RAPID SOIL FERTILITY SURVEY & SOIL TESTING INSTITUTE
Thokar Niaz Baig, Lahore, Ph: +92 42 99233581, 99233587 E-mail: director_sfri@yahoo.com

No. 572-23 /
Dated Lahore, the
28-03-22

To

1. To All Principal/Senior Scientists Field, SFRI, Punjab
2. All Chief/Principal/Senior Scientists Incharges of Divisional and District Labs, SFRI

SUBJECT: ANNUAL PROGRAM OF RESEARCH WORK FOR RABI 2021-22

1. Approved Annual Research Program of Work for Rabi 2021-22 is being circulated here. Effort has been made to make this document a comprehensive one. Research findings for each experiment conducted in the previous season are written in the form of simple text messages for our Agricultural Scientists. All Lab and Field incharges at Divisional and District level are required to carefully read these research findings for making fertilizer recommendations to farmers.
2. All Divisional/District Lab Incharges are required to distribute a copy of this Annual Program of Research Work to each Scientist working under your Administrative Supervision, as well as to the Deputy and Assistant Directors of the Agriculture Extension Department, for communicating research findings effectively to our farming community.
3. All SFOs/ASFOs are directed to implement the program as sowing plans for these studies have already been conveyed to you.
4. All laboratory Incharges are also required to complete the Lab Studies and submit the data to SFO Faisalabad on a timely basis.
5. All Lab and Field Incharges are required to take this ARP Rabi 2021-22 document as SFRI Guide No 8.

28/3/22

(Dr. Muhammad Akram Qazi)
Chief Scientist
Rapid Soil Fertility Survey & Soil Testing Institute, Punjab, Lahore

Scanned with CamScanner

SFRI GUIDE 8

(19-03-2022 Final)

ANNUAL PROGRAMME OF RESEARCH WORK

FOR

RABI, 2021-22

SOIL FERTILITY SURVEY & SOIL TESTING INSTITUTE

LAHORE

SOIL FERTILITY RESEARCH INSTITUTE, PUNJAB, LAHORE

Contents

TITLE	PLAN	PAGE
On Going Plans		
1. Wheat Crop		
• Fertilizer response curve studies on Wheat in irrigated areas.	72	5
• Fertilizer response curve studies on wheat under rainfed conditions	73	8
• Effect of Split application of potash on Wheat.	75	10
• Fertilizer requirement of Wheat advance lines.	79	12
• Micronutrients requirement of Wheat advance lines.	80	14
2 Long/Medium Term Studies on IPNM and Soil Health		
• Evaluation of leguminous crop in Rice-Wheat cropping system to improve soil fertility.	71	16
• Comparison of compost, FYM and green manure for incremental build-up of organic matter in soil and economicsof their use inWheat-Maize& Wheat-Rice cropping systems.	92	20
• Effect of residue incorporation through residue chopper on yield of wheat	76	22
3 Thal Specific Studies		
• Possibility of foliar spray of nutrients on Grams on Rainfed Sandy soils inThal	51	24
4. Vegetables		
• Fertilizer response curve studies on Turnip.	54	26
• Study the possibility of using micronutrients and sulfur to control Potato scab.	56	28
• Fertilizer response curve studies on Potatoes.	58	30
• Fertilizer response curve studies on Peas.	99	33
• Micronutrient requirements of cauliflower	60	36
• Best fertilizer combinations for pumpkin (Ghia kaddu)	61	38
• Nutrient requirements of water melon (Tarbooz)	62	40
• Nutrient requirements of apple gourd (Tinda)	63	42
• Nutrient requirements of bitter gourd (Karela)	64	44
• Nutrient requirements of okra (Bhindi tori)	66	46
• Nutrients requirements of cucumber (Kheera) outside tunnel	67	48
5. Ispaghol		
• Fertilizer requirements of Ispaghol.	70	50
6. Mango Orchards		

• Boron requirement of Mango (Chaunsa) orchards.	74	52
• Zinc requirement of Mango orchards.	83	53
7. Guava Orchards		
• Fertilizer requirements of Guava Orchards.	86	55
8. Citrus Orchards		
• Effect of soil application of micronutrients on yield of Citrus.	90	57
• Nutrients management in relation to disease control Citrus.	95	60
• Effect of calcium and magnesium application on fruit yield of citrus orchards in Thal zone (Layyah+Bhakkar)	97	61
9 Olive		
• Best combination of nutrients for olives in Pothwar (New)	53	63
10. Maize (Spring)		
• Fertilizer response curve studies on Spring Maize.	81	65
11. Sugarcane		
• Fertilizer response curve studies on Sugarcane advance lines.	52	68
• Fertilize response curve studies on Sugarcane new variety	65	70
• Effect of copper sulphate application on sugarcane new variety (Revised)	55	72
12. Lab Studies		
1. Toxic metalo-pollution and ecological risk assessment of Indus basin and hill torrents in Dera Ghazi Khan	49	74
2. Sulfur status of Punjab soils	50	75
3. Testing and maintaining the proficiency of divisional labs through InterLab comparison	39	76
4. Compost preparation of excellent quality to minimize environmental repercussions and for use as soil amendment	40	77
13. Concluded Plans		
• Comparison of efficiency of 'Urea + DAP' with 'Nitrophos + CAN' combinations as to be used per their recommended times for Wheat crop.	91	79
• Field evaluation of IPNI-Nutrient Expert fertilizer model for Wheat.	94	81
• Effect of mineral nutrition through foliar application on mitigation of disease incidence in citrus	96	83
• Bio-Fortification of Spring Maizefor Zinc and Iron.	88	86
• Effect of different sources of sulphur on the Sugarcane yield.	59	89
• Series wise K fixation studies on irrigated Wheat	93	91
• Best combination of NPK for Grapes grown under high efficiency irrigation system (Drip Irrigation).	85	93
14. New Plans		
• Possibility of reduction of nitrogen dose for wheat keeping P constant (New-1)	57	95
• Possibility of reduction of phosphorus application levels for wheat through	68	96

application of sulphur under farmer conditions (New-2)		
• **Possibility of reduction of phosphorus application levels through Bio-stimulant for wheat (New-3)**	**69**	**97**
• **Fertilizer requirements of Kinnow orchards in Thal zone (New-4)**	**89**	**99**
• **Using hydrogel on wheat in Thal zone to improve fertilizer use efficiency (irrigated trial) (New-5)**	**82**	**100**
• **Nutrient requirements of sunflower (spring crop) (New-6)**	**77**	**101**
• **Study of the effect of precipitation methodologies on determination of P_2O_5 contents in different phosphate fertilizer products (New-7)**	**78**	**102**
• **Effect of foliar application of moringa leaf extract on wheat yield (New-8)**	**84**	**103**
• **Response of wheat to different levels of magnesium fertilizer (New-9)**	**87**	**104**
• **Effect of molasses on soil properties in sugarcane crop (New-10)**	**100**	**105**
• **Fertilizer requirement of young Mango orchards (New-11)**	**101**	**106**
• **Fertilizer requirement of young Citrus orchards (New-12)**	**98**	**107**
15. ANNEXURES		
Annexure-1. Plan 95 Citrus Results		**108**
Annexure-2. Plan-39 Interlab Comparison Results		**134**
Annexure-3. Left over data		**148**
Annexure-4. List of experiments included in current report		**158**
Annexure-5. Post Harvest Soil Analysis Data		**169**

Prepared by: Dr. Muhammad Nadeem Iqbal, Principal Scientist, Soil Fertility, Faisalabad

Checked by: Dr. Muhammad Akram Qazi, Chief Scientist, Soil Fertility Research Institute, Lahore

I N T R O D U C T I O N

The fertility status of soils under cultivation is usually variable. It is affected by cultural practices like crop rotation, manuring, fertilizer application, irrigation and crop uptake of nutrients. Therefore, it is highly imperative to maintain fertility of soils at a level where nutrients are available to the growing plants in adequate quantities for realizing actual potential of different crops. The intensive cropping has resulted in deficiencies of various nutrients in the soils and has become a limiting factor for plant growth and optimum yields. It necessitates that these deficiencies be diagnosed promptly through soil testing, tissue analysis, field experimentation and replenished timely for obtaining optimum crop yields.

Simple fertilizer experimentation on farmers` fields is a well-established technique for diagnosing nutrient deficiencies in the soil and determining fertilizer needs of crops. In principle, this technique involves conducting trials on farmers` fields under varying agro-ecological conditions. This practice although is time consuming but remains the most reliable method of diagnosing nutrient deficiencies and finding out the fertilizer requirements of different crops.

The primary objectives of soil fertility investigations are to:

- To Monitor the fertility status of soils under different cropping systems and indexation of nutrients
- To workout response of crops under different agro-ecological zones and formulation of economic optimum fertilizer recommendations
- To appraise the best fertilizer combination according to the prevailing practice of tunnels growers
- To find out the best time and method of fertilizer application.
- To evaluate the comparative Agronomic Efficiency of different nutrient sources
- To find out the micronutrients requirements of different crops
- To render advisory service pertaining to soil, water, plant and fertilizer analysis to the farming community

DETAIL OF PLANS UNDERTAKEN DURING

RABI, 2021-22

On Going Plans =36

New Plans = 12

Concluded Plans = 8

Total = 56

DETAIL OF CROPS WISE EXPERIMENTS INCLUDED IN RABI, 2020-21	
Crops	**Experiments Conducted**
Wheat	**136**
Potato	**13**
Vegetables	**34**
Olive	**01**
Gram	**04**
Mango Orchard	**01**
Grapes Orchard	**01**
Guava Orchard	**02**
Citrus Orchard	**42**
Maize (Spring)	**29**
Ispaghol	**02**
Sugarcane	**24**
Total	**289**

1. On Going Plans

1. WHEAT CROP

PLAN-72

FERTILIZER RESPONSE CURVE STUDIES ON WHEAT IN IRRIGATED AREAS

OBJECTIVE Formulation of fertilizer recommendations

RESEARCH WORKER (S) Muhammad Akram Qazi, Muhammad Nadeem Iqbal, Zia Chishti, Nadeem Raza, Nadeem Hussain Rab Nawaz, M. Zahid Khan, Iftikhar Ahmad, M. Tahir Akbar, Nafeesa Muslim, Abdul Rauf, M. Bilal Khan, Mahreen Khalid, Muhammad Shakir

PROJECT DURATION 2018-19 to 2021-22

LOCATION All zones in the Punjab

P72.1: TREATMENT/ METHODOLOGY

	Nutrients (kg/ha)		
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	0	0
2	0	114	60
3	53	114	60
4	106	114	60
5	**160**	**114**	**60**
6	212	114	60
7	160	0	60
8	160	57	60
9	160	171	60
10	160	114	0
11	160	114	30

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K and ½ N at sowing by broadcast. Apply Zn (5kg/ha), B (1kg/ha), Fe (10kg/ha) and Mn (10kg/ha) as basal dose at sowing on soil test basis only.
2. Remaining ½ N at first irrigation.

Sub plot size: T-1 and T-2 = $1/80^{th}$ ha and others = $1/40^{th}$ ha.

Layout: R.C.B.D. (3 Replications)

OBSERVATIONS AND DATA COLLECTION

1. Grain and straw yield
2. Pre-sowing and post harvestsoil analysis
3. Plant population data

P72.2:PREVIOUS YEAR'S RESULT (2020-21)

Wheat grain yield (kg/ha)								
Tr. No.	Nutrients (kg/ha)			Rice zone 4(12R)*	Central zone 11(33R)*	Cotton zone 13(39R)*	Thal zone 2(6R)*	Overall 30(90R)*
	N	P_2O_5	K_2O					
1	0	0	0	1731 i	1551 i	1346 j	1113 e	1457 j
2	0	114	60	2587 h	2249 h	2551 i	1351 e	2365 i
3	53	114	60	3492 f	3378 f	3311 g	2282 d	3291 g
4	106	114	60	4175 d	4083 d	4021 e	3214 c	4011 e
5	**160**	**114**	**60**	4823 bc	4622 b	4826 c	4092 b	4702 c
6	212	114	60	4860 b	4588 b	5113 b	4168 b	4824 b
7	160	0	60	3062 g	2990 g	3015 h	3002 c	3011 h
8	160	57	60	3743 e	3737 e	3761 f	3831 b	3754 f
9	160	171	60	5167 a	4829 a	5703 a	4566 a	5235 a
10	160	114	0	4296 d	4363 c	4453 d	3917 b	4363 d
11	160	114	30	4608 c	4543 bc	4705 c	4099 b	4592 c
LSD 0.05				**229**	**180**	**176**	**366**	**118**

In all crop zones, the crop responded to varying NPK doses that were applied. However, an increased dose of P at 171 kg/ha (T9) resulted in the highest production on an overall basis, demonstrating that P fertiliser can be effective even at levels above the recommended level of 114 kg/ha.

* No of experiments.

P72.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Rice zone 4(12R)*		Central zone 11(33R)*		Cotton zone 13(39R)*		Thal zone 2(6R)*		Overall 30(90R)*	
	Avg.	Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.	Range
EC (dS m^{-1})	1.5	0.8 - 2.4	2.0	1.2 - 3.5	2.5	0.7 - 4.0	1.2	0.7 - 1.8	2.1	0.7 - 4.0
pH	8.0	7.7 - 8.2	8.2	7.7 - 8.4	8.2	7.9 - 8.4	8.3	8.0 - 8.4	8.2	7.7 - 8.4
OM%	0.7	0.7 - 0.8	0.9	0.4 - 1.7	0.7	0.5 - 1.0	0.6	0.5 - 0.6	0.7	0.4 - 1.7
P (ppm)	3.9	1.1 - 5.8	5.6	2.5 - 7.9	7.7	6.2 - 8.9	6.2	5.4 - 7.0	6.4	1.1 - 8.9
K (ppm)	101	42 - 137	155	120 - 180	148	87 - 240	110	100 - 120	143	42 - 240

* No of experiments.

P72.4: FERTILIZER PREDICTION(2020-21)

Ricezone 4(12R)*							
Nutrients & Wheatgrain yield (kg/ha)		**N**	**Yield**	**P_2O_5**	**Yield**	**K_2O**	**Yield**
Economical rate	MRR=1	**192**	4860	**81**	4245	**22**	4758
Max. Profit	MRR=2	**172**	4776	**-**	-	**15**	4657

Central zone 11(33R)*							
Nutrients & Wheatgrain yield (kg/ha)		**N**	**Yield**	**P_2O_5**	**Yield**	**K_2O**	**Yield**
Max. Profit	MRR=1	**167**	4585	**62**	3923	**7.22**	4456
Economical rate	MRR=2	**154**	4527	**-**	-	**-**	-

Cotton zone 13(39R)*							
Nutrients & Wheatgrain yield (kg/ha)		**N**	**Yield**	**P_2O_5**	**Yield**	**K_2O**	**Yield**
Max. Profit	MRR=1	**319**	5785				
Economical rate	MRR=2	**280**	5613				

Thal zone 2(6R)*							
Nutrients & Wheatgrain yield (kg/ha)		**N**	**Yield**	**P_2O_5**	**Yield**	**K_2O**	**Yield**
Max. Profit	MRR=1	**225**	4312				
Economical rate	MRR=2	**206**	4229				

Overall zone 30(90R)*							
Nutrients & Wheatgrain yield (kg/ha)		**N**	**Yield**	**P_2O_5**	**Yield**	**K_2O**	**Yield**
Max. Profit	MRR=1	**209**	4860	**91**	4310	**14.48**	4583
Economical rate	MRR=2	**188**	4771	**-**	-	**2.41**	4415

On an overall basis, N application up to 188 kg/ha was economical at current prices, while 209 kg/ha was optimal for-profit maximisation. The application of P@91 kg/ha was deemed to be profitable.

Nutrients Price/kg (N=Rs. 77, P=Rs. 297 , K=Rs.260/kg)

Urea-1768, **SOP**-6498, **DAP**-7515/bag

Wheat Crop Price (Rs.1800/40kg) (Rs. 45 /kg)

[(MRR+1)*(Fp/Cp)-b]/2C

PLAN-73

FERTILIZER RESPONSE CURVE STUDIES ON WHEAT UNDER RAINFED CONDITIONS

OBJECTIVES

- Evaluation of nutritional requirement of wheat
- Formulation of fertilizer recommendations for rainfed area

RESEARCH WORKER (S) Abdul Waheed, Sher Afzal, Muhammad Nadeem Iqbal

PROJECT DURATION 2018-19 to 2021-22

LOCATION Rainfed Tract

P73.1: TREATMENT/ METHODOLOGY

Tr. No.	Nutrients (Kg/ha) N	P_2O_5	K_2O
1	0	0	0
2	0	90	60
3	30	90	60
4	60	90	60
5	**90**	**90**	**60**
6	120	90	60
7	90	0	60
8	90	45	60
9	90	135	60
10	90	90	0
11	90	90	30

TIME AND METHOD OF FERTILIZER APPLICATION

All N, P and K to be applied at sowing by broadcast

Sub plot size: T_1 and T_2 =1/80th ha and others = 1/40th ha

Lay out: R.C.B.D. (3 Replications)

OBSERVATIONS AND DATA COLLECTION

1. Grain and straw yield
2. Pre- sowing soil analysis
3. Plant population data
4. Rainfall data

P73.2:PREVIOUS YEAR'S RESULT (2020-21)

Nutrients (kg/ha)				Wheat yield (kg/ha)	Pre-sowing SOIL ANALYSIS		
Tr. No.	N	P_2O_5	K_2O	Barani zone 2(6R)*	Soil parameters	Barani zone 2(6R)*	
						Average	Range
1	0	0	0	3012 e	**EC (dS m^{-1})**	0.7	0.4 - 1.0
2	0	90	60	3292 e	**pH**	7.2	7.1 - 7.4
3	30	90	60	3775 d	**OM%**	0.7	0.6 - 0.7
4	60	90	60	4065 cd	**P (ppm)**	5.0	4.8 - 5.2
5	**90**	**90**	**60**	4250 bc	**K (ppm)**	88	86 - 90
6	120	90	60	4782 a			
7	90	0	60	3802 d			
8	90	45	60	4262 bc			
9	90	135	60	4668 a			
10	90	90	0	4303 bc			
11	90	90	30	4497 ab			
			LSD 0.05	**297**			

T6@120-90-60 kg/ha of NPK generated the best grain production in rainfed wheat, but was comparable to T11@90-90-30 kg/ha.

* No of experiments.

P73.3: FERTILIZER PREDICTION (2020-21)

Barani zone 2(6R)*							
Nutrients & Wheat yield (kg/ha)		N	Yield	P_2O_5	Yield	K_2O	Yield
Max. Profit	MRR=1	**115**	4413	-	-	4.61	4362
Economical rate	MRR=2	**99**	4344	-	-	-	-

For rainfed wheat, N@99kg/ha was a cost-effective dose (MRR=2), while 115kg/ha was a profit-maximizing dose (MRR=1).

Nutrients Price/kg (N=Rs. 77, P=Rs. 297, K=Rs.260/kg)

Urea-1768, **SOP**-6498, **DAP**-7515/bag

Wheat Crop Price (Rs.1800/40kg) (Rs. 45 /kg)

PLAN-75

EFFECT OF SPLIT APPLICATION OF POTASH ON WHEAT

OBJECTIVES To determine the effect of splitting of Potash on wheat crop yield

RESEARCH WORKER (S) Muhammad Akram Qazi, Zia Chishti,NadeemRaza, Nadeem Hussain, RabNawaz, M. Zahid Khan, Abdul Waheed, Iftikhar Ahmad, M. Tahir Akbar, Nafeesa Muslim, Muhammad Saleem, Muhammad Nadeem Iqbal, Hafiz Riaz Ahmad, Samina Hamid

PROJECT DURATION 2019-20 to 2021-22

LOCATION Throughout Punjab

P75.1 TREATMENT/ METHODOLOGY

Nutrients (kg/ha)				
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Potash Application**
1	160	114	0	-
2	160	114	60	All K at sowing
3	160	114	30	All K at sowing
4	160	114	60	½ K at sowing, Half K at booting stage
5	160	114	0	Two foliar sprays of Potash SOP@ 2% at booting stage with 15 days interval before heading
6	160	114	0	Two foliar sprays of Potash SOP@ 2%. One after complete tiller formation; One when heads just start emerging (Stage 10.1)
Note: SOP will be used as source of Potash				

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P and half N to be applied at sowing
2. Remaining half N at first irrigation
3. Potash to be applied according to treatment

Sub plot size: 1/40th of a hectare

Lay out: R.C.B.D. (Replicated 3 repeats)

OBSERVATIONS AND DATA COLLECTION

1. Number of fertile tillers per meter square
2. 1000 grain weight
3. Grain and straw yield
4. Pre- and post-harvest soil analysis

P75.2:PREVIOUS YEAR'S RESULT (2020-21)

Average wheat yield (kg/ha)

Tr. No.	Nutrients (kg/ha)				Rice zone 5(15R)*	Central zone 9(27R)*	Cotton zone 13(39R)*	Thal zone 2(6R)*	Barani Irrigated zone 1(3R)*	Overall 30(90R)*
	N	P_2O_5	K_2O	Potash Application						
1	160	114	0	-	4313 c	4064 c	4329 e	3819 b	5807 e	4262 d
2	160	114	60	All K at sowing	4694 a	4741 a	5251 a	4286 a	6833 d	4993 a
3	160	114	30	All K at sowing	4435 bc	4509 b	4779 c	3907 b	6500 d	4640 c
4	160	114	60	½ K at sowing, Half K at booting stage	4622 a	4692 a	5075 b	4386 a	6967 a	4902 b
5	160	114	0	Two foliar sprays of Potash@ 2% at booting stage with 15 days interval before heading	4567 ab	4489 b	4623 d	3887 b	6667 c	4592 c
6	160	114	0	Two foliar sprays of Potash @ 2%. One after complete tiller formation; One when heads just start emerging (Stage 10.1)	4566 ab	4462 b	4669 cd	3863 b	6767 bc	4606 c
				LSD 0.05	**177**	**136**	**150**	**317.94**	**121**	**88**

Splitting K did not improve wheat yields overall; rather, it depressed yields marginally (T2 vs T4). In the Rice, Central, and Thal zones, adding K with or without splitting resulted in an equal (T2=T4) (T2=T4). Splitting, on the other hand, decreased yield in the Cotton zone while increasing yield in the Barani zone.

* No of experiments.

P75.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Rice zone 5(15R)*		Central zone 9(27R)*		Cotton zone 13(39R)*		Thal zone 2(6R)*		Barani Irrigated Zone 1(3R)*	Overall 30(90R)*	
	Avg.	Range	Avg.	Range	Avg.	Range	Avg.	Range	Value	Avg.	Range
EC (dS m^{-1})	1.2	0.8 - 2.1	1.7	1.2 - 2.4	2.4	0.7 - 3.6	1.4	1.2 - 1.6	1.1	1.9	0.7 - 3.6
pH	7.9	7.3 - 8.4	8.1	7.8 - 8.2	8.2	7.6 - 8.5	8.4	8.2 - 8.5	7.5	8.1	7.3 - 8.5
OM%	0.7	0.5 - 0.8	0.8	0.5 - 1.5	0.6	0.3 - 0.7	0.6	0.6 - 0.6	0.7	0.7	0.3 - 1.5
P (ppm)	4.8	3.4 - 5.8	6.5	4.3 - 8.4	7.9	6.4 - 9.0	7.0	7.0 - 7.0	4.3	6.8	3.4 - 9.0
K (ppm)	104	40 - 148	190	140 - 270	137	69 - 230	110	100 - 120	120	145	40 - 270

*** No of experiments.**

PLAN-79

FERTILIZER REQUIREMENT OF WHEAT ADVANCE LINES

OBJECTIVE To find out the fertilizer requirement of promising wheat lines/latest variety

RESEARCH WORKER (S) Zia Chishti,NadeemRaza, Muhammad Nadeem Iqbal

PROJECT DURATION 2013-14 to 2021-22

LOCATION Wheat Research Institute, AARI, Faisalabad.

P79.1: TREATMENTS/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	0	0
2	0	114	60
3	53	114	60
4	106	114	60
5	160	114	60
6	212	114	60
7	160	0	60
8	160	57	60
9	160	171	60
10	160	114	0
11	160	114	30

Promising lines as many as supplied by Wheat Research Institute, Faisalabad.

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K and ½ N at sowing by broadcast.
2. Remaining ½ N at first irrigation.

Sub plot size: 1/40th of a hectare or depending upon seed availability.

Layout: R.C.B.D.

OBSERVATIONS AND DATA COLLECTION

1. Grain and straw yield
2. Pre- and post-harvest soil analysis
3. Fertile tillers per square meter
4. 1000 grain weight

P79.2: PREVIOUS YEAR'S RESULTS (2020-21)

Nutrients (kg/ha)				Wheat yield (kg/ha)	Pre-sowing SOIL ANALYSIS	
Tr. No.	N	P_2O_5	K_2O	AARI, FSD 1(3R)* Yield (New Line)	Soil parameters	AARI, FSD 1(3R)* Value
1	0	0	0	2099 h	**EC (dS m^{-1})**	1.9
2	0	114	60	2582 g	**pH**	8.6
3	53	114	60	4017 e	**OM%**	0.6
4	106	114	60	4860 cd	**P (ppm)**	7.4
5	160	114	60	5323 ab	**K (ppm)**	160
6	212	114	60	5006 bc		
7	160	0	60	3209 f		
8	160	57	60	4549 d		
9	160	171	60	5487 a		
10	160	114	0	5006 bc		
11	160	114	30	5182 ab		
			LSD 0.05	**320**		

T5 (160-114-60 kg/ha) and T11 (160-114-30 kg/ha) yielded the highest but were strikingly similar in yield.

* No of experiments.

PLAN-80

MICRONUTRIENTS REQUIREMENT OF WHEAT ADVANCE LINES

OBJECTIVE To find out the micronutrients requirement ofpromising wheat lines.

RESEARCH WORKER (S) Zia Chishti, Nadeem Raza, Muhammad Nadeem Iqbal

PROJECT DURATION 2013-14 to 2021-22

LOCATION Wheat Research Institute, AARI, Faisalabad.

P80.1: TREATMENTS/ METHODOLOGY

Nutrients (kg/ha)							
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Zn**	**B**	**Fe**	**Mn**
1	160	114	60	0	0	0	0
2	160	114	60	5	0	0	0
3	160	114	60	0	1	0	0
4	160	114	60	0	0	10	0
5	160	114	60	0	0	0	10
6	160	114	60	5	1	10	10

Promising lines as many as supplied by Wheat Research Institute, Faisalabad.

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K, Micronutrients and ½ N at sowing by broadcast.
2. Remaining ½ N at first irrigation.

Sub plot size: 1/40th of a hectare.
Layout: R.C.B.D.

OBSERVATIONS AND DATA COLLECTION

1. Grain and straw yield
2. Pre-sowing soil analysis macro and micronutrients
3. Fertile tillers per square meter
4. 1000 grain weight

P80.2: PREVIOUS YEAR'S RESULTS (2020-21)

Nutrients (kg/ha)								Wheat yield (kg/ha)	Pre-Sowing SOIL ANALYSIS	
Tr. No.	N	P_2O_5	K_2O	Zn	B	Fe	Mn	AARI, FSD 1(3R)* Yield (New Line)	Soil parameters	AARI, FSD 1(3R)* Value
1	160	114	60	0	0	0	0	4107 e	**EC (dS m^{-1})**	2.26
2	160	114	60	5	0	0	0	4550 b	**pH**	8.50
3	160	114	60	0	1	0	0	4430 c	**OM (%)**	0.49
4	160	114	60	0	0	10	0	4308 d	**P (ppm)**	9.50
5	160	114	60	0	0	0	10	4319 d	**K (ppm)**	160
6	160	114	60	5	1	10	10	4694 a	**Zn (ppm)**	0.74
							LSD 0.05	**89**	**Fe (ppm)**	2.85
									Mn (ppm)	0.88
									B (ppm)	0.39

The application of all micronutrients resulted in an increase in yield. Combining micronutrient applications resulted in the highest yield (T6).

* No of experiments.

2. LONG/MEDIUM TERM STUDIES ON IPNM AND SOIL HEALTH

PLAN-71

EVALUATION OF LEGUMINOUS CROP IN WHEAT-RICE CROPPING SYSTEM TO IMPROVE SOIL FERTILITY

OBJECTIVE To evaluate the effect of inclusion of legume crop on soil fertility and crop yield in wheat-rice cropping system.

RESEARCH WORKER (S) Muhammad Akram Qazi, Muhammad Shakir, Hafiz Riaz Ahmad, Saima Nazar, Zia Chishti, Muhammad Nadeem Iqbal, Iftikhar Ahmad, Muhammad Saleem

PROJECT DURATION 2012-13 to 2021-22

LOCATION Kasur, Gujranwala, Gujrat, Faisalabad, Vehari and Bahawalnagar

P71-1: TREATMENTS/ METHODOLOGY

OLD SITES

Tr. No.	Crop and Nutrients	
	Wheat crop N- P_2O_5-K_2O (kg/ha)	**Rice crop N-P_2O_5-K_2Okg/ha**
1	No Jantar Recommended NPK(160-114-60)	135-90-60
2	Seasonal Jantar sown in standing wheat crop in mid Marchwith last irrigation) + Recommended NPK (160-114-60)	135-90-60
3	-do-	67.5-45-30

NEW SITES

Tr. No.	Crop and Nutrients	
	Wheat crop N- P_2O_5-K_2O kg/ha	**Rice crop N- P_2O_5-K_2O kg/ha**
1	Recommended NPK(160-114-60) and No Jantar	135-90-60
2	Recommended NPK (160-114-60)Plus Seasonal Jantar sown in thestanding wheat crop in mid Marchwith last irrigation)	135-90-60
3	-Do-	101-90-60
4	-Do-	67.5-90-60
5	-Do-	101-67.5-45
6	-Do-	67.5-45-30

Note: The experiment will be performed on a permanent layout at

least for three years. Data presents the results of successive wheat which first time received nutritional treatments one year earlier.

Crop Rotation: Rice-Wheat Cropping system

TIME AND METHOD OF FERTILIZER APPLICATION

Wheat: All P, K and ½ N will be applied at the time of sowing and remaining ½ N at 1st irrigation.

Rice: All P, K, and ½ N seven days after transplanting, ½ N before 20th of August.

Jantar: No fertilizer

Sub plot size: 1/40th of a hectare.

Layout: R. C. B. D. (Three Replications)

Methodology

Jantar seed will be broadcasted in standing wheat crop in mid of March before last irrigation and irrigated. It will be incorporated into soil just before flowering with rotavator or disc plough.

OBSERVATIONS AND DATA COLLECTION

1. Treatment wise soil analysis (pre-sowing and post-harvest): EC, pH, OM, available P & K
2. Treatment wise plant population data of rice, tillers/m2 of wheat
3. Overall fresh biomass data of Janter (t/ha)
4. Grain and Straw Yield

P71.2:- PREVIOUS YEAR'S RESULTS (2020-21) OLD SITES			
Average Wheat Grain yield (kg/ha) 2020-21			
Nutrients(kg/ha)			(Rice zone)
Tr. No.	Rice crop N- P_2O_5-K_2O kg/ha	Wheat crop N- P_2O_5-K_2O (kg/ha)	Wheat grain yield 2(6R)*
1	135-90-60 No Jantar	No Jantar Recommended NPK(160-114-60)	4118 c
2	135-90-60 + Jantar	Jantar Green Manure + Recommended NPK (160-114-60)	5017 a
3	67.5-45-30+ Jantar	Jantar Green Manure + Recommended NPK (160-114-60)	4590 b
		LSD 0.05	388
Green manure plus half of the recommended fertilizer (T3) resulted in a better paddy yield than recommended fertilizer alone (T1). As a result, if green manure is practiced, more than half of the fertilizer is saved.			
* No of experiments			

P71.3: Pre-Sowing SOIL ANALYSIS (2020-21)OLD SITES		
Soil Parameters	Rice zone 2(6R)*	
	Avg.	Range
EC (dS m^{-1})	0.9	0.5 - 1.3
pH	7.7	7.2 - 8.1
OM%	0.6	0.4 - 0.8
P (ppm)	8.6	4.6 - 12.5
K (ppm)	81	72 - 90
*No. of experiments		

NEW SITES

P71.4:- PREVIOUS YEAR'S RESULTS (2020-21) NEW SITES RICE CROP

Average wheat grain yield (kg/ha)2020-21 New Sites

Nutrients to Rice (kg/ha)					Nutrients to Wheat (Kg/ha)	Rice zone 2(6R)*	Central zone 2(6R)*	Cotton zone 1(3R)*	Overall Average 5(15R)*
Tr. No.	N	P_2O_5	K_2O	Treatments					
1	135	90	60	Recommended NPK dose to Rice crop (No Jantar)	Recommended NPK (160-114-60) and No Jantar	4112	4722	4641	4462
2	135	90	60	100% of Recommended NPK dose to Rice + Jantar	Recommended NPK (160-114-60) Plus Jantar	4172	4760	4726	4518
3	101	90	60	75% of Recommended N dose to Rice + Jantar	-Do-	4238	4749	4686	4532
4	67.5	90	60	50% of Recommended N dose to Rice + Jantar	-Do-	4238	4761	4577	4515
5	101	67.5	45	75% of Recommended NPK dose to Rice + Jantar	-Do-	4252	4745	4458	4490
6	67.5	45	30	50% of Recommended NPK dose to Rice + Jantar	-Do-	4242	4763	4361	4474
					LSD 0.05	**N.S**	**N.S**	**N.S**	**N.S**

Since the same amount of fertilizer was added to wheat, the effects were statistically insignificant.

P71.5: Pre-Sowing SOIL ANALYSIS (2020-21)NEW SITES RICE CROP

Soil Parameters	Rice zone 2(6R)*		Central zone 2(6R)*		Cotton zone 1(3R)*	Overall Average 5(15R)*	
	Avg.	Range	Avg.	Range	Value	Avg.	Range
EC (dS m^{-1})	1.2	1.1 - 1.3	2.9	2.3 - 3.4	2.1	2.0	1.1 - 3.4
pH	7.6	7.4 - 7.7	8.3	8.2 - 8.4	8.4	8.0	7.4 - 8.4
OM%	0.7	0.7 - 0.7	0.9	0.8 - 1.0	0.8	0.8	0.7 - 1.0
P (ppm)	5.1	4.6 - 5.5	7.4	7.4 - 7.4	7.9	6.6	4.6 - 7.9
K (ppm)	55	50 - 60	200	190 – 210	185	139	50 - 210

*No. of experiments

PLAN-92

COMPARISON OF COMPOST, FYM AND GREEN MANURE FOR INCREMENTAL BUILD-UP OF ORGANIC MATTER IN SOIL AND ECONOMICS OF THEIR USE IN WHEAT-MAIZE&WHEAT-RICE CROPPING SYSTEMS

RATIONALE: There is a need to take measures to enhance organic matter in our soils. In this regard, compost, FYM and green manure might be three effective sources of organic matter's enhancement in the soil. However, their economics and capacity of incremental build-up over the time are yet to be tested.

OBJECTIVE To compare compost, FYM and green manure as sources of incremental build-up of organic matter in soil and find out which of the three sources proves most effective and economical for wheat-maize and wheat-rice cropping systems.

RESEARCH WORKER (S) Zia Chishti, Nadeem Raza, Muhammad Nadeem Iqbal

PROJECT DURATION 2017-18 to 2022-23

LOCATION At farm/farmers' field anywhere in the Punjab province.

P92.1: TREATMENT/ METHODOLOGY

For Wheat					
Nutrients (kg/ha)				Organic Matter	
Tr. No.	N	P_2O_5	K_2O	Sources	Time of Application
1	160	114	60	-	-
2	160	114	60	Compost	Alternate year before wheat sowing
3	160	114	60	FYM	Alternate year before wheat sowing
4	160	114	60	Jantar	Once in a year after harvesting of wheat crop

Sub plot size:

Layout: R.C.B.D. Permanent (3 to 5 years)

Replications: Three

CROPS

1. Rice wheat rotation with recommended fertilizers
2. Wheat-seasonal maize rotation with recommended fertilizer

OBSERVATIONS AND DATA COLLECTION

1. Treatment wise soil sampling (0-15 cm & 15-30 cm)
2. Plant population of maize, rice and tillers/m2 of wheat
3. Yield data of crops
4. Calculation of economics of treatments

P92.2:PREVIOUS YEAR'S RESULT (2020-21)

Wheat Nutrients (kg/ha)				Organic Matter		Wheat yield (kg/ha)	Pre-sowing SOIL ANALYSIS	
Tr. No.	N	P_2O_5	K_2O	Sources	Time of Application	PARS, FSD 1(3R)* Avg. Yield	Soil parameters	PARS, FSD 1(3R)* Value
1	0	0	0	-	-	4193 c	**EC (dS m^{-1})**	2.1
2	160	114	60	Compost	Alternate year before wheat sowing	4522 a	**pH**	8.4
3	160	114	60	FYM	Alternate year before wheat sowing	4281 b	**OM%**	1.7
4	160	114	60	Jantar	Once in a year after harvesting of wheat crop	4148 c	**P (ppm)**	6.2
							K (ppm)	180
					LSD 0.05	**78**		

Compost, followed by FYM, was found to produce the highest wheat grain yield in applied treatments.

* No of experiments.

PLAN-76

EFFECT OF RESIDUE INCORPORATION THROUGH RESIDUE CHOPPER ON YIELD OF WHEAT

OBJECTIVE A new machine is being tested to check the impact of rice residue chopping and its incorporation in soil on nutrient requirements of wheat.

RESEARCH WORKER (S) Hafiz Riaz Ahmad, Muhammad Shakir

PROJECT DURATION 2020-21 to 2021-22

LOCATION Kala Shah Kaku farm

TREATMENTS/ METHODOLOGY

Tr. No.	Treatments before Wheat Sowing	Nutrients (kg/ha)	
		Wheat N- P_2O_5-K_2O	Basmati Rice N- P_2O_5-K_2O
1	Rice Residue Burning after combine	0-0-0	101-68-45
2	Rice Residue Burning after combine	160-114-60	101-68-45
3	Rice Residue incorporation through chopper followed by rotavator	0-0-0	101-68-45
4	-do-	80-57-30	101-68-45
5	-do-	120-85.5-45	101-68-45
6	-do-	160-114-60	101-68-45
Note: There will be no difference of fertilizer in treatments in rice but rice yield data will be taken.			

TIME AND METHOD OF FERTILIZER APPLICATION TO WHEAT

All N, P, K at sowing.

Rotation: Rice-Wheat

Sub plot size: 1/40th of a hectare

Methodology:

1. In T1 and T2, rice residues will be burnt after combine.
2. In T3, T4, T5 and T6, harvesting will be done by combine harvestor. Rice residues will be incorporated by chopper and followed by rotavator for mixing

Layout: Permanent (**Replications**=3)

OBSERVATIONS AND DATA COLLECTION

1. Pre-sowing soil analysis
2. Wheat parameters: Grain and straw yield, Plant Height (cm), Number of spikes per square meter, 1000-Grain Weight (gm)
3. Rice plant population, Paddy yield straw and grain

P76.2:PREVIOUS YEAR'S RESULT (2020-21)

Tr. No.	Nutrients (kg/ha) Treatments before Wheat Sowing	Wheat N- P_2O_5-K_2O	Basmati Rice N- P_2O_5-K_2O	Average Wheat yield (kg/ha) RiceZone 1(3R)*	
1	Rice Residue Burning after combine	0-0-0	101-68-45	2256 c	
2	Rice Residue Burning after combine	160-114-60	101-68-45	4543 a	
3	Rice Residue incorporation through chopper followed by rotavator	0-0-0	101-68-45	2183 c	
4	-do-	80-57-30	101-68-45	3959 b	
5	-do-	120-85.5-45	101-68-45	4087 b	
6	-do-	160-114-60	101-68-45	4510 a	
			LSD 0.05	**143**	

Since it was the commencement of the experiment. As a result, T2 equaled T6. Reduced fertilizer application to wheat resulted in a drop in yield.

* No of experiments.

P76.3:PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Rice Zone 1(3R)*	
	Value	
EC (dS m^{-1})	0.9	
pH	8.2	
OM%	0.7	
P (ppm)	4.7	
K (ppm)	129	

3. THAL STUDIES

PLAN-51: POSSIBILITY OF FOLIAR SPRAY OF NUTRIENTS ON GRAMS ON RAINFED SANDY SOILS OF THAL ZONE

OBJECTIVES To explore response of nutrients application through foliar spray on grams in sands in Thal area (Rainfed)

RESEARCH WORKER (S) Zia Chishti, Nadeem Hussain, Iftikhar Ahmad, M. Bilal Khan, Muhammad Akram Qazi, Muhammad Nadeem Iqbal

PROJECT DURATION 2019-20 to 2021-22

LOCATION Rainfed Thal Tract (Farm and Farmer's field)

P51.1; TREATMENT/ METHODOLOGY

Tr. No.	Fertilizer
1	Control (No foliar spray)
2	Foliar Spray (Urea @2%, three sprays)
3	Foliar Spray (MAP @2%, three sprays)
4	Foliar Spray NPK (17:17:10) @2% three sprays
5	Foliar spray (SOP @2%, three sprays)

Methodology:

1. Experiment will be conducted where No Fertilizer has been applied to soil.
2. First spray will be carried out between 10-15 December
3. Second spray will be carried out between 20 to 30 January
4. Third spray will be carried out between 20 to 25 February

Sub plot size: 1/40th of a hectare

Lay out: R.C.B.D. (Replicated 3 Replications)

OBSERVATIONS AND DATA COLLECTION

1. Grams yield
2. Treatment-wise Plant population on per acre basis
3. Pre sowing soil analysis
4. Rainfall data

P51.2:PREVIOUS YEAR'S RESULT (2020-21)

Average Gram yield (kg/ha)

Tr. No.	Fertilizer	Central zone Khushab 2(6R)*	Cotton zone M/Garh 1(3R)*	Thal zone Bhakkar 1(3R)*	Overall 4(12R)*
1	Control (No foliar spray)	743 e	567 c	556 c	652 d
2	Foliar Spray (Urea @2%, three sprays)	1209 c	924 b	611 bc	988 c
3	Foliar Spray (MAP @2%, three sprays)	1198 d	961 ab	718 b	1019 c
4	Foliar Spray NPK (17:17:10) @2% three sprays	1559 a	1123 a	941 a	1296 a
5	Foliar spray (SOP @2%, three sprays)	1271 b	999 ab	937 a	1119 b
	LSD 0.05	11	183	121	80

The application of foliar fertilizer resulted in an increase in gram yields. The majority of locations reported that foliar NPK spraying resulted in the highest yields. The best yield was obtained in T4 when NPK(17:17:10 @2% three sprays) was applied as a foliar spray.

* No of experiments.

P51.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Central zone Khushab 2(6R)*		Cotton zone M/Garh 1(3R)*	Thal zone Bhakkar 1(3R)*	Overall 4(12R)*	
	Avg.	Range	Value	Value	Avg.	Range
EC (dS m^{-1})	1.06	0.98-1.13	1.12	1.50	**1.18**	**0.98-1.50**
pH	7.9	7.8-8.0	8.2	8.3	**8.1**	**7.8-8.3**
OM%	0.83	0.83-0.83	0.58	0.57	**0.70**	**0.57-0.83**
P (ppm)	6.6	6.4-6.8	7.1	5.0	**6.3**	**5.0-7.1**
K (ppm)	173	170-176	90	120	**176**	**90-176**

* No of experiments.

2. VEGETABLES

PLAN-54

FERTILIZER RESPONSE CURVE STUDIES ON TURNIP

OBJECTIVE

- Evaluation of nutrients requirement of turnip.
- Formulation of fertilizer recommendations.

RESEARCH WORKER (S) Nadeem Raza,Zia Chishti

PROJECT DURATION 2019-20 to 2021-22

LOCATION All Punjab

P54.1: TREATMENT/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	57	63
2	40	57	63
3	60	57	63
4	80	57	63
5	100	57	63
6	80	85	63

TIME AND METHOD OF FERTILIZER APPLICATION

All P, K and ½ N at transplanting, Remaining ½ N after one month of transplanting

Sub plot size: 1/40th of a hectare

Layout: R.C.B.D. (Replicated)

OBSERVATIONS AND DATA COLLECTION

1. Pre Sowing Soil analysis
2. Yield data

P54.2:PREVIOUS YEAR'S RESULT (2020-21)

Average Turnip yield (t/ha)

Tr. No.	Nutrients (kg/ha)			Rice zone 2(6R)*	Central zone 2(6R)*	Cotton zone 1(3R)*	Overall 5(15R)*
	N	P_2O_5	K_2O				
1	0	57	63	15.07 c	22.44 c	20.09 c	19.02 d
2	40	57	63	19.32 b	24.20 c	23.82 b	22.17 c
3	60	57	63	21.91 a	26.46 b	23.93 b	24.14 b
4	80	57	63	23.66 a	26.66 b	26.13 ab	25.36 ab
5	100	57	63	23.39 a	27.42 a	27.66 a	25.86 a
6	80	85	63	23.07 a	27.75 a	27.06 ab	25.74 a
LSD 0.05				**2.57**	**0.61**	**3.54**	**1.22**

In all zones, T5 (100-57-63 kg/ha) was the top yielder of turnip crop, with a statistically significant yield equal to T6 (80-85-63 kg/ha).

* No of experiments.

P54.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Rice zone 2(6R)*		Central zone 2(6R)*		Cotton zone 1(3R)*	Overall 5(15R)*	
	Avg.	Range	Avg.	Range	Value	Avg.	Range
EC (dS m^{-1})	1.3	0.9 - 1.6	2.2	1.3 - 3.1	0.3	1.4	0.3 - 3.1
pH	8.2	8.1 - 8.3	8.3	8.2 - 8.4	8.0	8.2	8.0 - 8.4
OM%	0.6	0.6 - 0.6	1.0	0.8 - 1.3	0.7	0.8	06 - 1.3
P (ppm)	8.3	4.4 - 12.2	9.9	9.2 - 10.5	5.9	8.4	4.4 - 12.2
K (ppm)	128	112 - 144	185	180 - 190	174	160	112 - 190

* No of experiments.

PLAN-56

STUDYING THE POSSIBILITY OF USING MICRONUTRIENTS AND SULFUR TO CONTROL POTATO SCAB

OBJECTIVE To find out the possibility of using micronutrients iron, manganese and sulfur in controlling potato scab

RESEARCH WORKER (S) Zia Chishti, Nadeem Raza, Abdul Waheed, Iftikhar Ahmad, Nafeesa Muslim, Muhammad Shakir, Hafiz Riaz Ahmad

PROJECT DURATION 2019-20 to 2021-22

LOCATION All Punjab potato growing areas

P56.1: TREATMENT/ METHODOLOGY

Nutrients (Kg/ha)				
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Others chemicals**
1	250	125	125	0
2	250	125	125	Fe@10 kg/ha
3	250	125	125	Mn@6kg/ha
4	250	125	125	Elemental Sulfur @22kg/ha
5	250	125	125	Fe+Mn+S

During 2022, in Pothwar dose of elemental sulphur will be 30kg/ha

TIME AND METHOD OF FERTILIZER APPLICATION

1. Micronutrients (Iron and Manganese) will be applied at sowing.
2. Sulfur will be applied preferably one month before sowing if feasible

(All Divisions except Rawalpindi+Pothwar Spring Crop)

1. ⅓N with all P & K at sowing
2. ⅓N after one month of germination
3. ⅓N after two months of germination

Pothwar Autumn Crop

1. ⅓N with all P & K at sowing
2. ⅓N about 15 -20 days after germination
3. ⅓N in beginning of November

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

Replications: Three

OBSERVATIONS AND DATA COLLECTION

1. Soil analysis of each site (Pre sowing)
2. Periodic observations on plant growth and pest/disease Weather / climatic conditions during the growth cycle
3. Plant population
4. Yield data

P56.2:PREVIOUS YEAR'S RESULT (2020-21)

Average Potato yield (t/ha)

Tr. No.	Nutrients (kg/ha)				Rice zone 1(3R)*	Central zone 2(6R)*	Barani zone (Irrigated) 4(12R)*	Overall 7(21R)*
	N	P_2O_5	K_2O	Others chemicals				
1	250	125	125	0	28.48d	22.62	25.68 b	25.20 c
2	250	125	125	Fe@10 kg/ha	32.15bc	23.02	26.09 b	26.08bc
3	250	125	125	Mn@6kg/ha	30.76cd	22.42	25.85 b	25.57 c
4	250	125	125	Elemental Sulfur @22kg/ha	34.25ab	23.18	26.66 b	26.75 b
5	250	125	125	Fe+Mn+S	35.72a	24.04	28.58 a	28.29 a
				LSD 0.05	**3.02**	**N.S**	**1.18**	**0.98**

Potato responded positively (yield 28.29 t/ha) to a combination of micronutrients and sulphur application in addition to the recommended amount of NPK. In the rice zone, elemental sulphur had a beneficial influence on rice production. Manganese and iron, on the whole, exhibited minimal response.

* No of experiments.

P56.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Rice zone 1(3R)*	Central zone 2(6R)*		Barani zone (Irrigated) 4(12R)*		Overall 7(21R)*	
	Value	Avg.	Range	Avg.	Range	Avg.	Range
EC (dS m^{-1})	2.5	1.7	1.6 - 1.8	0.9	0.5 - 1.1	1.3	0.5 - 2.5
pH	8.3	8.1	8.1 - 8.1	7.4	7.3 - 7.5	7.7	7.3 - 8.3
OM%	0.6	0.6	0.6 - 0.7	0.5	0.5 - 0.7	0.6	0.5 - 0.7
P (ppm)	4.6	7.5	7.1 - 7.9	4.7	2.9 - 6.1	5.5	2.9 - 7.9
K (ppm)	80	130	120 - 140	126	80 - 170	121	80 - 170

PLAN-58 (To be concluded during 2021-22)

FERTILIZER RESPONSE CURVE STUDIES ON POTATOES

OBJECTIVE To find out the fertilizer requirement of Potatoes crop

RESEARCH WORKER (S) Zia Chishti, Nadeem Raza, Muhammad Nadeem Iqbal, Abdul Waheed, Iftikhar Ahmad, Nafeesa Muslim

PROJECT DURATION 2017-18 to 2021-22 (final year). The experiment will be continued in Pothwar autumn crop only)

LOCATION Lahore, Rawalpindi, Faisalabad and Multan

P58.1: TREATMENT/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	0	0
2	0	150	150
3	150	150	150
4	**300**	**150**	**150**
5	450	150	150
6	300	0	150
7	300	75	150
8	300	225	150
9	300	150	0
10	300	150	75
11	300	150	225

(All Divisions except Rawalpindi+Pothwar Spring Crop)

1. ⅓N with all P & K at sowing
2. ⅓N after one month of germination
3. ⅓N after two months of germination

Pothwar Autumn Crop (for 2022 autumn)

1. ⅓N with all P & K at sowing
2. ⅓N about 15 -20 days after germination
3. ⅓N in beginning of November.

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

Replications: Three

OBSERVATIONS AND DATA COLLECTION

1. Soil analysis of each site (Pre sowing)
2. Periodic observations on plant growth and pest/disease Weather / climatic conditions during the growth cycle.
3. Yield data.

P58.2:PREVIOUS YEAR'S RESULT (2020-21)

Nutrients (kg/ha)				Average Potato yield (t/ha)		
Tr. No.	N	P_2O_5	K_2O	Central Zone 4(12R)*	Barani Zone (Irrigated) 2(6R)*	Overall Average 6(12R)*
1	0	0	0	16.93 g	16.75 e	16.87 h
2	0	150	150	20.16 f	18.43 de	19.59 g
3	150	150	150	25.91 d	29.99 c	27.27 e
4	**300**	**150**	**150**	30.72 c	34.71 ab	32.05 cd
5	450	150	150	32.11bc	36.29 ab	33.50bc
6	300	0	150	22.44 e	21.29 d	22.05 f
7	300	75	150	27.58 d	30.76 c	28.64 e
8	300	225	150	35.42 a	36.65 a	35.83 a
9	300	150	0	31.66 c	30.57 c	31.29 d
10	300	150	75	32.32bc	33.28bc	32.64 ad
11	300	150	225	34.03 ab	35.67 ab	34.58 ab
LSD 0.05				**2.12**	**3. 34**	**1.87**

T8 at 300-225-150 kg/ha and T11 at 300-150-225 kg/ha had the highest potato yields in the Central Zone. T4 (300-150-150kg/ha) produced the maximum yield in the Barani irrigated zone.

*No. of experiments.

P58.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil Parameters	Central Zone 4(12R)*		Barani Zone(Irrigated) 2(6R)*		Overall Average 6(18R)*	
	Avg.	Range	Avg.	Range	Avg.	Range
EC (dS m^{-1})	1.8	1.3 - 2.2	0.9	0.8 - 1.1	1.5	0.8 - 2.2
pH	8.3	8.1 - 8.5	7.4	7.4 - 7.5	8.0	7.4 - 8.5
OM%	0.8	0.4 - 1.3	0.7	0.6 - 0.7	0.7	0.4 - 1.3
P (ppm)	8.1	6.5 - 10.4	5.4	4.9 - 5.8	7.2	4.9 - 10.4
K (ppm)	165	130 - 210	90	70 - 110	140	70 - 210

*No. of experiments.

P58.4: FERTILIZER PREDICTION

(2020-21)

Central zone 4(12R)*							
Nutrients & Potato yield (kg/ha)		**N**	**Yield**	**P_2O_5**	**Yield**	**K_2O**	**Yield**
Max. Profit	MRR=1	**445**	32.20	**-**	-	**-**	-
Max. Profit	MRR=2	**415**	31.99	**-**	-	**-**	-
At MRR=2, the usage of N up to 415 kg/ha in the Central Zone was found to be cost-effective.							

Barani zone 2(6R)*(Irrigated)							
Nutrients & Potato yield (kg/ha)		**N**	**Yield**	**P_2O_5**	**Yield**	**K_2O**	**Yield**
Max. Profit	MRR=1	**375**	36.31	**179**	36.16	**-**	-
Max. Profit	MRR=2	**361**	36.21	**162**	35.69	**-**	-
At MRR=2, N application up to 361 kg/ha and P2O5 use up to 162 kg/ha were determined to be cost-effective in the Barani Zone.							

Overall zone 6(18R)*							
Nutrients & Potato yield (kg/ha)		**N**	**Yield**	**P_2O_5**	**Yield**	**K_2O**	**Yield**
Max. Profit	MRR=1	**407**	33.40	**243**	36.18	**-**	-
Max. Profit	MRR=2	**386**	33.25	**205**	35.11	**-**	-
At MRR=2, N use up to 386 kg/ha and P2O5 use up to 205 kg/ha were determined to be cost-effective on an overall basis.							

Nutrients Price/kg (N=Rs. 77, P=Rs. 297 , K=Rs.260/kg)

Urea-1768, **SOP**-6498, **DAP-**7515/bag

Potato Crop Price (Rs- 2000/120kg) (Rs-16.7/kg)

PLAN-99

FERTILIZER RESPONSE CURVE STUDIES ON PEAS

OBJECTIVE Formulation of fertilizer recommendations

RESEARCH WORKER (S) Zia Chishti,Muhammad Shakir, Iftikhar Ahmad, Nafeesa Muslim, Samina Hamid

PROJECT DURATION 2018-19 to 2021-22

LOCATION Throughout Punjab

P99.1; TREATMENT/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	0	0
2	0	36	25
3	38	36	25
4	**76**	**36**	**25**
5	114	36	25
6	152	36	25
7	76	0	25
8	76	18	25
9	76	54	25
10	76	36	0
11	76	36	50

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K and ½ N at sowing.
2. Half N at flowering.

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

OBSERVATIONS AND DATA COLLECTION

1. Pre-sowing soil analysis.
2. Green Peas yield.

P99.2:PREVIOUS YEAR'S RESULT (2020-21)

Average Peas yield (t/ha)

Tr. No.	Nutrients (kg/ha)			Rice zone 1(3R)*	Centralzone 2(6R)*	Cotton zone 1(3R)*	Overall 4(12R)*
	N	P_2O_5	K_2O				
1	0	0	0	4.18 d	1.92 d	2.26 j	2.57 g
2	0	36	25	4.49 d	2.69 cd	2.86i	3.18fg
3	38	36	25	8.12 c	6.76 ab	3.66 g	6.32 cd
4	**76**	**36**	**25**	10.13 ab	6.15 ab	4.36 f	6.70bcd
5	114	36	25	10.35 ab	7.79 a	5.67 d	7.90ab
6	152	36	25	9.64 b	7.43 ab	6.79 b	7.82 ab
7	76	0	25	7.78 c	3.02 cd	3.26 h	4.27ef
8	76	18	25	8.11 c	4.91bc	4.56 e	5.62de
9	76	54	25	10.74 a	7.36 ab	7.23 a	8.17 a
10	76	36	0	10.11 ab	6.11 ab	4.63 e	6.74bcd
11	76	36	50	10.41 ab	6.45 ab	6.48 c	7.45abc
			LSD 0.05	**0.79**	**2.71**	**0.13**	**1.39**

Overall, T5 (114-36-25), T6 (76-54-25), T9 (76-54-25), and T11 (76-36-50) kg/ha had the best production of peas.

* No of experiments.

P99.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Rice zone 1(3R)*	Centralzone 2(6R)*		Cotton zone 1(3R)*	Overall 4(12R)*	
	Value	Avg.	Range	Value	Avg.	Range
EC (dS m^{-1})	2.8	1.9	1.8 - 1.9	2.2	2.2	1.8 - 2.8
pH	2.0	8.1	7.9 - 8.2	8.0	6.5	2.0 - 8.2
OM%	0.6	0.9	0.8 - 0.9	0.7	0.8	0.6 - 0.9
P (ppm)	4.7	5.7	4.3 - 7.0	7.3	5.8	4.3 - 7.3
K (ppm)	122	155	120 - 190	240	168	120 - 240

* No of experiments.

P99.4: FERTILIZER PREDICTION (2020-21)

Rice zone 1(3R)*							
Nutrients & Peas yield (kg/ha)		**N**	**Yield**	**P_2O_5**	**Yield**	**K_2O**	**Yield**
Max. Profit	MRR=0	**102**	9546	**226**	17101	**-**	-
Economical rate	MRR=1	**97**	9510	**153**	14752	**-**	-
At MRR=0, the application of fertiliser up to N@102 and P2O5@226 kg/ha was practicable.							

Central zone 2(6R)*							
Nutrients & Peas yield (kg/ha)		**N**	**Yield**	**P_2O_5**	**Yield**	**K_2O**	**Yield**
Max. Profit	MRR=0	**124**	12447	**69**	13941	**-**	-
Economical rate	MRR=1	**120**	12414	**65**	13998	**-**	-
At MRR=0, it was possible to apply fertiliser up to N@124 and P2O5@69 kg/ha, respectively.							

Cotton zone 1(3R)*							
Nutrients & Peas yield (kg/ha)		**N**	**Yield**	**P_2O_5**	**Yield**	**K_2O**	**Yield**
Max. Profit	MRR=0	**-**	-	**-**	-	**-**	-
Economical rate	MRR=1	**-**	-	**-**	-	**-**	-

Overall4(12R)*							
Nutrients & Peas yield (kg/ha)		**N**	**Yield**	**P_2O_5**	**Yield**	**K_2O**	**Yield**
Max. Profit	MRR=0	**119**	7118	**129**	10551	**-**	-
Economical rate	MRR=1	**110**	7043	**88**	9233	**-**	-
At MRR=0, application of fertiliser up to N@119 and P2O5@129 kg/ha was practicable on an overall basis.							

Nutrients Price/kg (N=Rs. 77, P=Rs. 297, K=Rs.260/kg)

Urea-1768, **SOP**-6498, **DAP-**7515/bag

Peas Crop Price (Rs. 920/40kg) (Rs. 23/kg)

PLAN-60

MICRONUTRIENT REQUIREMENTS OF CAULIFLOWER

OBJECTIVE To ascertain the response of cauliflower to micronutrients

RESEARCH WORKER (S) M. Zahid Khan, Abdul Waheed,

PROJECT DURATION 2020-21 to 2022-23

LOCATION All Punjab

TREATMENTS/ METHODOLOGY

Nutrients (kg /ha)						
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Zn**	**Fe**	**B**
1	120	100	100	0	0	0
2	120	100	100	5	0	0
3	120	100	100	0	10	0
4	120	100	100	0	0	1.0
5	120	100	100	5	10	1.0

Time and method of fertilizer application

1. All P, K, and ½ N at transplanting.
2. ½ N 30 days after transplanting.
3. Micronutrients i.e. Zn, Fe and B will be added in soil at transplanting according to treatments.

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

Observations and data collection

1. Soil analysis of each site (pre & post).
2. Periodic observations on plant growth and pests / diseases.
3. Weather/climatic conditions during the growth cycle.
4. Yield data.

P60.2:-PREVIOUS YEAR'S RESULTS (2020-21)

Nutrients kg/ha							Average cauliflower yield (Tons/ha) 2020-21		
Tr. No.	N	P_2O_5	K_2O	Zn	Fe	B	Rice zone 1(3R)*	Cotton zone 4(12R)*	Overall Average 5(15R)*
1	120	100	100	0	0	0	28.96	42.09 d	39.47 b
2	120	100	100	5	0	0	34.87	42.59 b	41.04 a
3	120	100	100	0	10	0	33.32	42.49bc	40.66 a
4	120	100	100	0	0	1.0	35.59	42.35 c	40.99 a
5	120	100	100	5	10	1.0	36.00	42.99 a	41.59 a
						LSD 0.05	**N.S**	**0.17**	**1.08**

Even though the application of all micronutrients in conjunction with NPK enhanced the yield, the magnitude of the increase appeared to be small..

*No of experiments

P60.3: Pre-Sowing SOIL ANALYSIS(2020-21)

Soil Parameters	Rice zone 1(3R)*	Cotton zone 4(12R)*		Overall Average 5(15R)*	
	Value	Avg.	Range	Avg.	Range
EC (dS m^{-1})	2.0	2.5	1.7 - 3.5	2.4	1.7 - 3.5
pH	7.1	8.1	7.9 - 8.3	7.9	7.1 - 8.3
OM%	0.8	0.6	0.4 - 0.9	0.7	0.4 - 0.9
P (ppm)	5.1	6.6	4.6 - 8.3	6.3	4.6 - 8.3
K (ppm)	120	131	112 - 162	129	112 - 162
Zn	-	0.52	0.50 - 0.54	0.52	0.50 - 0.54
Fe	-	2.28	2.20 - 2.42	2.28	2.20 - 2.42
B	-	0.32	0.30 - 0.34	0.32	0.30 - 0.34

*No. of experiments

PLAN-61

BEST FERTILIZER COMBINATIONS FOR PUMPKIN (Ghia Kaddu)

OBJECTIVE

To ascertain fertilizer requirements of pumpkin (Ghia Kaddu)

RESEARCH WORKER (S)

Zia Chishti,NadeemRaza, Nadeem Hussain, M. Zahid Khan

PROJECT DURATION

2020-21 to 2022-23

LOCATION

All Punjab

TREATMENTS/ METHODOLOGY

	Nutrients (kg/ha)		
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	0	0
2	100	50	75
3	150	50	75
4	200	50	75
5	100	100	75
6	150	100	75
7	200	100	75

Time and method of fertilizer application

1. All P, K and ½ N at transplanting.
2. Remaining half N in four splits
    1. ¼thN at start of flowering
    2. ¼thN after every three pickings (after 3rd picking, 6th picking, 9th picking)
3. Zn@5kg/ha will be applied at transplanting

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

Observations and data collection

1. Soil analysis of each site (pre & post).
2. Periodic observations on plant growth and pests / diseases.
3. Weather/climatic conditions during the growth cycle.
4. Yield data.

P61.2:-PREVIOUS YEAR'S RESULTS (2020-21)

Nutrients kg/ha				Average pumpkinyield (Tons/ha)2020-21
Tr. No.	**N**	**P_2O_5**	**K_2O**	**BaraniIrrigated zone 1(3R)***
1	0	0	0	6.31 e
2	100	50	75	11.96 d
3	150	50	75	13.19 c
4	200	50	75	13.23 c
5	100	100	75	13.81 b
6	150	100	75	14.57 a
7	200	100	75	14.90 a
			LSD 0.05	**0.51**
However, the highest pumpkin yields were obtained by T7 (150-105-75) and T6 (150-105-75), which were statistically equivalent.				

*No of experiments

PLAN-62

NUTRIENT REQUIREMENTS OF WATER MELON(Tarbooz)

OBJECTIVE

To ascertain fertilizer requirements of water melon(Tarbooz)

RESEARCH WORKER (S)

PS/SS/SO

PROJECT DURATION

2020-21 to 2022-23

LOCATION

All Punjab

TREATMENTS/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	58	60
2	45	58	60
3	90	58	60
4	135	58	60
5	180	58	60

Time and method of fertilizer application

1. All P, K and 1/3rd N at sowing.
2. 1/3rdN at 5-6 leaves stage.
3. 1/3rdN at flowering.
4. Zn@5kg/ha will be applied at sowing.

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

Observations and data collection

1. Soil analysis of each site (pre & post).
2. Periodic observations on plant growth and pests / diseases.
3. Weather/climatic conditions during the growth cycle.
4. Yield data.

P62.2:-PREVIOUS YEAR'S RESULTS (2020-21)

Nutrients kg/ha				Average WATER MELON yield (Tons/ha)2020-21		
Tr. No.	N	P_2O_5	K_2O	Cotton Zone 1(3R)*	Barani zone Irrigated 1(3R)*	Overall Average 2(6R)*
1	0	58	60	71.241 e	21.909 e	46.575 d
2	45	58	60	82.737 d	57.568 d	70.152 c
3	90	58	60	94.707 c	80.387 c	87.547 b
4	135	58	60	101.063 b	96.594 b	98.829 ab
5	180	58	60	105.444 a	107.016 a	106.230 a
			LSD 0.05	**1.776**	**8.694**	**13.721**
T5 (180-58-60 kg/ha) and T4 (135-58-60 kg/ha) had the best overall basis Watwr Melon yield, however statistically equal in terms of statistical yield.						

*No of experiments

P62.3: Pre-Sowing SOIL ANALYSIS (2020-21)				
Soil Parameters	Cotton Zone 1(3R)*	Barani zone Irrigated 1(3R)*	Overall Average 2(6R)*	
	Value	Value	Avg.	Range
EC (dS m^{-1})	2.8	1.0	1.9	1.0 - 2.8
pH	8.1	7.5	7.8	7.5 - 8.1
OM%	0.9	0.5	0.7	0.5 - 0.9
P (ppm)	6.0	4.8	5.4	4.8 - 6.0
K (ppm)	159	120	140	120 - 159
*No. of experiments				

PLAN-63

NUTRIENT REQUIREMENTS OF APPLE GOURD(Tinda)

(Irrigated Condition)

OBJECTIVE To ascertain fertilizer requirements of apple gourd (Tinda)Irrigated condition

RESEARCH WORKER (S) M. Zahid Khan, Abdul Waheed, Sher Afzal

PROJECT DURATION 2020-21 to 2022-23

LOCATION All Punjab

TREATMENTS/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	90	60
2	40	90	60
3	80	90	60
4	120	90	60
5	160	90	60

Time and method of fertilizer application

1. All P, K and 1/3rd N at sowing.
2. 1/3rd N at start of fruiting.
3. 1/3rdN at three weeks after 2nd dose.
4. Zn@5kg/ha will be applied at sowing.

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

Observations and data collection

1. Soil analysis of each site (pre & post).
2. Periodic observations on plant growth and pests / diseases.
3. Weather/climatic conditions during the growth cycle.
4. Yield data.

P63.2:-PREVIOUS YEAR'S RESULTS (2020-21)

Nutrients kg/ha				Averageapple gourd yield (Kg/ha)2020-21		
Tr. No.	N	P_2O_5	K_2O	Cotton Zone 4(12R)*	Barani Irrigated zone 3(9R)*	Overall Average 7(21R)*
1	0	90	60	19760 e	8989 d	15144 e
2	40	90	60	23904 d	10415 c	18123 d
3	80	90	60	27282 c	11711 b	20609 c
4	120	90	60	30320 b	12371 b	22627 b
5	160	90	60	33700 a	13188 a	24909 a
			LSD 0.05	**393**	**794**	**1242**

T5@160-90-60 kg/ha of fertilizer produced the highest significant yield, followed by T4@120-90-60 kg/ha.

*No of experiments

P63.3: Pre-Sowing SOIL ANALYSIS (2020-21)

Soil Parameters	Cotton Zone 4(12R)*		BaraniZone (Irrigated) 3(9R)*		Overall Average 7(21R)*	
	Avg.	Range	Avg.	Range	Avg.	Range
EC (dS m^{-1})	2.2	1.4 - 2.9	1.0	0.7- 1.4	1.7	0.7 - 2.9
pH	7.0	3.2 - 8.4	7.7	7.3 - 8.3	7.3	3.2 - 8.4
OM%	0.6	0.4 - 0.9	0.6	0.5 - 0.7	0.6	0.4 - 0.9
P (ppm)	10.5	8.5 - 13.3	5.2	4.1 - 5.9	8.3	4.1 - 13.3
K (ppm)	119	114 - 132	103	85 - 115	112	85 - 132

*No. of experiments

PLAN-64

NUTRIENT REQUIREMENTS OF BITTER GOURD(Karela)

OBJECTIVE

To ascertain fertilizer requirements of bitter gourd (Karela) outside tunnel

RESEARCH WORKER (S)

Zia Chishti,RabNawaz, Abdul Waheed, Sher Afzal

PROJECT DURATION

2020-21 to 2022-23

LOCATION

All Punjab

TREATMENTS/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	90	60
2	40	90	60
3	80	90	60
4	120	90	60
5	160	90	60

Time and method of fertilizer application

1. All P, K and 1/3rd N at sowing.
2. 1/3rd N at flowering.
3. 1/3rd N after 3rd picking.
4. Zn@5kg/ha will be applied at sowing.

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

Observations and data collection

1. Soil analysis of each site (pre & post).
2. Periodic observations on plant growth and pests / diseases.
3. Weather/climatic conditions during the growth cycle.
4. Yield data.

P-64 .2:-PREVIOUS YEAR'S RESULTS (2020-21)

Nutrients kg/ha				AverageBitter Gourd yield (Tons/ha)2020-21		
Tr. No.	N	P_2O_5	K_2O	Cotton Zone 1(3R)*	Barani Irrigated zone 3(9R)*	Overall Average 4(12R)*
1	0	90	60	10.274 c	10.466 c	10.418 d
2	40	90	60	13.403 b	12.432 bc	12.675 c
3	80	90	60	12.783 b	12.116 ab	12.283 bc
4	120	90	60	13.702 b	13.905 ab	13.855 ab
5	160	90	60	14.931 a	14.101 a	14.309 a
			LSD 0.05	**1.029**	**1.821**	**1.361**
Bitter Gourd yields were significantly higher in T4@120-90-60 and T5@160-90-60 than in any other treatment.						

*No of experiments

P-64.3: Pre-Sowing SOIL ANALYSIS (2020-21)					
Soil Parameters	Cotton Zone 1(3R)*	Barani Irrigated zone 3(9R)*		Overall Average 4(12R)*	
	Value	Avg.	Range	Avg.	Range
EC (dS m^{-1})	3.1	1.1	1.0 - 1.3	1.6	1.0 - 3.1
pH	8.4	7.5	7.4 - 7.5	7.7	7.4 - 8.4
OM%	0.7	0.7	0.6 - 0.9	0.7	0.6 - 0.9
P (ppm)	8.9	7.8	5.9 - 11.0	8.1	5.9 - 11.0
K (ppm)	239	78	56 - 112	118	56 - 239
*No. of experiments					

PLAN-66

NUTRIENT REQUIREMENTS OF OKRA (Bhindi Tori)

OBJECTIVE

To ascertain fertilizer requirements of Okra (Bhindi Tori)

RESEARCH WORKER (S)

Zia Chishti,NadeemRaza, RabNawaz, Abdul Waheed, Sher Afzal,

PROJECT DURATION

2020-21 to 2022-23

LOCATION

All Punjab

TREATMENTS/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	90	60
2	40	90	60
3	80	90	60
4	120	90	60
5	160	90	60

Time and method of fertilizer application

1. All P, K and 1/3rd N at sowing.
2. 1/3rd N at flowering.
3. 1/3rd N after 3rd picking.
4. Zn@5kg/ha will be applied at sowing.

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

Observations and data collection

1. Soil analysis of each site (pre & post).
2. Periodic observations on plant growth and pests / diseases.
3. Weather/climatic conditions during the growth cycle.
4. Yield data.

P66.2:-PREVIOUS YEAR'S RESULTS (2020-21)

Nutrients kg/ha				Average OKRA yield (Tons/ha)2020-21				
Tr. No.	N	P_2O_5	K_2O	Rice zone 1(3R)*	Central zone 1(3R)*	Thal zone 1(3R)*	Barani Irrigated zone 2(6R)*	Overall Average 5(15R)*
1	0	90	60	19.293 d	7.700 e	7.418 d	10.460 e	11.066 c
2	40	90	60	19.633 cd	10.635 d	7.420 d	11.948 d	12.317 b
3	80	90	60	20.078 bc	15.007 c	7.452 c	12.752 c	13.608 a
4	120	90	60	20.331 b	15.438 b	7.504 b	13.421 b	14.023 a
5	160	90	60	21.336 a	15.866 a	7.575 a	13.916 a	14.522 a
			LSD 0.05	**0.698**	**0.122**	**0.027**	**0.236**	**0.932**
On an overall basis, T5 @ 160-90-60 kg/ha yielded the best Okra yield, which was determined to be comparable to T4 and T3.								

*No of experiments

P66.3: Pre-Sowing SOIL ANALYSIS (2020-21)							
Soil Parameters	Rice zone 1(3R)*	Central zone 1(3R)*	Thal zone 1(3R)*	Barani Irrigated zone 2(6R)*		Overall Average 5(15R)*	
	Value	Value	Value	Avg.	Range	Avg.	Range
EC (dS m^{-1})	1.1	1.7	1.6	0.8	0.7 - 0.9	1.2	0.7 -1.7
pH	8.1	8.4	8.0	7.9	7.5 - 8.2	8.0	7.5 - 8.4
OM%	0.7	0.7	0.7	0.6	0.6 - 0.6	0.6	0.6 - 0.7
P (ppm)	5.6	7.3	6.0	5.0	4.8 - 5.1	5.8	4.8 - 7.3
K (ppm)	138	87	140	111	110 - 112	117	87 - 140
*No. of experiments							

PLAN-67

NUTRIENTS REQUIREMENTS OF CUCUMBER (KHEERA) OUTSIDE TUNNEL

OBJECTIVE To ascertain fertilizer requirements of cucumber (Non-Tunnel)

RESEARCH WORKER (S) PS/SS/SO

PROJECT DURATION 2020-21 to 2022-23

LOCATION All Punjab

TREATMENTS/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	90	60
2	40	90	60
3	80	90	60
4	120	90	60
5	160	90	60

Time and method of fertilizer application

1. All P and K will be applied at sowing
2. One third N at sowing
3. One third N at flowering
4. One third N after third picking
5. Zn@5kg/ha will be applied at sowing

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

Observations and data collection

1. Soil analysis of each site (pre-sowing & post-harvest).
2. Periodic observations on plant growth and pests / diseases.
3. Weather / climatic conditions during the crop standing period.
4. Yield data.

P67.2:-PREVIOUS YEAR'S RESULTS (2020-21)

Nutrients kg/ha				Averagecucumber yield (Tons/ha) 2020-21
Tr. No.	N	P_2O_5	K_2O	Barani Irrigated zone 1(3R)*
1	0	90	60	30.136 d
2	40	90	60	31.463 c
3	80	90	60	32.454 b
4	120	90	60	33.120 a
5	160	90	60	33.271 a
			LSD 0.05	**0.181**
The highest yields were achieved by T5 @ 160-90-60 kg/ha and T4 @ 120-90-60 kg/ha on an overall basis.				

*No of experiments

P67.3: Pre-Sowing SOIL ANALYSIS (2020-21)	
Soil Parameters	BaraniZone (Irrigated) 1(3R)*
	Value
EC (dS m^{-1})	1.2
pH	7.4
OM%	0.7
P (ppm)	6.8
K (ppm)	110
*No. of experiments	

4. ISPAGHOL

PLAN-70

FERTILIZER REQUIREMENTS OF ISPAGHOL

OBJECTIVE To find out the fertilizer requirement of Ispaghol.

RESEARCHWORKER (S) Senior Scientist Field, Bahawalpur

PROJECT DURATION 2018-19 to 2021-22

LOCATION Bahawalpur

P70.1: TREATMENTS/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	0	0
2	0	25	30
3	25	25	30
4	**50**	**25**	**30**
5	75	25	30
6	50	0	30
7	50	12.5	30
8	50	37.5	30
9	50	25	0
10	50	25	15
11	50	25	45

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K and 1/2 N at the time of sowing.
2. Remaining ½ N one month after germination.

Plot size: Depending on site.

Layout: R.C.B.D.

OBSERVATIONS AND DATA COLLECTION

1. Pre- and post soil analysis.
2. Yield data.

P70.2:PREVIOUS YEAR'S RESULT (2020-21)

Average ISPAGHOL yield (kg/ha)

Tr. No.	Nutrients (kg/ha)			Cotton zone 2(6R)*	
	N	P_2O_5	K_2O		
1	0	0	0	321 f	
2	0	25	30	410 e	
3	25	25	30	576 d	
4	50	25	30	685 b	
5	75	25	30	774 a	
6	50	0	30	466 d	
7	50	12.5	30	530 c	
8	50	37.5	30	768 a	
9	50	25	0	534 c	
10	50	25	15	664 b	
11	50	25	45	695 b	
			LSD 0.05	**54**	

The T5@75-25-30 kg/ha and T8@50-37.5-30 kg/ha treatments produced the highest and most comparable Ispaghol yields when compared to all other treatments that were used.

* No of experiments.

P70.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Cotton zone 2(6R)*	
	Avg.	Range
EC (dS m^{-1})	2.6	1.3 - 3.8
pH	8.3	8.3 - 8.3
OM%	0.6	0.6 - 0.7
P (ppm)	8.4	8.2 - 8.6
K (ppm)	124	122 - 126

* No of experiments.

5. MANGO ORCHARDS

PLAN-74 (Revised)

BORON REQUIREMENT OF MANGO (Chaunsa) ORCHARDS

OBJECTIVE

- To evaluate the response of mango to B application.
- To determine B requirement of mango.

RESEARCH WORKERS Iftikhar Ahmad

PROJECT DURATION 2022-2024 (To be shifted to ARP Kharif 2022)

LOCATION Multan and Bahawalpur area

P74.1: TREATMENTS / METHODOLOGY

Nutrients (g/plant)					
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Zn**	**B**
1	1500	1000	750	75	0
2	1500	1000	750	75	7.5
3	1500	1000	750	75	10.0
4	1500	1000	750	75	12.5
5	1500	1000	750	75	15.0

TIME AND METHOD OF FERTILIZER APPLICATION

All P, K, Zn, B, and 1/3 N at pre blossom stage while remaining N in two equal splits viz: last week of April and 1st week of August by broadcast.

Sub plot size: one row comprising six plants.

Lay out: R.C.B.D.

OBSERVATIONS AND DATA COLLECTION

1. Soil and plant analysis
2. Periodic observations on plant growth and pest / disease infestation
3. Fruit yield per plant
4. Fruit quality

PREVIOUS YEAR RESULTS Suitable site not available last season

PLAN-83

ZINC REQUIREMENT OF MANGO ORCHARDS

OBJECTIVE

- To evaluate the response of mango to Zn application.
- To determine Zn requirement of mango.

RESEARCH WORKERS

Iftikhar Ahmad

PROJECT DURATION

2022-2024 (To be shifted to ARP Kharif 2022)

LOCATION

Multan and Muzaffargarh area

P83.1: TREATMENTS / METHODOLOGY

Nutrients (g/plant)				
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Zn**
1	1500	1000	750	0
2	1500	1000	750	50
3	1500	1000	750	100
4	1500	1000	750	150
5	1500	1000	750	200

TIME AND METHOD OF FERTILIZER APPLICATION

All P, K, Zn and 1/3 N at pre blossom stage while remaining N in two equal splits viz: last week of April and 1st week of August by broadcast.

Sub plot size: one row comprising six plants.

Lay out: R.C.B.D.

OBSERVATIONS AND DATA COLLECTION

1. Soil and plant analysis
2. Periodic observations on plant growth and pest / disease infestation.
3. Fruit yield per plant
4. Fruit quality

P83.2: PREVIOUS YEAR'S RESULTS (2019-20)

Nutrients (g/plant)					Mango yield (kg/plant)	
Tr. No.	N	P_2O_5	K_2O	Zn	Cotton zone 1(3R)*	
1	1500	1000	750	0	86 b	
2	1500	1000	750	50	90 b	
3	1500	1000	750	100	98 a	
4	1500	1000	750	150	102 a	
5	1500	1000	750	200	103 a	
				LSD 0.05	**6**	

When compared to T1 and T2, the application of Zn at a rate of 100 gram per plant enhanced mango yield.

* No of experiments

P83.3: PRE-SOWING SOIL ANALYSIS (2019-20)

Soil parameters	Cottonzone1(3R)*		
	Value		
EC (dS m^{-1})	3.2		
pH	8.0		
OM%	0.5		
P (ppm)	9.1		
K (ppm)	170		
Zn (ppm)	0.82		

* No of experiments

6. GUAVA ORCHARDS

PLAN-86

FERTILIZER REQUIREMENTS OF GUAVA ORCHARDS

OBJECTIVE To assess nutrient requirements of Guava orchards

RESEARCH WORKER (S) Muhammad Shakir, Zia Chishti,NadeemRaza, Muhammad Nadeem Iqbal, Hafiz Riaz Ahmad, Samina Hamid

PROJECT DURATION 2018-19 to 2020-21

LOCATION All Punjab

P86.1: TREATMENTS/ METHODOLOGY

Treatments for 5-10 years age plants			
Nutrients (gram/plant)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	F.P.	F.P.	F.P.
2	1000	500	500
3	750	500	500
4	500	500	500
5	1000	750	500

TIME AND METHOD OF FERTILIZER APPLICATION

1. Half N, P and K will be applied in end of March before flowering under canopy
2. Half N, P and K will be applied in November under canopy
3. Basal dose of Zinc Sulphate (33%) @ 150 gram per plant, Ferrous Sulphate (20%) @ 200 gram per plant and Borax @ 50 gram per plant will be applied in end of March under canopy.

Sub plot size: Five plants in a treatments

Layout: R.C.B.D.

Replications: Three

OBSERVATIONS AND DATA COLLECTION

1. Soil analysis EC, pH, OM. AvP, ExK
2. Fruit yield per plant.
3. Number of fruits per plant
4. Average mature marketable fruit weight (Gram/fruit piece)

P86.2: PREVIOUS YEAR'S RESULTS (2019-20)

Nutrients (g/plant)				Guava yield (kg/plant)		
Tr. No.	N	P_2O_5	K_2O	Rice zone 1(3R)*	Central zone 1(3R)*	Overall Average 2(6R)*
1	F.P.	F.P.	F.P.	88	66 b	77
2	1000	500	500	88	74 a	81
3	750	500	500	90	68 b	79
4	500	500	500	89	74 a	82
5	1000	750	500	87	74 a	81
			LSD 0.05	**N.S**	**5.873**	**N.S**

The highest yield of guava was obtained with T4, which consisted of 500-500-500 gram of NPK per plant. A further increase in NP above this threshold has no noticeable effect on yield.

* No of experiments

P86.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Rice zone 1(3R)*	Central zone 1(3R)*	Overall Average 2(6R)*	
	Value	Value	Avg.	Range
EC (dS m^{-1})	1.7	2.4	2.1	1.7 - 2.4
pH	8.1	7.9	8.0	7.9 - 8.1
OM%	0.8	0.9	0.8	0.8 - 0.9
P (ppm)	5.1	6.9	6.0	5.1 - 6.9
K (ppm)	128	220	174	128 - 220

* No of experiments

CITRUS ORCHARDS
PLAN-90

EFFECT OF SOIL APPLICATION OF MICRONUTRIENTS ON YIELD OF CITRUS

OBJECTIVE To assess the impact of soil application of micronutrients on citrus fruit yield

RESEARCH WORKER (S) Zia Chishti,NadeemRaza, Nadeem Hussain RabNawaz, Iftikhar Ahmad, M. Bilal Khan, Nafeesa Muslim, Muhammad Nadeem Iqbal

PROJECT DURATION 2019-20 to 2021-22

LOCATION Two sites each with ASFO Faisalabad and Multan

P90.1: TREATMENTS/ METHODOLOGY

Nutrients (gram/plant)				Micronutrients
Tr. No.	N	P_2O_5	K_2O	Zn, Cu, Fe, Mn, B
1	1000	500	500	No soil application
2	1000	500	500	Zn soil application @ 100 gram/plant
3	1000	500	500	Cu soil application @ 10 gram/plant
4	1000	500	500	Fe soil application @ 75 gram/plant
5	1000	500	500	Mn soil application @ 30 gram/plant
6	1000	500	500	B soil application @ 25 gram/plant
7	1000	500	500	Zn+Cu+Fe+Mn+B soil application

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, Micronutrients and ½ N & ½ K will be applied at pre blossom stage in Dec. / Jan. whereas remaining ½ N & ½ K during last week of August
2. Doses are for mature citrus plants of over 10 years age

Total Plot size: One acre

Layout: R.C.B.D. with Four plants in each treatment

Replications: Three

OBSERVATIONS AND DATA COLLECTION

1. Soil and plant analysis
2. Citrus canker and scab incidence on fruit
3. Fruit yield per plant
4. Number of fruits per plant

P90.2: PREVIOUS YEAR'S RESULTS (2019-20)

Nutrients (g/plant)				Micronutrients	Citrus yield (No Of Fruit /plant)	
Tr. No.	N	P_2O_5	K_2O	Zn, Cu, Fe, Mn, B	Centralzone 1(3R)*	
1	1000	500	500	No spray	562 e	
2	1000	500	500	Zn soil application @ 100 gram/plant	642 ab	
3	1000	500	500	Cu soil application @ 10 gram/plant	614 cd	
4	1000	500	500	Fe soil application @ 75 gram/plant	610 cd	
5	1000	500	500	Mn soil application @ 30 gram/plant	625 bc	
6	1000	500	500	B soil application @ 25 gram/plant	596 d	
7	1000	500	500	Zn+Cu+Fe+Mn+BSoil application	659 a	
				LSD 0.05	25	

The application of all micronutrients separately and in combination with NPK had a favourable impact on citrus number of fruits/yield, but the soil application of all micronutrients combined with NPK resulted in the most statistically significant increase.

* No of experiments

P90.3: PREVIOUS YEAR'S RESULTS (2019-20)

Nutrients (g/plant)				Micronutrients	Citrus yield (Weight Fruit kg /plant) Harvested 13-2-2021	
Tr. No.	N	P_2O_5	K_2O	Zn, Cu, Fe, Mn, B	Centralzone 1(3R)*	
1	1000	500	500	No spray	91 d	
2	1000	500	500	Zn soil application @ 100 gram/plant	101 ab	
3	1000	500	500	Cu soil application @ 10 gram/plant	97 bcd	
4	1000	500	500	Fe soil application @ 75 gram/plant	96 bcd	
5	1000	500	500	Mn soil application @ 30 gram/plant	98 abc	
6	1000	500	500	B soil application @ 25 gram/plant	94 cd	
7	1000	500	500	Zn+Cu+Fe+Mn+Boil application	104 a	
				LSD 0.05	6.29	

The application of all micronutrients separately and in combination with NPK had a favourable impact on citrus fruitsyield, but the soil application of all micronutrients combined with NPK resulted in the most statistically significant increase..

* No of experiments

P90.4: PRE-SOWING SOIL ANALYSIS (2019-20)	
Soil parameters	**Central Zone1(3R)***
	Value
EC (dS m^{-1})	1.0
pH	8.2
OM%	1.0
P (ppm)	9.3
K (ppm)	140
Zn (ppm)	0.90
Cu (ppm)	0.32
Fe (ppm)	1.4
Mn (ppm)	0.8
B (ppm)	0.35
* No of experiments	

PLAN-95

NUTRIENTS MANAGEMENT IN RELATION TO DISEASE CONTROL IN CITRUS

OBJECTIVE To assess and demonstrate the impact of micronutrients application on disease management in citrus orchards

RESEARCH WORKER (S) Zia Chishti,RabNawaz, Muhammad Akram Qazi, Muhammad Nadeem Iqbal

PROJECT DURATION 2018-19 to 2021-22

LOCATION Punjab

P95.1: TREATMENTS/ METHODOLOGY

Nutrients (gram/plant)				Micronutrients
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Zn, Cu, Fe, Mn, B**
1	F.P.	F.P.	F.P.	0
2	F.P.	F.P.	F.P.	Soil (100, 10, 75, 30, 25 gram per plant)
3	1000	500	500	0
4	1000	500	500	Soil (100, 10, 75, 30, 25 gram per plant)
5	1000	500	500	Foliar sprays (0.15, 0.15, 0.1, 0.1 and 0.1 percent)

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, 1/3 N, ½ K and Soil Micronutrients will be applied at pre-blossom stage in end Dec-Jan after previous fruit harvest.
2. 1/3 Nwill be applied in April.
3. 1/3 N and ½ K will be applied in last week of August.
4. In foliar treatment
    a. First spray will be of Zn +Cu + Fe + Mn + B before flowering
    b. Second spray will be of Zn + Cu + Fe + Mn after fruit setting
    c. Third spray will be of Copper 15 days after second spray

Sub plot size: Five plants in each treatments

Layout: R.C.B.D.

Replications: Three

OBSERVATIONS AND DATA COLLECTION

1. Soil analysis EC, pH, OM. AvP, ExK, micronutrients.
2. Citrus canker and citrus scab on fruit
3. Fruit yield per plant.
4. Number of fruits per plant

Previous Year Results Given in annexure

PLAN-97 (New)

EFFECT OF CALCIUM AND MAGNESIUM APPLICATION ON FRUIT YIELD OF CITRUS ORCHARDS IN THAL ZONE (LAYYAH+BHAKKAR)

OBJECTIVE To assess the effect of some secondary nutrients (Ca, Mg) on yield of citrus orchards in Layyah and Bhakkar

RESEARCH WORKER (S) Zia Chishti,RabNawaz, Iftikhar Ahmad, Muhammad Bilal Khan, M. Tahir Akbar, Muhammad Akram Qazi, Muhammad Nadeem Iqbal

PROJECT DURATION 2020-21 to 2022-23

LOCATION Thal Zone, Layyah, Bhakkar

TREATMENTS/ METHODOLOGY

Nutrients (gram/plant)				Secondary Nutrients
Tr. No.	N	P_2O_5	K_2O	Dose
1	1000	500	500	0
2	1000	500	500	Gypsum@1.5kg/plant in Jan/Feb
3	1000	500	500	Soil Application of $MgSO_4$ (9.6%Mg) @ 416grams/plant in April
4	1000	500	500	Foliar Spray $MgSO_4$ @ 1.0% (=1Kg $MgSO_4$/100L water)
5	1000	500	500	Soil Application Gypsum+$MgSO_4$ in Jan/Feb and April respectively

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, 1/3 N, ½ K, Ca, Mg will be applied at pre-blossom stage in Jan/Feb after previous fruit harvest.
2. 1/3 N will be applied in April.
3. 1/3 N and ½ K will be applied in last week of August.
4. Zn-Fe-B will be applied @ 100-75-25 gm/plant in soil in Jan/Feb after previous fruit harvest.
5. Details of applications:
    a. In T2, CaSO4 in soil will be applied in Jan/Feb
    b. In T3, MgSO4 in soil will be applied in April
    c. In T4, two foliar sprays of MgSO4 will be done in July and August
    d. In T5, Ca and Mg will be added in Jan/Feb and April respectively.

Sub plot size: 4-5 plants in each treatments

Layout: R.C.B.D.

Replications: Four

OBSERVATIONS AND DATA COLLECTION

1. Soil analysis EC, pH, OM. AvP, ExK, micronutrients before spring fertilizer application
2. Fruit yield per plant.
3. Number of fruits per plant

PREVIOUS YEAR RESULTS: First Year (Fruit Harvesting not started yet)

PLAN-53

BEST COMBINATION OF NUTRIENTS FOR OLIVES IN POTHWAR

OBJECTIVE To work out optimum rate of fertilizer for olive in Pothwar region

RESEARCH WORKER (S) Abdul Waheed, Muhammad Nadeem Iqbal

PROJECT DURATION 2020-21 to 2022-23

LOCATION Farmers' field in Pothwar

TREATMENTS/ METHODOLOGY

Nutrients (grams/plant)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	400	200	300
2	500	200	300
3	600	200	300
4	400	300	300
5	500	300	300
6	600	300	300

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, 1/3 N, 1/2 K will be applied in end of February/beginning of March.
2. 1/3 N will be applied in Mid May.
3. 1/3 N and ½ K will be applied in mid of August

Sub plot size: 4-5 plants in each treatments

Layout: R.C.B.D.

Replications: Three

OBSERVATIONS AND DATA COLLECTION

1. Soil analysis EC, pH, OM. AvP, Ex K
2. Average weight per fruit
3. Fruit weight per tree
4. Oil content (%) of fruit if possible in plant

P53.2: PREVIOUS YEAR'S RESULTS (2020-21) (Harvested October 2021)

Nutrients (g/plant)				Olive yield (Kg/Plant)	Fruit Weight (Grams/Olive)
Tr. No.	N	P_2O_5	K_2O	Barani Irri zone 1(3R)*	Barani Irri zone 1(3R)*
1	400	200	300	9.88	1.269
2	500	200	300	10.17	1.304
3	600	200	300	10.36	1.301
4	400	300	300	10.58	1.302
5	500	300	300	11.63	1.384
6	600	300	300	12.24	1.412
LSD .05					

The highest olive yield (12.24 kg/plant) and fruit size (1.412 gram/olive) were produced with T6 @ 600-300-300 gram of N-P2O5-K2O per plant.

* No of experiments

P53.4: PRE-SOWING SOIL ANALYSIS (2020-21)

Soilparameters	Barani Irri zone 1(3R)*(Harvested Nov 2021)
	Value
EC (dS m^{-1})	**0.2**
pH	**7.7**
OM %	**0.39**
P (ppm)	**1.19**
K (ppm)	**20**

* No of experiments

9. MAIZE (Spring)

PLAN-81

FERTILIZER RESPONSE CURVE STUDIES ON SPRING HYBRID MAIZE

OBJECTIVE

- Formulation of fertilizer recommendations spring maize

RESEARCH WORKER (S)

Muhammad Akram Qazi, Zia Chishti,NadeemRaza, Nadeem Hussain, Muhammad Nadeem Iqbal, RabNawaz, Iftikhar Ahmad, M. Tahir Akbar, Muhammad Saleem, Nafeesa Muslim

PROJECT DURATION

2018-19 to 2021-22

LOCATION

All Punjab

P81.1: TREATMENT/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	0	0
2	0	150	125
3	75	150	125
4	150	150	125
5	**225**	**150**	**125**
6	300	150	125
7	225	0	125
8	225	50	125
9	225	100	125
10	225	150	0
11	225	150	62.5

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K and 1/3 N at the time of sowing through broadcasting.
2. 1/3 N at knee height stage (at 35-45 DAS)
3. 1/3 N at three feet height stage

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

OBSERVATIONS AND DATA COLLECTION

1. Soil analysis of each site (pre- & post).
2. Periodic observations on weather, plant growth and pest/disease
3. Maize Grain Yield data

P81.2:PREVIOUS YEAR'S RESULT (2020-21)

Tr. No.	Nutrients (kg/ha)			Average Spring Maize Grain yield (kg/ha)			
	N	P_2O_5	K_2O	Rice zone 3(9R)*	Central zone 8(24R)*	Cotton zone 1(3R)*	Overall 12(36R)*
1	0	0	0	3133 f	3424 i	2629 g	3285 i
2	0	150	125	4786 e	4806 h	4056 f	4738 h
3	75	150	125	6834 c	6619 g	5687 e	6595 g
4	150	150	125	9107 b	8238 ef	9211 c	8537 e
5	**225**	**150**	**125**	10111 a	9299 b	10146 ab	9572 ab
6	300	150	125	9896 a	9746 a	10216 a	9823 a
7	225	0	125	5787 d	6598 g	6423 e	6381 g
8	225	50	125	6721 c	8016 f	7886 d	7681 f
9	225	100	125	9077 b	8657 de	8968 c	8788 de
10	225	150	0	9648 ab	8740 cd	9442 bc	9025 cd
11	225	150	62.5	9847a	9143 bc	9605 abc	9357 bc
			LSD 0.05	**602**	**437**	**759**	**364**

When compared to all other applied treatments, the prescribed dose T6@300-150-125 proved to be the top yielder statistically and was on par with T5@225-150-125 kg NPK per hectare.

* No of experiments.

P81.3: PRE-SOWING SOIL ANALYSIS (2021-21)

Soil parameters	Rice zone 3(9R)*		Central zone 8(24R)*		Cotton zone 1(3R)*	Overall 12(36R)*	
	Avg.	Range	Avg.	Range	Value	Avg.	Range
EC (dS m^{-1})	1.5	0.9 - 2.2	2.2	1.2 - 3.3	2.8	2.1	0.9 - 3.3
pH	8.0	7.9 - 81	8.2	7.9 - 8.4	8.2	8.1	7.9 - 8.4
OM%	0.7	0.3 - 1.0	0.9	0.5 - 1.7	0.7	0.8	0.3 - 1.7
P (ppm)	7.9	4.2 -12.0	9.8	6.6 - 16.4	19.3	10.1	4.2 - 19.3
K (ppm)	116	100 - 130	182	66 - 360	288	174	66 – 360

* No of experiments.

P81.4: FERTILIZER PREDICTION (2020-21)

Rice zone 3(9R)*

Nutrients & Maize yield (kg/ha)		N	Yield	P_2O_5	Yield	K_2O	Yield
Max. Profit	MRR=1	**244**	10018	-	-	-	-
Economical rate	MRR=2	**230**	9946	-	-	-	-

The optimum nitrogen dose for economical yield was 230 kg/ha N, and the recommended nitrogen dose for maximum profit was 244 kg/ha N.

Central zone 8(24R)*

Nutrients & Maize yield (kg/ha)		N	Yield	P_2O_5	Yield	K_2O	Yield
Max. Profit	MRR=1	**301**	9789	86	8562	-	-
Economical rate	MRR=2	**277**	9663	35	7552	-	-

The optimum nitrogen dose for economical yield was 277 kg/ha N, and the recommended nitrogen dose for maximal profit was 301 kg/ha N. Because of the rising price of phosphorus, the profitability of phosphorus nutrient addition has decreased.

Cotton zone 1(3R)*

Nutrients & Maize yield (kg/ha)		N	Yield	P_2O_5	Yield	K_2O	Yield
Max. Profit	MRR=1	**276**	10346	**227**	11510	-	-
Economical rate	MRR=2	**262**	10274	**88**	8759	-	-

For economical yield, recommended nitrogen dose was 262 kg/ha; and for maximum profit, 276 kg/ha was the recommended dose. Due to higher P price, profitability of P nutrient addition was lower.

Overall zone 12(36R)*

Nutrients & Maize yield (kg/ha)		N	Yield	P_2O_5	Yield	K_2O	Yield
Max. Profit	MRR=1	**278**	9830	**128**	9262	-	-
Economical rate	MRR=2	**259**	9729	**52**	7742	-	-

259 kg/ha of nitrogen was advised for an economical yield, and a total of 278 kg/ha of nitrogen was recommended for maximum profit on an overall basis. Because of the greater price of phosphorus, the profitability of phosphorus nutrient addition was decreased. In this case, 52 kg/ha of P was an affordable dose, while 128 kg/ha was the highest profit dose.

Nutrients Price/kg (N=Rs. 77, P=Rs. 297 , K=Rs.260/kg)

Urea-1768, **SOP**-6498, **DAP-**7515/bag

Maize Crop Price (Rs.1500/40kg)

10. SUGARCANE

PLAN-52

FERTILIZER RESPONSE CURVE STUDIES ON SUGARCANE ADVANCE LINES

OBJECTIVE Formulation of fertilizer recommendations

RESEARCH WORKER (S) Zia Chishti,NadeemRaza, Muhammad Nadeem Iqbal

PROJECT DURATION 2014-15 to2021-22

LOCATION AARI, Faisalabad

P52-1: TREATMENTS/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	0	0
2	0	175	125
3	125	175	125
4	**250**	**175**	**125**
5	375	175	125
6	250	0	125
7	250	87	125
8	250	262	125
9	250	175	0
10	250	175	62
11	250	175	187

Time and method of fertilizer application

1. All P, K and 1/3 N at the time of sowing through broadcasting.
2. Remaining N in two splits-beginning of April and end of May.

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

Observations and data collection

1. Soil analysis of each site (Pre & post).
2. Periodic observations on plant growth and pest/disease.
3. Weather / climatic conditions during the growth cycle.
4. Yield data.

P52.2:PREVIOUS YEAR'S RESULT (2019-20)

Nutrients (kg/ha)				Cane yield (t/ha)	Pre-sowing soil analysis	
Tr. No.	N	P_2O_5	K_2O	AARI, FSD 1(3R)* VR = CPF-250 Yield	Soil parameters	AARI, FSD 1(3R)* VR = S-2005-US-54 Value
1	0	0	0	**53.19i**	**EC (dS m^{-1})**	**1.27**
2	0	175	125	**65.44 h**	**pH**	**8.2**
3	125	175	125	**77.32 f**	**OM%**	**0.76**
4	**250**	**175**	**125**	**95.15 d**	**P (ppm)**	**6.9**
5	375	175	125	**97.72 b**	**K (ppm)**	**180**
6	250	0	125	**67.96 g**		
7	250	87	125	**81.67 e**		
8	250	262	125	**100.52 a**		
9	250	175	0	**94.69 d**		
10	250	175	62	**95.11 d**		
11	250	175	187	**96.70 c**		
			LSD 0.05	**1.01**		

The most significant increase in sugar cane yield was obtained with T8 @250-262-125 kg/ha of NPK, followed by T5@375-175-125 kg/ha of NPK.

* No of experiments.

PLAN-65

FERTILIZER RESPONSE CURVE STUDIES ON SUGARCANE NEW VARIETY

OBJECTIVE Formulation of fertilizer recommendations of new promising variety

RESEARCH WORKER (S) Zia Chishti,NadeemRaza, Muhammad Nadeem Iqbal

PROJECT DURATION 2021-22 (CPF-246 concluded, new variety will be used now).

LOCATION Samundri (Faisalabad)

P65-1: TREATMENTS/ METHODOLOGY

Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	0	0	0
2	0	175	125
3	125	175	125
4	**250**	**175**	**125**
5	375	175	125
6	250	0	125
7	250	87	125
8	250	262	125
9	250	175	0
10	250	175	62
11	250	175	187

Time and method of fertilizer application

1. All P, K and 1/3 N at sowing through broadcasting.
2. Remaining N in two splits – beginning of April and end of May

Sub plot size: $1/40^{th}$ of a hectare.

Layout: R.C.B.D.

Observations and data collection

1. Soil analysis of each site (Pre & Post)
2. Periodic observations on plant growth & pests/ diseases.
3. Weather / climatic conditions during the growth cycle.
4. Yield data

(Crop sown in March 2021 in field now. CPF-246 concluded, new variety will be used).

P65.2:PREVIOUS YEAR'S RESULT (2019-20) Results of crop sown in March 2020 are as under.

Nutrients (kg/ha)				Cane yield (t/ha)	Pre-sowing SOIL ANALYSIS		
Tr. No.	N	P_2O_5	K_2O	Central zone 2(6R)* VR =CPF-246 Yield	Soil parameters	Central zone 2(6R)* VR =CPF-246 Avg.	Range
1	250	125	125	95.54 d	EC (dS m^{-1})	1.2	1.0 - 1.4
2	250	200	125	102.25 c	pH	8.2	8.2 - 8.2
3	250	250	125	110.67 b	OM%	0.7	0.6 - 0.8
4	250	300	125	113.11 ab	P (ppm)	7.3	7.1 - 7.5
5	250	350	125	114.11 a	K (ppm)	210	180 - 240
			LSD 0.05	3.38			

T5@250-350-125 kg/ha of NPK produced the highest yield and was on par with T4 in terms of productivity.

* No of experiments.

PLAN-55 (REVISED)

EFFECT OF COPPER SULPHATE APPLICATION ON SUGARCANE NEW VARIETY

OBJECTIVE

Application of copper sulphate to sugarcane crop is general practice of sugarcane growers to enhance yield. Therefore, it is imperative to find out best dose of copper sulphate to cane crop

RESEARCH WORKER (S)

Muhammad Shakir, Samina Hamid, Zia Chishti

PROJECT DURATION

2016-17to 2021-22 (Crop sown in March 2021 in field now)

LOCATION

All Punjab

P55-1: TREATMENTS/ METHODOLOGY

Nutrients Kg/ha				
Tr. No.	**N**	**P_2O_5**	**K_2O**	**$CuSO_4$**
1	250	175	125	0
2	250	175	125	6
3	250	175	125	8
4	250	175	125	10
4	250	175	125	12

Time and method of fertilizer application

1. All P, K, Cu and 1/3 N at sowing through broadcasting.
2. Remaining N in two splits – beginning of April and end of May

Sub plot size: 1/40th of a hectare.

Layout: R.C.B.D.

Observations and data collection

1. Soil analysis of each site (Pre & Post)
2. Periodic observations on plant growth & pests/ diseases.
3. Weather / climatic conditions during the growth cycle.
4. Yield data.
5. Plant analysis for Copper uptake at maturity.

P55.2:PREVIOUS YEAR'S RESULT (2019-20)

Average Cane yield (t/ha)

Tr. No.	Nutrients (kg/ha) N	P_2O_5	K_2O	$CuSO_4$	Central zone 8(24R)*	Cotton zone 5(15R)*	Thal zone 3(9R)*	Overall 16(48R)*
1	250	175	125	0	117.87d	90.97 c	93.70 c	104.93 d
2	250	175	125	4	119.77c	96.42bc	96.05bc	108.03 c
3	250	175	125	5	120.85b	98.76 ab	98.52 ab	109.76 b
4	250	175	125	6	122.15 a	101.44a	100.62 a	111.64 a
LSD 0.05					**0.91**	**3.17**	**2.82**	**1.29**

Overall, CuSO4 application at a rate of 6 kg/ha resulted in the highest statistically significant sugar cane yield.

* No of experiments. Crop sown in March 2021 is still in field.

P55.3: PRE-SOWING SOIL ANALYSIS (2019-20)

Soil parameters	Central zone 8(24R)*		Cotton zone 5(15R)*		Thal zone 3(9R)*		Overall 16(48R)*	
	Avg.	Range	Avg.	Range	Avg.	Range	Avg.	Range
EC ($dS\ m^{-1}$)	1.8	0.90 - 3.2	2.7	1.3 - 5.9	2.1	1.9 - 2.2	2.2	0.9 - 5.9
pH	7.9	7.3 - 8.2	8.1	7.7 - 8.4	7.9	7.8 - 8.0	8.0	7.3 - 8.4
OM%	0.8	0.5 - 1.0	0.7	0.6 -0.7	0.7	0.5 - 0.8	0.7	0.5 - 1.0
P (ppm)	7.7	6.3 - 9.5	7.6	5.9 - 8.6	6.0	4.5 - 6.7	7.3	4.5 -9.5
K (ppm)	183	140 - 240	170	118 - 220	141	140 - 142	171	118 - 240
Cu (ppm)	0.37	0.34 - 0.41	0.30	0.21 0.41	0.42	0.39 - 0.44	0.36	0.21 - 0.44

* No of experiments.

LAB STUDIES

PLAN-49

TITLE	**TOXIC METALO-POLLUTION AND ECOLOGICAL RISK ASSESSMENT OF INDUS BASIN AND HILL TORRENTS IN DERA GHAZI KHAN**
RATIONALE	Rainfall over mining sites leads to dissolution of minerals and subsequent mixing into waters of natural streams. These minerals are then deposited into the agricultural fields irrigated by this water.In this perspective, to have knowledge and way forward to coupe with downstream heavy metal threat in the existing ecological condition of Dera Ghazi Khan
OBJECTIVE	To quantify the heavy metals load in waters of hill torrents and the soils at the foothills
RESEARCH WORKER (S)	Rehmatullah, Muhammad Bilal, Sobia Noor, AACs Layyah, Muzzafargarh, Rajanpur, Muhammad Bilal Khan, Muhammad AkramQazi
PROJECT DURATION	2021-22
LOCATION	Dera Ghazi Khan
TREATMENTS/ METHODOLOGY	The study areas will be divided into three zones. ➢ Layyah Zones ➢ Dera Ghazi Khan Zones ➢ Rajanpur zones Only areas affected by mining will be covered. **Samples Collection:** Water samples will be collected from hill torrents. Soil samples will be collected from areas irrigated by these hill torrents. Latitude and Longitude of these samples will also be taken. **Samples Analysis:** 1. Water samples will be analyzed for common parameters fitness for irrigation purposes. 2. Soil samples will be analyzed for macro and micronutrients for crops 3. Water and soil samples will be analysed for heavy metals contamination.
PREVIOUS YEAR RESULTS	The study is in progress. It will be concluded during coming season season.

PLAN-50

TITLE	**SULFUR STATUS OF PUNJAB SOILS**
RATIONALE	Sulfur is being recommended for a variety of crops by various sources, regardless of the sulphur content of the soil in those regions. The aim of this experiment is to determine the sulphur content of various soils in Punjab province and classify them on the basis of available sufficiency ranges.
OBJECTIVE	To determine soil sulfur contents in soils of Punjab
RESEARCH WORKER (S)	Muhammad AkramQazi, All Agri. Chemists (SF), Faraz Ahmad, KausarMajeed, Asia Munir, TalhaMurad
PROJECT DURATION	2021
LOCATION	All divisional labs
TREATMENTS/ METHODOLOGY	1. In addition to the samples collected for field trials of field wings, 50 soil samples will be collected at random in each district, covering the entire area. 2. These soil samples will be analyzed by each divisional lab for all soil parameters, including sulphur content. 3. If needed, sulphur application recommendations for crop growth will be made based on the findings. 4. Uniform method of sulphur analysis will be used by all labs.
PREVIOUS YEAR RESULTS	Table given next

PLAN-39

TITLE	**TESTING AND MAINTAINING THE PROFICIENCY OF DIVISIONAL LABS THROUGH INTERLAB COMPARISON**
RATIONALE	All divisional labs of this institute are ISO certified. However, to maintain status of ISO, maintenance of analysis quality is a challenge. To maintain that standard, this activity is planned.
OBJECTIVE	To monitor and test the proficiency of divisional labs through interlab comparison
RESEARCH WORKER (S)	Muhammad Akram Qazi, All Agri. Chemists (SF) including reference lab, Abu Bakar Siddiq, Raja Abad Raza, Faraz Ahmad, Samreen Siddique, Talha Murad, Javed Iqbal, Salik Ali Khan, Ghulam Rasool
PROJECT DURATION	Continuous
LOCATION	All Divisional laboratories under SFRI Lahore
TREATMENTS/ METHODOLOGY	A. At least ten coded samples will be sent to all divisional labs for analysis in each category as under. a. Soil b. Water c. Fertilizer B. The inter lab comparison and scoring will be conducted and supervised by PRFTL, Raiwind as part of its mandate. C. Detailed method prepared will be used.
PREVIOUS YEAR RESULTS	First ILC has been completed. Results are given in annexure. As a result of ILC, considerable improvement has been observed in quality of analysis.

PLAN-40

TITLE

COMPOST PREPARATION OF EXCELLENT QUALITY TO MINIMIZE ENVIRONMENTAL REPERCUSSIONS AND FOR USE AS SOIL AMENDMENT

RATIONALE

With increasing cropping intensity, farmers find it difficult to wait for many weeks before FYM is fully decomposed after addition to the field. Addition of fully decomposed compost is the only solution for timely sowing of crops. To explore the possibility of preparation and quality of compost from existing farm trees/bush, this study is proposed.

OBJECTIVE

To prepare and test the quality of compost made from locally available materials.

RESEARCH WORKER (S)

All Agri. Chemists (SF), Azhar Hussain, SaroshAlvi, Qais Muhammad Affan, Rehman Gull, All ASFOs, SFOs, NaeemAkhter, Nadeem Raza, Muhammad AkramQazi

PROJECT DURATION

2021 (Subject to approval of procedure from competent forum/authority)

LOCATION

All Divisional Labs

TREATMENTS/ METHODOLOGY

1. Compost will be prepared using existing substrate available in Lab surroundings.
2. The method used is called Indore Method developed in India. It is relatively less time consuming due to turning.
3. One pit of 2.5 ft deep, 3 ft feet wide and 7 feet long will be prepared. It will be divided into two pits but placing a 9 inch wide wall of loose bricks (1.5 feet high) in the center of pit. Base of the pit should be slightly sloping towards one side so that water, if enters the pit, should flow to one side keeping the other composting material at normal moisture.
4. Readily available plant leaves, grasses of lawn will be used as substrate. Do not add branches of trees having higher girth because these do not get rotton easily.
5. Half pit of 2.5 feet deep, 3 ft wide and 3ft long will be filled. Rest of the 3x3 feet space will be kept empty for turning the compost.
6. Use 5 kg urea/100 cubic ft of initial material.
7. Sprinkle water while filling of pit
8. Fill the pit upto the level of about 6 inch higher than the adjoining soil so that rain water does not enter the pit. Otherwise aeration of material will be stopped.
9. After filling the pit, cover the pit with black plastic sheet.
10. The material is turned at specific intervals as described below.
11. For starting the turning operation, the first turn is manually given using long handled rakes 7 days after filling. The second turn is given after 10 more days. Further turning is normally not required.

Composting will be continued till attainment of CN ratio 20:1. Take compost sample after each 15 days and analyze. After CN ratio 20:1 is attained, the compost is ready and test it for other parameters.

12. Prepared compost will be analyzed for Total P, N, K, CEC, O.M. and CN ratio.
13. For the purpose of making high-quality compost, the time spent in preparing will be determined.

PREVIOUS YEAR RESULTS Compost formation is in progress.

Concluded Experiments

PLAN-91 (Concluded)

COMPARISON OF EFFICIENCY OF 'UREA+DAP' WITH 'NITROPHOS+CAN' COMBINATIONS AS TO BE USED PER THEIR RECOMMENDED TIMES FOR WHEAT CROP

OBJECTIVE To compare "Nitrophos+CAN' combination with conventional combinations of 'Urea + DAP' and 'Urea + SSP' combinations for wheat yield

RESEARCH WORKER (S) ASFO/SFO/Agricultural Officer (Field)

PROJECT DURATION 2017-18 to 2020-21

LOCATION All Punjab

P91.1: TREATMENT/ METHODOLOGY

Nutrients (kg/ha)				
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Fertilizer Sources of Nutrients**
1	0	0	0	-
2	120	85	60	Urea+DAP+SOP
3	120	85	60	Urea+SSP+SOP
4	120	85	60	Nitrophos+CAN+SOP
5	160	114	60	Urea+DAP+SOP
6	160	114	60	Urea+SSP+SOP
7	160	114	60	Nitrophos+CAN+SOP

TIME AND METHOD OF FERTILIZER APPLICATION			
T_2, T_3, T_5& T_6	**At Sowing:**	**½N + all P + all K**	**Broadcast**
	At 1st irrigation	**½N**	
T_4, T_7	**At Sowing**	**1/3 N + ½P + all K**	
	At 1st irrigation	**1/3 N + ½P**	
	At 2nd irrigation	**1/3 N**	

Sub plot size: 1/40th of a hectare

Layout: R.C.B.D.

Replications: Three

OBSERVATIONS AND DATA COLLECTION

1. Pre-sowing soil analysis
2. Fertile tillers per m2
3. Grain and straw yield.

P91.2:PREVIOUS YEAR'S RESULT (2020-21)

Nutrients (kg/ha)					Wheat grain yield(kg/ha)				
Tr. No.	N	P_2O_5	K_2O	Fertilizer Sources of Nutrients	Rice zone 1(3R)*	Central zone 7(21R)*	Cotton zone 12(36R)*	Thal zone 1(3R)*	Overall 21(63R)*
1	0	0	0	-	1757 d	1796 d	1348 e	981 f	1500 d
2	120	85	60	Urea+DAP+SOP	3876 c	4488 bc	4900 b	3279 c	4637 b
3	120	85	60	Urea+SSP+SOP	3901 c	4327 c	4388 d	3130 e	4285 c
4	120	85	60	Nitrophos+CAN+SOP	3946 c	4412 c	4762 bc	3222 d	4533 b
5	160	114	60	Urea+DAP+SOP	4729 b	4859 a	5194 a	3833 a	4995 a
6	160	114	60	Urea+SSP+SOP	4550 a	4684 ab	4680 c	3741 b	4630 b
7	160	114	60	Nitrophos+CAN+SOP	4657 a	4849 a	5264 a	3841 a	5029 a
				LSD 0.05	**90**	**205**	**212**	**27**	**151**

T7 in Nitrophos+ CAN+SOP combination and T5 in Urea+DAP+SOP combination yielded statistically equal yields of wheat when compared to all other applied treatments when compared on an overall basis.

* No of experiments.

P91.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Rice zone 1(3R)*	Centralzone 7(21R)*		Cotton zone 12(36R)*		Thalzone 1(3R)*	Overall 21(63R)*	
		Avg.	Range	Avg.	Range		Avg.	Range
EC (dS m^{-1})	0.9	3.5	1.2 - 8.0	2.1	0.9 - 3.2	1.8	2.5	0.9 - 8.0
pH	8.1	8.2	7.9 - 8.4	8.3	7.7 - 8.4	8.2	8.2	7.7 - 8.4
OM%	0.6	0.7	0.4 - 1.0	0.6	0.5 - 0.7	0.7	0.7	0.4 - 1.0
P (ppm)	12.2	7.1	6.1 - 9.0	7.4	0.7 - 8.9	8.1	7.6	0.7 - 12.2
K (ppm)	144	166	120 - 230	134	98 - 220	140	145	98 - 230

* No of experiments.

PLAN-94 (Concluded)

FIELD EVALUATION OF IPNI-NUTRIENT EXPERT FERTILIZER MODEL FOR WHEAT

OBJECTIVE Evaluation of Nutrient Expert fertilizer model for wheat

RESEARCH WORKER (S) Assistant Soil Fertility Officer / Agricultural Officer.

PROJECT DURATION 2017-18 to 2020-21

LOCATION All Punjab

P94.1: TREATMENT/ METHODOLOGY

		Nutrients (kg/ha)		
Tr. No.	**Treatment**	**N**	**P_2O_5**	**K_2O**
1	Control	0	0	0
2	FP	What farmer usually applies		
3	Half Recommended	80	57	30
4	Full Recommended	160	114	60
5	Nutrient Expert dose	Calculated from model after farmer interview		

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P & K at sowing by broadcast
2. ½ N at sowing and ½ N at first irrigation.

Sub plot size: 1/40th of a hectare

Layout: R.C.B.D. (3 Replications)

OBSERVATIONS AND DATA COLLECTION

1. Fertile Tillers/m^2
2. Grain and straw yield
3. Pre- sowing soil analysis

P94.2:PREVIOUS YEAR'S RESULT (2020-21)

Nutrients (kg/ha)					Wheat grain yield(kg/ha)					
Tr. No.	Treatment	N	P_2O_5	K_2O	Rice zone 2(6R)*	Central zone 3(9R)*	Cotton zone 8(24R)*	Thal zone 1(3R)*	Barani zone (Irrigated) 2(6R)*	Overall 16(48R)*
1	Control	0	0	0	1622 c	1518 d	1345 e	1074 d	2252 d	1508 d
2	FP	What farmer usually applies			4107 b	3361 c	4606 d	3000 c	5008 c	4260 c
3	Half Recommended	80	57	30	3722 b	3583 bc	3804 c	2407 b	4555 b	3759 b
4	Full Recommended	160	114	60	5016 a	4656 a	5074 b	2889 a	6042 b	5035 a
5	Nutrient Expert dose	Calculated from model after farmer interview			4701 a	3797 b	5649 a	3704 a	5043 a	4986 a
				LSD 0.05	192	308	194	373	379	192

The nutrient expert model (T5) produced results that were equal to the recommended fertiliser dose (T4). Farmer practise (T2) resulted in lower yields than the model and recommended dose, respectively. On a zonal basis, rice, central, and Barani zones produced good performance with the recommended dose, whereas the Nutrient Expert model produced the best results in cotton and Thal zones.

* No of experiments.

P94.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Rice zone 2(6R)*		Central zone 3(9R)*		Cotton zone 8(24R)*		Thal zone 1(3R)*	Barani zone (Irrigated) 2(6R)*		Overall 16(48R)*	
	Avg.	Range	Avg.	Range	Avg.	Range	Value	Avg.	Range	Avg.	Range
EC (dS m^{-1})	1.1	0.8 - 1.4	2.0	1.6 - 2.2	2.4	1.6 - 3.2	1.8	0.6	0.5 - 0.7	1.9	0.5 - 3.2
pH	8.1	7.9 - 8.2	8.2	7.9 - 8.3	8.3	7.7 - 8.5	8.2	7.2	7.1 - 7.3	8.1	7.1 - 8.5
OM%	0.7	0.6 - 0.8	0.8	0.6 - 1.0	0.7	0.7 - 0.9	0.8	0.7	0.6 - 0.7	0.7	0.6 - 1.0
P (ppm)	5.3	4.7- 5.8	8.6	7.0 - 11.5	8.1	6.6 - 8.6	7.8	5.9	0.5 - 6.8	7.6	4.7 - 11.5
K (ppm)	121	118-124	173	150 - 210	114	68 - 126	160	64	55 - 72	123	55 – 210

* No of experiments.

PLAN-96 (Concluded)

EFFECT OF MINERAL NUTRITION THROUGH FOLIAR APPLICATION ON MITIGATION OF DISEASE INCIDENCE IN CITRUS

OBJECTIVE To observe the effect of mineral nutrition through foliar application on disease mitigation in citrus orchards

RESEARCH WORKER (S) Assistant Soil Fertility Officer, Faisalabad, Multan/Agricultural Officers (Field).

PROJECT DURATION 2018-19 to 2019-20

LOCATION One site each with ASFO Faisalabad and Multan

96.1: TREATMENTS/ METHODOLOGY

Nutrients (gram/plant)				Micronutrients
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Zn, Cu, Fe, Mn, B**
1	F.P.	F.P.	F.P.	No spray
2	900	450	900	No spray
3	F.P.	F.P.	F.P.	Two sprays
4	900	450	900	Two sprays
5	F.P.	F.P.	F.P.	Three sprays
6	900	450	900	Three sprays

TIME AND METHOD OF FERTILIZER APPLICATION

1. FP = Farmer Practice: This treatment will receive as much dose of NPK as 1/2 of the 900, 450 and 900 g/plant respectively.
2. NPK will be applied in three equal splits, i.e. first dose at last week of January, second at mid of April and third at end of July.
3. Foliar spray will be done thrice, i.e. 15 days after appearance of new vegetative flush, 15 days after fruit formation and 15 days after the appearance of vegetative flush in August.
4. For one application, Foliar Spray will be prepared in volume of 500 mL with conc. of Zn, Cu, Fe, Mn & B @ 2.5, 0.2, 1.0, 1.0 and 0.5 percent respectively. It will subsequently be dissolved in 100 L of water and applied to the orchard of one acre.

Plot size: One acre.

Sub plot size: Four plants in eash treatments

Layout: R.C.B.D. **Replications:**Three

OBSERVATIONS AND DATA COLLECTION

1. Soil analysis EC, pH, OM. P_2O_5, K_2O and micronutrients
2. Leave analysis of N, P, K, Zn, Cu, Fe, Mn, and B
3. Citrus canker and citrus scab incidence on fruit and leaves
4. Fruit weight per 100 number
5. Fruit number per plant

P96.2: PREVIOUS YEAR'S RESULTS (2019-20)

Nutrients (g/plant)				Micronutrients	Citrus yield (No of Fruit /plant)
Tr. No.	N	P_2O_5	K_2O	Zn, Cu, Fe, Mn, B	Centralzone 1(3R)*
1	F.P.	F.P.	F.P.	No spray	590 e
2	900	450	900	No spray	658 b
3	F.P.	F.P.	F.P.	Two sprays	612 d
4	900	450	900	Two sprays	664 b
5	F.P.	F.P.	F.P.	Three sprays	628 c
6	900	450	900	Three sprays	682 a
				LSD 0.05	15

The number of citrus fruits increased as a result of micronutrient spraying. Three different micronutrient sprays were shown to be more effective. The sprays were effective at both recommended fertiliser use and farmer fertilizer use, according to the results.

* No of experiments

P96.3: PRE-SOWING SOIL ANALYSIS (2019-20)

Soil parameters	Central Zone1(3R)*
	Value
EC (dS m^{-1})	0.8
pH	8.3
OM%	0.8
P (ppm)	9.5
K (ppm)	160
Zn (ppm)	0.86
Cu (ppm)	0.31
Fe (ppm)	1.20
Mn (ppm)	0.60
B (ppm)	0.40

* No of experiments

PLAN-88 (Concluded)

BIO-FORTIFICATION OF SPRING MAIZE FOR ZINC AND IRON

OBJECTIVE To increase level of zinc and iron in spring maize grain

RESEARCH WORKER (S) Assistant Soil Fertility Officer / Agricultural Officer.

PROJECT DURATION 2018-19 to 2020-21

LOCATION All Punjab

P88.1: TREATMENT/ METHODOLOGY

Nutrients (kg/ha) Soil Application						Foliar Application	
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Zn**	**Fe**	**$ZnSO_4$ (33%Zn)**	**$FeSO_4$ (20%Fe)**
1	225	150	125	0	0	-	-
2	225	150	125	5	10	-	-
3	225	150	125	10	20	-	-
4	225	150	125	5	10	0.5%	0.5%
5	225	150	125	5	10	1.0%	1.0%
6	225	150	125	10	20	0.5%	0.5%
7	225	150	125	10	20	1.0%	1.0%

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K and 1/3 N at the time of sowing through broadcasting.
2. 1/3 N at knee height stage.
3. 1/3 N at pre tasseling stage.
4. Use $ZnSO_4$ (33% Zn) and $FeSO_4$ (20% Fe) for foliar spray.
5. Two sprays i.e. Zinc and Iron tasseling stage and 15 days later (Pre-Milking stage)

Sub plot size: $1/40^{th}$ of a hectare.

Layout: R.C.B.D.

OBSERVATIONS AND DATA COLLECTION

1. Soil analysis of each site (pre- & post).
2. Periodic observations on plant growth and pest/disease Weather / climatic conditions during the growth cycle.
3. Yield data

P88.2:PREVIOUS YEAR'S RESULT (2020-21)

Average Spring Maize Grain yield (kg/ha)

Tr. No.	Nutrients (kg/ha) Soil Application					Foliar Application		Rice zone 5(15R)*	Central zone 6(18R)*	Cotton zone 5(15R)*	Thal zone 1(3R)*	Overall 17(51R)*
	N	P_2O_5	K_2O	Zn	Fe	$ZnSO_4$ (33%Zn)	$FeSO_4$ (20%Fe)					
1	225	150	125	0	0	-	-	10137 d	8640 d	9561	10504 d	9461 c
2	225	150	125	5	10	-	-	10585 bc	9015 c	9741	10528 cd	9779 ab
3	225	150	125	10	20	-	-	10855 ab	9161 ab	9974	10543 c	9980 ab
4	225	150	125	5	10	0.5%	0.5%	10492 c	9068 bc	9449	10533 c	9685 bc
5	225	150	125	5	10	1.0%	1.0%	10728 bc	9134 ab	10187	10551 c	9996 a
6	225	150	125	10	20	0.5%	0.5%	10646 bc	9161 a	10373	10671 b	10043 a
7	225	150	125	10	20	1.0%	1.0%	11059 a	9189 a	9855	10868a	10034 a
							LSD 0.05	**320**	**90**	**N.S.**	**29**	**305**

On an aggregate basis, soil treatment plus Zn and Fe sprays in addition to NPK improved grain yield. T5, T6, and T7 all yielded at par. However, without the addition of micronutrients, the yield was drastically reduced.

* No of experiments.

P88.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Rice zone 5(15R)*		Central zone 6(18R)*		Cotton zone 5(15)*		Thal zone 1(3R)*	Overall 17(51R)*	
	Avg.	Range	Avg.	Range	Avg.	Range	Value	Avg.	Range
EC (dS m^{-1})	1.74	1.28 - 2.20	1.93	0.98 - 3.00	2.64	1.70 - 3.90	1.70	2.14	0.98 - 3.90
pH	8.0	7.9 - 8.2	8.1	7.6 - 8.3	8.2	8.0 - 8.5	8.0	8.1	7.6 - 8.5
OM%	0.93	0.91 - 0.94	1.09	0.51 - 1.84	0.59	0.21 - 1.00	0.68	0.86	0.21 - 1.84
P (ppm)	11.9	11.9	8.0	5.3 - 13.1	9.0	6.0 - 14.7	6.0	8.5	5.3 - 14.7
K (ppm)	112	98 - 126	185	87 - 348	155	70 - 280	140	161	70 - 348
Zn (ppm)	6.89	6.890	0.87	0.76 - 0.98	0.87	0.89 - 0.90	1.20	1.51	0.76 - 6.89
Fe (ppm)	8.43	8.430	2.81	1.77 - 450	4.30	4.10 - 4.50	4.50	3.84	1.77 - 8.43

* No of experiments.

PLAN NO. 88: BIO-FORTIFICATION OF SPRING MAIZE FOR ZINC AND IRON

Grain Analysis (Zn ppm)

No	M. Yasin 218/GB District Faisalabad	M. Shahzad 65/JB District Faisalabad	Zubair Ahmad 338/JB, Nia Lahore Distt. TT Singh	Ashiq Ali, BaroonKamalia, Distt. TT Singh	M. Imran 90/NB Sargodha	Asif, 48/NB Sargodha	Haji Dost Muhammad Mianwali	Nawab Qurban Ali Vehari	Mean
T 1	25.01	22.26	39.00	29.05	18.41	15.78	17.79	15.03	22.8
T 2	25.05	23.21	42.11	31.55	29.03	18.86	23.01	16.53	26.2
T 3	26.45	24.69	42.22	35.64	27.57	18.08	25.06	15.82	26.9
T 4	27.08	32.15	42.53	38.43	29.69	29.30	32.96	17.38	31.2
T 5	27.77	34.65	45.28	40.62	27.72	31.27	32.50	17.76	32.2
T 6	30.71	36.53	45.98	45.39	32.23	31.26	30.90	15.61	33.6
T 7	35.65	43.05	46.76	48.30	44.07	33.10	42.33	19.71	39.1

Using 10 kg Zn+ 20 kg Fe/ha together with a 1 percent foliar spray of ZnSO4 33 percent + FeSO4, it was possible to achieve the highest Zn levels (39ppm) in grains in the T7 treatment. T6 was the one that came after it. It was determined that both foliar and soil treatment were required.

Grain Analysis (Fe ppm)

No	M. Yasin 218/GB District Faisalabad	M. Shahzad 65/JB District Faisalabad	Zubair Ahmad 338/JB, Nia Lahore District TT Singh	Ashiq Ali, BaroonKamalia, Distt TT Singh	M. Imran 90/NB Sargodha	Asif, 48/NB Sargodha	Haji Dost Muhammad Mianwali	Nawab Qurban Ali Vehari	Mean
T 1	37.5	68.6	86.2	56.2	57.7	59.5	63.4	47.3	59.6
T 2	54.5	72.0	123.2	86.0	76.5	82.2	66.2	48.6	76.2
T 3	71.6	86.2	149.2	111.3	98.4	105.3	165.8	52.6	105.1
T 4	125.8	110.0	166.8	127.3	108.7	134.3	190.1	46.2	126.2
T 5	131.4	122.6	196.6	157.4	147.0	161.8	186.5	44.9	143.5
T 6	135.1	151.2	197.6	181.9	170.5	158.9	197.5	59.0	156.5
T 7	139.6	181.8	227.2	202.3	171.9	172.3	201.4	25.0	165.2

In T7, with 10 kg Zn+ 20 kg Fe per hectare and a 1 percent foliar spray of ZnSO4 33 percent + FeSO4, the highest Fe concentrations (165 ppm) in grains were reported. T6 was the one that came after it. It was identified that both foliar and soil applications were required for biofortification.

PLAN-59 (Concluded)

EFFECT OF DIFFERENT SOURCES OF SULPHUR ON SUGARCANE YIELD

OBJECTIVE To know the effect of sulphur on sugarcane yield

RESEARCH WORKER (S) Assistant Soil Fertility Officer / Agricultural Officer

PROJECT DURATION 2014-15to 2020-21 (Crop sown in March 2021 in field now)

LOCATION All Punjab

P59-1: TREATMENTS/ METHODOLOGY

Nutrients (kg/ha)					
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Elemental Sulphur**	**Bentonite Sulphur**
1	250	175	125	0	0
2	250	175	125	22	0
3	250	175	125	0	22

Note-1: Experiment will be carried out on **permanent layout** for two years. During second year, only NPK will be applied, sulphur will not be applied.

Note-2: Sources of fertilizer

N and P_2O_5 from Urea and DAP; K_2O from MOP only.

Time and method of fertilizer application

1. All P, K, sulphur and 1/3 N at the time of sowing through broadcasting.
2. Remaining N in two splits-beginning of April and end of May

Sub plot size: $1/40^{th}$ of a hectare.

Layout: R.C.B.D. (Permanent layout for two years)

Replications =4

Observations and data collection

1. Soil analysis of each site (Pre & post).
2. Periodic observations on plant growth and pest/disease.
3. Weather / climatic conditions during the growth cycle.
4. Yield data.

P59.2:PREVIOUS YEAR'S RESULT (2019-20)

Nutrients (kg/ha)						Cane yield (t/ha)			
Tr. No.	N	P_2O_5	K_2O	Elemental Sulphur	Bentonite Sulphur	Rice zone 1(3R)*	Central zone 1(3R)*	Cotton zone 3(12R)*	Overall 5(18R)*
1	250	175	125	0	0	118.567	111.910 b	101.562 c	106.121 c
2	250	175	125	22	0	120.192	113.563 b	104.245 b	108.456 b
3	250	175	125	0	22	120.830	116.774 a	106.156 a	110.371 a
					LSD 0.05	**N.S**	**2.299**	**1.296**	**1.002**

Sugarcane did not respond to sulphur when grown in the Rice zone. Only bentonite sulphur had a response in the central and cotton zones. A high response from sugarcane yield was observed in the cotton zone when bentonite sulphur was applied.

* No of experiments. Crop sown in March 2021 in field now.

P59.3: PRE-SOWING SOIL ANALYSIS (2019-20)

Soil parameters	Rice zone 1(3R)*	Central zone 1(3R)*	Cotton zone 3(12R)*		Overall 5(18R)*	
	Value	Value	Avg.	Range	Avg.	Range
EC (dS m^{-1})	2.5	1.3	1.4	1.1 - 1.9	1.6	1.1 - 2.5
pH	8.1	8.2	8.0	7.9 - 8.1	8.1	7.9 - 8.2
OM%	0.6	0.6	0.7	0.6 - 0.7	0.6	0.6 - 0.7
P (ppm)	5.1	6.8	8.0	6.3 - 9.4	7.2	5.1 - 9.4
K (ppm)	114	180	136	114 - 163	140	114 - 180
Cu (ppm)	2.5	1.3	1.4	1.1 - 1.9	1.6	1.1 - 2.5

* No of experiments.

PLAN-93 (Concluded)

SERIES WISE K FIXATION STUDIES ON IRRIGATED WHEAT

OBJECTIVES To determine soil series wise fixation of potash after addition to wheat crop for development of K fertilizer recommendation

RESEARCH WORKER (S) Assistant Soil Fertility Officer / Agricultural Officer.

PROJECT DURATION 2019-20 to 2021-22

LOCATION Throughout Punjab (At least 16 sites)

P93.1: TREATMENT/ METHODOLOGY

Nutrients (Kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	160	114	0
2	160	114	15
3	160	114	30
4	160	114	45
5	160	114	60
6	160	114	75
7	160	114	90
8	160	114	105
9	160	114	120

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K and half N will be applied at sowing by broadcast
2. Remaining half N at first irrigation
3. Soil series will be identified by Soil Survey of Punjab
4. K fixation or Mineralogy of soils will be determined using XRDA/ICP or other method.
5. Treatment wise post harvestSoil samples will be sent to Soil and Water Testing Laboratory Lahore for necessary analysis

Sub plot size: 1/40th of a hectare

Lay out: R.C.B.D. (Replicated three replications)

OBSERVATIONS AND DATA COLLECTION

1. Grain and straw yield
2. Pre-sowing and post-harvest **Treatment Wise** soil sample collection.
3. Plant population data

P93.2:PREVIOUS YEAR'S RESULT (2020-21)

Average wheat yield (kg/ha)

Tr. No.	Nutrients (kg/ha)			Rice zone 7(21R)*	Central zone 9(27R)*	Cotton zone 9(27R)*	Thal zone 1(3R)*	Overall 26(78R)*
	N	P_2O_5	K_2O					
1	**160**	**114**	**0**	4124 f	4278 d	4285 f	3148 c	4196 f
2	**160**	**114**	**15**	4206 ef	4376 cd	4390 ef	3222 c	4291 e
3	**160**	**114**	**30**	4324 de	4466 bc	4434 e	3326 bc	4373 e
4	**160**	**114**	**45**	4428 cd	4583 b	4517 de	3341 bc	4471 d
5	**160**	**114**	**60**	4575 bc	4768 a	4649 d	3389 abc	4622 c
6	**160**	**114**	**75**	4629 b	4775 a	4826 c	3574 ab	4707 c
7	**160**	**114**	**90**	4697 ab	4827 a	5029 b	3611ab	4815 b
8	**160**	**114**	**105**	4733 ab	4864 a	5206 a	3630 ab	4900 ab
9	**160**	**114**	**120**	4828 a	4902 a	5221 a	3704 a	4947 a
			LSD 0.05	**166**	**172**	**147**	**334**	**92**

Gradual increasing the dose of K resulted in an increase in yield at all three sites during the course of the three-year study. Distinct responses of K, on the other hand, were observed in different zones.

* No of experiments.

P93.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Rice zone 7(21R)*		Central zone 9(27R)*		Cotton zone 9(27R)*		Thal zone 1(3R)*	Overall 26(78R)*	
	Avg.	Range	Avg.	Range	Avg.	Range	Value	Avg.	Range
EC (dS m^{-1})	1.1	0.7 - 1.7	1.9	1.1 - 3.0	2.5	1.2 - 3.2	1.6	1.9	0.7 - 3.2
pH	7.9	7.4 - 8.4	8.1	7.8 - 8.3	8.2	7.8 - 8.4	8.2	8.1	7.4 - 8.4
OM%	0.6	0.4 - 0.7	0.8	0.5 - 1.3	0.6	0.5 - 0.8	0.7	0.7	0.4 - 1.3
P (ppm)	5.1	3.1 - 7.6	7.5	5.8 - 9.9	7.8	6.3 - 8.9	7.0	6.9	3.1 - 9.9
K (ppm)	98	50 - 126	169	110-210	128	70 - 196	160	135	50 - 210

* No of experiments.

PLAN-85 (CONCLUDED)

BEST COMBINATION OF NPK FOR GRAPES GROWN UNDER HIGH EFFICIENCY IRRIGATION SYSTEM (Drip Irrigation)

OBJECTIVE To find out the best combination of NPK fertilizer to obtain maximum yield of grapes grown under drip irrigation.

RESEARCH WORKER (S) Abdul Waheed, Sher Afzal

PROJECT DURATION 2021-22 to 2023-24

LOCATION Depending upon availability of site

P85.1: TREATMENTS/ METHODOLOGY

Nutrients (g/plant)			
Tr. No.	**N**	**P_2O_5**	**K_2O**
1	100	120	300
2	150	120	300
3	200	120	300
4	250	120	300

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, 1/4 N and 1/4 K will be applied at the time of sprouting.
2. Remaining N and K in three equal splits after 20-25 days intervals.

Sub plot size: one row comprising six plants.

Lay out: R.C.B.D.

Replications: Four

OBSERVATIONS AND DATA COLLECTION

1. Pre fertilizer application soil analysis.
2. Weight of fruit in kg/plant.

P85.2: PREVIOUS YEAR'S RESULTS (2020-21)

Nutrients (g/plant)				Grapes yield (kg/plant)
Tr. No.	N	P_2O_5	K_2O	Barani zone 1(3R)*
1	240	120	200	7703 c
2	360	120	300	9752 b
3	480	120	400	10428 a
			LSD 0.05	340.16

With 480-120-400 gram/plant of NPK, the highest significant maximum production of grapes was recorded.

* No of experiments

P85.3: PRE-SOWING SOIL ANALYSIS (2020-21)

Soil parameters	Barani zone 1(3R)*
	Value
EC (dS m^{-1})	0.8
pH	7.4
OM%	0.5
P (ppm)	2.5
K (ppm)	70
Zn (ppm)	0.8

* No of experiments

NEW EXPERIMENTS

PLAN-57

TITLE: POSSIBILITY OF REDUCTION OF NITROGEN DOSE FOR WHEAT KEEPING P CONSTANT (New-1)

RATIONALE Lodging has been observed with recommended dose of fertilizer at a number of places. Amongst the causes of lodging, increased plant height due to over application of nitrogen is also the one.

OBJECTIVE This study is planned to see whether use of N may be decreased without a *major* compromise in yield under farmer conditions?

RESEARCH WORKER (S) Muhammad Akram Qazi, Muhammad Nadeem Iqbal, Zia Chishti,NadeemRaza, Nadeem Hussain RabNawaz, M. Zahid Khan, Abdul Waheed, Sher Afzal, Iftikhar Ahmad, M. Tahir Akbar, Abdul Rauf, Hafiz Riaz Ahmad, Samina Hamid, Saima Nazar

PROJECT DURATION 2021-22 to 2023-24

LOCATION All zones in the Punjab

TREATMENT/ METHODOLOGY

	Nutrients (kg/ha)			
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Equivalent Bags/acre**
1	160	114	60	Urea=2.00, DAP = 2.00, SOP=1.00
2	145	114	60	Urea=1.75, DAP = 2.00, SOP=1.00
3	131	114	60	Urea=1.50, DAP = 2.00, SOP=1.00
4	117	114	60	Urea=1.25, DAP = 2.00, SOP=1.00
5	103	114	60	Urea=1.00, DAP = 2.00, SOP=1.00

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P and ½ N at sowing by broadcast
2. Remaining ½ N at first irrigation

Sub plot size: 1/40th ha.

Layout: R.C.B.D. (3 Replications)

OBSERVATIONS AND DATA COLLECTION

1. Grain and straw yield
2. Pre-sowing soil analysis
3. Plant height treatment wise
4. Plant population data

PREVIOUS YEAR RESULTS FIRST YEAR

PLAN-68

TITLE: POSSIBILITY OF REDUCTION OF PHOSPHORUS APPLICATION LEVELS

FOR WHEAT THROUGH APPLICATION OF SULPHUR UNDER FARMER CONDITIONS (New-2)

RATIONALE Prices of phosphorus fertilizers have been raised in international and local markets. To utilize existing P in soil, role of sulphur is to be tested.

OBJECTIVE This study is planned to see whether use of sulphur may improve yield with reduced phosphorus application?

RESEARCH WORKER (S) Muhammad Akram Qazi, Zia Chishti,NadeemRaza, Nadeem Hussain, RabNawaz, M. Zahid Khan, Abdul Waheed, Iftikhar Ahmad, M. Tahir Akbar, Muhammad Nadeem Iqbal, Samina Hamid, Saima Nazar, Muhammad Shakir

PROJECT DURATION 2021-22 to 2023-24

LOCATION All zones in the Punjab

TREATMENT/ METHODOLOGY

Nutrients (kg/ha)				
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Other Soil Application**
1	160	85.5	60	Nil
2	160	85.5	60	Elemental sulphur @ 10 kg/ha
3	160	57.0	60	Elemental sulphur @ 10 kg/ha
4	160	85.5	60	Elemental sulphur @ 20 kg/ha
5	160	57.0	60	Elemental sulphur @ 20 kg/ha
6	160	85.5	60	Elemental sulphur @ 30 kg/ha
7	160	57.0	60	Elemental sulphur @ 30 kg/ha

Elemental Sulphur 70% will be used for experiment

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P and ½ N at sowing by broadcast
2. Sulphur will be applied at soil preparation
3. Remaining ½ N at first irrigation

Sub plot size: 1/40th ha.

Layout: R.C.B.D. (3 Replications)

OBSERVATIONS AND DATA COLLECTION

1. Grain and straw yield
2. Pre-sowing soil analysis
3. Plant population data
4. Economics

PREVIOUS YEAR RESULTS FIRST YEAR

PLAN-69

TITLE: POSSIBILITY OF REDUCTION OF PHOSPHORUS APPLICATION LEVELS

THROUGH BIOSTIMULANT FOR WHEAT (New-3)

RATIONALE Prices of phosphorus fertilizer have been raised in international and local markets. Therefore, to utilize existing P in soil, application of bio-stimulant (Biozote) is to be tested.

OBJECTIVE This study is planned to see whether use of Biozote may partially replace P application in wheat?

RESEARCH WORKER (S) Muhammad Akram Qazi, Muhammad Nadeem Iqbal, Zia Chishti,NadeemRaza, Nadeem Hussain RabNawaz, Abdul Waheed, Sher Afzal, Iftikhar Ahmad, Nafeesa Muslim, Samina Hamid, Hafiz Riaz Ahmad, Muhammad Shakir

PROJECT DURATION 2021-22 to 2023-24

LOCATION All zones in the Punjab

TREATMENT/ METHODOLOGY

Nutrients (kg/ha)					
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Other Applications**	**Explanation**
1	160	114	60	No Biozote	Recommended P
2	160	114	60	+ Biozote	Recommended P
3	160	91	60	+ Biozote	80% P
4	160	68	60	+ Biozote	60% P
5	160	91	60	Biozote+30 kg Elemental sulphur	80% P
6	160	68	60	Biozote+30 kg Elemental sulphur	60% P
7	160	114	60	Biozote+30 kg Elemental sulphur	Recommended

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K and ½ N at sowing by broadcast
2. Remaining ½ N at first irrigation
3. Biozote will be applied to seed at sowing in recommended dose
4. Elemental sulphur will be applied at soil preparation.

Sub plot size: 1/40th ha.

Layout: R.C.B.D. (3 Replications)

OBSERVATIONS AND DATA COLLECTION

1. Grain and straw yield

2. Pre-sowing soil analysis
3. Plant population data

PREVIOUS YEAR RESULTS FIRST YEAR

PLAN-89

FERTILIZER REQUIREMENTS OF KINNOW ORCHARDS IN THAL ZONE (New-4)

OBJECTIVE To standardize the dose of Nitrogen and Phosphorus fertilizers for Kinnow in Thal Zone

RESEARCH WORKER (S) Zia Chishti,RabNawaz, Iftikhar Ahmad, M. Bilal Khan

PROJECT DURATION 2021-22 to 2023-24

LOCATION Layyah, Bhakkar

TREATMENTS/ METHODOLOGY

Nutrients (gram/plant)				Micronutrients
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Zn, Cu, Fe, Mn, B**
1	1000	500	500	Foliar sprays (0.15, 0.15, 0.10, 0.10 and 0.10 percent)
2	1250	500	500	-do-
3	1500	500	500	-do-
4	1000	750	500	-do-
5	1250	750	500	-do-
6	1500	750	500	-do-

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, 1/3 N, ½ K will be applied at Pre-blossom stage in end Dec-Jan after previous fruit harvest.
2. 1/3 Nwill be applied in April.
3. 1/3 N and ½ K will be applied in last week of August.

Schedule of Foliar Sprays to all Treatments

1. First spray will be of Zn +Cu + Fe + B before flowering
2. Second spray will be of Zn + Cu + Fe after fruit setting
3. Third spray will be of Copper 15 days after second spray

Sub plot size: Four plants in each treatments

Layout: R.C.B.D. **Replications:**Three

OBSERVATIONS AND DATA COLLECTION

1. Soil analysis EC, pH, OM. AvP, ExK, micronutrients.
2. Post experiment soil analysis
3. Fruit yield (Kg) per plant.
4. Number of fruits per plant

PREVIOUS YEAR RESULTS FIRST YEAR

PLAN-82

TITLE: USING HYDROGEL ON WHEAT IN THAL ZONE TO IMPROVE

FERTILIZER USE EFFICIENCY (IRRIGATED TRIAL New-5)

RATIONALE Due to limited moisture storage potential of lighter Thal soils, nutrients are not properly utilized by crops. Therefore, hydrogels may improve moisture and nutrient use efficiency in turn and improve crop yields.

OBJECTIVE To test the use of hydrogel alongwith varying levels of fertilizers on wheat

RESEARCH WORKER (S) Zia Chishti,RabNawaz, Iftikhar Ahmad, M. Bilal Khan.

PROJECT DURATION 2021-22 to 2023-24

LOCATION Layyah, Bhakkar (Irrigated Trial)

TREATMENT/ METHODOLOGY

Nutrients (kg/ha)				
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Hydrogel (Kg/ha)**
1	128	91	60	Nil
2	128	91	60	5 kg
3	128	91	60	10 kg
4	128	91	60	15 kg

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K and 1/3 N at sowing by broadcast
2. Second dose 1/3 N at first irrigation
3. Third dose 1/3 N at second irrigation
4. Hydrogel will be applied at sowing.
5. Water absorption capacity of hydrogel will be determined.

Sub plot size: $1/40^{th}$ ha.

Layout: R.C.B.D. (3 Replications)

OBSERVATIONS AND DATA COLLECTION

1. Grain and straw yield
2. Pre-sowing soil analysis
3. Plant population data
4. Economics

PREVIOUS YEAR RESULTS FIRST YEAR

PLAN-77

NUTRIENT REQUIREMENTS OF SUNFLOWER (SPRING CROP) New-6

OBJECTIVE To determine nutrient requirements of sunflower and their economics

RESEARCH WORKER (S) All PS/SS/SOs Field in Punjab

PROJECT DURATION 2021-22 to 2023-24

LOCATION All zones in the Punjab

TREATMENT/ METHODOLOGY

Nutrients (kg/ha)				
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Elemental Sulphur**
1	90	85	60	30
2	120	85	60	30
3	150	85	60	30
4	90	100	60	30
5	120	100	60	30
6	150	100	60	30

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K, elemental sulphur and 34% N at sowing
2. 22% N at first irrigation
3. 22% N at second irrigation
4. 22% N 15 days after second irrigation
5. **SOP** will be used as source of potash.

   Elemental Sulphur (70%)

Sub plot size: 1/40th ha.

Layout: R.C.B.D. (3 Replications)

OBSERVATIONS AND DATA COLLECTION

1. Sunflower grain (achene) yield
2. Pre-sowing soil analysis
3. Average Plant population of field

PREVIOUS YEAR RESULTS FIRST YEAR

PLAN-78

STUDY OF THE EFFECT OF PRECIPITATION METHODOLOGIES ON DETERMINATION OF P_2O_5 CONTENTS IN DIFFERENT PHOSPHATE FERTILIZER PRODUCTS (New-7)

OBJECTIVE

1. To test reduction in time of analysis for P fertilizers
2. To standardize speedy recovery of P_2O_5 analyte

RESEARCH WORKER (S) Principal Scientist (Soil Fertility) all Divisional Labs, Fertilizer Analysts

PROJECT DURATION 2021-22

LOCATION All Divisional labs and PRFT Lab Raiwind

TREATMENTS/ METHODOLOGY

Tr. No.	Time for precipitation after ammonium molybdate addition (Hours)
1	Stay for 24 hours at room temperature
2	Stay for 2 hours at room temperature
3	Gentle heat for 2 hours @ 65ºC in oven/hotplate
4	Gentle heat for 3 hours @ 65ºC in oven/hotplate
5	Refrigeration for 2 hours at 8-10 ºC
6	Refrigeration for 3 hours at 8-10 ºC

1. Two percent citric acid solution containing sample will be gently heated to a temperature of 65^{O}C. It will be shaken in reciprocating shaker for one hour at 150 rpm. Then precipitates of ammonium phosphomolybdate will be developed. Time for precipitation is given above.
2. Samples will be sent to all divisional labs by PRFTL Riawind and activity will be coordinated by it.

PRODUCTS TO BE TESTED

1. SSP 18%
2. DAP
3. Nitrophos

Layout: CRD

Replicates: Three

OBSERVATIONS AND DATA COLLECTION

1. Phosphorus contents of fertilizers
2. Temperatures during the course of study

PREVIOUS YEAR RESULTS FIRST YEAR

PLAN-84

TITLE: EFFECT OF FOLIAR APPLCIATION OF MORINGA LEAF EXTRACT ON WHEAT YIELD (New-8)

OBJECTIVE To evaluate the effect of foliar application of Moringa leaf extract (MLE) on wheat yield & yield components

RESEARCH WORKER (S) Iftikhar Ahmad, M. Tahir Akbar

PROJECT DURATION 2021-22

LOCATION Multan, Adaptive Research Farm, Vehari

TREATMENTS/ METHODOLOGY

Treatments No.	Fertilizer Dose N-P_2O_5-K_2O (kg/ha)	*MLE as foliar spray	MLE(ml)
1	160-114-60	Control(No MLE-Spray)	0
2	160-114-60	50 DAS	180
3	160-114-60	75 DAS	180
4	160-114-60	100 DAS	180
5	160-114-60	50+75 DAS	360
6	160-114-60	50+100 DAS	360
7	160-114-60	75+100 DAS	360
8	160-114-60	50+75+100 DAS	540

(*MLE=Moringa leaf extract), DAS =Days after sowing

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K and ½ N at sowing by broadcast
2. Remaining ½ N at first irrigation
3. Moringa leaf extract will be sprayed at given stages

Layout: Randomized

Replicates: Three

Plot Size: 8x3=24 plots, 80 Marla's, consisting of 24 plots of equal size

OBSERVATIONS AND DATA COLLECTION

1. Analysis of MLE
2. Grain and straw yield
3. Plant height, 1000 grain weight, Spikelets/spike, fertile tillers/m^2
4. Pre-sowing soil analysis

PREVIOUS YEAR RESULTS FIRST YEAR

PLAN-87

TITLE: RESPONSE OF WHEAT TO DIFFERENT LEVELS OF MAGNESIUM FERTILIZER (New-9)

RATIONALE Magnesium as a major nutrient is being used in various parts of world. This experiment is planned to investigate its effect in Punjab Soils,

OBJECTIVE To investigate the effect of magnesium application on yield of wheat

RESEARCH WORKER (S) Muhammad Nadeem Iqbal, Zia Chishti,NadeemRaza, Nadeem Hussain,RabNawaz, M. Zahid Khan, Iftikhar Ahmad, M. Tahir Akbar, Muhammad Akram Qazi, Saima Nazar, Hafiz Riaz Ahmad, Muhammad Shakir

PROJECT DURATION 2021-22 to 2023-24

LOCATION All zones in the Punjab

TREATMENT/ METHODOLOGY

Nutrients (kg/ha)				
Tr. No.	**N**	**P_2O_5**	**K_2O**	**Magnesium***
1	160	114	60	0
2	160	114	60	15
3	160	114	60	30
4	160	114	60	45
5	160	114	60	60

*Magnesium Sulphate commercial will be used as source of Mg.

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, K and ½ N at sowing by broadcast
2. Remaining ½ N at first irrigation
3. Magnesium will be applied at sowing

Sub plot size: 1/40th ha.

Layout: R.C.B.D. (3 Replications)

OBSERVATIONS AND DATA COLLECTION

1. Grain and straw yield
2. Pre-sowing soil analysis
3. Plant population data
4. Economics

PREVIOUS YEAR RESULTS FIRST YEAR

PLAN-100

EFFECT OF MOLASSES ON SOIL PROPERTIES IN SUGARCANE CROP (New-10)

OBJECTIVE

To ascertain the effect of molasses on soil properties under sugarcane crop

RESEARCH WORKER (S)

Iftikhar Ahmad,Multan

PROJECT DURATION

2021-22

LOCATION

South Punjab (Multan)

TREATMENTS/ METHODOLOGY

Tr. No.	N-P_2O_5-K_2O Kg/ha	Molasses (T/ha)
1	250-175-125	0
2	250-175-125	2.5
3	250-175-125	5.0
4	250-175-125	7.5
5	250-175-125	10.0

Time and method of fertilizer application

1. All P, K and 1/2 N at the time of sowing through broadcast
2. Remaining N in two splits in beginning of April and end of May.
3. Molasses will be added to soil at least 15 days before sowing.

Sub plot size: 1/40th of a hectare or as feasible

Layout: Repeats (3), Not randomized

Observations and data collection

1. Treatment wise soil analysis of each site before application of molasses
2. Treatment wise soil analysis of each site at sowing
3. Treatment wise soil analysis of each site 3 months and 6 months after sowing for ECe, pH, O.M.
4. Periodic observations on plant growth and pest/disease.
5. Yield data.

PREVIOUS YEAR RESULTS

FIRST YEAR

PLAN-101

FERTILIZER REQUIREMENT OF YOUNG MANGO ORCHARDS (New-11)

OBJECTIVE To evaluate the response of young mango (one year) to fertilizer application in light soils

RESEARCH WORKERS ASFO Faisalabad, Multan

PROJECT DURATION 2021-22

LOCATION Punjab, Light Soils of Thal(depending upon availability of site)

P90.1: TREATMENTS/ METHODOLOGY

Nutrients (Gram/plant)				
Tr. No.	**N**	**P_2O_5**	**K_2O**	
1	150	100	150	
2	150	100	300	
3	150	200	150	
4	150	200	300	
5	300	100	150	
6	300	100	300	
7	300	200	150	
8	300	200	300	

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, half K to be applied before beginning of spring sprouts in end of December/January.
2. One third nitrogen to be applied in end of February
3. One third nitrogen to be applied in end of March.
4. Remaining one third of N and half K in 1st week of August by broadcast

Total Plot size:96 plants

Layout: R.C.B.D. with four plants in each treatment

Replications: Three

OBSERVATIONS AND DATA COLLECTION

1. Soil and plant analysis at start of experiment
2. Nutrient deficiency symptoms if any during experiment
3. Periodic observations on plant growth and pest / disease infestation
4. Plant height, Plant canopy at start of experiment and in end of October.

PREVIOUS YEAR RESULTS First Year

PLAN-98

FERTILIZER REQUIREMENT OF YOUNG CITRUS ORCHARDS (New-12)

OBJECTIVE To evaluate the response of young citrus (2 years) to fertilizer application in light soils

RESEARCH WORKERS ASFO Faisalabad, Multan

PROJECT DURATION 2021-22

LOCATION Punjab, Light Soils of Thal(depending upon availability of site)

P90.1: TREATMENTS/ METHODOLOGY

Nutrients (Gram/plant)				
Tr. No.	**N**	**P_2O_5**	**K_2O**	
1	200	100	200	
2	200	100	300	
3	200	150	200	
4	200	150	300	
5	300	100	200	
6	300	100	300	
7	300	150	200	
8	300	150	300	

TIME AND METHOD OF FERTILIZER APPLICATION

1. All P, half K to be applied before beginning of spring sprouts in end of December/January.
2. One third nitrogen to be applied in end of February
3. One third nitrogen to be applied in end of March.
4. Remaining one third of N and half K in 1st week of August by broadcast.

Total Plot size:96 plants

Layout: R.C.B.D. with four plants in each treatment

Replications: Three

OBSERVATIONS AND DATA COLLECTION

1. Soil analysis at start of experiment
2. Nutrient deficiency symptoms if any during experiment
3. Periodic observations on plant growth and pest / disease infestation
4. Plant height, Plant canopy at start of experiment and in end of October.

PREVIOUS YEAR RESULTS First Year

ANNEXURES OF ARP

ANNEXURE-1

P95.2: PREVIOUS YEAR'S RESULTS (2019-20 Harvested February/March 2021)**Citrus (Number of Fruits per plant)**

PARB (T.T.Singh)										
Sr. No.►	1	2	3	4	5	6	7	8	9	10
Tr. No.	M. Shafiq	Imran	Faisal	CH. Azmat	Waqas	M. Javed Cheema	M. Hassan	Anwar Saeed	Mahmood-ul-Hussain	M. Tanvir
1	622	603	563	594	593	587	716	621	584	563
2	637	651	585	604	605	618	744	664	685	612
3	674	684	619	614	608	651	776	709	733	732
4	694	690	649	656	614	680	808	730	801	816
5	701	691	666	681	625	687	820	740	824	833

P95.3: PREVIOUS YEAR'S RESULTS (2019-20)Citrus Fruits Kg per plant

PARB (T.T.Singh)										
Sr. No.►	1	2	3	4	5	6	7	8	9	10
Tr. No.	M. Shafiq	Imran	Faisal	CH. Azmat	Waqas	M. Javed Cheema	M. Hassan	Anwar Saeed	Mahmood-ul-Hussan	M. Tanvir
1	87.37	84.74	77.04	76.89	82.01	81.15	100.53	85.50	84.83	77.13
2	99.10	98.05	88.65	85.30	84.25	90.75	112.18	106.50	103.80	98.60
3	105.40	103.79	93.59	90.57	88.74	102.30	120.30	115.80	113.55	111.38
4	114.20	111.94	104.42	98.88	92.20	112.38	126.38	125.30	127.30	128.15
5	116.35	114.82	105.94	106.52	99.97	112.75	128.00	126.50	128.65	129.88

P95.6: PREVIOUS YEAR'S RESULTS (2019-20)Citrus (Number of Fruits per plant)

PARB (Sahiwal)										
Sr. No.►	1	2	3	4	5	6	7	8	9	10
Tr. No.	Faiz Ahmad	Majid Mehmood	Ali Sher	Bashir Ahmad	Malik Nau Bahar Awan	M. Iqbal Dogar	M. AbassJutt	Sajjad Cheema	M. Umair	Ejaz Ahmad
1	497	497	513	502	608	623	633	589	522	526
2	592	715	702	713	710	710	736	675	635	626
3	663	775	764	785	789	786	774	762	686	697
4	740	882	814	807	813	805	803	801	725	730
5	782	923	885	866	878	887	882	825	785	758

P95.7: PREVIOUS YEAR'S RESULTS (2019-20)Citrus Fruits Kg per plant

PARB (Sahiwal)										
Sr. No.►	1	2	3	4	5	6	7	8	9	10
Tr. No.	Faiz Ahmad	Majid Mehmood	Ali Sher	Bashir Ahmad	Malik Nau Bahar Awan	M. Iqbal Dogar	M. AbassJutt	Sajjad Cheema	M. Umair	Ejaz Ahmad
1	86.27	101.33	99.73	96.90	99.40	102.20	95.50	96.90	95.83	91.70
2	105.73	119.90	115.37	113.43	115.07	113.00	109.50	110.07	110.40	108.73
3	114.00	139.47	128.30	120.50	128.97	130.17	123.83	126.83	117.23	112.73
4	121.10	156.10	138.20	136.80	137.03	138.23	135.27	138.43	128.77	124.30
5	128.87	177.00	152.63	149.67	151.23	150.67	142.80	146.57	132.87	129.57

P95.9: Pre-Fruit SOIL ANALYSIS(2019-20)

PARB (Sahiwal)										
Sr. No.►	1	2	3	4	5	6	7	8	9	10
Soil Para-meters	Faiz Ahmad	Majid Mehmood	Ali Sher	Bashir Ahmad	Malik Nau Bahar Awan	M. Iqbal Dogar	M. AbassJutt	Sajjad Cheema	M. Umair	Ejaz Ahmad
EC(dS m^{-1}	2.38	2.30	2.41	1.93	2.35	2.83	2.11	1.38	1.40	1.62
pH	8.30	8.20	8.20	8.30	8.10	8.00	8.00	8.10	8.00	8.20
OM%	0.57	0.69	0.65	0.69	0.65	0.73	0.75	0.60	0.58	0.50
P (ppm)	7.60	8.40	8.20	7.50	8.40	8.00	8.20	6.30	6.40	7.40
K (ppm)	186	220	180	180	190	200	182	180	180	240
Zn (ppm)	0.78	0.81	0.64	0.90	0.62	0.78	0.70	0.60	0.58	0.67
Cu (ppm)	0.29	0.27	0.26	0.18	0.14	0.15	0.20	0.12	0.11	0.16
Fe (ppm)	4.42	4.46	4.41	4.20	3.87	3.90	4.24	3.50	3.60	3.70
Mn (ppm)	0.75	0.78	0.68	0.86	0.56	0.71	0.87	0.77	0.78	0.72
B (ppm)	0.49	0.46	0.44	0.48	0.49	0.46	0.38	0.42	0.41	0.46

P95.10 PREVIOUS YEAR'S RESULTS (2019-20)Citrus (Number of Fruits per plant)

PARB (Bhakkar)										
Sr. No.►	1	2	3	4	5	6	7	8	9	10
Tr. No.	M. Mushtaq	Kaleem Ullaha	Ghulam Abbas	M. Saeed	M. Yousaf	M. Sarwar	M. Aamir	M. Ayub	Abdul Rehman	Ghulam Muhammad
1	502	442	492	516	624	539	607	663	480	414
2	632	519	704	603	742	602	658	701	562	448
3	699	565	746	662	780	652	698	723	635	522
4	744	632	785	740	795	725	730	749	719	624
5	785	674	832	778	837	769	749	788	761	654

P95.11: PREVIOUS YEAR'S RESULTS (2019-20)Citrus Fruits Kg per plant

PARB (Bhakkar)										
Sr. No.►	1	2	3	4	5	6	7	8	9	10
Tr. No.	M. Mushtaq	Kaleem Ullaha	Ghulam Abbas	M. Saeed	M. Yousaf	M. Sarwar	M. Aamir	M. Ayub	Abdul Rehman	Ghulam Muhammad
1	71.33	62.33	69.67	73.00	88.67	76.67	85.33	105.33	68.67	59.00
2	89.67	73.33	100.00	85.67	105.67	85.67	85.67	108.67	80.00	63.67
3	99.33	80.33	106.00	94.00	111.00	93.00	92.33	110.00	90.67	74.00
4	123.67	105.00	130.33	123.00	133.33	120.33	95.33	114.00	120.00	103.33
5	130.67	114.67	138.00	129.33	139.00	128.00	98.33	117.33	127.00	108.33

P95.13: Pre-Fruit SOIL ANALYSIS(2019-20)

PARB (Bhakkar)										
Sr. No.►	1	2	3	4	5	6	7	8	9	10
Soil Para-meters	M. Mushtaq	Kaleem Ullaha	Ghulam Abbas	M. Saeed	M. Yousaf	M. Sarwar	M. Aamir	M. Ayub	Abdul Rehman	Ghulam Muhammad
EC (dS m^{-1})	0.87	0.95	0.85	0.95	0.90	1.00	0.80	1.00	1.50	1.00
pH	8.10	8.00	8.30	8.00	8.40	8.20	8.20	8.30	8.00	8.20
OM%	0.67	0.63	0.72	0.58	0.74	0.85	0.78	0.65	0.80	0.87
P (ppm)	6.20	6.90	7.10	6.50	5.80	7.20	6.80	6.20	7.00	7.50
K (ppm)	134	154	162	124	114	230	142	182	142	165
Zn (ppm)	0.60	0.50	0.70	0.80	0.70	0.30	0.50	0.45	0.80	0.60
Cu (ppm)	0.48	0.45	0.42	0.49	0.46	0.45	0.42	0.40	0.48	0.42
Fe (ppm)	4.10	4.50	4.00	4.80	4.20	4.00	3.90	4.20	4.00	4.80
Mn (ppm)	3.20	2.80	2.50	2.78	3.50	4.50	4.00	4.20	3.80	4.20
B (ppm)	0.15	0.20	0.30	0.40	0.40	0.40	0.30	0.50	0.60	0.45

P95.14 PREVIOUS YEAR'S RESULTS (2019-20)Citrus (Number of Fruits per plant)

PARB (Layyah)										
Sr. No.►	1	2	3	4	5	6	7	8	9	10
Tr. No.	Qamar Habib	Khuram Ilyas	M. Hussain	Arshad Shaheen	M. Ikram	M. Saleem	Shahid Rasool	M. Yasin	M. Rauf	Zulfiqar Ali
1	602	495	573	572	674	494	410	464	312	546
2	627	645	731	670	719	538	485	552	363	642
3	656	703	744	748	816	744	589	586	391	790
4	948	837	940	882	1011	915	682	777	463	915
5	900	769	833	748	909	818	613	735	450	833

P95.15: PREVIOUS YEAR'S RESULTS (2019-20)Citrus Fruits Kg per plant

PARB (Layyah)										
Sr. No.►	1	2	3	4	5	6	7	8	9	10
Tr. No.	Qamar Habib	Khuram Ilyas	M. Hussain	Arshad Shaheen	M. Ikram	M. Saleem	Shahid Rasool	M. Yasin	M. Rauf	Zulfiqar Ali
1	65.10	53.43	52.40	59.87	68.10	50.23	46.93	46.57	52.80	56.27
2	73.57	299.87	98.03	83.67	94.10	65.23	67.70	62.90	55.33	68.50
3	112.67	121.27	130.33	120.67	126.23	119.47	96.33	99.20	62.33	143.00
4	170.33	150.60	154.90	139.93	156.03	157.00	112.33	135.53	76.67	160.37
5	156.67	142.40	147.43	123.50	137.60	144.77	105.33	128.53	64.67	145.67

P95.17: Pre-Fruit SOIL ANALYSIS(2019-20)

PARB (Layyah)										
Sr. No.►	1	2	3	4	5	6	7	8	9	10
Soil Para-meters	Qamar Habib	Khuram Ilyas	M. Hussain	Arshad Shaheen	M. Ikram	M. Saleem	Shahid Rasool	M. Yasin	M. Rauf	Zulfiqar Ali
EC (dS m^{-1})	2.67	2.59	2.17	2.35	2.54	2.40	2.41	2.49	1.83	1.94
pH	8.10	8.00	8.30	8.20	8.10	8.00	8.10	8.10	8.10	8.10
OM%	0.45	0.44	0.49	0.47	0.47	0.51	0.46	0.51	0.44	0.47
P (ppm)	5.30	6.50	5.30	5.00	6.00	7.20	6.00	6.00	6.80	7.00
K (ppm)	110	99	110	130	110	120	110	120	140	130
Zn (ppm)	0.40	0.62	0.39	0.49	0.42	0.59	0.62	0.53	0.68	0.78
Cu (ppm)	0.16	0.16	0.15	0.15	0.13	0.12	0.14	0.14	0.13	0.15
Fe (ppm)	3.56	3.18	2.64	2.54	2.41	3.80	3.59	3.67	3.50	3.90
Mn (ppm)	0.71	0.78	0.65	0.81	0.60	0.72	0.65	0.56	0.50	0.71
B (ppm)	0.45	0.38	0.44	0.45	0.41	0.41	0.40	0.45	0.42	0.43

P95.18 PREVIOUS YEAR'S RESULTS (2019-20)

Citrus (Number of Fruits per plant)

Average Citrus (Number of Fruits per plant)			
Tr. No.	Central zone T.T.Singh + Sahiwal 20(70R)*	Thal zone Bhakkar + Layyah 20(60R)*	Overall 40(130R)*
1	582 e	521 d	554 d
2	658 d	607 c	635 c
3	709 c	673 b	692 b
4	747 b	780 a	762 a
5	778 a	762 a	771 a
LSD .05	16	24	15

* No of experiments.

P95.19 PREVIOUS YEAR'S RESULTS (2019-20)

Citrus Fruits Kg per plant

Average Citrus Fruits Kg per plant			
Tr. No.	**Central zone T.T.Singh + Sahiwal 20(70R)***	**Thal zone Bhakkar + Layyah 20(60R)***	**Overall 40(130R)***
1	89.23 e	65.59 c	78.32 d
2	103.32 d	92.35 b	98.25 c
3	112.97 c	104.11 b	108.88 b
4	123.25 b	129.10 a	125.95 a
5	129.47 a	126.36 a	128.04 a
LSD .05	**2.29**	**14.95**	**7.08**

* No of experiments.

P95.21: PRE-FRUIT SOIL ANALYSIS (2019-20)

Soil parameters	Central zone T.T.Singh + Sahiwal 20(70R)*		Thal zone Bhakkar + Layyah 20(60R)*		Overall 40(130R)*	
	Avg.	**Range**	**Avg.**	**Range**	**Avg.**	**Range**
EC (dS m^{-1})	1.7	0.9 - 2.8	1.7	0.8 - 2.7	1.7	0.8 - 2.8
pH	8.1	7.9 - 8.3	8.1	8.0 - 8.4	8.1	7.9 - 8.4
OM%	0.7	0.5 - 1.0	0.6	0.4 - .09	0.6	0.4 - 1.0
P (ppm)	8.0	5.3 - 10.2	6.4	5.0 - 7.5	7.2	5.0 - 10.2
K (ppm)	192	160 – 240	136	99 - 230	164	99 - 240
Zn (ppm)	0.81	0.58 - 1.21	0.57	0.30 - 0.80	0.69	0.31 - 1.21
Cu (ppm)	0.25	0.11 - 0.41	0.30	0.12 - 0.49	0.27	0.11 - 0.49
Fe (ppm)	3.0	1.28 - 4.46	3.8	2.41 - 4.80	3.4	1.28 - 4.80
Mn (ppm)	0.7	0.5 - 0.9	2.1	0.5 - 4.5	1.4	0.5 - 4.5
B (ppm)	0.4	0.3 - 0.6	0.4	0.2 - 0.6	0.4	0.2 - 0.6

* No of experiments.

Picking of citrus experiments (P-95) was done in February-March 2021.

CITRUS DATA PARB 2020-2021

DISTRICT: TOBA TEK SINGH

M. Shafiq,Chak No 324 JB, TOBA TEK SINGH										
	No. of Fruits /Plant (Av)					**Fruit Yield Kg/Plant**				
Treatments	R_1	R_2	R_3	R_4	Mean	R_1	R_2	R_3	R_4	Mean
1. F.P	608	624	610	605	612	87.1	89.3	88.2	84.8	87
2. F. P+Soil App.	643	630	620	615	627	98.1	101.1	101.1	96.1	99
3. Recommended	680	660	655	660	664	98.0	110.7	106.3	106.5	105
4. Rec+ Soil Appli.	695	680	675	685	684	116.3	119.5	105.3	115.5	114
5. Rec+ Spray	705	715	675	670	691	121.1	117.5	115.3	111.3	116
Imran,Chak No 346 GB										
	No. of Fruits /Plant (Av)					**Fruit Yield Kg/Plant**				
Treatments	R_1	R_2	R_3	R_4	Mean	R_1	R_2	R_3	R_4	Mean
1 F.P	610	590	615	595	603	88.2	84.2	84.2	82.2	84.7
2 F. P+Soil App.	650	655	665	635	651	99.3	96.3	95.4	101.1	98.0
3 Recommended	685	675	695	680	684	106.4	104.3	101.1	103.4	103.8
4 Rec+ Soil Appli.	675	695	700	690	690	116.2	111.3	109.1	111.1	111.9
5Rec+ Spray	700	680	690	695	691	117.2	113.5	113.2	115.2	114.8
Faisal Chak No 299 JB										
	No. of Fruits /Plant					**Fruit Yield Kg/Plant**				
Treatments	R_1	R_2	R_3	R_4	Mean	R_1	R_2	R_3	R_4	Mean
1 F.P	570	555	565	560	563	79.2	83.3	70.4	79.2	77.0
2 F. P+Soil App.	595	575	568	600	585	90.1	85.2	91.2	90.1	88.6
3 Recommended	635	620	605	615	619	99.2	94.6	89.3	99.2	93.6
4Rec+ Soil Appli.	652	644	655	645	649	109.4	105.2	99.0	109.4	104.4
5Rec+ Spray	665	660	655	685	666	111.2	107.2	102.3	111.2	105.9
Ch. Azmat Chak No 390 JB										
	No. of Fruits /Plant					**Fruit Yield Kg/Plant**				
Treatments	R_1	R_2	R_3	R_4	Mean	R_1	R_2	R_3	R_4	Mean
1. F.P	580	595	590	610	594	81.4	83.3	69.6	73.3	76.9
2. F. P+Soil App.	602	603	592	618	604	84.3	93.3	83.5	80.2	85.3
3.Recommended	615	610	605	625	614	93.1	85.6	90.3	93.3	90.6
4.Rec+Soil Appli.	660	650	670	645	656	104.2	100.4	92.6	98.4	98.9
5. Rec+ Spray	670	690	675	690	681	108.3	104.4	110.1	103.3	106.5

Waqas

Waqas Chak No 376 JB										
	No. of Fruits /Plant					**Fruit Yield Kg/Plant**				
Treatments	R_1	R_2	R_3	R_4	Mean	R_1	R_2	R_3	R_4	Mean
1. F.P	610	580	588	595	593	82.2	81.1	83.5	81.2	82.0
2. F. P+Soil App.	605	610	615	591	605	84.2	84.3	85.4	83.2	84.3
3. Recommended	618	601	610	602	608	91.3	89.2	88.3	86.2	88.7
4. Rec+ Soil Appli.	617	613	600	625	614	93.1	92.2	91.3	92.2	92.2
5. Rec+ Spray	630	625	616	627	625	103.7	100.3	97.1	98.8	100.0

	Muhammad Javed Cheema, Chak No. 303/GB Gojra, District T. T. Singh											
							Fruits yield /Plant(Kg)					
	R1	R2	R3	R4	TOTAL	MEAN	R1	R2	R3	R4	TOTAL	MEAN
1	585	573	598	592	2348	587	81.2	80.0	81.9	81.5	324.5	81.1
2	614	611	621	626	2472	618	90.2	89.8	91.2	91.8	363.1	90.8
3	648	641	660	655	2604	651	102.5	101.9	102.7	102.1	409.1	102.3
4	677	673	683	687	2720	680	112.3	111.8	112.6	112.8	449.6	112.4
5	686	677	695	690	2748	687	112.7	112.6	112.9	112.8	450.9	112.7
	Muhammad Hassan 244/GB Gojra, District T.T. Singh											
	No. of Fruits/Plant(Av)						Fruits yield /Plant(Kg)					
	R1	R2	R3	R4	TOTAL	MEAN	R1	R2	R3	R4	TOTAL	MEAN
1	717	706	731	710	2864	716	100.5	99.5	102.8	99.3	410.9	100.6
2	749	732	754	739	2974	765	112.4	111.7	112.8	111.8	448.7	112.2
3	766	775	783	780	3104	776	118.8	120.1	121.3	121.0	481.2	120.3
4	811	798	806	817	3232	808	126.5	125.7	126.1	127.2	505.4	126.4
5	820	814	828	818	3280	820	127.8	126.6	130.1	127.5	512.1	128.0
	Anwar Saeed Chak No. 338/GB T. T. Singh											
	No. of Fruits/Plant(Av)						Fruits yield /Plant(Kg)					
	R1	R2	R3	R4	TOTAL	MEAN	R1	R2	R3	R4	TOTAL	MEAN
1	607	630	622	625	2484	621	85.5	86.3	85.9	86.1	343.8	86.0
2	674	664	659	659	2656	664	106.5	104.4	103.9	104.0	418.8	104.7
3	715	699	706	716	2836	709	115.8	117.7	116.9	116.0	466.4	116.6
4	732	722	727	739	2920	730	125.3	124.8	125.0	125.7	500.8	125.2
5	749	732	734	745	2960	740	126.5	126.0	125.9	126.3	504.7	126.2

	Mahmood-ul-Hassan Chak NO. 336/GB T.T. Singh											
	No. of Fruits/Plant(Av)						Fruits yield /Plant(Kg)					
	R1	R2	R3	R4	TOTAL	MEAN	R1	R2	R3	R4	TOTAL	MEAN
1	569	589	583	593	2334	584	83.3	85.2	84.9	85.7	339.1	84.7
2	651	768	658	664	2741	685	102.7	104.3	104.1	103.9	415.1	103.7
3	738	722	730	742	2932	733	114.3	112.8	113.3	113.7	454.1	113.5
4	792	802	800	810	3204	801	126.8	127.3	126.9	128.1	509.2	127.3
5	818	830	822	826	3296	824	128.6	129.7	127.1	129.1	514.5	128.6
	Muhammad Tanvir 290/GB T.T. Singh											
	No. of Fruits/Plant(Av)						Fruits yield /Plant(Kg)					
	R1	R2	R3	R4	Total	Mean	R1	R2	R3	R4	Total	Mean
1	572	562	552	566	2252	563	78.1	76.3	77.1	77.0	308.5	77.1
2	609	600	628	611	2448	612	98.5	97.9	99.1	98.9	394.3	98.6
3	742	736	728	722	2928	732	112.5	111.8	110.9	110.3	445.5	111.4
4	800	829	813	822	3264	816	127.8	128.5	128.3	128.0	512.6	128.2
5	842	826	834	830	3332	833	130.3	129.6	130.1	129.5	519.5	129.9

Soil Analysis of Citrus Orchards at T.T.SINGH

			Soil Analysis									
S. No	Name of Farmer	Address	pH	EC	OM	P (ppm)	K (ppm)	Cu	Zn	Fe	Mn	B
1	M. Shafiq	324 JB	8.0-7.9	1.10-1.31	0.57-0.41	7.8-4.5	220-160	0.37-0.28	0.77-0.79	2.73-1.54	0.63-0.53	0.41-0.40
2	M. Faisal	299 GB	8.1-7.9	1.86-1.45	0.55-0.35	8.4-6.5	180-140	0.28-0.22	0.83-0.72	1.76-1.72	0.54-0.43	0.47-0.37
3	Azmat Ali	390 JB	8.0-8.0	1.41-1.34	0.69-0.41	5.3-3.9	160-140	0.28-0.26	0.92-0.88	2.34-2.36	0.68-0.60	0.41-0.39
4	M. Waqas	376 JB	7.9-7.8	1.48-1.45	0.76-0.41	7.2-4.1	220-180	0.41-0.33	0.92-0.77	2.37-1.89	0.71-0.69	0.40-0.39
5	M. Imran	346 GB	7.9-7.8	1.33-1.30	0.83-0.44	7.8-5.8	180-160	0.41-0.34	0.88-0.76	2.30-1.90	0.66-0.68	0.39-0.35

Toba Tek Singh

SOIL ANALYSIS OF CITRUS ORCHARDS UNDER PARB												
Sr. NO	Name of Farmer	Sample depth	pH	ECe	OM	P	K	Cu	Zn	Fe	Mn	B
1	Javed Cheema	0-15	8.1	0.87	0.69	8.7	180	0.28	0.97	2.21	0.78	0.33
		15-30	8.1	0.94	0.51	6.5	160	0.24	0.89	2.20	0.63	0.29

	303/JB											
2	Mian Hassan, 244/GB	0-15	8.1	1.46	0.97	9.2	180	0.23	0.66	1.27	0.68	0.39
		15-30	8.2	1.09	0.69	6.8	160	0.29	0.87	1.78	0.90	0.52
3	M. Tariq 338/GB	0-15	8.2	1.2	0.76	10.2	160	0.28	0.74	2.24	0.81	0.50
		15-30	8.2	1.33	0.62	7.5	140	0.27	0.68	1.80	0.70	0.47
4	M. Sajid 374/JB	0-15	8.3	0.96	0.55	8.5	200	0.24	1.20	1.63	0.78	0.44
		15-30	8.1	1.32	0.41	5.4	180	0.22	1.13	1.53	0.69	0.37
5	M. Tanvir 290/GB	0-15	8.2	1.37	0.76	9.5	220	0.34	1.13	2.32	0.60	0.58
		15-30	8.2	1.19	0.69	6.2	180	0.29	1.08	2.00	0.55	0.42

Disease Incidence on citrus fruit near maturity

Farmer Name, M. Shafiq, Chak No 324JB, Toba Tek Singh

Treatment	DISEASE SEVERITY				
	Very high	high	medium	low	Very low
1			✓		
2			✓		
3			✓		
4				✓	
5				✓	

Farmer Name, Imran, Chak no 346GB, TTSingh

Treatment	DISEASE SEVERITY				
	Very high	high	medium	Low	Very low
1			✓		
2			✓		
3			✓		
4				✓	
5				✓	

Farmer Name, Faisal, Chak No 299JB, TTSingh

Treatment	DISEASE SEVERITY				
	Very high	high	medium	low	Very low
1			✓		
2			✓		
3			✓		
4				✓	
5				✓	

Farmer Name, Ch. Azmat, Chak No 390 JB, TTSingh

Treatment	DISEASE SEVERITY				
	Very high	high	Medium	low	Very low
1			✓		
2			✓		

3			✓		
4				✓	
5				✓	

Farmer Name, Waqas, Chak No 376 JB, TTSingh

Treatment	DISEASE SEVERITY				
	Very high	High	medium	low	Very low
1			✓		
2			✓		
3			✓		
4				✓	
5				✓	

FARMER' NAME: Muhammad Javed Cheema, Chak No. 303/JB Gojra District T. T. Singh

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1		✓			
2					
3					
4					
5					

FARMER' NAME: Muhammad Hassan, Chak No. 244/GB Gojra, District T.T. Singh

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2				✓	
3			✓		
4				✓	
5				✓	

FARMER' NAME: Anwar Saeed, Chak No. 338/GB T. T. Singh

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2			✓		
3				✓	
4				✓	
5				✓	

FARMER' NAME: Mahmood-ul-Hassan, Chak No. Chak NO. 336/GB T.T. Singh

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2			✓		
3			✓		
4				✓	
5				✓	

FARMER' NAME: Muhammad Tanvir, Chak No. 290/GB District T. T. Singh

Treatments	Disease severity				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1		✓			
2			✓		
3			✓		
4				✓	
5				✓	

DISTRICT SAHIWAL

	CITRUS DATA									
	Faiz Ahmad Chak no 61/4R Sahiwal (Kinnow)									
	No of fruits/plant					Fruit yield Kg/plant				
	R1	R2	R3	Total	Avg.	R1	R2	R3	Total	Mean
1	485	510	495	1490	497	91.6	89.7	77.5	258.9	86.3
2	590	559	627	1776	592	115.0	103.7	98.5	317.2	105.7
3	715	635	640	1990	663	109.1	110.3	122.6	342.0	114.0
4	707	765	749	2221	740	125.0	116.8	121.5	363.3	121.1
5	779	809	758	2346	782	128.5	127.5	130.6	386.6	128.8
	Majid Mehmood Chak no 74/5R Sahiwal (Sweet Lime)									
	No of fruits/plant					Fruit yield Kg/plant				
	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
1	485	510	495	1490	497	98.6	105.4	100	304.0	101.3
2	690	715	740	2145	715	115	123.7	121	359.7	119.9
3	786	735	803	2324	775	129.1	142.3	147.	419.1	139.7
4	874	870	901	2645	882	151	156.8	160.5	468.3	156.1
5	955	889	925	2769	923	180	195	156	531.0	177.0
	Ali Sher Chak no 64/4-R Sahiwal (kinnow)									
	No of fruits/plant					Fruit yield Kg/plant				
	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
1	496	530	512	1538	513	94.9	98.7	105.6	299.3	99.7
2	678	731	698	2107	702	107.5	118.0	120.6	346.1	115.3
3	744	767	781	2292	764	129.8	131.6	123.5	384.9	128.3
4	805	813	823	2441	814	135.2	147.7	131.7	414.6	138.2
5	889	876	890	2655	885	148.2	150.2	159.5	457.9	152.6
	Bashir Ahmad Chak no 107/12L Chichawatni Sahiwal (Kinnow)									
	No of fruits/plant					Fruit yield Kg/plant				

	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
1	531	481	495	1507	502	92.4	104.6	93.7	290.7	96.9
2	695	707	736	2138	713	105	121.8	113.5	340.2	113.4
3	803	768	783	2354	785	125.5	110.5	125.5	361.5	120.5
4	805	811	805	2421	807	131.7	142.4	136.3	410.4	136.8
5	847	850	901	2598	866	155	149.4	144.6	449.0	149.6
	Malik Nau Bahar Awan Chak no 93/12L Chichawatni Sahiwal (Kinnow)									
	No of fruits/plant					Fruit yield Kg/plant				
	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
1	605	593	625	1823	608	101.7	102.0	94.5	298.2	99.4
2	685	715	729	2129	710	115.1	111.1	119.0	345.2	115.0
3	783	795	788	2366	789	124.0	133.2	129.7	386.9	128.9
4	805	811	823	2439	813	136.0	144.1	131.0	411.1	137.0
5	850	877	908	2635	878	145.5	149.2	159.0	453.7	151.2
	Ch Muhammad Iqbal DogarChak no 114/12L Sahiwal (kinnow)									
	No of fruits/plant					Fruit yield Kg/plant				
	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
1	675	570	625	1870	623	102.6	103	101	307.2	102.4
2	775	645	710	2130	710	112.0	109	118	339.0	113.0
3	793	785	780	2358	786	127.5	131	132	390.5	130.1
4	795	800	821	2416	805	132.7	139	143	414.7	138.2
5	870	890	900	2660	887	157.0	149	146	452.0	150.6
	Muhammad AbassJutt,Chak no 50/12L Chichawatni Sahiwal (Kinnow)									
	No of fruits/plant					Fruit yield Kg/plant				
	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
1	670	605	625	1900	633	101.5	85.5	99.5	286.5	95.5
2	770	735	702	2207	736	110.0	102.0	116.5	328.5	109.5
3	790	775	758	2323	774	126.0	115.5	130	371.5	123.8
4	793	800	817	2410	803	130.6	134.7	140.5	405.8	135.2
5	880	870	895	2645	882	138.5	145.5	144.4	428.4	142.8
	Sajjad Cheema Chak no 42/12 L Chichawatni Sahiwal (kinnow)									
	No of fruits/plant					Fruit yield Kg/plant				
	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean

1	591	562	613	1766	589	96.5	92.5	101.7	290.7	96.9
2	682	643	700	2025	675	110.2	109.5	110.5	330.2	110.0
3	756	747	783	2286	762	122.5	129.5	128.5	380.5	126.8
4	830	771	801	2402	801	138.3	139.0	138.0	415.3	138.4
5	782	835	859	2476	825	149.1	139.0	151.6	439.7	146.6
	Muhammad Umair 180/9L Harrapa Sahiwal (Kinnow)									
	No of fruits/plant					Fruit yield Kg/plant				
	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
1	540	577	450	1567	522	91.5	101.5	94.5	287.5	95.8
2	602	618	686	1906	635	106.0	104.5	120.7	331.2	110.4
3	663	691	705	2059	686	129.5	113.0	109.2	351.7	117.2
4	698	710	768	2176	725	124.5	129.5	132.3	386.3	128.7
5	809	791	755	2355	785	141.2	125.8	131.6	398.6	132.8
	Ejaz Ahmad Chak no 3/10L Harrapa Sahiwal (Kinnow)									
	No of fruits/plant					Fruit yield Kg/plant				
	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
1	530	538	510	1578	526	104.0	101.0	70.1	275.1	91.7
2	617	562	700	1879	626	113.0	102.5	110.7	326.2	108.7
3	649	717	725	2091	697	106.1	118.9	113.2	338.2	112.7
4	688	723	779	2190	730	128.8	118.8	125.3	372.9	124.3
5	819	755	700	2274	758	137.0	121.1	130.6	388.7	129.5

FARMER' NAME: Faiz Ahmad, Chak No 61/4R Sahiwal

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2			✓		
3			✓		
4				✓	
5				✓	

FARMER' NAME: Majid Mehmood, Chak no 74/5R Sahiwal

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2				✓	
3			✓		
4				✓	
5				✓	

FARMER' NAME: Ali Sher, Chak no 64/4-R Sahiwal

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2			✓		
3			✓		
4				✓	
5				✓	

FARMER' NAME: Bashir Ahmad, Chak no 107/12L Chichawatni, Sahiwal

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2			✓		
3			✓		
4				✓	
5				✓	

FARMER' NAME: Malik Nau Bahar Awan, Chak no 93/12L Chichawatni Sahiwal

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2			✓		
3			✓		
4				✓	
5					✓

FARMER' NAME: Ch Muhammad Iqbal Dogar, Chak no 114/12L Sahiwal

Treatments	**Disease severity**				
	Very High	High	Medium	Low	Very Low
1			✓		
2			✓		
3			✓		
4				✓	
5				✓	

FARMER' NAME: Muhammad AbassJutt, Chak no 50/12L Chichawatni Sahiwal

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2			✓		
3			✓		
4				✓	
5				✓	

FARMER' NAME: Sajjad Cheema, Chak no 42/12 L Chichawatni Sahiwal

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2			✓		
3			✓		
4				✓	
5				✓	

FARMER' NAME: Muhammad Umair, Chak no 180/9L Harrapa Sahiwal

Treatments	Disease severity				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2			✓		
3			✓		
4					✓
5				✓	

FARMER' NAME: Ejaz Ahmad,Chak no 3/10L Harrapa, Sahiwal

Treatments	Disease severity				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2				✓	
3			✓		
4				✓	
5					✓

Soil and leaf analysis of citrus orchards under PARB at SAHIWAL

				Soil analysis									
Sr. No.		**Address**	**Depth**	**ECe**	**pH**	**OM %**	**P (ppm)**	**K (ppm)**	**Zn (ppm)**	**Cu (ppm)**	**Fe (ppm)**	**Mn (ppm)**	**B (ppm)**
1	Faiz Ahmad	61/4R	1-6"	2.38	8.3	0.57	7.6	186	0.78	0.29	4.42	0.75	0.49
			6-12"	2.15	8.3								
2	Majid Mehmood	74/5R	1-6"	2.30	8.2	0.69	8.4	220	0.81	0.27	4.46	0.78	0.46
			6-12"	2.20	8.0								
3	Ali Sher	64/4R	1-6"	2.41	8.2	0.65	8.2	180	0.64	0.26	4.41	0.68	0.44
			6-12"	2.94	8.2								
4	Bashir Ahmad	107/12L	1-6"	1.93	8.3	0.69	7.5	180	0.90	0.18	4.20	0.89	0.48
			6-12"	2.21	8.2								
5	Malik Nau ahar Awan	93/12L	1-6"	2.35	8.1	0.65	8.4	190	0.62	0.14	3.87	0.56	0.49
			6-12"	2.90	8.2								
6	Ch Iqbal Dogar	114/12L	1-6"	2.83	8.0	0.73	8.0	200	0.78	0.15	3.90	0.71	0.46
			6-12"	2.20	8.0								
7	M. Abbas Jutt	50/12L	1-6"	2.11	8.0	0.75	8.2	182	0.70	0.20	4.24	0.87	0.38
			6-12"	2.49	8.1								
8	Sajjad Cheema	42/12L	1-6"	1.38	8.1	0.6	6.3	180	0.60	0.12	3.50	0.77	0.42
			6-12"	1.62	8.2								
9	M. Umair	180/9L	1-6"	1.40	8.0	0.58	6.4	180	0.58	0.11	3.60	0.78	0.41
			6-12"	1.50	8.1								
10	Ejaz Ahmad	3/10L	1-6"	1.62	8.2	0.5	7.4	240	0.67	0.16	3.70	0.72	0.46
			6-12"	1.50	8.0								

District Bhakkar

Name & Address of Farmer: Muhammad Mushtaq,Chak No: 46m/L, Tehsil Darya Khan& District Bhakkar

	No. of fruits/plant					Fruit yield kg/plant				
Treatments	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
01	530	500	477	1507	502	75.0	71.0	68.0	214.0	71.3
02	655	612	629	1896	632	93.0	87.0	89.0	269.0	89.7
03	691	698	707	2096	698	98.0	99.0	101.0	298.0	99.3
04	740	768	725	2233	744	123.0	128.0	120.0	571.0	123.7
05	775	788	793	2356	785	129.0	131.0	132.0	392.0	130.7

Name & Address of Farmer: Kaleem Ullah, Dera Kaleem Ullah, Tehsil Drya Khan, District Bhakkar

	No. of fruits/plant					Fruit yield kg/plant				
Treatments	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
01	439	453	433	1325	441	62	64	61	187	62.3
02	519	507	530	1556	518	74	71	75	220	73.3
03	562	550	584	1696	565	80	78	83	241	80.3
04	614	636	647	1897	632	102	106	107	315	105.0
05	675	667	680	2022	674	115	113	116	344	114.7

Name & Address of Farmer: Ghulam Abbas Chak No.47M/L, Tehsil Darya Khan, District Bhakkar

	No. of fruits/plant					Fruit yield kg/plant				
Treatments	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
01	513	473	489	1475	491	73	67	69	209	69.7
02	691	703	717	2111	703	98	100	102	300	100.0
03	739	752	747	2238	746	105	107	106	318	106.0
04	769	788	797	2354	784	128	131	132	391	130.3
05	819	833	845	2497	832	136	138	140	414	138.0

Name & Address of Farmer: Muhammad Saeed, Chak No.47 M/L, Tehsil Darya Khan, District Bhakkar

	No. of fruits/plant					Fruit yield kg/plant				
Treatments	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
01	530	503	516	1549	516	75	71	73	219	73.0
02	617	591	600	1808	602	88	84	85	257	85.7
03	661	677	648	1986	662	94	96	92	282	94.0
04	721	760	738	2219	739	120	126	123	369	123.0
05	779	762	793	2334	778	129	127	132	388	129.3

Name & Address of Farmer: Muhammad Yousaf, Chak#47 M/L, Tehsil Darya Khan District Bhakkar

	No. of fruits/plant					Fruit yield kg/plant				
Treatments	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
01	628	640	603	1871	623	89	91	86	266	88.7
02	757	731	739	2227	742	108	104	105	317	105.7
03	781	796	763	2340	780	111	113	109	333	111.0
04	800	789	82 1	2410	803	133	131	136	400	133.3
05	827	834	851	2512	837	137	139	141	417	139.0

Name & Address of Farmer: Muhammad Sarwar, Dera Karmu Wala, Tehsil Dary Khan, District Bhakkar

	No. of fruits/plant					Fruit yield kg/plant				
Treatments	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
01	541	518	558	1617	539	77	74	79	230	76.7
02	600	611	596	1807	602	85	87	85	257	85.7
03	653	637	665	1955	651	93	91	95	279	93.0
04	741	727	707	2175	725	123	121	117	361	120.3
05	788	750	769	2307	769	131	125	128	384	128.0

Name & Address of Farmer: Muhammad Aamir Chak#46 M/L, Tehsil, Darya Khan, District Bhakkar

	No. of fruits/plant					Fruit yield kg/plant				
Treatments	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
01	613	605	603	1821	607	86	85	85	256	85.3
02	655	670	650	1975	658	88	79	90	267	85.7
03	705	690	700	2095	698	91	92	94	277	92.3
04	718	725	748	2191	730	95	96	95	286	95.3
05	745	755	748	2248	748	98	99	98	295	98.3

Name & Address of Farmer: Muhammad Ayub Chak#47 M/L, Tehsil Darya Khan, District Bhakkar

	No. of fruits/plant					Fruit yield kg/plant				
Treatments	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
01	655	670	665	1990	663	105	104	107	316	105.3
02	700	708	695	2103	701	108	109	109	326	108.7
03	717	725	728	2170	723	110	111	109	330	110.0
04	745	754	748	2247	749	113	114	115	342	114.0
05	785	790	788	2363	787	116	117	119	352	117.3

Name & Address of Farmer: Abdul Rehman, Chak #.15 Tda, Tehsil Darya Khan, District Bhakkar

	No. of fruits/plant					Fruit yield kg/plant				
Treatments	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
01	482	490	469	1441	480	69	70	67	206	68.7
02	537	558	590	1685	561	76	80	84	240	80.0
03	624	635	647	1906	635	89	91	92	272	90.7
04	701	719	737	2157	719	117	120	123	360	120.0
05	749	772	763	2284	761	125	129	127	381	127.0

Name & Address of Farmer: Ghulam Muhammad, Dera Ghulam Muhammad Wala, Tehsil Darya Khan District Bhakkar

	No. of fruits/plant					Fruit yield kg/plant				
Treatments	R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
01	429	400	412	1241	413	61	57	59	177	59.0
02	447	459	438	1344	448	64	65	62	191	63.7
03	519	538	509	1566	522	74	76	72	222	74.0
04	639	622	610	1871	623	106	103	101	310	103.3
05	670	651	641	1962	654	111	108	106	525	108.3

Disease severity on citrus fruit at maturity at District Bhakkar

FARMER' NAME: Muhammad Mushtaq, Chak No. 46 M/L,Tehsil Darya Khan, District Bhakkar

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1				✓	
2				✓	
3					✓
4					✓
5					✓

FARMER' NAME: Kaleem Ullah, Chak No. Dera Kaleem Ullah ,Tehsil, Darya Khan, District Bhakkar

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1				✓	
2				✓	
3					✓
4					✓
5					✓

FARMER' NAME: Ghulam Abbas, Chak No.47 M/L.Tehsil Darya Khan, District Bhakkar

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1				✓	
2				✓	
3					✓
4					✓
5					✓

FARMER' NAME: Muhammad Saeed, Chak No. 47 M/L, Tehsil Darya Khan, District Bhakkar

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1				✓	
2				✓	
3					✓
4					✓
5					✓

FARMER' NAME: Muhammad Yousaf, Chak No. 47 M/L, Tehsil Darya Khan, District Bhakkar

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1					✓
2					✓
3					✓
4					✓
5					✓

FARMER' NAME: Muhammad Sarwar, Dera karmuWala,Tehsil Darya Khan, District Bhakkar

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1				✓	
2				✓	
3					✓
4					✓
5					✓

FARMER' NAME: Muhammad Aamir, Chak No. 46 M/L, Tehsil Darya Khan, District Bhakkar

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1				✓	
2				✓	
3					✓
4					✓
5					✓

FARMER' NAME: Muhammad Ayub, Chak No. 47 M/L, Tehsil Darya Khan, District Bhakkar

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1				✓	
2				✓	✓
3					✓
4					✓
5					✓

FARMER' NAME: Abdul Rehman, Chak No.15 T.D.A, Tehsil Darya Khan, District Bhakkar

Treatments	Disease severity				
	Very High	*High*	*Medium*	*Low*	*Very Low*
1				✓	
2				✓	
3					✓
4					✓
5					✓

FARMER' NAME: Ghulam Muhammad, Dera Ghulam Muhammad Wala, Tehsil, Darya Khan, District Bhakkar

Treatments	Disease severity				
	Very High	*High*	*Medium*	*Low*	*Very Low*
1				✓	
2				✓	
3					✓
4					✓
5					✓

DISTRICT LAYYAH

Malik Qamar Habib, Chak No 280/TDA Tehsil and District Layyah									
No. of Fruit/Plant					Fruit Yield kg/plant				
R1	**R2**	**R3**	**Total**	**Mean**	**R1**	**R2**	**R3**	**Total**	**Mean**
590	600	615	1805	601	68.0	65.0	62.3	195.3	65.1
617	675	590	1882	627	71.6	75.1	74.0	220.2	73.6
669	700	600	1969	656	111.0	122.0	105.0	338.0	112.7
880	975	990	2845	948	166.0	170.0	175.0	511.0	170.3
890	910	900	2700	900	155.0	165.0	150.0	470.0	156.7

Khuram Ilyas Chak No 281/TDA Tehsil and District Layyah									
No. of Fruit/Plant					Fruit Yield kg/plant				
R1	**R2**	**R3**	**Total**	**Mean**	**R1**	**R2**	**R3**	**Total**	**Mean**
498	486	500	1484	494	55.0	49.8	55.5	160.3	53.4
600	660	675	1935	645	75.0	65.3	84.3	224.6	74.8
710	699	700	2109	703	118.3	116.5	130.0	364.8	121.6
845	870	795	2510	836	140.8	160.0	151.0	451.8	150.6
756	771	780	2307	769	125.0	150.2	152.0	427.0	142.4

Muhammad Hussain Chak No 318/TDA Tehsil Chobara District Layyah									
No. of Fruit/Plant					Fruit Yield kg/plant				
R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
600	570	549	1717	573	54.5	57.0	45.7	157.2	52.4
736	771	685	2195	730	122.0	96.0	76.1	294.1	98.0
743	796	694	2233	744	125.0	130.0	126.0	381.0	127.0
980	953	887	2820	940	180.0	158.3	126.7	465.0	155.0
812	887	800	2499	833	135.3	147.8	160.0	443.0	147.7

Arshad ShaheenChak No 316/TDA Tehsil Chobara District Layyah									
No. of Fruit/Plant					Fruit Yield kg/plant				
R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
590	550	575	1715	571	63.3	57.3	59.0	179.6	59.8
690	665	655	2010	670	83.7	73.8	93.5	251.0	83.6
789	725	730	2244	748	125.0	115.0	122.0	362.0	120.6
890	885	870	2645	881	148.3	131.5	140.0	419.8	139.9
780	745	720	2275	758	111.4	124.1	135.0	370.5	123.5

Muhammad Ikram Chak No 309/TDA Tehsil Chobara District Layyah									
No. of Fruit/Plant					Fruit Yield kg/plant				
R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
700	690	633	2023	674	75.0	76.6	52.7	204.3	68.1
771	745	640	2156	718	128.5	82.7	71.1	282.3	94.1
800	797	852	2449	816	114.2	124.5	140.0	378.7	126.2
986	1000	1047	3033	1011	164.3	142.8	161.0	468.0	156.0
900	970	856	2726	908	128.5	129.3	155.0	413.4	137.8

Muhammad Saleem Chak No 307/TDA Tehsil Karor Lal Esan District Layyah									
No. of Fruit/Plant					Fruit Yield kg/plant				
R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
492	500	490	1482	494	49.3	51.4	50.0	150.7	50.2
560	540	515	1615	538	62.2	60.0	73.5	195.7	65.2
710	760	762	2232	744	101.4	130.0	127.0	358.4	119.4
874	880	992	2746	915	145.6	155.0	170.4	471.0	157.0
835	850	768	2453	817	139.1	141.6	153.6	434.3	144.7

Shahid Rasool Chak No 295/TDA Tehsil Karor Lal Esan District Layyah.									
No. of Fruit/Plant					Fruit Yield kg/plant				
R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
425	395	410	1230	410	43.6	47.0	50.2	140.8	46.93
480	490	485	1455	485	75.0	70.0	58.1	203.1	67.7
590	585	593	1768	589	98.0	95.0	96.0	289.0	96.3
685	678	683	2046	682	110.0	112.0	115.0	337.0	112.3
600	610	630	1840	613	105.0	108.0	103.0	316.0	105.3

Muhammad Yasin Chak No 305/TDA Tehsil Karor Lal Esan District Layyah.									
No. of Fruit/Plant					Fruit Yield kg/plant				
R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
430	495	468	1393	464	45.7	50.0	44.0	139.7	46.5
500	560	596	1656	502	64.0	65.0	59.7	188.7	62.9
580	599	579	1758	586	103.0	99.8	94.8	297.6	99.2
756	785	790	2331	777	125.0	150.0	131.6	406.6	135.5
730	700	775	2205	735	121.6	135.0	129.0	385.5	128.5

Muhammad Rauf Chak No 303/TDA Tehsil Chobara District Layyah									
No. of Fruit/Plant					Fruit Yield kg/plant				
R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
300	295	340	935	312	45.3	51.1	62.0	158.4	52.8
360	359	371	1090	363	47.0	56.0	63.0	166.0	55.3
395	388	390	1173	391	57.0	62.0	68.0	187.0	62.3
499	420	470	1389	463	78.0	75.0	77.0	230.0	76.6
460	430	460	1350	450	65.0	59.0	70.0	194.0	64.6

Zulfiqar Ali Chak No 304/TDA Tehsil Karor Lal Esan District Layyah									
No. of Fruit/Plant					Fruit Yield kg/plant				
R1	R2	R3	Total	Mean	R1	R2	R3	Total	Mean
590	580	469	1639	546	59.0	47.8	62.0	168.7	56.3
671	590	665	1926	642	68.5	69.0	68.0	205.3	68.5
780	800	790	2370	790	135.0	146.0	148.0	429.0	143.0
950	895	900	2745	915	165.0	149.1	167.0	481.1	168.3
890	800	810	2500	833	155.0	134.0	148.0	437.0	145.6

FRUIT QUALITY DISTRICT LAYYAH

FARMER' NAME: Malik Qamar Habib, Chak No 280/TDA Tehsil, District Layyah

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2				✓	
3					✓
4					✓
5					✓

FARMER' NAME: Khuram Ilyas, Chak No 281/TDA Tehsil and District Layyah

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2					✓
3				✓	
4					✓
5					✓

FARMER' NAME: Muhammad Hussain, Chak No 318/TDA Tehsil Chobara District Layyah

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2			✓		
3				✓	
4					✓
5					✓

FARMER' NAME: Arshad Shaheen, Chak No 316/TDA Tehsil Chobara District Layyah

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1				✓	
2					✓
3				✓	
4					✓
5					✓

FARMER' NAME: Muhammad Ikram, Chak No 309/TDA Tehsil Chobara District Layyah

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2				✓	
3			✓		
4					✓
5				✓	

FARMER' NAME: Muhammad Saleem, Chak No 307/TDA Tehsil Karor Lal Esan District Layyah

Treatments	**Disease severity**				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2				✓	
3			✓		
4					✓
5				✓	

FARMER' NAME: Shahid Rasool, Chak No 295/TDA Tehsil Karor Lal Esan District Layyah.

Treatments	Disease severity				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1		✓			
2			✓		
3			✓		
4					✓
5				✓	

FARMER' NAME: Muhammad Yasin, Chak No 305/TDA Tehsil Karor Lal Esan District Layyah.

Treatments	Disease severity				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2				✓	
3			✓		
4					✓
5				✓	

FARMER' NAME: Muhammad Rauf,Chak No 303/TDA Tehsil Chobara, Layyah

Treatments	Disease severity				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2					✓
3			✓		
4					✓
5				✓	

FARMER' NAME: Zulfiqar Ali, Chak No 304/TDA Tehsil Karor Lal Esan District Layyah

Treatments	Disease severity				
	Very High	***High***	***Medium***	***Low***	***Very Low***
1			✓		
2				✓	
3			✓		
4					✓
5				✓	

Soil Analysis PARB Citrus Project Layyah

Soil Parameters	Qamar Habib	Khurram Ilyas	M. Hussain	Arshad Shaheen	M. Akram	M. Saleem	Shahid Rasool	M. Yasin	M. Rauf	Zulfiqar Ali
EC (dS/m)	2.67	2.59	2.17	2.35	2.54	2.40	2.41	2.49	1.83	1.94
pH	8.1	8.0	8.3	8.2	8.1	8.0	8.1	8.1	8.1	8.1
OM (%)	0.45	0.44	0.49	0.47	0.47	0.51	0.46	0.51	0.44	0.47
P (ppm)	5.3	6.5	5.3	5.0	6.0	7.2	6.0	6.0	6.8	7.0
K (ppm)	110	99	110	130	110	120	110	120	140	130
Zn (ppm)	0.40	0.62	0.39	0.49	0.42	0.59	0.62	0.53	0.68	0.78
Cu (ppm)	0.16	0.16	0.15	0.15	0.13	0.12	0.14	0.14	0.13	0.15
Fe (ppm)	3.56	3.18	2.64	2.54	2.41	3.80	3.59	3.67	3.50	3.90
Mn (ppm)	0.71	0.78	0.65	0.81	0.60	0.72	0.65	0.56	0.50	0.71
B (ppm)	0.45	0.38	0.44	0.45	0.41	0.41	0.40	0.45	0.42	0.43

ANNEXURE-2
PLAN-39
INTERLAB COMPARISON REPORT BY PUNJAB REFERENCE FERTILIZER LAB, RAIWIND

■Introduction:

The Inter-Lab Comparison (ILC) is a tool to evaluate participant performance. The purpose of this inter-lab. comparison of thirty-eight (38) laboratories functioning under the control of SFRI, Lahore, is defined as below:

A. To evaluate the Lab. analytical results for quality assurance and homogeneity.

B. To take measures to minimize the variation of results between labs.

■Participant Laboratories

In this program all the 36 Soil and Water Testing Laboratories of Soil Fertility Research Institute participated along with one laboratory of Soil Salinity Research institute, Pindi Bhatti and one laboratory from Institute of Soil Chemistry and Env. Sciences, Kala Shah Kaku.

■Sample Preparation and Delivery

Soil and water samples were collected from different sites of Lahore region. Soil samples were ground, sieved through 2mm sieve, homogenized. Water samples were collected in plastic bottles. All samples were prepared and coded at Provincial Reference Fertilizer Testing Laboratory, Raiwindand delivered to representatives of each participating laboratory on 13.07.2021 in the committee room of Secretariate, Agriculture Department , Lahore

■Evaluation of ILC Results and Statistical Analysis

The analytical results were assessed considering the Z-Score of different parameters of soil and water samples. The Z-Score is globally used for evaluating the results of ILC and PT. It is a numerical measurement of a value's relationship to the mean in a group of values. It represents the deviation from assigned value in standard deviation units. The Z-scores are classified into three categories.

Figure 1: Coded Soil and Water samples prepared at PRFTL Raiwind for ILC-SFRI-2021

If a Z-Score is 0, it represents the score is identical to the mean score. Z-Scores may also be positive or negative, with a positive value indicating the score is above the mean and a negative score indicating it is below the mean. Positive and negative scores also reveal the number of standard deviations the score is either above or below the mean.

The Z-Score value in range of ±2.0 is classified as satisfactory. The Z-Score value equals andabove ±3.0 range indicates unsatisfactory results and needs to take necessary corrective action to deal with the problem.

Interpretation of z-score		
Sr. No.	**z-score**	**Interpretation**
1.	$Z \leq 2.0$	Satisfactory results
2.	$2.0 < Z < 3.0$	Questionable results
3.	$Z \geq 3.0$	Unsatisfactory results

■Determination of Z-score

Z-score was calculated using following formula

$$\textbf{Z Score} = \frac{\textbf{xi - X}}{\boldsymbol{\sigma}}$$

xi = Results of lab. i

σ = Standard Deviation

X = Assigned value. It was determined by taking average of all participants results after excluding the results that have one of the following issues.

i. Having wrong units
ii. Non-numerical results or a range of value
iii. The result that is 10 times greater or smaller than the majority of submitted results (reporting error).

This procedure was followed for all analytes and the mean was taken as assigned value (Appendix 1).

■Results

Table-1: Z-Score of Different Soil Characteristics(Sample No.1)

Lab. No.	Description	EC	pH	SOM	P	K	SP %
Lab. No. 1	S&WTL Lahore	**-0.52**	**-0.80**	**4.85**	**-1.79**	**0.50**	**-0.70**
Lab. No. 2	S&WTL Sheikhupura	**0.39**	**-0.65**	**-0.44**	**-0.17**	**0.25**	**0.13**
Lab. No. 3	S&WTL Kasur	**0.52**	**0.40**	**-0.44**	**0.16**	**0.38**	**0.97**
Lab. No. 4	S&WTL Nankana Sb	**0.78**	**-0.10**	**-0.97**	**0.95**	**-0.06**	**-0.70**
Lab. No. 5	S&WTL Faisalabad	**1.66**	**1.84**	**1.01**	**-1.21**	**0.25**	**0.97**
Lab. No. 6	S&WTL Jhang	**-0.52**	**1.39**	**2.16**	**0.49**	**1.26**	**0.55**
Lab. No. 7	S&WTL TT Singh	**-0.31**	**1.14**	**-0.31**	**0.09**	**0.44**	**0.13**
Lab. No. 8	S&WTL Chiniot	**0.81**	**1.39**	**0.84**	**-0.03**	**2.11**	**0.13**
Lab. No. 9	S&WTL Sargodha	**-1.48**	**-1.09**	**0.00**	**-1.61**	**0.35**	**2.64**
Lab. No. 10	S&WTL Khushab	**1.12**	**1.69**	**0.00**	**0.99**	**1.54**	**-1.12**
Lab. No. 11	S&WTL Bakhar	**0.42**	**-0.30**	**-0.40**	**0.06**	**-0.91**	**0.55**
Lab. No. 12	S&WTL Mianwali	**-1.43**	**-1.09**	**0.31**	**-1.51**	**0.06**	**1.80**
Lab. No. 13	S&WTL Rawalpindi	**-0.73**	**-1.49**	**-0.26**	**-0.29**	**-0.69**	**0.55**
Lab. No. 14	S&WTL Attock	**-1.01**	**0.20**	**-0.26**	**0.34**	**-2.39**	**1.80**
Lab. No. 15	S&WTL Chakwal	**-0.60**	**-1.14**	**-0.13**	**-0.35**	**-0.57**	**0.13**
Lab. No. 16	S&WTL Jhelum	**-0.52**	**-1.09**	**0.00**	**0.81**	**-0.69**	**0.55**
Lab. No. 17	S&WTL Gujranwala	**-0.52**	**0.05**	**-0.35**	**-0.31**	**-0.31**	**-0.70**
Lab. No. 18	S&WTL Narowal	**-0.16**	**-0.60**	**0.31**	**-1.08**	**-0.19**	**-0.70**
Lab. No. 19	S&WTL Sialkot	**0.00**	**-0.35**	**0.44**	**-1.19**	**0.03**	**-0.70**
Lab. No. 20	S&WTL Gujrat	**-0.55**	**-2.59**	**-0.31**	**2.20**	**-2.77**	**0.13**
Lab. No. 21	S&WTL M. B. Din	**0.49**	**-0.10**	**0.66**	**1.69**	**-0.38**	**-2.37**
Lab. No. 22	S&WTL Hafizabad	**-0.10**	**-0.20**	**-0.22**	**-0.12**	**-0.50**	**-1.12**

Table-1: Z-Score of Different Soil Characteristics(Sample No.1)

Lab. No.	Description	EC	pH	SOM	P	K	SP %
Lab. No. 23	S&WTL Multan	**-0.16**	**0.40**	**-0.93**	**-0.78**	**1.61**	**0.13**
Lab. No. 24	S&WTL Vehari	**-0.08**	**-0.10**	**-0.62**	**0.36**	**1.04**	**0.55**
Lab. No. 25	S&WTL Khanewal	**-0.13**	**1.89**	**-0.57**	**-1.20**	**0.35**	**-0.08**
Lab. No. 26	S&WTL Lodhran	**0.26**	**0.15**	**0.00**	**-1.12**	**1.76**	**-0.28**
Lab. No. 27	S&WTL Bahawalpur	**0.23**	**-1.54**	**-0.62**	**0.75**	**0.72**	**-0.70**
Lab. No. 28	S&WTL R. Y. Khan	**0.31**	**0.40**	**0.00**	**1.18**	**-0.75**	**0.13**
Lab. No. 29	S&WTL Bahawalnagar	**0.96**	**0.40**	**0.00**	**0.30**	**-0.53**	**-0.70**
Lab. No. 30	S&WTL D G Khan	**2.62**	**-0.10**	**0.00**	**1.27**	**-0.63**	**0.55**
Lab. No. 31	S&WTL Layyah	**0.31**	**-0.60**	**-0.35**	**0.85**	**-1.29**	**0.55**
Lab. No. 32	S&WTL Muzaffargarh	**-1.43**	**-0.60**	**-0.31**	**-0.82**	**0.03**	**1.38**
Lab. No. 33	S&WTL Rajan Pur	**2.52**	**0.40**	**-1.32**	**1.32**	**-0.85**	**-1.95**
Lab. No. 34	S&WTL Sahiwal	**-2.47**	**0.40**	**-0.44**	**0.62**	**-0.38**	**-1.12**
Lab. No. 35	S&WTL Okara	**0.49**	**-0.10**	**-0.04**	**0.44**	**0.38**	**-0.70**
Lab. No. 36	S&WTL Pakpattan	**-0.55**	**0.40**	**-0.09**	**0.76**	**-0.03**	**0.13**
Lab. No. 37	SSRI Pindi Bhattian	**-0.08**	**0.55**	**-0.40**	**-0.63**	**0.25**	**-0.28**
Lab. No. 38	SC AARI FSD	**-0.13**	**1.34**	**-0.04**	**-1.47**	**0.60**	**-0.49**

Table-2: Z-Score of Different Soil Characteristics(Sample No.2)

Lab. No.	Description	EC	pH	SOM	P	K	SP
Lab. No. 1	S&WTL Lahore	**0.00**	**-1.88**	**1.51**	**0.96**	**0.70**	**0.20**
Lab. No. 2	S&WTL Sheikhupura	**-0.53**	**0.14**	**0.33**	**0.05**	**0.74**	**-0.63**
Lab. No. 3	S&WTL Kasur	**1.09**	**0.91**	**0.15**	**0.05**	**-0.03**	**0.20**
Lab. No. 4	S&WTL Nankana Sb	**1.09**	**0.91**	**-1.96**	**-0.34**	**0.20**	**1.03**
Lab. No. 5	S&WTL Faisalabad	**2.23**	**1.73**	**0.70**	**4.37**	**0.47**	**-1.46**
Lab. No. 6	S&WTL Jhang	**-1.01**	**0.43**	**0.70**	**-0.68**	**1.34**	**0.20**
Lab. No. 7	S&WTL TT Singh	**-0.72**	**0.63**	**0.11**	**-0.35**	**0.07**	**-0.22**
Lab. No. 8	S&WTL Chiniot	**2.02**	**0.96**	**1.85**	**-0.82**	**-2.68**	**1.03**
Lab. No. 9	S&WTL Sargodha	**-1.19**	**-1.83**	**-0.07**	**-0.11**	**0.10**	**1.86**
Lab. No. 10	S&WTL Khushab	**0.05**	**2.21**	**0.41**	**-0.66**	**1.71**	**0.61**
Lab. No. 11	S&WTL Bakhar	**-0.13**	**0.91**	**-0.07**	**-0.21**	**-1.07**	**0.20**
Lab. No. 12	S&WTL Mianwali	**-1.22**	**-0.53**	**-0.33**	**-0.08**	**0.67**	**2.27**
Lab. No. 13	S&WTL Rawalpindi	**-0.85**	**-0.43**	**-0.30**	**-0.17**	**-1.11**	**0.61**
Lab. No. 14	S&WTL Attock	**-0.66**	**1.44**	**0.00**	**0.08**	**-1.51**	**1.44**
Lab. No. 15	S&WTL Chakwal	**-0.80**	**-0.77**	**-0.18**	**-0.17**	**-1.01**	**-0.22**
Lab. No. 16	S&WTL Jhelum	**-0.72**	**-0.53**	**-0.33**	**0.73**	**-0.87**	**0.20**

Table-2: Z-Score of Different Soil Characteristics(Sample No.2)

Lab. No.	Description	EC	pH	SOM	P	K	SP
Lab. No. 17	S&WTL Gujranwala	**-0.32**	**0.24**	**0.59**	**-0.01**	**0.87**	**-0.22**
Lab. No. 18	S&WTL Narowal	**1.27**	**0.14**	**1.18**	**0.18**	**-0.10**	**0.20**
Lab. No. 19	S&WTL Sialkot	**0.88**	**-0.63**	**0.96**	**0.25**	**-0.34**	**0.20**
Lab. No. 20	S&WTL Gujrat	**0.72**	**-1.01**	**-2.29**	**1.73**	**-1.21**	**-1.46**
Lab. No. 21	S&WTL M. B. Din	**0.72**	**0.91**	**1.62**	**-0.76**	**-0.30**	**-1.46**
Lab. No. 22	S&WTL Hafizabad	**-0.05**	**0.43**	**0.44**	**0.08**	**0.40**	**-0.63**
Lab. No. 23	S&WTL Multan	**-0.03**	**0.91**	**-2.69**	**-0.57**	**1.07**	**-0.63**
Lab. No. 24	S&WTL Vehari	**-1.09**	**-1.01**	**-2.15**	**-1.47**	**0.74**	**0.20**
Lab. No. 25	S&WTL Khanewal	**0.00**	**0.82**	**-0.04**	**-1.45**	**0.37**	**-0.42**
Lab. No. 26	S&WTL Lodhran	**-0.08**	**0.67**	**-0.11**	**-1.03**	**1.71**	**-0.22**
Lab. No. 27	S&WTL Bahawalpur	**0.29**	**-0.43**	**0.44**	**-0.23**	**1.21**	**-2.29**
Lab. No. 28	S&WTL R. Y. Khan	**1.62**	**0.91**	**-0.33**	**0.76**	**-0.94**	**0.20**
Lab. No. 29	S&WTL Bahawalnagar	**-0.56**	**-0.05**	**-1.14**	**0.15**	**-1.78**	**1.03**
Lab. No. 30	S&WTL D G Khan	**1.38**	**-1.68**	**0.33**	**1.05**	**0.10**	**0.61**
Lab. No. 31	S&WTL Layyah	**-0.48**	**-1.01**	**0.15**	**-0.21**	**-0.80**	**-0.63**
Lab. No. 32	S&WTL Muzaffargarh	**-1.06**	**-0.77**	**0.41**	**-0.08**	**-0.17**	**1.03**
Lab. No. 33	S&WTL Rajan Pur	**1.62**	**-0.05**	**-0.59**	**1.02**	**-0.80**	**-0.63**
Lab. No. 34	S&WTL Sahiwal	**-1.59**	**-0.05**	**0.37**	**0.18**	**-0.37**	**-0.22**
Lab. No. 35	S&WTL Okara	**0.21**	**0.43**	**0.15**	**-0.30**	**0.27**	**-1.46**
Lab. No. 36	S&WTL Pakpattan	**-0.66**	**-0.53**	**-0.70**	**-0.63**	**0.50**	**1.44**
Lab. No. 37	SSRI Pindi Bhattian	**-0.53**	**-1.88**	**-0.11**	**-0.01**	**0.40**	**-0.55**
Lab. No. 38	SC AARI FSD	**-1.33**	**-0.24**	**0.52**	**-1.34**	**1.44**	**-1.46**

Table-3: Z-Score of Different Soil Characteristics(Sample No.3)

Lab. No.	Description	EC	pH	SOM	P	K	SP
Lab. No. 1	S&WTL Lahore	**0.22**	**-1.14**	**3.61**	**-0.92**	**0.97**	0.44
Lab. No. 2	S&WTL Sheikhupura	**-0.67**	**0.26**	**-0.02**	**-0.29**	**0.02**	0.44
Lab. No. 3	S&WTL Kasur	**0.63**	**0.73**	**0.02**	**-0.34**	**-0.18**	0.44
Lab. No. 4	S&WTL Nankana Sb	**0.69**	**0.73**	**-1.13**	**0.17**	**0.23**	1.46
Lab. No. 5	S&WTL Faisalabad	**2.68**	**1.35**	**1.24**	**4.04**	**0.46**	0.44
Lab. No. 6	S&WTL Jhang	**-0.98**	**0.73**	**-0.54**	**0.07**	**0.50**	-0.06
Lab. No. 7	S&WTL TT Singh	**-0.45**	**1.35**	**0.50**	**-0.12**	**-0.11**	0.44
Lab. No. 8	S&WTL Chiniot	**1.74**	**0.36**	**1.02**	**0.80**	**-2.52**	-0.57
Lab. No. 9	S&WTL Sargodha	**-0.83**	**-2.80**	**-0.54**	**-0.53**	**0.36**	2.47
Lab. No. 10	S&WTL Khushab	**0.22**	**0.67**	**1.39**	**0.63**	**1.14**	-0.06

Table-3: Z-Score of Different Soil Characteristics(Sample No.3)

Lab. No.	Description	EC	pH	SOM	P	K	SP
Lab. No. 11	S&WTL Bakhar	**-0.09**	**1.30**	**-0.02**	**-0.20**	**-0.96**	-0.06
Lab. No. 12	S&WTL Mianwali	**-0.85**	**-1.35**	**-0.83**	**-0.63**	**0.80**	2.47
Lab. No. 13	S&WTL Rawalpindi	**-0.74**	**0.26**	**0.05**	**-0.41**	**-0.90**	0.44
Lab. No. 14	S&WTL Attock	**-0.74**	**1.55**	**-0.02**	**-0.37**	**-1.13**	-0.06
Lab. No. 15	S&WTL Chakwal	**-0.74**	**-0.10**	**0.17**	**-0.37**	**-0.73**	-0.06
Lab. No. 16	S&WTL Jhelum	**-0.69**	**0.21**	**-0.54**	**0.05**	**-0.96**	0.44
Lab. No. 17	S&WTL Gujranwala	**-0.22**	**0.00**	**0.20**	**-0.15**	**0.46**	-0.06
Lab. No. 18	S&WTL Narowal	**0.16**	**0.52**	**0.72**	**-0.57**	**-0.25**	0.44
Lab. No. 19	S&WTL Sialkot	**0.27**	**-0.21**	**0.61**	**-0.44**	**-0.05**	0.44
Lab. No. 20	S&WTL Gujrat	**0.51**	**-0.57**	**-1.06**	**-0.10**	**-1.68**	-0.57
Lab. No. 21	S&WTL M. B. Din	**0.47**	**0.73**	**0.98**	**-1.14**	**-0.56**	-0.57
Lab. No. 22	S&WTL Hafizabad	**-0.13**	**0.26**	**0.39**	**-0.22**	**0.26**	-0.57
Lab. No. 23	S&WTL Multan	**0.27**	**0.21**	**-2.06**	**-0.26**	**2.09**	0.95
Lab. No. 24	S&WTL Vehari	**-1.00**	**-0.83**	**-2.09**	**-1.05**	**0.87**	-2.08
Lab. No. 25	S&WTL Khanewal	**-0.13**	**0.73**	**-0.50**	**-1.19**	**-0.01**	-0.31
Lab. No. 26	S&WTL Lodhran	**-0.18**	**0.47**	**-0.43**	**-0.79**	**1.04**	-0.06
Lab. No. 27	S&WTL Bahawalpur	**3.10**	**-1.81**	**-0.02**	**2.65**	**2.36**	-2.59
Lab. No. 28	S&WTL R. Y. Khan	**0.27**	**0.73**	**-0.28**	**0.19**	**-1.34**	0.44
Lab. No. 29	S&WTL Bahawalnagar	**-0.96**	**0.73**	**-1.06**	**0.14**	**-0.45**	-0.57
Lab. No. 30	S&WTL D G Khan	**1.38**	**-0.78**	**0.13**	**0.00**	**0.09**	-1.07
Lab. No. 31	S&WTL Layyah	**-0.31**	**-0.31**	**-0.06**	**-0.10**	**-0.56**	-0.57
Lab. No. 32	S&WTL Muzaffargarh	**-0.78**	**-1.97**	**-0.54**	**-0.39**	**-0.08**	0.95
Lab. No. 33	S&WTL Rajan Pur	**1.32**	**0.31**	**-1.06**	**0.02**	**-0.96**	-0.57
Lab. No. 34	S&WTL Sahiwal	**-1.56**	**0.21**	**0.91**	**1.86**	**-0.79**	-0.57
Lab. No. 35	S&WTL Okara	**0.13**	**0.21**	**0.94**	**0.19**	**-0.05**	-1.58
Lab. No. 36	S&WTL Pakpattan	**-0.45**	**-0.31**	**-0.09**	**0.87**	**0.36**	0.44
Lab. No. 37	SSRI Pindi Bhattian	**-0.33**	**-2.02**	**0.05**	**-0.22**	**0.50**	0.50
Lab. No. 38	SC AARI FSD	**-1.12**	**-0.26**	**0.98**	**-0.87**	**1.75**	-1.07

Table-4: Z-Score of Different Soil Characteristics(Sample No.4)

Lab. No.	Description	EC	pH	SOM	P	K	SP
Lab. No. 1	S&WTL Lahore	**-0.28**	**-1.81**	**1.70**	**-2.77**	**1.47**	**-0.39**
Lab. No. 2	S&WTL Sheikhupura	**-0.94**	**0.23**	**-0.43**	**0.19**	**0.23**	**0.47**
Lab. No. 3	S&WTL Kasur	**0.45**	**1.35**	**-0.46**	**0.03**	**-0.01**	**-0.39**

Table-4: Z-Score of Different Soil Characteristics(Sample No.4)							
Lab. No.	**Description**	**EC**	**pH**	**SOM**	**P**	**K**	**SP**
Lab. No. 4	S&WTL Nankana Sb	**0.50**	**0.76**	**-1.82**	**1.30**	**0.37**	**1.76**
Lab. No. 5	S&WTL Faisalabad	**1.96**	**1.29**	**0.40**	**1.58**	**0.23**	**-1.25**
Lab. No. 6	S&WTL Jhang	**-0.99**	**0.18**	**-0.43**	**1.27**	**0.51**	**0.47**
Lab. No. 7	S&WTL TT Singh	**-0.26**	**0.64**	**-0.93**	**0.44**	**0.03**	**0.47**
Lab. No. 8	S&WTL Chiniot	**1.72**	**-0.06**	**1.27**	**0.98**	**1.23**	**0.90**
Lab. No. 9	S&WTL Sargodha	**-0.99**	**-2.05**	**-1.30**	**-0.41**	**-0.01**	**0.47**
Lab. No. 10	S&WTL Khushab	**0.35**	**1.52**	**1.70**	**0.22**	**0.88**	**3.05**
Lab. No. 11	S&WTL Bakhar	**0.00**	**1.17**	**0.00**	**0.44**	**-0.69**	**0.47**
Lab. No. 12	S&WTL Mianwali	**-1.06**	**-0.41**	**-1.30**	**-0.47**	**1.09**	**0.47**
Lab. No. 13	S&WTL Rawalpindi	**-0.50**	**-0.76**	**-0.28**	**0.34**	**-1.41**	**0.47**
Lab. No. 14	S&WTL Attock	**-0.71**	**1.81**	**0.00**	**0.26**	**-0.80**	**0.47**
Lab. No. 15	S&WTL Chakwal	**-0.52**	**-0.94**	**-0.15**	**0.36**	**-1.28**	**0.04**
Lab. No. 16	S&WTL Jhelum	**-0.47**	**-0.41**	**-0.09**	**0.20**	**-1.14**	**0.04**
Lab. No. 17	S&WTL Gujranwala	**-0.21**	**0.64**	**0.37**	**0.32**	**-0.15**	**-0.39**
Lab. No. 18	S&WTL Narowal	**0.07**	**-0.12**	**1.48**	**-0.80**	**0.06**	**-0.39**
Lab. No. 19	S&WTL Sialkot	**-0.07**	**-0.41**	**1.36**	**-0.56**	**0.40**	**-0.39**
Lab. No. 20	S&WTL Gujrat	**0.83**	**-0.23**	**0.83**	**-1.72**	**-2.06**	**-1.25**
Lab. No. 21	S&WTL M. B. Din	**0.28**	**0.76**	**1.70**	**-0.74**	**-0.52**	**-0.39**
Lab. No. 22	S&WTL Hafizabad	**-0.14**	**0.18**	**0.46**	**0.44**	**0.09**	**-0.39**
Lab. No. 23	S&WTL Multan	**0.40**	**0.18**	**-1.98**	**-1.27**	**1.40**	**-0.39**
Lab. No. 24	S&WTL Vehari	**-1.08**	**-0.99**	**-1.08**	**-1.49**	**0.81**	**-2.11**
Lab. No. 25	S&WTL Khanewal	**-0.12**	**0.18**	**0.59**	**-1.15**	**0.47**	**1.54**
Lab. No. 26	S&WTL Lodhran	**0.24**	**1.05**	**0.25**	**-1.31**	**1.26**	**-0.39**
Lab. No. 27	S&WTL Bahawalpur	**0.24**	**1.52**	**0.00**	**-0.40**	**0.61**	**-0.39**
Lab. No. 28	S&WTL R. Y. Khan	**-0.09**	**0.76**	**0.19**	**0.19**	**-1.14**	**-1.25**
Lab. No. 29	S&WTL Bahawalnagar	**3.89**	**0.18**	**-1.64**	**1.01**	**1.67**	**-2.11**
Lab. No. 30	S&WTL D G Khan	**1.18**	**-1.70**	**0.19**	**-0.07**	**0.13**	**0.90**
Lab. No. 31	S&WTL Layyah	**-0.61**	**-1.58**	**0.03**	**0.42**	**-0.49**	**0.47**
Lab. No. 32	S&WTL Muzaffargarh	**-0.87**	**-1.05**	**-1.11**	**-0.20**	**-0.45**	**1.33**
Lab. No. 33	S&WTL Rajan Pur	**1.04**	**-0.18**	**-1.08**	**-0.03**	**-0.90**	**-0.39**
Lab. No. 34	S&WTL Sahiwal	**-1.42**	**-0.41**	**0.96**	**1.46**	**-0.45**	**0.04**
Lab. No. 35	S&WTL Okara	**0.02**	**0.76**	**-0.93**	**0.59**	**0.06**	**-1.25**
Lab. No. 36	S&WTL Pakpattan	**-0.33**	**-0.99**	**0.77**	**2.21**	**-2.85**	**0.04**
Lab. No. 37	SSRI Pindi Bhattian	**-0.07**	**-1.23**	**0.03**	**0.09**	**0.09**	**-0.18**
Lab. No. 38	SC AARI FSD	**-1.06**	**0.12**	**0.49**	**-0.95**	**1.26**	**-0.18**

Table-5: Z-Score of Different Soil Characteristics(Sample No. 5)							
Lab. No.	**Description**	**EC**	**pH**	**SOM**	**P**	**K**	**SP**
Lab. No. 1	S&WTL Lahore	**-0.04**	**0.08**	**2.34**	**-2.34**	**0.62**	**0.14**
Lab. No. 2	S&WTL Sheikhupura	**-0.30**	**0.34**	**-0.45**	**0.30**	**0.05**	**0.14**
Lab. No. 3	S&WTL Kasur	**0.77**	**1.22**	**-0.45**	**0.50**	**0.00**	**0.84**
Lab. No. 4	S&WTL Nankana Sb	**0.95**	**0.46**	**-1.50**	**0.85**	**0.49**	**1.55**
Lab. No. 5	S&WTL Faisalabad	**1.25**	**0.50**	**-0.49**	**0.61**	**0.27**	**-0.57**
Lab. No. 6	S&WTL Jhang	**0.09**	**0.46**	**-0.70**	**1.01**	**0.84**	**0.49**
Lab. No. 7	S&WTL TT Singh	**-0.25**	**0.65**	**-1.50**	**0.41**	**0.09**	**0.49**
Lab. No. 8	S&WTL Chiniot	**0.68**	**-0.65**	**1.05**	**0.88**	**0.29**	**1.20**
Lab. No. 9	S&WTL Sargodha	**-1.59**	**-2.29**	**-0.45**	**0.20**	**0.29**	**2.26**
Lab. No. 10	S&WTL Khushab	**1.51**	**0.31**	**1.64**	**1.06**	**0.95**	**-0.57**
Lab. No. 11	S&WTL Bakhar	**0.43**	**0.73**	**-0.21**	**0.29**	**-0.75**	**-0.57**
Lab. No. 12	S&WTL Mianwali	**-1.56**	**-1.83**	**-0.21**	**0.24**	**0.44**	**1.90**
Lab. No. 13	S&WTL Rawalpindi	**-0.73**	**-0.88**	**-0.03**	**0.29**	**-0.64**	**1.20**
Lab. No. 14	S&WTL Attock	**-0.61**	**1.15**	**-0.42**	**0.36**	**-0.88**	**1.20**
Lab. No. 15	S&WTL Chakwal	**-0.70**	**-0.73**	**0.10**	**0.33**	**-0.70**	**0.49**
Lab. No. 16	S&WTL Jhelum	**-0.66**	**-0.69**	**0.03**	**0.64**	**-0.75**	**0.84**
Lab. No. 17	S&WTL Gujranwala	**-0.13**	**-0.23**	**0.49**	**-0.14**	**0.33**	**-0.57**
Lab. No. 18	S&WTL Narowal	**0.13**	**0.53**	**1.71**	**-0.89**	**0.86**	**0.14**
Lab. No. 19	S&WTL Sialkot	**0.05**	**0.31**	**1.64**	**-1.09**	**-0.31**	**0.14**
Lab. No. 20	S&WTL Gujrat	**2.78**	**0.19**	**1.82**	**-1.39**	**-3.88**	**-1.28**
Lab. No. 21	S&WTL M. B. Din	**0.82**	**1.22**	**1.29**	**-0.86**	**-0.28**	**0.14**
Lab. No. 22	S&WTL Hafizabad	**-0.02**	**0.38**	**0.24**	**-0.18**	**0.49**	**-0.22**
Lab. No. 23	S&WTL Multan	**0.86**	**-0.69**	**-1.78**	**-1.16**	**1.92**	**-0.57**
Lab. No. 24	S&WTL Vehari	**-0.39**	**0.08**	**-1.68**	**-1.50**	**1.44**	**-1.98**
Lab. No. 25	S&WTL Khanewal	**-0.13**	**1.18**	**-0.21**	**-1.24**	**0.07**	**-0.39**
Lab. No. 26	S&WTL Lodhran	**0.05**	**0.65**	**-0.24**	**-1.36**	**1.13**	**-1.63**
Lab. No. 27	S&WTL Bahawalpur	**-1.45**	**-1.34**	**-0.70**	**-2.45**	**-0.31**	**0.84**
Lab. No. 28	S&WTL R. Y. Khan	**-0.20**	**1.22**	**0.52**	**0.73**	**-0.79**	**0.14**
Lab. No. 29	S&WTL Bahawalnagar	**0.77**	**0.84**	**0.59**	**0.98**	**-0.11**	**0.14**
Lab. No. 30	S&WTL D G Khan	**1.83**	**-0.76**	**-0.10**	**0.67**	**0.31**	**-1.98**
Lab. No. 31	S&WTL Layyah	**-0.02**	**-0.69**	**-0.21**	**0.45**	**-0.53**	**-0.92**
Lab. No. 32	S&WTL Muzaffargarh	**-1.59**	**-2.37**	**0.03**	**0.11**	**0.38**	**0.84**
Lab. No. 33	S&WTL Rajan Pur	**0.73**	**0.46**	**-1.15**	**0.71**	**-0.59**	**-0.57**
Lab. No. 34	S&WTL Sahiwal	**-2.10**	**0.84**	**0.52**	**1.36**	**-0.35**	**-0.92**

Table-5: Z-Score of Different Soil Characteristics(Sample No. 5)

Lab. No.	Description	EC	pH	SOM	P	K	SP
Lab. No. 35	S&WTL Okara	**0.05**	**0.84**	**-1.33**	**0.56**	**0.71**	**-0.92**
Lab. No. 36	S&WTL Pakpattan	**-0.48**	**1.22**	**0.31**	**1.71**	**-2.29**	**-0.22**
Lab. No. 37	SSRI Pindi Bhattian	**-0.13**	**-1.68**	**0.03**	**0.15**	**0.58**	**-0.39**
Lab. No. 38	SC AARI FSD	**-0.93**	**-0.69**	**0.00**	**-0.80**	**0.58**	**-0.92**

Table-6: Z-Score of Different Water Quality Parameters

		Water Sample 1			Water Sample 2		
Lab. No.	Description	EC	SAR	RSC	EC	SAR	RSC
Lab. No. 1	S&WTL Lahore	**-0.28**	**-1.55**	**-0.40**	**-0.07**	**-0.99**	**-1.19**
Lab. No. 2	S&WTL Sheikhupura	**-0.40**	**-0.11**	**0.34**	**-0.10**	**-0.22**	**0.05**
Lab. No. 3	S&WTL Kasur	**-0.40**	**-0.11**	**0.47**	**-0.10**	**-0.22**	**-0.08**
Lab. No. 4	S&WTL Nankana Sb	**0.22**	**2.05**	**0.82**	**-0.19**	**0.60**	**2.45**
Lab. No. 5	S&WTL Faisalabad	**0.76**	**0.71**	**1.34**	**-0.22**	**-0.25**	**0.36**
Lab. No. 6	S&WTL Jhang	**1.02**	**0.79**	**-0.03**	**-0.21**	**0.01**	**0.30**
Lab. No. 7	S&WTL TT Singh	**0.96**	**-0.24**	**-0.07**	**-0.24**	**-0.15**	**0.13**
Lab. No. 8	S&WTL Chiniot	**-0.89**	**0.41**	**1.90**	**0.16**	**0.19**	**1.36**
Lab. No. 9	S&WTL Sargodha	**0.55**	**0.62**	**0.03**	**-0.18**	**-0.09**	**-0.20**
Lab. No. 10	S&WTL Khushab	**1.14**	**0.32**	**0.15**	**5.91**	**5.39**	**-1.19**
Lab. No. 11	S&WTL Bakhar	**0.03**	**0.57**	**0.10**	**-0.21**	**-0.17**	**-0.36**
Lab. No. 12	S&WTL Mianwali	**0.43**	**0.72**	**-0.03**	**-0.14**	**-0.11**	**-0.20**
Lab. No. 13	S&WTL Rawalpindi	**0.43**	**0.45**	**-0.36**	**-0.18**	**-0.05**	**-0.45**
Lab. No. 14	S&WTL Attock	**-0.04**	**0.31**	**0.11**	**-0.15**	**-0.06**	**-0.51**
Lab. No. 15	S&WTL Chakwal	**-0.83**	**-0.11**	**0.54**	**-0.12**	**-0.11**	**-0.12**
Lab. No. 16	S&WTL Jhelum	**-0.81**	**-0.22**	**0.55**	**-0.11**	**-0.11**	**-0.10**
Lab. No. 17	S&WTL Gujranwala	**-2.22**	**-0.22**	**0.03**	**-0.97**	**-0.79**	**-0.46**
Lab. No. 18	S&WTL Narowal	**0.81**	**-1.38**	**-0.93**	**-0.05**	**-1.09**	**-1.19**
Lab. No. 19	S&WTL Sialkot	**1.20**	**-1.26**	**-1.08**	**-0.01**	**-1.13**	**-1.19**
Lab. No. 20	S&WTL Gujrat	**0.03**	**-3.85**	**-3.95**	**-0.24**	**-0.51**	**-0.86**
Lab. No. 21	S&WTL M. B. Din	**-0.80**	**0.28**	**-0.82**	**0.07**	**0.36**	**-1.19**
Lab. No. 22	S&WTL Hafizabad	**-2.29**	**-0.49**	**-0.20**	**-0.32**	**-0.29**	**-0.99**
Lab. No. 23	S&WTL Multan	**0.10**	**-0.23**	**0.87**	**-0.09**	**-0.07**	**1.12**
Lab. No. 24	S&WTL Vehari	**0.37**	**-0.98**	**1.46**	**0.01**	**-0.58**	**-0.86**
Lab. No. 25	S&WTL Khanewal	**-1.44**	**-0.46**	**1.46**	**-0.39**	**-0.20**	**2.21**
Lab. No. 26	S&WTL Lodhran	**0.55**	**-0.16**	**0.33**	**-0.15**	**-0.60**	**-0.99**
Lab. No. 27	S&WTL Bahawalpur	**0.20**	**0.24**	**-0.05**	**-0.02**	**0.77**	**1.02**

Table-6: Z-Score of Different Water Quality Parameters

		Water Sample 1			Water Sample 2		
Lab. No.	**Description**	**EC**	**SAR**	**RSC**	**EC**	**SAR**	**RSC**
Lab. No. 28	S&WTL R. Y. Khan	**1.85**	**1.78**	**0.48**	**0.00**	**0.77**	**0.28**
Lab. No. 29	S&WTL Bahawalnagar	**1.85**	**1.73**	**0.29**	**0.01**	**0.75**	**0.12**
Lab. No. 30	S&WTL D G Khan	**-0.02**	**0.52**	**-1.54**	**-0.15**	**0.02**	**0.07**
Lab. No. 31	S&WTL Layyah	**-0.04**	**0.43**	**0.18**	**-0.17**	**-0.13**	**-0.46**
Lab. No. 32	S&WTL Muzaffargarh	**0.96**	**-0.31**	**-0.69**	**-0.16**	**-0.15**	**0.30**
Lab. No. 33	S&WTL Rajan Pur	**0.79**	**-0.44**	**-0.75**	**-0.10**	**-0.06**	**1.29**
Lab. No. 34	S&WTL Sahiwal	**0.02**	**0.56**	**0.48**	**-0.15**	**-0.04**	**0.89**
Lab. No. 35	S&WTL Okara	**-1.72**	**-0.41**	**0.19**	**-0.21**	**-0.22**	**-1.19**
Lab. No. 36	S&WTL Pakpattan	**-0.04**	**0.04**	**0.69**	**-0.20**	**-0.12**	**0.79**
Lab. No. 37	SSRI Pindi Bhattian	**-0.40**	**-0.03**	**-0.91**	**-0.36**	**-0.31**	**-0.94**
Lab. No. 38	SC AARI FSD	**-1.70**	**-0.01**	**-0.95**	**-0.21**	**-0.02**	**2.12**

Table-7: Z-Score of Different Water Quality Parameters

		Water Sample 3			Water Sample 4		
Lab. No.	**Description**	**EC**	**SAR**	**RSC**	**EC**	**SAR**	**RSC**
Lab. No. 1	S&WTL Lahore	**-0.07**	**-1.49**	**-0.73**	**0.01**	**-0.67**	**-0.35**
Lab. No. 2	S&WTL Sheikhupura	**0.74**	**-0.20**	**-0.13**	**0.01**	**-0.53**	**0.48**
Lab. No. 3	S&WTL Kasur	**0.74**	**-0.20**	**-0.28**	**0.01**	**-0.53**	**0.21**
Lab. No. 4	S&WTL Nankana Sb	**-0.20**	**1.45**	**1.77**	**-0.06**	**1.41**	**2.68**
Lab. No. 5	S&WTL Faisalabad	**0.83**	**0.13**	**-0.81**	**0.27**	**-0.14**	**0.19**
Lab. No. 6	S&WTL Jhang	**-0.29**	**0.79**	**0.45**	**0.01**	**0.05**	**0.37**
Lab. No. 7	S&WTL TT Singh	**-0.38**	**-0.36**	**-0.53**	**-0.08**	**-0.53**	**-0.69**
Lab. No. 8	S&WTL Chiniot	**1.77**	**-2.31**	**-0.86**	**0.40**	**-0.62**	**1.51**
Lab. No. 9	S&WTL Sargodha	**-0.20**	**0.53**	**0.26**	**0.01**	**-0.26**	**-0.60**
Lab. No. 10	S&WTL Khushab	**0.27**	**0.74**	**0.75**	**0.40**	**-1.09**	**-0.79**
Lab. No. 11	S&WTL Bakhar	**-0.20**	**0.53**	**0.64**	**0.05**	**-0.23**	**-0.60**
Lab. No. 12	S&WTL Mianwali	**-0.20**	**0.53**	**0.26**	**0.23**	**-0.26**	**-0.60**
Lab. No. 13	S&WTL Rawalpindi	**0.90**	**1.04**	**-0.13**	**0.75**	**0.14**	**-0.75**
Lab. No. 14	S&WTL Attock	**-0.13**	**0.43**	**0.15**	**0.14**	**-0.29**	**-0.77**
Lab. No. 15	S&WTL Chakwal	**0.27**	**0.59**	**0.21**	**0.40**	**-0.30**	**-0.39**
Lab. No. 16	S&WTL Jhelum	**0.33**	**0.66**	**0.47**	**0.47**	**-0.27**	**-0.33**
Lab. No. 17	S&WTL Gujranwala	**-4.03**	**-1.22**	**-0.45**	**-4.59**	**-0.05**	**0.17**
Lab. No. 18	S&WTL Narowal	**0.12**	**-1.24**	**-1.67**	**-0.21**	**-0.88**	**0.81**
Lab. No. 19	S&WTL Sialkot	**0.49**	**-0.94**	**-1.88**	**0.23**	**-0.81**	**0.56**

Table-7: Z-Score of Different Water Quality Parameters

		Water Sample 3			Water Sample 4		
Lab. No.	**Description**	**EC**	**SAR**	**RSC**	**EC**	**SAR**	**RSC**
Lab. No. 20	S&WTL Gujrat	**-0.79**	**-2.59**	**-0.68**	**-0.48**	**2.99**	**3.46**
Lab. No. 21	S&WTL M. B. Din	**0.68**	**1.15**	**0.04**	**1.14**	**0.59**	**-0.79**
Lab. No. 22	S&WTL Hafizabad	**-0.35**	**-0.45**	**-0.75**	**-0.47**	**-0.56**	**-0.37**
Lab. No. 23	S&WTL Multan	**1.68**	**0.56**	**0.90**	**1.69**	**0.11**	**-0.79**
Lab. No. 24	S&WTL Vehari	**0.58**	**-0.46**	**1.20**	**0.88**	**-1.07**	**-0.41**
Lab. No. 25	S&WTL Khanewal	**-1.47**	**-0.30**	**1.45**	**-0.80**	**-0.59**	**-0.56**
Lab. No. 26	S&WTL Lodhran	**-0.16**	**-0.85**	**0.75**	**-0.64**	**-0.58**	**0.06**
Lab. No. 27	S&WTL Bahawalpur	**1.05**	**0.68**	**-0.60**	**0.84**	**2.04**	**0.42**
Lab. No. 28	S&WTL R. Y. Khan	**0.80**	**1.74**	**-0.75**	**0.84**	**2.51**	**1.22**
Lab. No. 29	S&WTL Bahawalnagar	**1.05**	**1.70**	**-0.98**	**0.88**	**2.60**	**0.89**
Lab. No. 30	S&WTL D G Khan	**0.05**	**0.93**	**0.60**	**0.36**	**-0.11**	**-0.60**
Lab. No. 31	S&WTL Layyah	**-0.13**	**0.51**	**0.19**	**0.12**	**-0.29**	**-0.79**
Lab. No. 32	S&WTL Muzaffargarh	**0.21**	**0.26**	**0.64**	**0.12**	**-0.21**	**-0.79**
Lab. No. 33	S&WTL Rajan Pur	**0.05**	**-0.14**	**1.77**	**0.25**	**0.05**	**-0.79**
Lab. No. 34	S&WTL Sahiwal	**-0.20**	**-0.23**	**-0.49**	**0.18**	**-0.27**	**-0.39**
Lab. No. 35	S&WTL Okara	**-0.44**	**-0.64**	**-2.29**	**-0.06**	**-0.46**	**-0.79**
Lab. No. 36	S&WTL Pakpattan	**-0.51**	**0.04**	**1.03**	**-0.27**	**-0.65**	**-0.79**
Lab. No. 37	SSRI Pindi Bhattian	**-1.44**	**-1.12**	**-1.15**	**-2.17**	**-0.78**	**-0.79**
Lab. No. 38	SC AARI FSD	**-1.44**	**-0.46**	**1.95**	**-0.86**	**0.29**	**1.33**

Table-8: Z-Score of Different Water Quality Parameters

		Water Sample 5		
Lab. No.	**Description**	**EC**	**SAR**	**RSC**
Lab. No. 1	S&WTL Lahore	**0.03**	**-1.22**	**0.12**
Lab. No. 2	S&WTL Sheikhupura	**-0.12**	**0.17**	**0.56**
Lab. No. 3	S&WTL Kasur	**-0.12**	**0.17**	**0.21**
Lab. No. 4	S&WTL Nankana Sb	**0.12**	**1.31**	**0.72**
Lab. No. 5	S&WTL Faisalabad	**0.12**	**0.52**	**0.81**
Lab. No. 6	S&WTL Jhang	**0.16**	**0.20**	**-0.02**
Lab. No. 7	S&WTL TT Singh	**0.03**	**-0.02**	**0.02**
Lab. No. 8	S&WTL Chiniot	**0.33**	**-0.52**	**2.62**
Lab. No. 9	S&WTL Sargodha	**0.08**	**0.32**	**0.07**
Lab. No. 10	S&WTL Khushab	**-5.45**	**-1.40**	**-2.29**
Lab. No. 11	S&WTL Bakhar	**0.04**	**0.30**	**0.26**

Table-8: Z-Score of Different Water Quality Parameters				
		Water Sample 5		
Lab. No.	Description	EC	SAR	RSC
Lab. No. 12	S&WTL Mianwali	**0.18**	**0.05**	**0.07**
Lab. No. 13	S&WTL Rawalpindi	**0.57**	**0.73**	**-0.06**
Lab. No. 14	S&WTL Attock	**0.13**	**0.27**	**-0.16**
Lab. No. 15	S&WTL Chakwal	**0.39**	**0.34**	**0.43**
Lab. No. 16	S&WTL Jhelum	**0.43**	**0.23**	**0.39**
Lab. No. 17	S&WTL Gujranwala	**-0.60**	**-0.19**	**-0.16**
Lab. No. 18	S&WTL Narowal	**0.22**	**-0.86**	**-0.14**
Lab. No. 19	S&WTL Sialkot	**0.33**	**-0.67**	**0.06**
Lab. No. 20	S&WTL Gujrat	**0.07**	**-3.79**	**-2.69**
Lab. No. 21	S&WTL M. B. Din	**0.72**	**0.98**	**-0.64**
Lab. No. 22	S&WTL Hafizabad	**-1.15**	**-0.95**	**-0.56**
Lab. No. 23	S&WTL Multan	**1.20**	**0.38**	**1.46**
Lab. No. 24	S&WTL Vehari	**0.48**	**-0.22**	**1.00**
Lab. No. 25	S&WTL Khanewal	**-0.61**	**-0.29**	**1.49**
Lab. No. 26	S&WTL Lodhran	**0.18**	**-0.24**	**0.25**
Lab. No. 27	S&WTL Bahawalpur	**0.84**	**1.97**	**-0.30**
Lab. No. 28	S&WTL R. Y. Khan	**0.56**	**1.72**	**-0.66**
Lab. No. 29	S&WTL Bahawalnagar	**0.48**	**1.86**	**-1.79**
Lab. No. 30	S&WTL D G Khan	**0.25**	**0.41**	**0.24**
Lab. No. 31	S&WTL Layyah	**0.10**	**0.37**	**0.04**
Lab. No. 32	S&WTL Muzaffargarh	**0.18**	**0.06**	**0.11**
Lab. No. 33	S&WTL Rajan Pur	**0.26**	**-0.31**	**0.90**
Lab. No. 34	S&WTL Sahiwal	**0.21**	**-0.03**	**-0.36**
Lab. No. 35	S&WTL Okara	**0.05**	**-0.55**	**-0.30**
Lab. No. 36	S&WTL Pakpattan	**0.18**	**0.06**	**0.17**
Lab. No. 37	SSRI Pindi Bhattian	**-0.63**	**-1.20**	**-2.14**
Lab. No. 38	SC AARI FSD	**-0.23**	**0.01**	**0.17**

■Conclusion

The aim of this exercise was to compare the analytical results of different laboratories working under the umbrella of SFRI, Lahore and find accuracy and precision of the Laboratories.All the 36 laboratories of SFRI participated and timely submitted the results. Most of the laboratories gained satisfactory Z-score whereas some has

questionable Z-score value.

None of the participating laboratory has unsatisfactory Z-score value which indicates that over-all performance of all laboratories is satisfactory.

Any feedback, comments, suggestions from participating laboratoriesregarding this ILC will be appreciated.

■Recommendations

- ✓ Training need assessment of technical staff should be conducted by laboratory in-charges and annual training plan should be prepared and implemented.
- ✓ The SFRI-guides circulated by Worthy Director, SFRI, Lahore should be followed to harmonize the analytical work in laboratories across the Province Punjab
- ✓ Equipment / Apparatus should be calibrated from ISO-accredited calibration bodies.

Estimation/Analyte	Questionable Z Score
Soil EC	1. S&WTL DG Khan 2. S&WTL Rajanpur 3. S&WTL Sahiwal 4. S&WTL Faisalabad 5. S&WTL Bahawalpur 6. S&WTL Gujrat 7. S&WTL Chiniot 8. S&WTL Bahawalnagar
Soil pH	1. S&WTL Gujrat 2. S&WTL Khushab 3. S&WTL Sargodha 4. S&WTL Muzaffargarh 5. Soil Salinity Research Institute, Pindi Bhattian
Soil Organic Matter	1. S&WTL Lahore 2. S&WTL Jhang 3. S&WTL Gujrat 4. S&WTL Multan 5. S&WTL Vehari

Estimation/Analyte	Questionable Z Score
Saturation %	1. S&WTL M. B. Din 2. S&WTL Mianwali 3. S&WTL Bahawalpur 4. S&WTL Vehari 5. S&WTL Khushab 6. S&WTL Sargodha 7. S&WTL Bahawalnagar
Soil P	1. S&WTL Gujrat 2. S&WTL Faisalabad 3. S&WTL Bahawalpur 4. S&WTL Lahore 5. S&WTL Pakpattan
Soil K	1. S&WTL Chiniot 2. S&WTL Attock 3. S&WTL Gujrat 4. S&WTL Multan 5. S&WTL Bahawalpur 6. S&WTL Pakpattan

Estimation/Analyte	Questionable Z Score
Water EC	1. S&WTL Gujranwala 2. S&WTL Hafiz Abad 3. S&WTL Khushab 4. Soil Salinity Research Institute, Pindi Bhattian
Water SAR	1. S&WTL Gujrat 2. S&WTL Khushab 3. S&WTL Chiniot 4. S&WTL R Y Khan 5. S&WTL Bahawalnagar 6. S&WTL Nankana Sahib 7. S&WTL Bahawalpur
Water RSC	1. S&WTL Nankana Sahib 2. S&WTL Khanewal 3. S&WTL Gujrat 4. S&WTL Okara 5. S&WTL Chiniot 6. S&WTL Khushab 7. SSRI Pindi Bhatti an 8. Soil Chemistry, Faisalabad

ANNEXURE-3: LEFT OVER DATA OF PREVIOUS SEASONS

PLAN-55

EFFECT OF COPPER SULPHATE APPLICATION ON SUGARCANE NEW VARIETY

P55.2:PREVIOUS YEAR'S RESULT (2019-20)

Average Cane yield (t/ha)									
Tr. No.	Nutrients (kg/ha)				Barkat Ali Nankana Sahib	M. Shbeer Sheikhupura	Amanit Ali Kasur	Sikander Hayat M. B.Din	Zulafiqar Rahim Yar Khan
	N	P_2O_5	K_2O	$CuSO_4$					
1	250	175	125	0	148.08	146.56	88.01	47.53	7.79
2	250	175	125	4	150.49	154.01	179.83	45.76	7.98
3	250	175	125	5	121.810	154.320	147.460	48.354	8.189
4	250	175	125	6	106.479	159.320	144.813	48.189	8.353
				LSD .05					

* No of experiments.

P55.3: PRE-SOWING SOIL ANALYSIS (2019-20)

Soil parameters	Barkat Ali Nankana Sahib	M. Shbeer Sheikhupura	Amanit Ali Kasur	Sikander Hayat M. B.Din	Zulafiqar Rahim Yar Khan
	Value	Value	Value	Value	Value
EC (dS m^{-1})	2.20	1.30	2.50	-	-
pH	8.1	8.1	7.7	-	8.5
OM%	0.77	0.84	0.70	-	5.70
P (ppm)	2.5	2.0	5.0	-	0.6
K (ppm)	128	130	110	-	172
Cu (ppm)	-	-	-	-	-

* No of experiments.

PLAN-59

EFFECT OF DIFFERENT SOURCES OF SULPHUR ON SUGARCANE

P59.3: PRE-SOWING SOIL ANALYSIS (2019-20)

Soil parameters	Ameen Khan Kasur	Shah Nawaz Nankana Sahib	Sohal Ahmad M. B.Din	Rasheed Ahmad B.W.N
	Value	Value	Value	Value
EC (dS m^{-1})	1.60	2.20	-	1.90
pH	8.0	8.0	-	8.1
OM%	0.77	0.70	-	0.62
P (ppm)	1.5	2.5	-	8.2
K (ppm)	94	137	-	114
Cu (ppm)	-	-	-	-

* No of experiments.

GUAVA ORCHARDSPLAN-86
FERTILIZER REQUIREMENTS OF GUAVA ORCHARDS

P86.2: PREVIOUS YEAR'S RESULTS (2019-20)

Nutrients (g/plant)				Guava yield (kg/plant)		
Tr. No.	N	P_2O_5	K_2O	M. Lateef H.Abad	Ali Hassan Nankana Sahib	M. Shar Nankana Sahib
1	F.P.	F.P.	F.P.	61.97	65.14	70.68
2	1000	500	500	70.97	67.39	75.19
3	750	500	500	67.701	72.40	74.38
4	500	500	500	64.107	71.70	74.74
5	1000	750	500	71.80	78.27	76.12
LSD .05						

* No of experiments

P86.3: PRE-SOWING SOIL ANALYSIS (2019-20)

Soil parameters	M. Lateef H.Abad	Ali Hassan Nankana Sahib	M. Shar Nankana Sahib
	Value	Value	Value
EC (dS m^{-1})	1.60	1.60	1.30
pH	8.0	8.2	8.0
OM%	0.74	0.91	0.63
P (ppm)	5.2	3.5	3.0
K (ppm)	120	114	67

* No of experiments

PLAN-88
BIO-FORTIFICATION OF SPRING MAIZE FOR ZINC AND IRON

P88.2:PREVIOUS YEAR'S RESULT (2019-20)

Average Spring Maize Grain yield (kg/ha)								
Tr. No.	Nutrients (kg/ha) Soil Application					Foliar Application		M. Khalid Nankana Sahib
	N	P_2O_5	K_2O	Zn	Fe	$ZnSO_4$ (33%Zn)	$FeSO_4$ (20%Fe)	
1	225	150	125	0	0	-	-	8381
2	225	150	125	5	10	-	-	8388
3	225	150	125	10	20	-	-	8507
4	225	150	125	5	10	0.5%	0.5%	8418
5	225	150	125	5	10	1.0%	1.0%	8389
6	225	150	125	10	20	0.5%	0.5%	8406
7	225	150	125	10	20	1.0%	1.0%	8528
LSD .05								

P88.3: PRE-SOWING SOIL ANALYSIS (2019-20)

Soil parameters	M. Khalid Nankana Sahib
	Value
EC (dS m^{-1})	1.40
pH	7.9
OM%	0.72
P (ppm)	3.3
K (ppm)	130
Zn (ppm)	-
Fe (ppm)	-

* No of experiments.

PLAN-94
FIELD EVALUATION OF IPNI-NUTRIENT EXPERT FERTILIZER MODEL FOR WHEAT

P94.2:PREVIOUS YEAR'S RESULT (2018-19)

Nutrients (kg/ha)					Wheat grain yield (kg/ha)
Tr. No.	Treatment	N	P_2O_5	K_2O	M. Maqbool B.W.N
1	Control	0	0	0	1815
2	FP	What farmer usually applies			4444
3	Half Recommended	80	57	30	3963
4	Full Recommended	160	114	60	5444
5	Nutrient Expert dose	Calculated from model after farmer interview			5481
				LSD .05	

* No of experiments.

PLAN-95
NUTRIENTS MANAGEMENT IN RELATION TO DISEASE CONTROL IN CITRUS

P95.1 PREVIOUS YEAR'S RESULTS (2018-19)

Citrus (Number of Fruits per plant)

Average Citrus (Number of Fruits per plant)				
Tr. No.	Abdul Ghafoor T.T.Singh	Hamza bin amjad T.T.Singh	Naiz Ahmad T.T.Singh	Mehmood Ahmad T.T.Singh
1	82	78	85	80
2	102	97	96	74
3	116	115	101	97
4	128	132	110	104
5	131	133	115	105

P95.2 PREVIOUS YEAR'S RESULTS (2018-19)

Citrus (Number of Fruits per plant)

Average Citrus (Number of Fruits per plant)								
Tr. No.	M. Ibrahim Sargodha	Iftikhar Ahmad Sargodha	M. Raifq Sargodha	Haji Tahir Sargodha	Ahmad Nawaz Sargodha	M. Murtaza Sargodha	Azhar Hussain Sargodha	M. Hussain Sargodha
1	63	84	75	92	71	90	68	95
2	69	91	80	95	76	96	74	103
3	79	107	85	97	92	109	81	122
4	102	125	89	107	112	130	101	137
5	105	130	95	110	117	135	110	144

* No of experiments.

P95.3 PREVIOUS YEAR'S RESULTS (2018-19)

Citrus Fruits Kg per plant

Average Citrus Fruits Kg per plant				
Tr. No.	**Abdul Ghafoor T.T.Singh**	**Hamza bin amjad T.T.Singh**	**Naiz Ahmad T.T.Singh**	**Mehmood Ahmad T.T.Singh**
1	82	78	85	80
2	102	97	96	74
3	116	115	101	97
4	128	132	110	104
5	131	133	115	105

* No of experiments.

P95.4 PREVIOUS YEAR'S RESULTS (2018-19)

Citrus Fruits Kg per plant

Average Citrus Fruits Kg per plant								
Tr. No.	M. Ibrahim Sargodha	Iftikhar Ahmad Sargodha	M. Raifq Sargodha	Haji Tahir Sargodha	Ahmad Nawaz Sargodha	M. Murtaza Sargodha	Azhar Hussain Sargodha	M. Hussain Sargodha
1	5	6	7	8	9	10	11	12
2	63	84	75	92	71	90	68	95
3	69	91	80	95	76	96	74	103
4	79	107	85	97	92	109	81	122
5	102	125	89	107	112	130	101	137

* No of experiments.

P95.5: LEAF ANALYSIS(2018-19)

Soil parameters	Abdul Ghafoor T.T.Singh	Hamza bin Amjad T.T.Singh	Naiz Ahmad T.T.Singh	Mehmood Ahmad T.T.Singh
	Value	Value	Value	Value
Zn (ppm)	21.00	19.00	22.00	23.00
Cu (ppm)	2.3	2.1	3.2	3.0
Fe (ppm)	42.00	39.00	17.00	35.00
Mn (ppm)	24.0	22.0	16.0	16.0
B (ppm)	18	17	32	15

* No of experiments.

P95.6: PRE-FRUIT SOIL ANALYSIS (2018-19)

Soil parameters	Abdul Ghafoor T.T.Singh	Hamza bin Amjad T.T.Singh	Naiz Ahmad T.T.Singh	Mehmood Ahmad T.T.Singh
	Value	Value	Value	Value
EC (dS m^{-1})	1.73	2.13	3.10	2.90
pH	0.8	8.0	8.2	8.2
OM%	0.77	0.70	0.77	0.77
P (ppm)	5.8	5.1	5.9	7.9
K (ppm)	220	190	180	220
Zn (ppm)	0.43	0.37	0.47	0.47
Cu (ppm)	0.18	0.17	0.16	0.20
Fe (ppm)	2.95	2.73	2.31	2.61
Mn (ppm)	0.57	0.51	0.58	0.64
B (ppm)	0.45	0.40	0.46	0.39

* No of experiments.

P95.7: PRE-FRUIT SOIL ANALYSIS (2018-19)

Soil parameters	M. Ibrahim Sargodha	Iftikhar Ahmad Sargodha	M. Rafiq Sargodha	Haji Tahir Sargodha	Ahmad Nawaz Sargodha	M. Murtaza Sargodha	Azhar Hussain Sargodha	M. Hussain Sargodha
	Value	Value	Value	Value	Value	Value	Value	Value
EC (dS m^{-1})	1.58	1.65	1.65	1.30	1.50	1.73	1.20	0.98
pH	7.9	8.0	8.0	7.9	7.9	7.9	7.7	7.7
OM%	0.83	0.90	0.90	8.86	0.74	0.84	0.90	0.92
P (ppm)	7.6	5.6	5.6	5.6	5.9	6.0	6.5	7.1
K (ppm)	176.000	180	180	176	176	186	180	80
Zn (ppm)	0.76	0.70	0.70	0.60	0.63	0.60	0.76	0.65
Cu (ppm)	0.35	0.25	0.25	0.35	0.40	0.40	0.42	0.38
Fe (ppm)	4.40	4.50	4.50	4.20	5.00	4.80	4.70	5.50
Mn (ppm)	1.80	2.00	2.00	1.80	2.00	1.60	1.50	3.50
B (ppm)	0.65	0.55	0.55	0.60	0.56	0.45	0.52	0.55

* No of experiments.

PLAN-96

EFFECT OF MINERAL NUTRITION THROUGH FOLIAR APPLICATION ON MITIGATION OF DISEASE INCIDENCE IN CITRUS

P96.1: PREVIOUS YEAR'S RESULTS (2019-20)

Nutrients (g/plant)				Micronutrients	Citrus yield (No Of Fruit /plant) Average
Tr. No.	N	P_2O_5	K_2O	Zn, Cu, Fe, Mn, B	Zafar Iqbal T.T.Singh
1	F.P.	F.P.	F.P.	No spray	603
2	900	450	900	No spray	671
3	F.P.	F.P.	F.P.	Two sprays	624
4	900	450	900	Two sprays	676
5	F.P.	F.P.	F.P.	Three sprays	641
6	900	450	900	Three sprays	695

* No of experiments

P96.2: PREVIOUS YEAR'S RESULTS (2019-20)

Nutrients (g/plant)				Micronutrients	Citrus yield (Weight of 100 Fruit kg / Plant) Average
Tr. No.	N	P_2O_5	K_2O	Zn, Cu, Fe, Mn, B	Zafar Iqbal T.T.Singh
1	F.P.	F.P.	F.P.	No spray	14.15
2	900	450	900	No spray	14.98
3	F.P.	F.P.	F.P.	Two sprays	14.73
4	900	450	900	Two sprays	14.64
5	F.P.	F.P.	F.P.	Three sprays	15.05
6	900	450	900	Three sprays	15.45

* No of experiments

P96.3: PRE-SOWING SOIL ANALYSIS (2019-20)

Soil parameters	Zafar IqbalT.T.Singh
	Value
EC (dS m^{-1})	1.90
pH	7.9
OM%	0.98
P (ppm)	6.5
K (ppm)	200
Zn (ppm)	0.44
Cu (ppm)	0.19
Fe (ppm)	2.40
Mn (ppm)	0.51
B (ppm)	0.41

PLAN-98
EFFECT OF MICRONUTRIENTS THROUGH SOIL APPLICATION ON CONTROL OF DISEASE IN CITRUS

P98.2: PREVIOUS YEAR'S RESULTS (2019-20)

Nutrients (g/plant)				Micronutrients	Citrus yield (No Of Fruit /plant) Average
Tr. No.	N	P_2O_5	K_2O	Zn, Cu, Fe, Mn, B	Zafar IqbalT.T.Singh
1	F.P.	F.P.	F.P.	No spray	588
2	900	450	900	No spray	636
3	F.P.	F.P.	F.P.	Two sprays	609
4	900	450	900	Two sprays	661
5	F.P.	F.P.	F.P.	Three sprays	626
6	900	450	900	Three sprays	679
				LSD .05	

* No of experiments

P98.3: PREVIOUS YEAR'S RESULTS (2019-20)

Nutrients (g/plant)				Micronutrients	Citrus yield (Weight of 100 Fruit kg / Plant) Average
Tr. No.	N	P_2O_5	K_2O	Zn, Cu, Fe, Mn, B	Zafar IqbalT.T.Singh
1	F.P.	F.P.	F.P.	No spray	13.92
2	900	450	900	No spray	14.75
3	F.P.	F.P.	F.P.	Two sprays	14.50
4	900	450	900	Two sprays	15.08
5	F.P.	F.P.	F.P.	Three sprays	14.75
6	900	450	900	Three sprays	15.19
				LSD .05	

P98.4: PRE-SOWING SOIL ANALYSIS (2019-20)

Soil parameters	Zafar Iqbal T.T.Singh
	Value
EC (dS m^{-1})	1.86
pH	7.9
OM%	0.84
P (ppm)	6.1
K (ppm)	210
Zn (ppm)	0.41
Cu (ppm)	0.18
Fe (ppm)	2.45
Mn (ppm)	0.49
B (ppm)	0.39

Rice

PLAN-14

TO EXPLORE THE BEST NP RATIO FOR COARSERICE WITHIN LIMITS OF PRESENT FARMER BUDGET FOR FERTILIZER

P14.3: Pre-Sowing SOIL ANALYSIS (2019)

Soil Parameters	Basharat Ali Narowal	M. Yousaf Hafizabad
	Value	Value
EC (dS m^{-1})	0.70	1.20
pH	8.1	8.5
OM%	0.57	0.48
P (ppm)	1.0	4.7
K (ppm)	71	140

*No. of experiments

PLAN-16

FERTILIZER RESPONSE CURVE STUDIES ON FINE RICE

P16.2:- PREVIOUS YEAR'S RESULTS (2019)

Nutrients (kg/ha)				Average Paddy yield (kg/ha) (Fine Rice) 2019
Tr. No.	N	P_2O_5	K_2O	M. Yousan Hafizabad
1	0	0	0	1601
2	0	90	60	1933
3	45	90	60	3389
4	90	90	60	4202
5	135	90	60	4600
6	180	90	60	4444
7	135	0	60	3533
8	135	45	60	4074
9	135	135	60	4704
10	135	90	0	4148
11	135	90	120	4630
			LSD 0.05	

*No of experiments

P16.3: Pre-Sowing SOIL ANALYSIS (2019)

Soil Parameters	M. Yousan Hafizabad
	Value
EC (dS m^{-1})	1.400
pH	8.500
OM%	0.700
P (ppm)	6.700
K (ppm)	140
*No. of experiments	

3. MAIZE

PLAN-27

FERTILIZER RESPONSE CURVE STUDIES ON MAIZE FODDER (Non hybrid varieties)

P27.2: PREVIOUS YEAR'S RESULTS (2019)

Nutrients (kg/ha)				Average Maize Fodder yield (t/ha) 2019
Tr. No.	N	P_2O_5	K_2O	Rana Mahfuz Kasur
1	0	0	0	24
2	0	60	30	42
3	65	60	30	63
4	130	60	30	75
5	195	60	30	100
6	130	0	30	66
7	130	30	30	49
8	130	90	30	104
9	130	60	0	67
10	130	60	15	74
11	130	60	45	92
			LSD .05	

*No of experiments

P27-3: Pre-Sowing SOIL ANALYSIS (2019)

Soil Parameters	Rana Mahfuz (Kasur)
	Value
EC (dS m^{-1})	3.9
pH	8.3
OM%	0.84
P (ppm)	3.5
K (ppm)	114
*No. of experiments	

PLAN-29

EFFECT OF DIFFERENT SOURCES OF SULPHUR ON THE MAIZE YIELD

P29.2: PREVIOUS YEAR'S RESULTS (2019)

Nutrients (kg/ha)							Average Maize grain yield (kg/ha) 2019
Tr. No.	N	P_2O_5	K_2O	Elemental Sulphur	Bentonite Sulphur	Gypsum	Abdul Raqeeb Kasur
1	225	150	125	0	0	0	10458
2	225	150	125	22	0	0	11590
3	225	150	125	0	22	0	12074
4	225	150	125	0	0	169	11060

*No of experiments

P29-3: Pre-Sowing SOIL ANALYSIS (2019)

Soil Parameters	Abdul Raqeeb Kasur
	Value
EC (dS m^{-1})	-
pH	-
OM%	-
P (ppm)	-
K (ppm)	-
*No. of experiments	

ANNEXURE-4
LIST OF EXPERIMENTS INCLUDED IN CURRENT REPORT

Sr. No.	Plan. No	Crops	Sr. No.	District	Farmer Name	Sowing List No	Zone	Location	Date of sowing	Name of Field Assistant/AO
1	51	Grams	1	Khushab	M. Naveed	47R1	Central	51/MB	15/11/2020	Hasnat Ahmad
2	51	Grams	2	Khushab	Abdul Waheed	48R1	Central	51/MB	14/11/2020	Hasnat Ahmad
3	51	Grams	1	Muzaffar Garh	Munir Ahmad	48R1	Cotton	628/TDA	26/10/2020	Abdul Majeed
4	51	Grams	1	Layyah	M. Ameen	43R1	Thal	111/TDA	09/10/2020	Liaqat Ali
5	52	Sugarcane	1	Faisalabad	Sugarcane Farm	63R1	Central	Sugarcane Farm	15/04/2020	Manzoor Ahmad
6	53	Olive	1	Chakwal	Izhar Naeem	R1	Rainfed	ChakChalah Kalu	5-3-2021	M. Akram
7	54	Turnip	1	Sialkot	Usama Abdulla	30R1	Rice	Dulemwala	12/01/2020	Asim Ali
8	54	Turnip	2	Sheikhupura	Ali Jabran	3R1	Rice	Manawala	15-09-2020	Allah ditta
9	54	Turnip	1	Jhang	Taj	40R1	Central	Munirabad	10/06/2020	M. Shoail Nafees
10	54	Turnip	2	T.T.Singh	Ghulam Mustafa	41R1	Central	BaroonKamalia	28/11/2020	Asif Sajjad
11	54	Turnip	1	D.G.Khan	M. Sadiq	51R1	Cotton	Samina Mauza Khakhi	09/10/2020	Abdul Rauf
12	55	Sugarcane	1	Jhang	Rana Amir	52R1	Central	Basti Ghazi Shah	20-03-2020	M. Sohail Nafees
13	55	Sugarcane	2	T.T Singh	Azeem Alim	53R1	Central	375/JB	24-03-2020	Abdul Waheed
14	55	Sugarcane	3	T.T Singh	M. Farooq	54R1	Central	341/JB	25-03-2020	M. Iqbal
15	55	Sugarcane	4	Jhang	Gulam Fareed	55R1	Central	Pirwala	20-03-2020	Ijaz Ahmad
16	55	Sugarcane	5	Jhang	Ali Raza	56R1	Central	Ashaba	03/10/2020	M. Sohail Nafees
17	55	Sugarcane	6	Sargodha	AllahaDeeta	57R1	Central	Kadlathi	01/05/2020	Shahbaz Ahmad
18	55	Sugarcane	7	Faisalabad	Shahid Hussain	51R1	Central	Chak 63/GB	20/03/2020	Tariq Mahmood
19	55	Sugarcane	8	Faisalabad	Manzoor Ahmad	61R1	Central	Chak 273/RB	04/04/2020	M. Imtiaz Ahmad
20	55	Sugarcane	1	B.W.N	M. Navid	55R1	Cotton	31/3R	26-02-2020	Khalil Ahmad
21	55	Sugarcane	2	B.W.N	Falak Sheer	01R1	Cotton	Ghafoorabad	20-03-2020	Gulam Murtaza
22	55	Sugarcane	3	Khanewal	Abdul Rashid	39R1	Cotton	DaduAana	23-2-2020	M. Munir
23	55	Sugarcane	4	D.G.Khan	M. Saleem	41R1	Cotton	D.G.Khan	23-02-2020	Abdul Rauf

24	55	Sugarcane	5	Muzaffar Garh	M. Yousaf	42R1	Cotton	Rang pur	29-03-2020	Abdul Majeed
25	55	Sugarcane	1	Mianwali	Ghulam Hassan	58R1	Thal	Chak 19/AML	24-02-2020	M. Iqbal
26	55	Sugarcane	2	Mianwali	Hafeezullah khan	59R1	Thal	Habib Kheilanwala	27-02-2020	M. Iqbal
27	55	Sugarcane	3	Mianwali	Ratbas Khan	60R1	Thal	Gulmir Hafeez wala	27-02-2020	M. Iqbal
28	56	Potato	1	Kasur	Shah Zaib	15R1	Rice	-	12-10-2021	Azhar Iqbal
29	56	Potato	1	PakPattan	M. Talib	25R1	Central	31/SP	17/10/2020	Riasat Ali
30	56	Potato	2	Sahiwal	Bashir Ahmad	28R1	Central	88/6R	25/10/2020	Dur Hussain
31	56	Potato	1	Rawalpindi	M. Ayaz	1R1	Barani Irri	Jhugyan	16-09-2020	M. Amjad
32	56	Potato	2	Rawalpindi	Faqeer Muhammad	2R1	Barani Irri	Malik Abad	17-09-2020	M. Amjad
33	56	Potato	3	Rawalpindi	Nawab Ali	11R1	Barani Irri	Nawab Abad	21-01-2021	M. Rashid A/O
34	56	Potato	4	Attock	M. Ismail	18R1	Barani Irri	Shamsabad	28-09-2020	Abdul Ghaffar
35	58	Potato	1	Faisalabad	NumanNaseeb	42R1	Central	36JB	10/01/2020	Manzoor Ahmad
36	58	Potato	2	T.T Singh	M. Aslam	43R1	Central	338/JB	20-10-2020	M. Iqbal
37	58	Potato	3	Sahiwal	Bashir Ahmad	18R1	Central	88/6R	25-10-2020	Dur Hussain
38	58	Potato	4	Pakpattan	M. Talib	24R1	Central	31/SP	17-10-2020	Riasat Ali
39	58	Potato	1	Rawalpindi	M. Ayaz	10R1	Barani Irri	Jhuggian	24-12-2020	M. Rashid
40	58	Potato	2	Attock	Bakht Zeb	21R1	Barani Irri	Rangoo	14-01-2020	Abdul Ghaffar
41	59	Sugarcane	1	Nankana sahib	MazmalHussan	37R1	Rice	82/RB	26/03/2020	M. Arif
42	59	Sugarcane	1	Faisalabad	Asif Ali	62R1	Central	470/GB	31/03/2020	Ghulam Mohiuddin
43	59	Sugarcane	1	B.W.N	Fiaz Ahmad	24R1	Cotton	BdyanaSharqi	13-3-2021	Tariq Mehmood
44	59	Sugarcane	2	B.W.P	M. Asif	11R1	Cotton	165/M	02/10/2020	M. Idrees
45	59	Sugarcane	3	B.W.P	Falak Sheer	2R1	Cotton	Ghafoorabad	20-03-2020	Ghulam Murtaza
46	60	Cauliflower	1	Sheikhupura	M. Sohail	1R1	Rice	Manawala	12/10/2020	Allah Dita
47	60	Cauliflower	1	B.W.N	Shabir Ahmad	7R1	Cotton	58/F	15-10-2020	Asghar Ali
48	60	Cauliflower	2	B.W.N	M. Parvaiz	23R1	Cotton	173/MR	11/01/2020	Khalil Ahmad
49	60	Cauliflower	3	B.W.P	Khalil	48R1	Cotton	Basti Hanif	10/08/2020	Ghulam Murtaza

50	60	Cauliflower	4	B.W.P	Nawaz Hussion	47R1	Cotton	Madina Colony	11/02/2020	Ghulam Murtaza
51	61	Pumpkin	1	Attock	Faizan Ali	23R1	Barani Irri	Haji Shah	03/01/2021	Abdul Ghaffar
52	62	Water Melon	1	B.W.P	M. Faiz	61R1	Cotton	Nawabpura	03/04/2021	Ghulam Murtaza
53	6	Water Melon	1	Attock	Faizan Ali	17R1	Barani Irri	Haji Shah	13-03-2021	Abdul Ghaffar
54	63	Apple Gourd	1	B.W.P	Rajab Ali	8R1	Cotton	164/m	27/03/2021	M. Idrees
55	63	Apple Gourd	2	B.W.N	M. Khalid	22R1	Cotton	105/F	23/03/2021	M. Taiq
56	63	Apple Gourd	3	B.W.N	Talib Hussain	36R1	Cotton	137/6R	16/03/2021	M. Sajid Iqbal
57	63	Apple Gourd	4	B.W.N	M. Tariq	43R1	Cotton	170/7R	24/03/2021	M. Ashraf Shad
58	63	Apple Gourd	1	Rawalpindi	Raad Ali	3R1	Barani Irri	Usman Khatter	21.01.2021	M. Amjad
59	63	Apple Gourd	2	Islambad	Ali Akbar	13R1	Barani Irri	Sihala Markaz	03/11/2021	M. Rashid
60	63	Apple Gourd	3	Attock	Israr ulHaq	16R1	Barani Irri	Shamsabad	19-02-2021	Abdul Ghaffae
61	64	Bitter Gourd	1	D.G.Khan	Asif Khan	52R1	Cotton	Noorpur	31-01-2021	Abdul Rauf
62	64	Bitter Gourd	1	Rawalpindi	Nawab Ali	5R1	Barani Irri	Nawababad	03/01/2021	M. Amjad
63	64	Bitter Gourd	2	Islamabad	M. Hussain	9R1	Barani Irri	Sihala	30-3-2021	M. Akram
64	64	Bitter Gourd	3	Attock	Bakhtzeb	15r1	Barani Irri	Rangoo	22-02--2021	Abdul Ghaffar
65	65	Sugarcane	1	T.T.Singh	M. Munir	64R1	Central	241/GB	04/03/2020	M. Shahid Tanveer
66	65	Sugarcane	2	Faisalabad	M. Bilal	65R1	Central	162/RB	04/06/2020	Ahmad Khan
67	66	Okra	1	Sialkot	Zafar Iqbal	28R1	Rice	DaduBajwa	10.03.2021	Asim
68	66	Okra	1	T.T.Singh	Ghulam Mustafa	90R1	Central	BaroonKamalia	16/03/2021	M. Asif Sajjad
69	66	Okra	1	Mianwali	Asad Ali	91R1	Thal	Kamar Mashani	27/03/2021	Mukhtiar Hussain
70	66	Okra	1	Islamabad	Munir Khan	12R1	Barani Irri	Sihala	03/11/2021	M. Rashid
71	66	Okra	2	Attock	Israr ulHaq	22R1	Barani Irri	Shamsabad	22-02-2021	Abdul Ghaffar
72	67	Cucumber	1	Rawalpindi	Raad Ali	4R1	Barani Irri	Usman Khatter	21-01-2021	M. Amjad
73	70	Ispaghol	1	B.W.N	M. Irfan	42R1	Cotton	166/7R	21-11-2020	M. Ashraf Shad

74	70	Ispaghol	2	B.W.N	Ghulam Hussain	44R1	Cotton	426/6R	11/06/2020	M. Ayub
75	71	Wheat	1	kasur	Abdul khalaq	17R1	Rice	Sandal Kalaa	22-11-2020	-
76	71	Wheat	2	Gujranwala	Zahoor Ahmad	35R1	Rice	Ghaiyewala	17-11-2020	Saima Nazar
77	71	Wheat	1	Gujrat	Shaukat Ali	27R1	Rice	Tarekha	12/02/2020	Amir Mahmood
78	71	Wheat	2	Gujrat	Ghulam Sarwar	31R1	Rice	SahnuwaalKallan	12/03/2020	M. Javed
79	71	Wheat	1	Jhang	Rafiq	2R1	Central	Rustam Sargana	22-11-2020	Ijaz A.Hamayoun
80	71	Wheat	2	Jhang	Zawar	1R1	Central	Nasir Abad	27-11-2020	M. Yusaf Saleem
81	71	Wheat	1	Vehari	Barkat Ali	13R1	Cotton	549/EB	05/11/2020	M. Saleem
82	72	Wheat	1	Gujrat	M. Yousaf	30R1	Rice	SahnueaalKallan	30-11-2020	M. Javed
83	72	Wheat	2	M. B.Din	M. Azmat	25R1	Rice	ArzaniSohawa	21-11-2020	Amir Muhmood
84	72	Wheat	1	Lahore	M. Faqeer	19R1	Rice	Rang pur	28-11-2019	M. Hanif
85	72	Wheat	2	Sialkot	M. Saleem	23R1	Rice	Dawood Bajwa	26-11-2020	Abdul Waheed
86	72	Wheat	1	Pakpattan	M. Khalid	27R1	Central	Bahiwal, 31/SP	20-11-2020	Riasat Ali
87	72	Wheat	2	Sahiwal	M. Naeem	29R1	Central	88/6-R	26-11-2020	Dur.Huseen
88	72	Wheat	3	Sahiwal	Nasir Iqbal	32R1	Central	109/12-l	28-11-2020	Walayat Ali
89	72	Wheat	4	T.T.Singh	Sajjad	4R1	Central	338/JB	19-11-2020	M. Iqbal
90	72	Wheat	5	Jhang	Amjad Ali	5R1	Central	DuryGongal	27-11-2020	M. Yusaf Saleem
91	72	Wheat	6	T.T.Singh	M. Zikria	3R1	Central	303GB	11/12/2020	Umar Farooq
92	72	Wheat	7	Faisalabad	M. Bilal	6R1	Central	Chak 162	27/11/2020	Ahmad Kahan
93	72	Wheat	8	Faisalabad	Naseeb Ali	7R1	Central	36/JB	25/11/2020	Manzoor Ahmad
94	72	Wheat	9	Faisalabad	Ghulam Murtaza	8R1	Central	472/GB	25/11/2020	Ghulam-Mhy-Ud-Din
95	72	Wheat	10	Sargodha	Ghulam Nabi	10R1	Central	Shareefabad	15/12/2020	Shahbaz Ahmad
96	72	Wheat	11	Sargodha	M. Naeem	11R1	Central	Khdlathi	30/11/2020	Shahbaz Ahmad
97	72	Wheat	1	B.W.N	M. Yaseen	24R1	Cotton	30/3R	19/11/20	Khaleel Ahmad
98	72	Wheat	2	B.W.N	M. Ameen	16R1	Cotton	103/F	11/05/2020	Tariq Mehmood
99	72	Wheat	3	B.W.N	Tariq Ali	30R1	Cotton	101/6R	22/11/2020	M. Sajid Iqbal
100	72	Wheat	4	B.W.N	Uzar Khan	51R1	Cotton	Khalilabad	19/11/2020	M. Zahiad khan
101	72	Wheat	5	B.W.P	Shabeer Ahmad	4R1	Cotton	164/M	28/11/2020	M. Idrees
102	72	Wheat	6	B.W.N	Munawar Hussian	45R1	Cotton	136/6.R	16/11/2020	M. Auyb
103	72	Wheat	7	B.W.N	Mehar khan	11R1	Cotton	09/F.W	11/06/2020	Asghar Ali

104	72	Wheat	8	B.W.N	Riaz Ahmad	37R1	Cotton	186/7R	17/11/2020	M. Ashraf shad
105	72	Wheat	9	Multan	M. Amir	1R1	Cotton	ChahDosowala	25/11/2020	Waheedur Rehman
106	72	Wheat	10	Khanewal	M. Shama khan	6R1	Cotton	Muze Sultan Thiraj	30/11/2020	Mushtaq Ali
107	72	Wheat	11	Khanewal	M. Kazim	10R1	Cotton	Mouza Bahawalpur	23-11-2020	M. Munir
108	72	Wheat	12	Muzaffar Garh	M. Ramzan	46R1	Cotton	624/TDA	19-11-2020	Abdul Majeed
109	72	Wheat	13	D.G.Khan	Jindwada	49R1	Cotton	KotlaShafi	26-10-2020	Abdul Rauf
110	72	Wheat	1	Layyah	Malik Yasin	37R1	Thal	121/TDA	12/11/2020	M. Bilal
111	72	Wheat	2	Mianwali	Rafi-Ullah-Khan	9R1	Thal	Maharnawala	27/11/2020	M. Iqbal
112	73	Wheat	1	Attock	M. Siddique	19R1	Barani	Shamsabad	11/04/2020	Abdul Ghaffar
113	73	Wheat	2	Rawalpindi	Zakir Hussain	6R1	Barani	Sihala	11/04/2020	M. Akram
114	75	Wheat	1	M. B.Din	Imtiaz Nasir	26R1	Rice	ArzaniSohawa	23-11-2020	Amir Mehmood
115	75	Wheat	2	Gujrat	M. Yousaf	29R1	Rice	Adowal	29-11-2020	M. Javed
116	75	Wheat	3	Nankana Sahib	M. Irshaad	2R1	Rice	Manawala	20-11-2020	Allah Dita
117	75	Wheat	4	Sheikupura	M. Jaweed	21R1	Rice	Shamka	30-11-2020	M. Haneef
118	75	Wheat	5	Sialkot	Abdullah	27R1	Rice	Dodo Bajwa	27/11/2020	Saim Ali
119	75	Wheat	1	Sahiwal	Ghulam Rasool	22R1	Central	JinnahTown	26-11-2020	Tahir Ibrar
120	75	Wheat	2	Sahiwal	M. Naeem	30R1	Central	88/6-R	26-11-2020	Dur Hussain
121	75	Wheat	3	Sahiwal	Mazhar Iqbal	33R1	Central	109/12-L	28-11-2020	Walayat Ali
122	75	Wheat	4	T.T.Singh	M. Khalid	13R1	Central	375/JB	21-11-2020	AddulWaheed
123	75	Wheat	5	Jhang	Rana Haider	14R1	Central	LukBadhar	22-11-2020	M. Sohail Nafees
124	75	Wheat	6	Chiniot	M. Salman	15R1	Central	Silman	30-11-2020	M. Yaqoob
125	75	Wheat	7	T.T.Singh	M. Sabir	12R1	Central	241/GB	11/10/2020	M. Shaid Tanveer
126	75	Wheat	8	Sargodha	Imtiaz Ahmad	17R1	Central	SB/67	11/03/2020	M. Raiz
127	75	Wheat	9	Khushab	Abdul Majeed	18R1	Central	51/MB	29/11/2020	Husnat Ahmad
128	75	Wheat	1	B.W.N	M. Ashraf	27R1	Cotton	38/3.R	23/11/2020	Khaleel Ahmad
129	75	Wheat	2	B.W.N	M. Asif	19R1	Cotton	102/F	19/11/2020	Tariq Mehmood
130	75	Wheat	3	B.W.N	Amjad Ali	34R1	Cotton	101/6.R	28/11/2020	M. Sajid Iqbal
131	75	Wheat	4	B.W.N	M. Yusan	53R1	Cotton	103/F	17/11/2020	M. Zahiad Khan
132	75	Wheat	5	B.W.P	Naseer Akmal	2R1	Cotton	164/M	20/11/2020	M. Idrees

133	75	Wheat	6	B.W.N	Saeed Ahmad	14R1	Cotton	51/F	10/11.2020	Asghar Ali
134	75	Wheat	7	B.W.P	Waseem	55R1	Cotton	Basti Mohana	25/11/2020	Ghulam Muratza
135	75	Wheat	8	B.W.N	M. Ahmad	46R1	Cotton	136/6.R	11/10/2020	M. Ayub
136	75	Wheat	9	B.W.N	Maqbool Ahmad	41R1	Cotton	165/7R	20/11/2020	M. Ashraf Shad
137	75	Wheat	10	Multan	Gulam Yasen	4R1	Cotton	QasbaMaral	19-11-2020	Waheedur Rehman
138	75	Wheat	11	Khanewal	M. Razwan	7R1	Cotton	Muza Sultan Hiraj	25-11-2020	Mushtaq Ali
139	75	Wheat	12	Muzaffar Garh	Amjad Ali	38R1	Cotton	623/TDA	13-11-2020	M. Bilal
140	75	Wheat	13	D.G.Khan	Dilshad Ahmad	50R1	Cotton	Chakdlail	27-10-2020	Abdul Rauf
141	75	Wheat	1	Layyah	M. Suleman	42R1	Thal	121/TDA	11/11/2020	Liaqat Ali
142	75	Wheat	2	Mianwali	Ikram-Ullah-Khan	16R1	Thal	Dera Habib	28/11/2020	M. Iqbal
143	75	Wheat	1	Attock	M. Sadiq	14R1	Barani Irri	Shamsabad	12/04/2021	Abdul Ghaffar
144	76	Wheat	1	Sheikhupura	Rice Farm	22R1	Rice	Kalashah Kaku	28/11/2020	M. Hanif
145	79	Wheat	1	Faisalabad	Wheat Research Area	19R1	Central	Wheat Research Area	11/05/2020	Nadeem Raza A/O
146	80	Wheat	1	Faisalabad	Wheat Research Area	20R1	Central	Wheat Research Area	11/05/2020	Nadeem Raza A/O
147	81	Maize	1	Hafizabad	M. Tahir	32R1	Rice	Pepalwala	26-02-2021	M. Imran
148	81	Maize	2	Nankana Sahib	Riaz Ahmad	12R1	Rice	Kashifabad	25-02-2021	M. Arif
149	81	Maize	3	Gujranwala	Wajeehaidar	33R1	Rice	Saub Nagar	03/04/2021	Saima Nazar
150	81	Maize	1	Sahiwal	Bashir Ahmad	23R1	Central	2/10-L	20/02/2021	Tahir Ibrar
151	81	Maize	2	Sahiwal	M. Zafar	31R1	Central	77/5-R	26-02-2021	Dur Hussain
152	81	Maize	3	Sahiwal	Naseer Ahmad	36R1	Central	40/12-L	10/03/2021	Walayat Ali
153	81	Maize	4	Chiniot	Qamar Ali	67R1	Central	WaraThatta	02/11/2021	M. Yaqoob
154	81	Maize	5	T.T.Singh	M. Ramzan	64R1	Central	BaroonKamalia	25/02/2021	Asif Sajjad
155	81	Maize	6	Faisalabad	Mian Mudaseer	65R1	Central	65/Jb	03/01/2021	Manzoor Ahmad
156	81	Maize	7	T.T.Singh	M. Hafeez	66R1	Central	242/gb	03/01/2021	M. Shahid Tanveer
157	81	Maize	8	Sargodha	Naveed Shahzad	68R1	Central	SB/109	03/05/2021	M. Riaz
158	81	Maize	1	Vehari	M. Shahid	15R1	Cotton	86/WB	17/02/2021	M. Saleem
159	83	Mango	1	Khanewal	Ghulam Shabir	11R1	Cotton	Mauza Chopper Hatta	31-8-2020	M. Munir
160	85	Grapes	1	Attock	Moazzam Khan	24R1	Barani	Barotha	9-3-2021	Abdul Ghaffar

							Irri			
161	86	Guava	1	Nankana Sahib	M. Naveed	5R1	Rice	Shahkot	13/12/2020	M. Arif
162	86	Guava	1	Pakpattan	M. Idrees	33R1	Central	Bahiwal	1-4-2020	Riasat Ali
163	88	Maize	1	Nankana Sahib	Abid Ali	7R1	Rice	Shahkot	20-2-2021	M. Arif
164	88	Maize	2	Kasur	Yahya	14R1	Rice	Kasur	25-2-2021	Azhar Iqbal
165	88	Maize	3	Sheikhupura	M. Javed	20R1	Rice	Shamawala	03/05/2021	M. Hanif
166	88	Maize	4	Gujranwala	M. Rizwan	36R1	Rice	DehlaChatha	03/08/2021	Saima Nazar
167	88	Maize	5	Gujranwala	Ansar Mangata	34R1	Rice	Saib Nagar	03/04/2021	Saima Nazar
168	88	Maize	1	T.T.Singh	Zubair Ahmad	71R1	Central	338/JB	20/02/2021	M. Iqbal
169	88	Maize	2	Faisalabad	M. Yaseen	69R1	Central	218/GB	16/02/2021	G-Mohyud din
170	88	Maize	3	Faisalabad	M. Shahzad	70R1	Central	65/Jb	22/2/2021	Nadeem Raza A/O
171	88	Maize	4	T.T.Singh	Ashiq Ali	72R1	Central	BaroonKamalia	26-02-2021	Asif Sajjad
172	88	Maize	5	Sargodha	M. Asif	74R1	Central	125/South	04/01/2021	Shahbaz Ahmad
173	88	Maize	6	Sargodha	M. Imran	75R1	Central	90/NB	02/02/2021	Ghulam Yaseen
174	88	Maize	1	Khanewal	M. Akram	8R1	Cotton	Muza Dara Mehram	27-01-2021	Mushtaq Ali
175	88	Maize	2	Vehari	M. Qurban	16R1	Cotton	521/EB	20-02-2021	M. Saleem
176	88	Maize	3	B.W.P	M. Akram	7R1	Cotton	141/m	14-02-2021	M. Idess
177	88	Maize	4	B.W.N	Khaild Iqbal	15R1	Cotton	8/FW	01/01/2021	Asghar Ali
178	88	Maize	5	B.W.P	Jhanzib	61R1	Cotton	Nawab Pura	23/02/2021	Ghulam Murtaz
179	88	Maize	1	Mianwali	Dost Muhammad	73R1	Thal	Jalalpur Pakka	16/03/2021	Mukhtiar Hussain
180	90	Citrus	1	T.T.Singh	M. Tariq	66R1	Central	425/JB	17/04/2020	Nadeen Raza A/O
181	91	Wheat	1	Sialkot	Fahad Abdullah	29R1	Rice	DaduBajwa	27-11-2020	Asim Ali
182	91	Wheat	1	Sahiwal	Bashir Ahmad	19R1	Central	88/6R	25-11-2020	Nafeesa Muslim
183	91	Wheat	2	Pakpattan	M. Sakhi	26R1	Central	Wan Dal Singh	18-11-2020	Riasat Ali
184	91	Wheat	3	T.T.Singh	Amjad Ali	22R1	Central	338/JB	18/11/2020	M. Iqbal
185	91	Wheat	4	Jhang	Manzoor Ahmad	21R1	Central	Pirwala	16-11-2020	Ijaz Ahmad Hamayoun
186	91	Wheat	5	Chiniot	M. Akmal	23R1	Central	T.M. Saha	19-11-2020	M. Yaqoob
187	91	Wheat	6	T.T.Singh	Abdul Malik	24R1	Central	242/GB	12/05/2020	M. Shahid Tanveer
188	91	Wheat	7	Sargodha	Naveed Shahzas	26R1	Central	48/NB	12/02/2020	Ghulam Yasin

189	91	Wheat	1	B.W.N	M. Yaseen	23R1	Cotton	30/3.R	19/11/2020	Khalil Ahmad
190	91	Wheat	2	B.W.N	M. Saleem	17R1	Cotton	105/F	15/11/2020	Tariq Mehmood
191	91	Wheat	3	B.W.N	M. Yar	32R1	Cotton	101/6.R	24/11/2020	M. Sajid Iqbal
192	91	Wheat	4	B.W.N	Uzair Khan	52R1	Cotton	Khaliabad	19/11/2020	M. Zahid Khan
193	91	Wheat	5	B.W.P	Shabeer Ahmad	5R1	Cotton	164/m	28/11/2020	M. Idrees
194	91	Wheat	6	B.W.N	Munawar Hussan	47R1	Cotton	136/6R	16/11/2020	M. Ayub
195	91	Wheat	7	B.W.P	Waseem	56R1	Cotton	Basti Mohana	20/11/2020	Ghulam Murtaza
196	91	Wheat	8	B.W.N	Mehar Khan	10R1	Cotton	09/F.W	11/07/2020	Asghar Ali
197	91	Wheat	9	B.W.N	Manzoor Ahmad	38R1	Cotton	165/7.R	20/11/2020	M. Ashraf Shad
198	91	Wheat	10	Multan	M. Amir	2R1	Cotton	Hamid purKanora	27-11-2020	Waheedur Rehman
199	91	Wheat	11	Khanewal	Ghulam Fareed	9R1	Cotton	Kabir Wala	16-11-2020	Muhammad Munir
200	91	Wheat	12	Muzaffar Garh	M. Ismail	47R1	Cotton	Kotadu	21-11-2020	Abdul Majeed
201	91	Wheat	1	Mianwali.	Shadat Ali	25R1	Thal	Kamar Mashani	22/11/2020	Mukhtiar Hussain
202	92	Wheat	1	Faisalabad	PARS farm	27R1	Central	PARS farm	12/07/2020	Manzoor Ahmad
203	93	Wheat	1	Gujrat	M. Zafar	28R1	Rice	Tarekha	13-11-2020	Amir Muhmood
204	93	Wheat	2	Gujrat	M. Yousaf	32R1	Rice	Adowal	12/04/2020	M. Javed
205	93	Wheat	3	Nankana Sahib	M. Moeen	6R1	Rice	Chak 82	26/11/2021	M. Arif
206	93	Wheat	4	Sheikhupura	Amjad Ali	8R1	Rice	Thothiankalan	25-11-2020	Zulfiqar Ali
207	93	Wheat	5	Kasur	Khazar Hayat	18R1	Rice	Bakar ka	28/11/2020	M. Hanif
208	93	Wheat	6	Sialkot	AbdulRaheem	24R1	Rice	DaduBajwa	26-11-2020	Abdul Waheed
209	93	Wheat	7	Haifzabad	M. Afzal	31R1	Rice	Doaaba	12/07/2020	M. Imran
210	93	Wheat	1	Sahiwal	Bashir Ahmad	17R1	Central	88/6-R	25/11/2020	Nafeesa Muslim
211	93	Wheat	2	Sahiwal	Zahid Masood	21R1	Central	2/10-L	26/11/2020	Tahir Ibrar
212	93	Wheat	3	Jhang	Taswar	30R1	Central	Nasir Abad	20/11/2020	M. Yousif Saleem
213	93	Wheat	4	Jhang	Akhtar Abass	31R1	Central	Maduki	11/10/2020	M. Sohail Nafees
214	93	Wheat	5	T.T.Singh	M. Boota	28R1	Central	318/JB	11/10/2020	Abdul Waheed
215	93	Wheat	6	Sargodha	Ijaz Ahmad	35R1	Central	SB/76	11/03/2020	M. Riaz
216	93	Wheat	7	Khushab	M. Adeel	34R1	Central	51/MB	30/11/2020	Hasnat Ahmad
217	93	Wheat	8	Sargodha	Asif Masih	33R1	Central	88/NB	23/11/2020	Ghulam Yasin
218	93	Wheat	9	Faisalabad	M. Munir	29R1	Central	219/GB	18/11/2020	Ghulam Mohiud

										din
219	93	Wheat	1	B.W.N	M. Yaseen	25R1	Cotton	30/3.R	12/05/2020	Khaleel Ahmad
220	93	Wheat	2	B.W.N	M. Asif	20R1	Cotton	102/F	20/11/2020	Tariq Mehmood
221	93	Wheat	3	B.W.N	Tariq Ali	31R1	Cotton	101/6R	22/11/2020	Sajid Iqbal
222	93	Wheat	4	B.W.N	Ibrahim Khan	13R1	Cotton	09/F.W	12/05/2020	Asghar Ali
223	93	Wheat	5	B.W.N	Manzoor Ahmad	39R1	Cotton	165/7R	25/11/2020	M. Ashraf Shad
224	93	Wheat	6	B.W.N	M. Shafeeq	1R1	Cotton	164/M	11/07/2020	M. Idrees
225	93	Wheat	7	B.W.N	M. Ibrahim	49R1	Cotton	136/6.R	18/11/2020	M. Ayub
226	93	Wheat	8	Multan	Ghulam Yaseen	3R1	Cotton	QasbaMaral	19/11/2020	Waheedur Rehman
227	93	Wheat	9	Vehari	M. Ghafoor	14R1	Cotton	531/EB	17/11/2020	M. Saleem
228	93	Wheat	1	Mianwali	Amjad Khan	32R1	Thal	Bilal Colony	18/11/2020	Mukhtiar Hussain
229	94	Wheat	1	Nankana Sahib	M. Tehseen	11R1	Rice	Chak 82	26-11-2020	M. Arif
230	94	Wheat	2	Sailkot	Abdul Rhman	25R1	Rice	DaduBajwa	27-11-2020	Abdul Wheed
231	94	Wheat	1	Jhang	Fareed	36R1	Central	Pirwala	18-11-2020	Ijaz A. Hamayoun
232	94	Wheat	2	Faisalabad	M. Bilal	37R1	Central	162/RB	27/11/2020	Ahmad Khan
233	94	Wheat	3	Sargodha	Zulqarnain	39R1	Central	Kudlathi	30/11/2020	Shahbaz Ahmad
234	94	Wheat	1	B.W.N	Mqbool Ahmad	40R1	Cotton	165/7.R	20/11/2020	M. Ashraf Shad
235	94	Wheat	2	B.W.N	Ibrahim khan	12R1	Cotton	09/F.W	12/05/2020	Asghar Ali
236	94	Wheat	3	B.W.N	Mahmood Ahmad	48R1	Cotton	136/6R	11/10/2020	M. Ayub
237	94	Wheat	4	B.W.P	Naseer Akmad	3R1	Cotton	164/m	20/11/2020	M. Idrees
238	94	Wheat	5	B.W.N	Ibrahim khan	54R1	Cotton	9/F.W	12/05/2020	M/Zahiad khan
239	94	Wheat	6	B.W.N	Muhammad Yar	33R1	Cotton	102/F	21/11/2020	M. Sajid Iqbal
240	94	Wheat	7	B.W.N	Shabeer Hussian	18R1	Cotton	102/F	16/11/2020	Tariq mehmood
241	94	Wheat	8	B.W.N	M. Ashraf	26R1	Cotton	38/3R	23/11/2020	Khaleel Ahmad
242	94	Wheat	1	Mianwali	Ghulam Shabir	38R1	Thal	Dhelanwala	12/08/2020	M. Iqbal
243	94	Wheat	1	Islamabad	Ali Akbar	7R1	Barani Irri	Sihala	11/12/2020	M. Akram
244	94	Wheat	2	Attock	M. Siddique	20R1	Barani Irri	Shamsabad	11/10/2020	Abdul Ghaffar
245	95	Citrus	1	T.T Singh	M. Shafiq	R1	Central	Chak 324JB	20-3-2020	Sajid Ali A/O
246	95	Citrus	2	T.T Singh	Imran	R1	Central	Chak 346GB	20-3-2020	Sajid Ali A/O

247	95	Citrus	3	T.T Singh	Faisal	R1	Central	Chak 299GB	20-3-2020	Sajid Ali A/O
248	95	Citrus	4	T.T Singh	CH.Azmat	R1	Central	Chak 390JB	20-3-2020	Sajid Ali
249	95	Citrus	5	T.T Singh	Waqas	R1	Central	Chak 376 JB	20-3-2020	Sajid Ali
250	95	Citrus	6	T.T Singh	M. Javed Cheema	R1	Central	Chak 303 JB	13-4-2020	Umar Farooq
251	95	Citrus	7	T.T Singh	Muhammad Hassan	R1	Central	Chak 244 GB	23-4-2020	M. Shaid Tanvir
252	95	Citrus	8	T.T Singh	Anwar Saeed	R1	Central	Chak 338 GB	8-4-2020	Asif Sajjad
253	95	Citrus	9	T.T Singh	Mahmood-ul-Hussan	R1	Central	Chak 336 GB	8-4-2021	Asif Sajjad
254	95	Citrus	10	T.T Singh	Muhammad Tanvir	R1	Central	Chak 290 GB	8-4-2021	Asif Sajjad
255	95	Citrus	11	Sahiwal	Faiz Ahmad	R1	Central	Chak 61/4R	17/03/2020	Nafeesa Muslim
256	95	Citrus	12	Sahiwal	Majid Mehmood	R1	Central	Chak 74/5R	16/03/2020	Nafeesa Muslim
257	95	Citrus	13	Sahiwal	Ali Sher	R1	Central	Chak 64/4R	19/03/2020	Nafeesa Muslim
258	95	Citrus	14	Sahiwal	Bashir Ahmad	R1	Central	Chak107/12L	18/03/2020	Nafeesa Muslim
259	95	Citrus	15	Sahiwal	Malik Nau Bahar Awan	R1	Central	Chak 93/12L	10/03/2020	Nafeesa Muslim
260	95	Citrus	16	Sahiwal	M. Iqbal Dogar	R1	Central	Chak 114/12L	12/03/2020	Nafeesa Muslim
261	95	Citrus	17	Sahiwal	Muhammad AbassJutt	R1	Central	Chak 50/12L	15/03/2020	Nafeesa Muslim
262	95	Citrus	18	Sahiwal	Sajjad Cheema	R1	Central	Chak 42/12L	22/02/2020	Nafeesa Muslim
263	95	Citrus	19	Sahiwal	Muhammad Umair	R1	Central	Chak 180/9L	24/02/2020	Nafeesa Muslim
264	95	Citrus	20	Sahiwal	Ejaz Ahmad	R1	Central	Chak 3/10L	26/02/2020	Nafeesa Muslim
265	95	Citrus	1	Bhakkar	M. Mushtaq	R1	Thal	Chak 46M/L	3-3-2020	Rab Nawaz
266	95	Citrus	2	Bhakkar	Kaleem Ullaha	R1	Thal	Drya Khan	3-4-2020	Rab Nawaz
267	95	Citrus	3	Bhakkar	Ghulam Abbas	R1	Thal	Chak.47M/L	9-4-2020	Rab Nawaz
268	95	Citrus	4	Bhakkar	Muhammad Saeed	R1	Thal	Chak.47 M/L	17-3-2020	Rab Nawaz
269	95	Citrus	5	Bhakkar	Muhammad Yousaf	R1	Thal	Chak.47 M/L	10-4-2020	Rab Nawaz
270	95	Citrus	6	Bhakkar	Muhammad Sarwar	R1	Thal	Dera Karmu Wala	10-4-2020	Rab Nawaz
271	95	Citrus	7	Bhakkar	Muhammad Aamir	R1	Thal	Chak.46 M/L	9-4-2020	Rab Nawaz

272	95	Citrus	8	Bhakkar	Muhammad Ayub	R1	Thal	Chak.47 M/L	17-3-2020	Rab Nawaz
273	95	Citrus	9	Bhakkar	Abdul Rehman	R1	Thal	Chak.15 Tda	8-4-2020	Rab Nawaz
274	95	Citrus	10	Bhakkar	Ghulam Muhammad	R1	Thal	Dera Ghulam. M Wala	8-4-2020	Rab Nawaz
275	95	Citrus	11	Layyah	Qamar Habib	R1	Thal	Chak 280/TDA	04-03-2020	M. Bilal A/O
276	95	Citrus	12	Layyah	Khuram Ilyas	R1	Thal	Chak 281/TDA	26-02-2020	M. Bilal A/O
277	95	Citrus	13	Layyah	M. Hussain	R1	Thal	Chak 318/TDA	01-03-2020	M. Bilal A/O
278	95	Citrus	14	Layyah	Arshad Shaheen	R1	Thal	Chak 316/TDA	06-03-2020	M. Bilal A/O
279	95	Citrus	15	Layyah	M. Ikram	R1	Thal	Chak 309/TDA	30-02-2020	M. Bilal A/O
280	95	Citrus	16	Layyah	M. Saleem	R1	Thal	Chak 307/TDA	23-02-2020	M. Bilal A/O
281	95	Citrus	17	Layyah	Shahid Rasool	R1	Thal	Chak 295/TDA	27-02-2020	M. Bilal A/O
282	95	Citrus	18	Layyah	M. Yasin	R1	Thal	Chak 305/TDA	17-02-2020	M. Bilal A/O
283	95	Citrus	19	Layyah	M .Rauf	R1	Thal	Chak 303/TDA	20-02-2020	M. Bilal A/O
284	95	Citrus	20	Layyah	Zulfiqar Ali	R1	Thal	Chak 304/TDA	26-02-2020	M. Bilal A/O
285	96	Citrus	1	T.T.Singh	M. Sajid	67R1	Central	374/JB	17/04/2020	Nadeem Raza A/O
286	99	Peas	1	Nankana Sahib	Abbas	10R1	Rice	82/RB	11/01/2020	Samina Hamid
287	99	Peas	1	Sahiwal	M. Akhtar	20R1	Central	77/5-R	16/10/2020	Nafeesa Muslim
288	99	Peas	2	T.T.Singh	M. Ilyas	44R1	Central	323/JB	22-11-2020	Abdul Waheed
289	99	Peas	1	Khanewal	M. Ismail	5R1	Cotton	Muza Haji Doanna	10/11/2020	Mushtaq Ali

ANNEXURE-5

Post Harvest Soil Analysis Data (Faisalabad)

Sr. No	Farmer Name	Reg.No	Depth	EC-dS/m	Soil PH	Organic Matter%)	Available P (ppm)	Available K(ppm)	(Satur-ation (%)	Texture
247	Muhammad Bilal, 162/RB, Plan 72, T1R1	782	0-15	1.58	8.1	0.70	11.1	175	34	Loam
248	T1 R1	783	15-30	1.41	8.0	0.49	8.5	115	32	Loam
249	T1R2	784	0-15	1.64	7.9	0.84	11.6	175	32	Loam
250	T1R2	785	15-30	1.58	7.8	0.70	12.9	111	32	Loam
251	T1R3	786	0-15	2.42	7.8	0.91	12.5	135	34	Loam
252	T1R3	787	15-30	2.14	7.7	0.70	6.7	83	32	Loam
253	T2R1	788	0-15	2.08	8.0	0.98	12.9	151	36	Loam
254	T2R1	789	15-30	1.84	8.0	0.84	12.5	119	34	Loam
255	T2R2	790	0-15	2.34	8.3	0.84	11.6	151	34	Loam
256	T2R2	791	15-30	2.16	8.2	0.70	10.3	107	32	Loam
257	T2R3	792	0-15	1.64	8.2	1.05	7.6	139	36	Loam
258	T2R3	793	15-30	1.41	8.2	0.91	6.7	91	34	Loam
259	T3R1	794	0-15	1.34	8.2	0.91	16.0	151	34	Loam
260	T3R1	795	15-30	1.18	8.1	0.84	13.4	91	32	Loam
261	T3R2	796	0-15	1.41	8.0	1.05	11.1	151	34	Loam
262	T3R2	797	15-30	1.16	8.0	0.84	8.5	107	32	Loam
263	T3R3	798	0-15	1.64	8.1	0.98	20.0	155	34	Loam
264	T3R3	799	15-30	1.65	8.1	0.77	16.0	87	32	Loam
265	T4R1	800	0-15	1.70	8.1	1.05	16.4	156	36	Loam
266	T4R1	801	15-30	1.59	7.9	0.91	15.1	120	34	Loam

267	T4R2	802	0-15	2.36	7.8	0.91	17.9	152	34	Loam
268	T4R2	803	15-30	2.16	7.8	0.84	16.2	124	32	Loam
269	T4R3	804	0-15	2.15	8.4	0.98	15.8	152	34	Loam
270	T4R3	805	15-30	1.58	8.3	0.91	14.9	124	32	Loam
271	T5R1	806	0-15	1.42	8.3	0.77	14.8	159	34	Loam
272	T5R1	807	15-30	1.18	8.3	0.70	14.2	116	32	Loam
273	T5R2	808	0-15	1.33	8.1	0.63	14.3	152	36	Loam
274	T5R2	809	15-30	1.16	8.1	0.42	13.7	108	34	Loam
275	T5R3	810	0-15	1.49	8.2	0.91	13.4	152	34	Loam
276	T5R3	811	15-30	1.36	8.2	0.84	12.6	100	32	Loam
277	T6R1	812	0-15	1.72	8.2	1.05	13.0	128	34	Loam
278	T6R1	813	15-30	1.58	8.1	0.91	12.2	80	32	Loam
279	T6R2	814	0-15	1.42	8.2	0.70	13.9	160	34	Loam
280	T6R2	815	15-30	1.17	8.1	0.63	13.2	104	32	Loam
281	T6R3	816	0-15	1.42	8.1	0.84	13.4	148	34	Loam
282	T6R3	817	15-30	1.33	8.0	0.77	12.6	96	32	Loam
283	T7R1	818	0-15	1.64	8.0	0.98	13.1	152	36	Loam
284	T7R1	819	15-30	1.58	8.0	0.91	12.5	100	34	Loam
285	T7R2	820	0-15	2.42	8.0	0.98	12.1	156	36	Loam
286	T7R2	821	15-30	2.09	7.9	0.77	11.5	104	34	Loam
287	T7R3	822	0-15	2.16	7.9	0.77	11.1	165	36	Loam
288	T7R3	823	15-30	2.10	7.8	0.70	10.0	100	34	Loam
289	T8R1	824	0-15	1.34	7.7	0.56	12.5	165	34	Loam
290	T8R1	825	15-30	1.27	7.8	0.49	12.3	112	32	Loam
291	T8R2	826	0-15	1.99	8.2	1.05	12.2	140	34	Loam

292	T8R2	827	15-30	1.61	8.2	0.84	11.5	84	34	Loam
293	T8R3	828	0-15	1.66	8.1	0.84	12.6	136	34	Loam
294	T8R3	829	15-30	1.59	8.1	0.70	11.6	88	32	Loam
295	T9R1	830	0-15	2.60	8.2	0.63	13.9	140	34	Loam
296	T9R1	831	15-30	2.42	8.2	0.49	13.3	184	32	Loam
297	T9R2	832	0-15	2.08	8.1	0.77	13.4	144	36	Loam
298	T9R2	833	15-30	1.91	8.1	0.70	12.8	108	34	Loam
299	T9R3	834	0-15	1.69	8.1	0.70	12.6	144	32	Loam
300	T9R3	835	15-30	1.63	7.9	0.55	12.3	116	32	Loam
301	T10R1	836	0-15	1.87	8.0	0.63	12.1	148	34	Loam
302	T10R1	837	15-30	1.79	7.9	0.56	11.6	100	32	Loam
303	T10R2	838	0-15	1.84	8.0	1.05	10.9	148	34	Loam
304	T10R2	839	15-30	1.79	8.2	0.91	10.2	96	32	Loam
305	T10R3	840	0-15	1.39	8.2	0.70	10.6	132	34	Loam
306	T10R3	841	15-30	1.33	8.1	0.56	9.8	80	32	Loam
307	T11R1	842	0-15	1.22	8.1	0.91	9.9	165	36	Loam
308	T11R1	843	15-30	1.07	8.0	0.77	9.3	96	34	Loam
309	T11R2	844	0-15	1.12	8.1	0.77	13.9	169	36	Loam
310	T11R2	845	15-30	1.02	8.1	0.70	13.3	104	34	Loam
311	T11R3	846	0-15	1.27	8.0	1.12	13.0	165	34	Loam
312	T11R3	847	15-30	1.12	7.9	0.91	12.6	90	32	Loam
313	Naseeb Ali, 36/JB, Plan 72 wheat T1R1	848	0-15	1.48	7.9	0.84	12.5	160	34	Loam
314	T1 R1	849	15-30	1.25	7.8	0.77	12.0	116	32	Loam
315	T1R2	850	0-15	1.82	8.2	0.98	11.5	152	34	Loam
316	T1R2	851	15-30	1.61	8.1	0.84	10.9	96	32	Loam

317	T1R3	852	0-15	1.42	8.0	0.98	12.8	152	34	Loam
318	T1R3	853	15-30	1.28	8.0	0.91	12.2	100	32	Loam
319	T2R1	854	0-15	0.98	7.9	1.19	11.8	148	36	Loam
320	T2R1	855	15-30	0.96	7.8	1.05	11.0	104	34	Loam
321	T2R2	856	0-15	1.59	7.8	0.91	12.6	144	34	Loam
322	T2R2	857	15-30	1.67	7.8	0.84	12.1	100	32	Loam
323	T2R3	858	0-15	1.11	8.1	1.05	10.6	132	32	Loam
324	T2R3	859	15-30	1.06	8.0	0.98	10.1	84	32	Loam
325	T3R1	860	0-15	1.77	8.0	0.77	12.7	140	34	Loam
326	T3R1	861	15-30	1.11	8.3	0.63	13.1	80	34	Loam
327	T3R2	862	0-15	1.73	8.2	0.98	13.4	144	34	Loam
328	T3R2	863	15-30	1.24	8.2	0.91	13.2	100	32	Loam
329	T3R3	864	0-15	2.18	8.1	1.12	14.4	144	34	Loam
330	T3R3	865	15-30	1.28	8.0	1.05	13.8	120	32	Loam
331	T4R1	866	0-15	1.25	8.0	0.91	14.7	151	34	Loam
332	T4R1	867	15-30	2.21	8.1	0.98	13.2	107	32	Loam
333	T4R2	868	0-15	1.25	8.1	0.98	13.3	139	36	Loam
334	T4R2	869	15-30	1.30	8.1	0.84	13.2	83	34	Loam
335	T4R3	870	0-15	0.79	8.1	1.05	12.8	163	34	Loam
336	T4R3	871	15-30	2.02	8.0	0.91	12.5	103	34	Loam
337	T5R1	872	0-15	1.05	8.2	0.91	12.3	167	36	Loam
338	T5R1	873	15-30	2.03	8.2	0.84	12.2	107	34	Loam
339	T5R2	874	0-15	1.20	8.2	0.91	12.7	139	34	Loam
340	T5R2	875	15-30	1.06	8.1	0.70	12.3	87	32	Loam
341	T5R3	876	0-15	1.01	8.1	0.91	11.8	147	36	Loam

342	T5R3	877	15-30	1.16	8.2	0.77	11.2	103	34	Loam
343	T6R1	878	0-15	1.64	8.1	0.98	10.9	151	34	Loam
344	T6R1	879	15-30	1.04	8.0	0.84	10.2	91	32	Loam
345	T6R2	880	0-15	1.11	7.9	0.91	13.1	151	34	Loam
346	T6R2	881	15-30	1.22	7.8	0.77	13.7	107	34	Loam
347	T6R3	882	0-15	1.20	7.8	0.98	14.3	151	32	Loam
348	T6R3	883	15-30	1.16	7.9	0.84	14.4	107	32	Loam
349	T7R1	884	0-15	1.08	7.9	0.91	14.1	143	36	Loam
350	T7R1	885	15-30	1.02	8.0	0.84	13.6	103	34	Loam
351	T7R2	886	0-15	1.24	8.1	1.12	14.9	139	34	Loam
352	T7R2	887	15-30	0.80	8.1	1.05	14.3	91	32	Loam
353	T7R3	888	0-15	0.76	8.2	0.91	13.4	127	34	Loam
354	T7R3	889	15-30	1.06	8.2	0.77	14.8	87	32	Loam
355	T8R1	890	0-15	1.05	8.1	0.70	14.6	139	34	Loam
356	T8R1	891	15-30	0.95	8.0	0.63	14.2	87	32	Loam
357	T8R2	892	0-15	0.96	8.1	0.98	14.7	119	36	Loam
358	T8R2	893	15-30	0.90	8.1	0.91	13.8	99	36	Loam
359	T8R3	894	0-15	0.91	8.0	0.77	14.1	135	36	Loam
360	T8R3	895	15-30	0.86	8.0	0.70	13.3	87	34	Loam
361	T9R1	896	0-15	0.72	8.0	0.70	14.6	143	34	Loam
362	T9R1	897	15-30	0.93	8.0	0.56	13.4	99	32	Loam
363	T9R2	898	0-15	0.75	8.1	0.77	14.2	147	34	Loam
364	T9R2	899	15-30	0.71	8.1	0.63	13.4	107	32	Loam
365	T9R3	900	0-15	1.32	8.2	0.84	13.1	139	34	Loam
366	T9R3	901	15-30	1.31	8.1	0.63	12.6	107	32	Loam

367	T10R1	902	0-15	1.64	8.1	0.77	14.9	135	36	Loam
368	T10R1	903	15-30	1.57	8.1	0.70	14.0	83	34	Loam
369	T10R2	904	0-15	1.10	8.0	0.70	12.6	127	36	Loam
370	T10R2	905	15-30	0.99	8.0	0.63	11.4	91	36	Loam
371	T10R3	906	0-15	0.97	8.2	1.12	10.8	151	36	Loam
372	T10R3	907	15-30	0.93	8.1	0.98	10.3	87	34	Loam
373	T11R1	908	0-15	0.91	8.1	1.05	13.1	155	32	Loam
374	T11R1	909	15-30	1.20	8.0	0.91	11.8	67	32	Loam
375	T11R2	910	0-15	1.14	8.0	0.84	11.9	159	36	Loam
376	T11R2	911	15-30	1.13	7.8	0.77	10.8	107	34	Loam
377	T11R3	912	0-15	1.26	7.9	0.63	13.3	155	34	Loam
378	T11R3	913	15-30	1.43	7.9	0.49	11.8	111	32	Loam
379	Muhammad Bilal, 162/RB, Plan 94, T1R1	914	0-15	1.43	8.0	1.12	11.4	147	34	Loam
380	T1 R1	915	15-30	1.58	8.1	0.98	8.9	103	32	Loam
381	T1R2	916	0-15	1.56	8.1	0.84	10.3	159	34	Loam
382	T1R2	917	15-30	1.34	8.0	0.77	9.8	87	32	Loam
383	T1R3	918	0-15	1.32	8.0	1.05	10.5	135	34	Loam
384	T1R3	919	15-30	1.35	8.0	0.91	9.7	83	32	Loam
385	T2R1	920	0-15	1.34	8.1	1.19	11.8	155	36	Loam
386	T2R1	921	15-30	1.13	8.0	0.91	10.8	107	34	Loam
387	T2R2	922	0-15	1.13	8.1	0.70	11.4	151	34	Loam
388	T2R2	923	15-30	1.11	8.0	0.63	10.3	99	32	Loam
389	T2R3	924	0-15	1.09	8.0	0.98	7.2	159	36	Loam
390	T2R3	925	15-30	0.75	8.0	0.84	7.9	107	34	Loam
391	T3R1	926	0-15	0.79	8.1	1.05	9.7	139	34	Loam

392	T3R1	927	15-30	1.62	8.1	0.98	8.5	123	32	Loam
393	T3R2	928	0-15	1.58	8.2	0.98	15.9	155	36	Loam
394	T3R2	929	15-30	1.48	8.2	0.84	15.1	127	36	Loam
395	T3R3	930	0-15	1.46	8.3	1.12	13.5	155	34	Loam
396	T3R3	931	15-30	1.43	8.2	1.05	13.6	127	32	Loam
397	T4R1	932	0-15	1.43	8.1	0.84	15.1	157	34	Loam
398	T4R1	933	15-30	1.45	8.1	0.70	15.5	117	32	Loam
399	T4R2	934	0-15	1.20	8.0	0.70	14.0	153	34	Loam
400	T4R2	935	15-30	1.19	8.0	0.56	11.4	110	32	Loam
401	T4R3	936	0-15	1.17	8.1	0.63	17.6	153	34	Loam
402	T4R3	937	15-30	1.13	8.0	0.49	15.5	102	32	Loam
403	T5R1	938	0-15	0.98	8.1	0.77	15.4	129	34	Loam
404	T5R1	939	15-30	1.02	8.1	0.70	15.3	82	34	Loam
405	T5R2	940	0-15	1.05	8.0	0.84	15.3	161	32	Loam
406	T5R2	941	15-30	1.11	8.1	0.70	14.6	106	32	Loam
407	T5R3	942	0-15	1.13	8.2	0.54	15.0	149	36	Loam
408	T5R3	943	15-30	1.18	8.2	0.42	14.0	98	34	Loam
409	Nauman Naseeb, 36/JB, Plan 58 Potato, T1R1	944	0-15	0.97	8.2	1.05	13.5	153	32	Loam
410	T1 R1	945	15-30	0.93	8.1	0.91	13.1	102	32	Loam
411	T1R2	946	0-15	0.77	8.0	1.05	13.0	157	34	Loam
412	T1R2	947	15-30	0.76	8.0	0.98	12.8	106	34	Loam
413	T1R3	948	0-15	0.88	8.1	1.12	16.1	165	34	Loam
414	T1R3	949	15-30	0.90	8.1	1.12	14.9	102	32	Loam
415	T2R1	950	0-15	0.92	8.1	0.98	14.6	165	36	Loam

416	T2R1	951	15-30	0.96	8.2	0.91	14.0	113	34	Loam
417	T2R2	952	0-15	0.99	8.0	1.19	14.4	141	34	Loam
418	T2R2	953	15-30	0.95	8.0	1.05	13.9	86	34	Loam
419	T2R3	954	0-15	3.27	8.4	0.91	13.5	137	34	Loam
420	T2R3	955	15-30	3.17	8.3	0.77	12.8	90	32	Loam
421	T3R1	956	0-15	3.17	8.3	0.70	12.6	143	36	Loam
422	T3R1	957	15-30	2.91	8.3	0.63	11.3	86	34	Loam
423	T3R2	958	0-15	2.17	8.2	0.98	10.3	145	34	Loam
424	T3R2	959	15-30	1.71	8.1	0.84	8.5	86	32	Loam
425	T3R3	960	0-15	1.61	8.4	0.70	10.2	141	34	Loam
426	T3R3	961	15-30	2.52	8.4	0.63	8.5	94	32	Loam
427	T4R1	962	0-15	2.44	8.2	0.98	10.5	137	34	Loam
428	T4R1	963	15-30	1.68	8.2	0.84	9.9	94	32	Loam
429	T4R2	964	0-15	1.61	8.2	0.63	13.1	149	34	Loam
430	T4R2	965	15-30	2.45	8.1	0.56	12.8	106	32	Loam
431	T4R3	966	0-15	2.36	7.9	1.05	10.4	141	36	Loam
432	T4R3	967	15-30	3.27	7.9	0.91	9.8	121	34	Loam
433	T5R1	968	0-15	2.91	7.8	1.12	14.3	145	34	Loam
434	T5R1	969	15-30	2.16	7.8	0.91	13.6	86	32	Loam
435	T5R2	970	0-15	2.36	8.0	0.98	13.4	141	36	Loam
436	T5R2	971	15-30	1.70	8.0	0.84	12.7	98	34	Loam
437	T5R3	972	0-15	1.40	8.0	1.12	11.4	149	34	Loam
438	T5R3	973	15-30	1.17	8.0	0.84	10.6	98	32	Loam
439	T6R1	974	0-15	1.19	8.3	1.05	9.1	157	36	Loam
440	T6R1	975	15-30	1.02	8.1	0.84	8.2	107	34	Loam

441	T6R2	976	0-15	1.70	8.2	1.05	13.7	153	34	Loam
442	T6R2	977	15-30	1.42	8.1	0.84	12.9	106	32	Loam
443	T6R3	978	0-15	2.09	8.2	1.19	11.9	149	32	Loam
444	T6R3	979	15-30	1.99	8.2	1.05	10.5	106	32	Loam
445	T7R1	980	0-15	2.18	8.1	0.84	9.1	133	34	Loam
446	T7R1	981	15-30	2.08	8.1	0.70	8.2	82	34	Loam
447	T7R2	982	0-15	1.42	8.1	0.91	12.3	125	34	Loam
448	T7R2	983	15-30	1.33	8.1	0.84	11.0	106	32	Loam
449	T7R3	984	0-15	2.17	8.2	1.12	12.0	153	34	Loam
450	T7R3	985	15-30	2.08	8.2	0.84	9.9	86	32	Loam
451	T8R1	986	0-15	2.45	8.2	0.77	10.2	165	34	Loam
452	T8R1	987	15-30	2.08	8.1	0.56	9.4	106	32	Loam
453	T8R2	988	0-15	2.42	8.3	0.91	8.2	177	36	Loam
454	T8R2	989	15-30	2.38	8.2	0.84	7.2	106	34	Loam
455	T8R3	990	0-15	2.16	8.3	0.70	6.7	133	34	Loam
456	T8R3	991	15-30	1.55	8.3	0.77	7.1	106	32	Loam
457	T9R1	992	0-15	3.56	8.1	1.05	8.8	137	36	Loam
458	T9R1	993	15-30	2.45	8.1	0.91	8.5	102	34	Loam
459	T9R2	994	0-15	2.45	8.2	0.91	10.8	165	34	Loam
460	T9R2	995	15-30	2.16	8.2	0.77	12.3	94	32	Loam
461	T9R3	996	0-15	2.52	8.3	1.12	12.0	137	32	Loam
462	T9R3	997	15-30	2.48	8.2	0.98	11.0	86	32	Loam
463	T10R1	998	0-15	2.16	8.3	1.12	15.9	163	34	Loam
464	T10R1	999	15-30	2.08	8.2	0.98	14.2	103	34	Loam
465	T10R2	1000	0-15	5.36	8.2	1.05	14.0	147	34	Loam

466	T10R2	1001	15-30	4.65	8.1	0.91	13.4	103	32	Loam
467	T10R3	1002	0-15	2.11	8.0	1.05	14.8	135	34	Loam
468	T10R3	1003	15-30	1.63	8.1	0.91	13.7	103	32	Loam
469	T11R1	1004	0-15	2.52	8.1	1.05	15.6	139	36	Loam
470	T11R1	1005	15-30	2.42	8.2	0.84	13.8	87	34	Loam
471	T11R2	1006	0-15	2.48	8.1	1.05	15.6	151	34	Loam
472	T11R2	1007	15-30	2.18	8.0	0.98	13.4	103	32	Loam
473	T11R3	1008	0-15	3.11	8.2	0.98	14.8	135	34	Loam
474	T11R3	1009	15-30	2.44	8.2	0.91	13.1	103	32	Loam
475	M. Yaseen, 218/GB, Plan 88, Maize, T1R1	1010	0-15	2.11	8.3	1.12	14.0	151	36	Loam
476	T1 R1	1011	15-30	1.63	8.3	0.98	12.8	103	34	Loam
477	T1R2	1012	0-15	2.45	8.3	0.63	13.8	147	34	Loam
478	T1R2	1013	15-30	1.70	8.2	0.56	12.8	131	32	Loam
479	T1R3	1014	0-15	2.39	8.0	0.77	12.8	131	34	Loam
480	T1R3	1015	15-30	2.15	8.0	0.63	10.1	83	32	Loam
481	T2R1	1016	0-15	3.09	8.0	0.63	12.2	139	34	Loam
482	T2R1	1017	15-30	2.45	8.0	0.56	11.1	95	32	Loam
483	T2R2	1018	0-15	2.36	8.2	0.98	11.3	155	34	Loam
484	T2R2	1019	15-30	2.15	8.2	0.84	10.6	91	32	Loam
485	T2R3	1020	0-15	2.34	8.2	0.77	9.5	151	34	Loam
486	T2R3	1021	15-30	2.33	8.1	0.56	8.8	103	34	Loam
487	T3R1	1022	0-15	2.15	8.2	0.84	12.4	167	32	Loam
488	T3R1	1023	15-30	1.92	8.2	0.77	12.0	119	32	Loam
489	T3R2	1024	0-15	2.01	8.3	1.05	11.8	135	34	Loam
490	T3R2	1025	15-30	1.77	8.3	0.84	10.6	111	32	Loam

491	T3R3	1026	0-15	1.40	8.2	0.91	12.5	147	36	Loam
492	T3R3	1027	15-30	1.17	8.2	0.84	10.5	103	34	Loam
493	T4R1	1028	0-15	2.43	8.4	0.70	11.0	131	34	Loam
494	T4R1	1029	15-30	1.63	8.4	0.49	10.1	83	32	Loam
495	T4R2	1030	0-15	3.11	8.4	1.12	13.8	131	32	Loam
496	T4R2	1031	15-30	2.47	8.3	1.05	12.9	103	32	Loam
497	T4R3	1032	0-15	2.15	8.2	0.98	12.8	163	34	Loam
498	T4R3	1033	15-30	2.08	8.2	0.91	12.7	114	34	Loam
499	T5R1	1034	0-15	1.99	8.1	0.98	12.0	167	34	Loam
500	T5R1	1035	15-30	1.92	8.1	0.84	8.2	119	32	Loam
501	T5R2	1036	0-15	1.68	8.2	0.77	13.7	163	34	Loam
502	T5R2	1037	15-30	1.60	8.2	0.70	12.9	147	32	Loam
503	T5R3	1038	0-15	2.45	8.1	0.91	11.9	151	36	Loam
504	T5R3	1039	15-30	2.40	8.1	0.70	10.5	95	34	Loam
505	T6R1	1040	0-15	2.11	8.0	0.84	12.0	131	34	Loam
506	T6R1	1041	15-30	2.03	8.0	0.77	11.5	83	32	Loam
507	T6R2	1042	0-15	2.42	8.3	0.98	12.5	155	36	Loam
508	T6R2	1043	15-30	2.34	8.2	0.91	10.6	103	34	Loam
509	T6R3	1044	0-15	1.99	8.1	0.77	6.5	147	34	Loam
510	T6R3	1045	15-30	1.88	8.1	0.63	5.4	103	32	Loam
511	T7R1	1046	0-15	2.11	8.0	0.84	9.5	139	34	Loam
512	T7R1	1047	15-30	2.09	8.0	0.77	8.5	83	32	Loam
513	T7R2	1048	0-15	1.59	8.2	0.84	7.7	143	32	Loam
514	T7R2	1049	15-30	1.40	8.1	0.77	12.3	103	32	Loam
515	T7R3	1050	0-15	1.35	8.2	0.77	11.9	143	34	Loam

516	T7R3	1051	15-30	1.17	8.1	0.70	7.9	99	32	Loam
517	M. Shahzad, 65/JB, Plan 88, Maize T1R1	1052	0-15	1.71	8.2	0.91	8.5	135	34	Loam
518	T1 R1	1053	15-30	1.59	8.2	0.84	9.1	99	34	Loam
519	T1R2	1054	0-15	2.43	8.3	0.84	7.8	155	34	Loam
520	T1R2	1055	15-30	2.63	8.2	0.84	10.6	99	32	Loam
521	T1R3	1056	0-15	2.68	8.1	1.05	9.9	155	36	Loam
522	T1R3	1057	15-30	2.15	8.1	1.05	12.4	119	34	Loam
523	T2R1	1058	0-15	3.11	8.1	1.12	12.2	151	34	Loam
524	T2R1	1059	15-30	2.36	8.0	1.05	10.5	123	32	Loam
525	T2R2	1060	0-15	2.45	8.0	1.05	10.2	151	36	Loam
526	T2R2	1061	15-30	2.10	7.9	0.91	10.6	123	34	Loam
527	T2R3	1062	0-15	2.52	8.0	1.05	7.9	155	34	Loam
528	T2R3	1063	15-30	2.36	8.0	0.91	11.3	115	34	Loam
529	T3R1	1064	0-15	2.16	8.1	0.84	10.5	153	34	Loam
530	T3R1	1065	15-30	1.61	8.1	0.77	12.7	110	32	Loam
531	T3R2	1066	0-15	2.52	8.1	0.98	10.6	153	32	Loam
532	T3R2	1067	15-30	2.34	8.0	0.84	8.5	102	32	Loam
533	T3R3	1068	0-15	2.11	7.9	1.05	16.0	129	34	Loam
534	T3R3	1069	15-30	2.02	7.9	0.91	13.4	82	32	Loam
535	T4R1	1070	0-15	2.10	7.9	0.77	21.3	161	32	Loam
536	T4R1	1071	15-30	1.72	7.8	0.63	16.0	106	32	Loam
537	T4R2	1072	0-15	2.11	8.0	0.91	16.4	149	34	Loam
538	T4R2	1073	15-30	1.71	8.0	0.84	14.7	98	34	Loam
539	T4R3	1074	0-15	2.42	8.2	0.77	20.4	153	34	Loam
540	T4R3	1075	15-30	2.34	8.1	0.70	17.8	102	32	Loam

541	T5R1	1076	0-15	1.69	8.1	0.98	14.7	157	36	Loam
542	T5R1	1077	15-30	1.62	8.1	0.84	13.8	106	34	Loam
543	T5R2	1078	0-15	2.71	8.2	1.12	18.2	165	34	Loam
544	T5R2	1079	15-30	2.17	8.2	0.98	14.7	102	32	Loam
545	T5R3	1080	0-15	2.14	8.1	0.91	14.2	165	32	Loam
546	T5R3	1081	15-30	1.99	8.1	0.77	10.3	113	32	Loam
547	T6R1	1082	0-15	1.58	8.1	0.91	13.4	141	34	Loam
548	T6R1	1083	15-30	1.35	8.0	0.77	11.6	86	32	Loam
549	T6R2	1084	0-15	1.33	8.3	1.12	19.1	137	36	Loam
550	T6R2	1085	15-30	1.24	8.3	0.98	16.0	90	34	Loam
551	T6R3	1086	0-15	1.27	8.2	0.91	16.9	165	34	Loam
552	T6R3	1087	15-30	1.20	8.2	0.84	18.2	106	32	Loam
553	T7R1	1088	0-15	1.17	8.1	1.12	9.8	149	36	Loam
554	T7R1	1089	15-30	1.02	8.1	0.98	10.3	106	34	Loam
555	T7R2	1090	0-15	1.70	8.1	0.98	11.1	137	34	Loam
556	T7R2	1091	15-30	1.57	8.0	0.84	12.5	106	32	Loam
557	T7R3	1092	0-15	3.11	7.9	1.12	11.6	141	36	Loam
558	T7R3	1093	15-30	2.45	7.9	0.84	9.4	90	34	Loam
559	Mian Madddasar, 65/JB, Plan 81, Maize T1R1	1094	0-15	2.19	8.2	1.12	22.6	153	34	Loam
560	T1 R1	1095	15-30	2.08	8.2	0.91	19.1	106	32	Loam
561	T1R2	1096	0-15	2.26	8.1	1.05	18.7	137	36	Loam
562	T1R2	1097	15-30	2.11	8.1	0.84	20.0	106	34	Loam
563	T1R3	1098	0-15	1.70	8.1	1.05	22.6	153	34	Loam
564	T1R3	1099	15-30	1.27	8.1	0.91	20.4	106	32	Loam

565	T2R1	1100	0-15	1.42	8.2	0.63	24.4	149	36	Loam
566	T2R1	1101	15-30	1.17	8.2	0.42	23.5	133	34	Loam
567	T2R2	1102	0-15	1.99	8.1	0.70	15.6	133	36	Loam
568	T2R2	1103	15-30	1.88	8.1	0.63	13.8	86	34	Loam
569	T2R3	1104	0-15	2.11	8.2	0.77	12.9	141	34	Loam
570	T2R3	1105	15-30	1.87	8.2	0.56	11.6	98	32	Loam
571	T3R1	1106	0-15	1.27	8.1	1.19	13.4	157	34	Loam
572	T3R1	1107	15-30	1.12	8.1	0.77	10.3	94	34	Loam
573	T3R2	1108	0-15	1.42	8.2	0.91	9.8	153	34	Loam
574	T3R2	1109	15-30	1.33	8.2	0.77	7.2	106	32	Loam
575	T3R3	1110	0-15	1.70	8.2	0.91	9.8	169	36	Loam
576	T3R3	1111	15-30	1.55	8.1	0.70	5.4	121	34	Loam
577	T4R1	1112	0-15	2.11	8.0	0.63	13.8	137	34	Loam
578	T4R1	1113	15-30	1.61	8.0	0.49	11.6	113	32	Loam
579	T4R2	1114	0-15	1.35	8.0	0.84	15.6	149	36	Loam
580	T4R2	1115	15-30	1.17	7.9	0.70	13.8	106	34	Loam
581	T4R3	1116	0-15	1.99	8.1	0.98	14.7	133	34	Loam
582	T4R3	1117	15-30	1.76	8.1	0.63	10.7	86	32	Loam
583	T5R1	1118	0-15	2.11	8.1	1.05	14.7	133	32	Loam
584	T5R1	1119	15-30	2.08	8.1	0.84	18.2	106	32	Loam
585	T5R2	1120	0-15	1.64	8.0	0.49	12.9	165	34	Loam
586	T5R2	1121	15-30	1.51	8.0	0.35	13.8	121	34	Loam
587	T5R3	1122	0-15	1.27	8.1	0.42	10.3	169	34	Loam
588	T5R3	1123	15-30	1.17	8.1	0.35	19.1	121	32	Loam
589	T6R1	1124	0-15	1.36	8.2	0.77	16.0	165	36	Loam

590	T6R1	1125	15-30	0.88	8.2	0.70	17.3	149	34	Loam
591	T6R2	1126	0-15	1.42	8.2	1.05	15.1	153	34	Loam
592	T6R2	1127	15-30	1.24	8.1	0.91	18.2	198	32	Loam
593	T6R3	1128	0-15	1.33	8.0	1.12	15.1	133	36	Loam
594	T6R3	1129	15-30	0.92	8.0	0.98	17.8	86	34	Loam
595	T7R1	1130	0-15	2.11	8.3	0.91	14.7	155	34	Loam
596	T7R1	1131	15-30	1.68	8.2	0.70	12.9	119	32	Loam
597	T7R2	1132	0-15	2.52	8.5	0.98	10.3	151	36	Loam
598	T7R2	1133	15-30	2.47	8.5	0.70	2.0	123	34	Loam
599	T7R3	1134	0-15	2.11	8.5	0.84	17.3	151	36	Loam
600	T7R3	1135	15-30	1.99	8.3	0.77	17.8	123	36	Loam
601	T8R1	1136	0-15	2.40	8.2	1.05	11.6	155	36	Loam
602	T8R1	1137	15-30	2.27	8.2	0.84	7.2	115	34	Loam
603	T8R2	1138	0-15	2.45	8.2	1.05	17.9	151	34	Loam
604	T8R2	1139	15-30	1.57	8.1	0.63	16.2	107	32	Loam
605	T8R3	1140	0-15	2.02	8.0	1.05	15.8	151	34	Loam
606	T8R3	1141	15-30	1.91	8.0	0.70	14.9	99	34	Loam
607	T9R1	1142	0-15	2.11	8.3	0.91	14.8	127	36	Loam
608	T9R1	1143	15-30	1.42	8.3	0.77	14.2	79	34	Loam
609	T9R2	1144	0-15	1.56	8.3	0.98	14.3	160	34	Loam
610	T9R2	1145	15-30	1.47	8.1	0.84	13.7	103	32	Loam
611	T9R3	1146	0-15	1.40	8.2	0.91	13.4	147	36	Loam
612	T9R3	1147	15-30	1.17	8.2	0.77	12.6	95	34	Loam
613	T10R1	1148	0-15	1.35	8.1	0.84	13.0	151	34	Loam
614	T10R1	1149	15-30	1.17	8.1	0.70	12.2	99	32	Loam

615	T10R2	1150	0-15	1.63	8.4	0.98	13.9	155	34	Loam
616	T10R2	1151	15-30	1.59	8.3	0.91	13.2	103	32	Loam
617	T10R3	1152	0-15	1.68	8.3	1.05	6.7	164	34	Loam
618	T10R3	1153	15-30	1.63	8.2	0.84	12.9	99	32	Loam
619	T11R1	1154	0-15	1.42	8.1	1.05	12.5	164	34	Loam
620	T11R1	1155	15-30	1.27	8.1	0.77	11.6	111	32	Loam
621	T11R2	1156	0-15	3.26	8.2	0.91	10.3	139	34	Loam
622	T11R2	1157	15-30	3.09	8.2	0.84	7.6	83	32	Loam
623	T11R3	1158	0-15	2.90	8.5	0.98	6.7	135	34	Loam
624	T11R3	1159	15-30	2.67	8.3	0.77	16.0	87	32	Loam
625	M. Hafeez 242/GB Plan 81 Maize T1R1	1160	0-15	2.16	8.3	0.91	13.4	139	36	Loam
626	T1 R1	1161	15-30	2.08	8.2	0.49	11.1	103	34	Loam
627	T1R2	1162	0-15	2.43	8.1	0.70	8.5	143	36	Loam
628	T1R2	1163	15-30	2.16	8.1	0.56	11.0	107	34	Loam
629	T1R3	1164	0-15	3.11	8.1	0.84	16.0	143	36	Loam
630	T1R3	1165	15-30	2.41	8.0	0.63	16.4	115	34	Loam
631	T2R1	1166	0-15	2.52	8.1	0.70	13.4	147	34	Loam
632	T2R1	1167	15-30	2.34	8.0	0.63	12.6	99	32	Loam
633	T2R2	1168	0-15	2.11	7.9	0.91	13.1	147	34	Loam
634	T2R2	1169	15-30	2.02	7.9	0.77	12.5	95	32	Loam
635	T2R3	1170	0-15	2.10	7.9	0.84	12.1	151	34	Loam
636	T2R3	1171	15-30	1.72	7.8	0.70	11.5	103	32	Loam
637	T3R1	1172	0-15	2.11	8.0	0.91	11.1	135	34	Loam
638	T3R1	1173	15-30	1.71	8.0	0.77	10.0	103	32	Loam
639	T3R2	1174	0-15	2.42	8.0	0.84	12.5	151	36	Loam

640	T3R2	1175	15-30	2.34	8.2	0.77	12.3	103	34	Loam
641	T3R3	1176	0-15	1.69	8.1	0.77	12.2	143	34	Loam
642	T3R3	1177	15-30	1.62	8.1	0.70	11.5	131	32	Loam
643	T4R1	1178	0-15	2.71	8.2	0.70	12.6	131	34	Loam
644	T4R1	1179	15-30	2.17	8.2	0.63	11.6	83	32	Loam
645	T4R2	1180	0-15	1.18	8.0	0.70	13.9	139	36	Loam
646	T4R2	1181	15-30	0.95	8.0	0.98	13.3	95	34	Loam
647	T4R3	1182	0-15	2.10	8.0	0.77	13.4	115	36	Loam
648	T4R3	1183	15-30	1.42	8.2	0.84	12.8	91	34	Loam
649	T5R1	1184	0-15	1.46	8.2	0.70	12.6	151	36	Loam
650	T5R1	1185	15-30	1.61	7.9	0.49	12.3	103	34	Loam
651	T5R2	1186	0-15	2.07	8.1	0.91	12.1	168	34	Loam
652	T5R2	1187	15-30	2.01	8.1	0.70	11.6	119	32	Loam
653	T5R3	1188	0-15	1.54	8.1	0.56	10.9	135	36	Loam
654	T5R3	1189	15-30	2.34	8.0	0.49	10.2	111	32	Loam
655	T6R1	1190	0-15	1.46	7.9	1.26	10.6	147	34	Loam
656	T6R1	1191	15-30	1.29	7.9	1.12	9.8	103	32	Loam
657	T6R2	1192	0-15	1.22	8.0	1.05	9.9	131	34	Loam
658	T6R2	1193	15-30	1.26	8.0	0.98	9.3	83	32	Loam
659	T6R3	1194	0-15	1.22	8.3	1.40	13.9	131	36	Loam
660	T6R3	1195	15-30	1.37	8.1	1.33	13.3	103	34	Loam
661	T7R1	1196	0-15	1.37	8.2	1.40	13.0	145	34	Loam
662	T7R1	1197	15-30	1.40	8.2	1.33	12.6	102	32	Loam
663	T7R2	1198	0-15	1.27	8.2	0.70	12.5	137	32	Loam
664	T7R2	1199	15-30	1.18	8.1	0.35	12.0	86	32	Loam

665	T7R3	1200	0-15	1.37	8.0	0.70	11.5	141	34	Loam
666	T7R3	1201	15-30	1.26	8.1	0.42	10.9	106	34	Loam
667	T8R1	1202	0-15	1.28	8.2	1.05	12.8	153	34	Loam
668	T8R1	1203	15-30	1.16	8.1	0.84	12.2	86	32	Loam
669	T8R2	1204	0-15	1.23	8.1	0.98	11.8	149	36	Loam
670	T8R2	1205	15-30	5.11	8.1	0.77	11.0	106	34	Loam
671	T8R3	1206	0-15	2.16	8.3	1.12	12.6	149	34	Loam
672	T8R3	1207	15-30	5.47	8.2	0.98	12.1	106	32	Loam
673	T9R1	1208	0-15	1.42	8.2	1.05	10.6	157	36	Loam
674	T9R1	1209	15-30	0.92	8.2	0.91	10.1	121	34	Loam
675	T9R2	1210	0-15	1.17	8.0	1.12	12.7	153	34	Loam
676	T9R2	1211	15-30	0.82	8.0	0.91	13.1	125	32	Loam
677	T9R3	1212	0-15	1.06	8.1	1.05	13.4	153	36	Loam
678	T9R3	1213	15-30	0.83	8.0	0.28	13.2	125	34	Loam
679	T10R1	1214	0-15	1.27	7.9	0.77	14.4	157	34	Loam
680	T10R1	1215	15-30	1.28	7.8	0.70	13.8	117	32	Loam
681	T10R2	1216	0-15	1.99	8.2	1.12	14.7	153	34	Loam
682	T10R2	1217	15-30	2.00	8.2	0.91	13.2	110	32	Loam
683	T10R3	1218	0-15	1.98	8.1	1.12	13.3	153	34	Loam
684	T10R3	1219	15-30	2.13	8.1	0.98	13.2	102	32	Loam
685	T11R1	1220	0-15	1.46	8.0	0.91	12.8	129	34	Loam
686	T11R1	1221	15-30	1.69	8.0	0.77	12.5	82	32	Loam
687	T11R2	1222	0-15	1.34	8.4	0.98	12.3	161	36	Loam
688	T11R2	1223	15-30	0.97	8.3	0.91	12.2	106	34	Loam
689	T11R3	1224	0-15	1.09	8.2	1.05	12.7	149	34	Loam

690	T11R3	1225	15-30	1.13	8.2	0.84	12.3	98	32	Loam
691	Ghulam Mustafa BaroonKamalia Plan 66 Okra T1R1	1226	0-15	1.25	8.1	1.05	11.8	153	32	Loam
692	T1 R1	1227	15-30	0.82	7.9	0.77	11.2	102	32	Loam
693	T1R2	1228	0-15	1.76	8.0	0.91	10.9	157	34	Loam
694	T1R2	1229	15-30	1.65	8.0	0.84	10.2	102	34	Loam
695	T1R3	1230	0-15	1.87	8.1	0.98	13.1	165	36	Loam
696	T1R3	1231	15-30	1.69	8.1	0.77	13.7	102	34	Loam
697	T2R1	1232	0-15	2.48	8.1	0.91	14.3	165	36	Loam
698	T2R1	1233	15-30	2.19	8.0	0.49	13.4	118	36	Loam
699	T2R2	1234	0-15	1.66	8.0	0.70	14.1	141	34	Loam
700	T2R2	1235	15-30	1.20	7.9	0.56	13.6	86	34	Loam
701	T2R3	1236	0-15	1.27	7.9	0.84	14.9	137	32	Loam
702	T2R3	1237	15-30	0.95	7.8	0.63	14.3	90	32	Loam
703	T3R1	1238	0-15	1.82	8.2	0.70	15.4	153	34	Loam
704	T3R1	1239	15-30	1.59	8.2	0.63	14.8	106	34	Loam
705	T3R2	1240	0-15	1.64	8.1	0.91	14.6	109	32	Loam
706	T3R2	1241	15-30	1.32	8.1	0.77	14.2	102	32	Loam
707	T3R3	1242	0-15	2.36	8.1	0.84	14.7	145	32	Loam
708	T3R3	1243	15-30	2.15	8.1	0.70	13.8	86	34	Loam
709	T4R1	1244	0-15	2.04	8.3	0.91	14.1	117	36	Loam
710	T4R1	1245	15-30	1.77	8.3	0.77	13.0	86	36	Loam
711	T4R2	1246	0-15	2.17	8.3	0.84	14.6	153	34	Loam
712	T4R2	1247	15-30	2.00	8.2	0.77	13.4	102	32	Loam
713	T4R3	1248	0-15	2.82	8.2	0.77	14.2	117	34	Loam

714	T4R3	1249	15-30	2.70	8.1	0.70	13.4	82	32	Loam
715	T5R1	1250	0-15	2.67	8.2	0.91	14.6	145	34	Loam
716	T5R1	1251	15-30	2.46	8.2	0.84	13.4	102	32	Loam
717	T5R2	1252	0-15	2.02	8.2	1.12	14.2	137	36	Loam
718	T5R2	1253	15-30	1.77	8.1	0.98	13.4	102	34	Loam
719	T5R3	1254	0-15	2.49	8.0	0.98	13.1	141	34	Loam
720	T5R3	1255	15-30	2.17	8.0	0.77	12.6	98	32	Loam