharif crops, the appropriate number of plants are 25000-26000, the seed rate should be 10 – 12 kg/ac.

Temperature & Climate

 Maize is very sensitive crop to temperature at all growth stages specially at emergence and at grain formation. Temp. above 40 C (104 F) adversely effects the formation of grains in the cob.

Varieties (Spring)

Variety	Company	Sowing Time	Area
6525	Monsanto	Mid Jan-March	Punjab,NWFP
Magic	Monsanto	Mid Jan-March	Punjab, NWFP
NK-8001	Syngenta	Jan-Mid March	Punjab and NWFP
NK-8441	Sngenta	Jan-End February	Punjab,NWFP
32W86	Pioneer	JanEnd Februry	Punjab,NWFP
32 F 10	Pioneer	Jan-Mid March	Punjab, NWFP
34N43	Pioneer	Jan-Mid March	Punjab, NWFP
Garst 8464		Mid Jan-March	Punjab, NWFP
Garst 8288		Mid Jan-March	Punjab, NWFP

Varieties (Autum)



Variety	Company	Sowing Time	Area
3062	Pioneer	Mid May-July	Punjab & NWFP
30 Y87	Pioneer	Mid May-July	Punjab,NWFP,AJK
31 R88	Pioneer	Mid May-July	Punjab, NWFP
Hycorn 11 plus		Mid May-July	Punjab, NWFP
922	Monsanto	Mid May-July	Punjab, NWFP
919	Monsanto	Mid May-July	Punjab, NWFP
3549/2021	Monsanto	Mid May-July	NWFP,AJk

Fertilizer Application

N - 100-120kg/acP - 46kg/acK- 50kg/ac

Sowing: 2 Bag DAP + 1 Bag SOP +.5 Bag Urea or equivalent.

- 1/2 Feet Height: 1 Bag Urea.
- 6 leaf Stage: 1 Bag urea+1 Bag SOP
- 3 Feet height: 1 Bag Urea.
- Earings: 1 bag Urea



Maize Development		(OS	(as percentage of total need)		
Maturity	Lansada anno 10 au	% N	% P	% K	%Water
17 weeks		less than 1	less than 1	-K	less than 1
16 weeks	h	less than 1	1	-ĸ	J.
15 weeks		less than 1	2	-К	2
14 weeks		less than 1	5	-К	3
13 weeks	EL .	2	8	2012 2013	5
12 weeks	1 ml	4	9	are u ski	6
11 weeks	(H)	6	11	1	8
10 weeks	AN	10	13	5	11
silking	Mar	12	15	8	12
Tasseling //		16	11	16	12
7 weeks		15	10	20	n
ó weeks		- 14	eb rong	21	10
5 weeks	1 LA	n	4	16	7
4 weeks		7	2	9	5
3 weeks	1	2	1	3	4
2 weeks	y~	less than 1	less than 1	1	2
1 week		less than 1	less than 1	less than 1	1
		The Designed of the	loss	The second se	loon

Elementary Analysis

- 44.62 wt.%,dm
 - 5.37 wt.%,dm
 - 0.41 wt.%,dm
 - 0.05 wt.%,dm
 - 1.48 wt.%,dm
 - by difference

Micro Nutrients requirements

Micro Nutrient	24-45 day Crop	45-80 day crop	Grain Formation
Zinc	25-60 mg	20-60 mg	19-75 mg
Boron	6-25 mg	6-25 mg	5-40 mg
Copper	6-20 mg	6-20 mg	3-15 mg

Vegetative and Reproductive Stages

Vegetative Stages

- •Emergence
- •First leaf
- Second leaf
- •Third leaf
- •nth leaf
- Tasseling

Reproductive Stages

- Silking
- •Milk
- Blister
- •Dent
- •Dough



Growth Stages





Germination and Seeding Established

- 1st critical stage in the life of Maize plant.
- Germination may be slow or the young seedling may die before establishment if the soil is too cool, wet or too dry.



Vegetative Development week1-3

- This stage creates root system and leaf structure that will support the ear and grain formation.
- All the leaves the plant will ever have are formed during 1st three weeks of growth.
- They are formed by a single point which is below the surface of ground.
- Young maize plants are susceptible to flooding specially when temp. is high.



Tassel and Ear initiation week-4

 When the plant is at knee height change takes place in the function of growing points. The growing point is at the soil surface and having formed all the leaves ,developed into embryonic tassel.

Vegetative Growth 5-8 week

- The most critical period in the development.
- The plant has a high requirement for sunlight ,nutrients and water.
- Lower internodes elongate rapidly and soon fill root zone.
- Ear size is determined over a three week period in week 6-8. The number of rows per ear are determined 1st then kernels per row.



Flowering week 9-10

- When plant structure is developed, the maize plant shift most of its energy in producing kernels and on an ear.
- Stage demands heavy water and nutrients.





Grain Development and Maturity week11-18

- Moisture is important to fill kernels in this Stage.
- No. of ear and kernels is already been set.
- This stage determine kernel size.



Harvesting

- Maturity of crop is from 110-130 days depends upon variety and environmental conditions.
- Yield Potential of different varieties is 130-160 monds per acre depends upon varieties.





Crop Production Technology



Soil Preparation

to Get Maximum Genetic Potential.....

- At soil preparation use Saver Because
- It Increased water holding capacity
- Improved seed bed
- Improved drought tolerance
- Improved soil aeration
- Increase organic matter in soil
- Increased the effectiveness of macrofertilizers
- Neutralize soil pH

Recommendation

4 kg saver/acre during soil preparation





Why Maize Required More Micronutrients

- Critical stage management. e.g. Highly sensitive to high temp.
- Today's hybrids varieties.
- Increasing pH.
- From soil availability deficient.
- **Depletion by many years farming.**
- Multiple cropping system.
- Excessive use of major nutrients.
- Transient deficiency (At flowering, seed filling)
- For quality.



Micronutrients Deficiency Symptoms



Boron Deficiency

Zinc Deficiency





Copper

Trophy

- Trophy enhance auxin, strengthen the root which reduces crop lodging
- Increase photosynthesis, which ensure early crop maturity.
- Increase resistance against diseases.
- Give strength against Biotic & a biotic stress.
- Increase production.





Response of Zinc

	Zn Applied Ib/acre				
Zn Source	0	0.1	0.3	1	3
		Grain yie	eld, bu/a	acre	
ZnSO4	62	132	141	131	144
700		104	104	124	1 1 1
200		124	124	134	144
Zn-EDTA		138	139	155	141



Response of Zinc





Boll Feed

- Increase growth and strength of stem.
- Increase pollination, cob length & grain filling improved.
- Increase food transport; ultimately increase grains weight.
- Increased the efficacy of other fertilizers





Effect of Foliar Boron

	G	rain Yie	ld bu/Acre	
Treatment	1997	1998	1999	Mean
Control	249.1	277.7	281.2	269.3
Foliar Boron	255.5	289.8	282.9	276. 0



Recommendation

Growth Stage	Dose Rate	Application
Land Preparation	4 kg/acre Saver	 Fertigation Broadcast Side Dressing
20-35 days of germination	500 ml/acre Trophy	Spray
35-50 days of germination	250 ml/acre Boll Feed	Spray



Guide to Nutrient Deficiency Symptoms

PHOSPHATE shortage marks leaves drying along the color when adequately fed strips along the veins and often a purplish NITHOGEN hunger sign is yellowing that starts at tip and moves along middle of leaf. POTASH deficiency appears as a firing o reddish-purple, particularly on young plants MAGNESIUM deficiency **Never** color on the underside of the lower leaves DESEASE, helminthosporium blight, starts gravish-green color and the nearly to the size of a pencil. DROUGHT causes the in small spots, gradually spreads across leaf tips and edges 0000 causes whitesh leaves roll up đ of lowest have a with Manand R

CHEMICALS may sometimes burn tips, edges of leaves and at other contacts. Tissue dies, leaf becomes whitecap. Plate IV

HEALTHY leaves shine

with a rich dark greet