ANNUAL RESEARCH PROGRAM

KHARIF 2012

INSTITUTE OF SOIL CHEMISTRY AND ENVIRONMENTAL SCIENCES FAISALABAD

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INSTITUTE OF SOIL CHEMISRTY AND ENVIRONMNTAL SCIENCES

INTRODUCTION

The former Soil Chemistry Section was established with the establishment of Punjab Agricultural College Lyallpur (Faisalabad) in 1907. The limited objectives of the section were to determine the nutritional requirements of major crops. With time and according to the need new sections and directorates were emerged from this section like Biochemistry in 1954, Soil Fertility Survey and Soil Testing Institute in 1968, Soil Bacteriology in 1975 and Soil Salinity Research Institute in 1981. During restructuring phase of Ayub Agricultural Research Institute Faisalabad, the Soil Chemistry Section was upgraded as Institute of Soil Chemistry and Environmental Sciences in January 2009 by bringing the Soil Chemistry Section, Pesticide Quality Control Labs Faisalabad, Kala Shah Kaku, Multan, Bhalwalpur and Pesticide Residue Research Lab Kala Shah Kaku under one umbrella. With the establishment of this institute the work related to soil chemistry, the pollution problem caused by the agricultural inputs i.e. fertilizers and pesticides and pesticide quality control is being dealt more effectively and efficiently.

OBJETIVES

- To study the long term effect of chemical fertilizers on soil health and crops yield.
- To monitor the environmental pollution caused by agricultural inputs and safe use of domestic and industrial waste and sewage/industrial water.
- To find out the optimum doses of macro and micro nutrients for crops, vegetables and fruits.
- To study the integrated use of chemical fertilizers and organic manures
- To evaluate the effect of organic & inorganic farming
- To test the pesticide for quality control in Punjab under APO 1971.
- To conduct research on pesticides residue in crops, vegetables and fruits

SOIL CHEMISTRY SECTION

NEW EXPERIMENTS

TITLE-1	**CADMIUM AND LEAD CONTENTS IN RICE GROWN ACROSS THE HIGHWAYS AND BY SEWAGE WATER AROUND CITIES.**
OBJECTIVE	A survey will be conducted to assess Pb and Cd contents in rice paddy and straw grown across the highways and by sewage water especially in Sambrial and Muridkay area.
RESEARCHERS	T. Majeed, A. Mahmood, S. Javid, and A. Khan
DURATION	2012 – 2014
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	Plant analysis: The rice straw and paddy samples will be collected from the field adjacent to the highways and rice grown by sewage water especially from the Sambrial and Muridkay area. The samples will be analyzed for Pb and Cd. Soil analysis: From same site soil samples will also be collected for Pb and Cd analysis.
PREVIOUS RESULTS	New Experiment

TITLE-2	**TO STUDY THE EFFICIENCY OF DIFFERENT ORGANIC SOURCES IN REDUCING LEAD ACCUMULATION IN SOIL AND CROPS**
OBJECTIVE	To bind lead in soil in non-available forms hence to reduce the translocation from soil to plant.
RESEARCHERS	I.Saleem, T. Majeed, S. Javid and A. Khan
DURATION	2012 - 2014
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	Organic sources:

	Control FYM Pressmud Poultry litter The organic sources will be applied @ 10 t/ha on the basis organic matter content. Lead level: 600 mg/kg Crop: Maize Design: CRD with 3 Replications Soil analysis: Basic soil analysis including Pb status before application of organic matter and soil samples will be collected after 1, 15, 30, 45 and 60 days intervals and will be analyzed for Pb.
	Plant analysis: The ear leaf and stalk samples will be analyzed for Pb. Bio-concentration factor (BCF) and Translocation Ratio (TR) will be determined to study the translocation pattern of Pb in plant. Yield data: Total biomass will be recorded.
PREVIOUS RESULTS	New Experiment

TITLE-3	**LONG-TERM EFFECT OF ORGANIC AND INORGANIC FERTILIZER USE ON MICRONUTRIENTS AND HEAVY METALS STATUS OF SOIL**
OBJECTIVE	To study the micronutrients and heavy metals in soil where inorganic, organic and integrated sources of nutrients are being used since 35 years.
RESEARCHERS	A. Majeed, A. Muhmood, S. Javid and A. Khan
DURATION	2012 - 2012
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	Soil sampling : The soil samples from a long term study (since 1978) having the following treatments will be collected from 0-120 cm with 20 cm intervals. 1. Control 2. Only N from chemical fertilizer

	3. NP from chemical fertilizer 4. NPK from chemical fertilizer 5. FYM on the basis of nitrogen 6. ½ nitrogen from fertilizer and ½ from FYM 7. ½ NP from fertilizer Soil analysis: Soil samples will be analyzed for Zn, Cu, Fe, Mn, Pb, Ni and Cd.
PREVIOUS RESULTS	New Experiment

TITLE-4	**EVALUATION OF HYBRID MAIZE RESPONSE TO SOIL APPLIED AND FOLIAR ZINC APPLICATION**
OBJECTIVE	The study is planned to check the response of hybrid maize to soil and foliar application of zinc.
RESEARCHERS	F. Bibi, S. Javid and A. Khan
DURATION	2012 - 2014
LOCATION	Soil Chemistry Section, ISC&ES, AARI Faisalabad
METHODOLOGY	**Treatments** Following treatments will be tested in field i. Control (No fertilizer will be applied) ii. NPK iii. NPK+Zn @ 2.5 kg/ha iv. NPK+Zn @ 5.0 kg/ha v. NPK+Zn @ 7.5 kg/ha vi. NPK+Zn @ 10.0 kg/ha vii. NPK+Zn @ 0.1% solution (3sprays) Zn spray at 10-20 days interval after germination of seed NPK for hybrid maize 275-125- 75kg/ha
	Design: RCBD Replications: three Soil Analysis: Basic fertility analysis before sowing of maize including Zn. Plant Analysis: Ear leaf and at maturity grain and stalk samples will be analyzed for P and Zn. Yield Data: Grain yield will be recorded at harvesting of crop
PREVIOUS RESULTS	New Experiment

TITLE-5	**COMPARISON OF ZINC ENRICHED COMPOST AND MINERAL ZINC FERTILIZER ON GROWTH AND ZINC USE EFFICIENCY IN MUNGBEAN**
OBJECTIVE	Zinc enriched compost improves the availability of Zn in soil by preventing their fixation and precipitation hence saving the cost of inputs.
RESEARCHERS	A. H. Shah, A. Mahmood, S. Javid and A. Khan
DURATION	2012 -2014
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	Treatments: 1. Control 2. RD NPK 3. RD NPK + Compost 4. RD NPK + Zn @ 5 kg ha-1 5. RD NPK + Zn @ 10 kg ha-1 6. RD NPK + enriched compost with Zn @ 5 kg ha-1 7. RD NPK + enriched compost with Zn @ 10 kg ha-1 Recommended NPK =150-90-50 kg-1 Design: RCBD with 3 Replications Soil analysis: Basic soil analysis before sowing of rice including Zn status. Zinc enriched compost analysis: N, P, K, Zn, Cu, Fe and Mn Plant analysis: Grain and straw samples will be analyzed for N, P,K and Zn Yield data: Rice grain and straw yield data will be Recorded
PREVIOUS RESULTS	New Experiment

TITLE-6	**TO EXAMINE THE EFFICIENCY OF SLOW RELEASING UREA WITH ORDINARY UREA IN RICE-WHEAT CROPPING SYSTEM**
OBJECTIVE	To compare the efficiency of various slow releasing urea with ordinary urea in rice wheat rotation.
RESEARCHERS	F. Habib, A. Niaz, S. Javid and A. Khan
DURATION	2012-2014

LOCATION	Soil Chemistry Section, ISC&ES, Faisalabad
METHODOLOGY	Rotation: rice-wheat Treatments: 1. Control (no fertilizer) 2. Ordinary urea 3. Urea treated with urease inhibitor 4. Neem oil treated urea 5. Urea treated with organic compound The urea treated with different compound to inhibit nitrification will be provided by Dowood Hercules Fertilizer Limited. Before application, the products will be analyzed for nitrogen content. The recommended dose of NPK will be applied for rice and wheat crop.
	Design: RCBD Replication: 3 Soil analysis: Before sowing and after harvest of crop Plant Analysis: The chlorophyll content will be monitored after 10, 15, 20, 30, 40 and 50 days of transplanting of rice. Yield data: Yield parameters and paddy yield data will be recorded.
PREVIOUS RESULTS	New Experiment

TITLE-7	**IMPACTS OF MORINGA LEAF EXTRACT (MLE) ON GROWTH, YIELD AND NUTRIENT UPTAKE OF COTTON**
OBJECTIVES	It is claimed that moringa leaf extract contains plant growth hormones which can increase yields by 25-30 %. This study is planned to assess its efficacy on cotton seed yield.
RESEARCHERS	A.Niaz, A.Mahmood, Z.A.Ahmed, S.Javid and A.Khan
DURATION	2012-2014
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	Following treatments will be tested on cotton. T1: Control (RD of NPK). T2: NPK + 2 % four sprays of MLE (at germination, seedling, flowering and boll formation). T3: NPK + 2 % six sprays of MLE (at germination, seedling, before flowering, at flowering, boll initiation and boll formation stages). T4: NPK + 3 % four sprays of MLE (at germination, seedling,

	flowering and boll formation stages). T5: NPK + 3 % six sprays of MLE (at germination, seedling, before flowering, at flowering, boll initiation and boll formation stages). T6: NPK + 4 % four sprays of MLE (at germination, seedling, flowering and boll formation stages). T7: NPK + 4 % six sprays of MLE (at germination, seedling, before flowering, at flowering, boll initiation and boll formation stages). Formulation of MLE: Leaf extract will be formulated by grinding 10 kg fresh material of young moringa shoots in 1 L distilled water and then filter the solid out of the solution by placing the solution in a cloth and wringing-out the liquid. After filtration the extract will be diluted up to 2, 3 and 4 percent solutions with water (e.g. 2 %=2 L moringa leaf extract/100 L water). The diluted material will be sprayed directly onto cotton plants in each treatment plot. Design: RCBD with three replications. Soil Analysis: Basic soil analysis to evaluate the soil fertility. Plant Analysis: Cotton plant samples at flowering and maturity stages will also be analyzed for N, P, K, Zn, Mn, B, Cu and Fe concentrations and total plant uptake will be calculated. Seed cotton yield data will be collected from each treatment plot and statistical analysis will be done.
PREVIOUS RESULTS	New experiment.

TITLE-8	**RESPONSE OF VEGETABLES TO MORINGA LEAF EXTRACT (MLE) ALONG WITH RECOMMENDED NPK FERTILIZERS**
OBJECTIVES	It is being reported that moringa leaf extract can increase yields up to 25-30 % for many vegetables This study is initiated to evaluate the response of lady finger to moringa leaf extract (MLE) along with recommended NPK fertilizers.
RESEARCHERS	A.Niaz, A.Mahmood, S.Javid and A.Khan
DURATION	2012-2014
LOCATION	Soil Chemistry Section, ISCES,AARI, Faisalabad
METHODOLOGY	Following treatments will be tested on lady finger/okra. T1: Control (RD of NPK). T2: NPK + 2 % four sprays of MLE (at germination, seedling,

	flowering and fruit formation). T3: NPK + 3 % four sprays of MLE (at germination, seedling, flowering and fruit formation). T4: NPK + 4 % four sprays of MLE (at germination, seedling, flowering and fruit formation). All P, K and 1/3 N will be applied at sowing of okra while remaining 1/3 N will be applied after 2nd and 4th pickings of okra, respectively. Soil Analysis: Basic soil analysis for fertility evaluation. Plant Analysis: Lady finger leaf samples at flowering and maturity stages will be analyzed for N, P, K, Zn, Mn, B, Cu and Fe concentrations and total uptake. Yield data: Okra fruit yield data will be recorded at each picking. Design: RCBD with three replications.
PREVIOUS RESULTS	New experiment.

ON GOING EXPERIMENTS

TITLE-9	**REMOVAL AND DETOXIFICATION OF SOIL CONTAMINANT (LEAD) THROUGH PHYTOREMEDIATION (pot experiment)**
OBJECTIVE	Heavy metals can be removed from soil through hyper accumulation after enhancing their solubility in soil through different amendments. This study is planned to enhance lead solubility and phytoextraction through amendments and hyper accumulated plants.
RESEARCHERS	I.Saleem, S. Javid and A. Khan
DURATION	2012-2014
LOCATION	Soil Chemistry Section, ISC&ES, Faisalabad (pot experiment)
METHODOLOGY	Crop: Maize Treatments: 1. Control (contaminated soil) 2. Contaminated soil + EDTA 3. Contaminated soil + FYM 4. Contaminated soil + citric acid Soil will be collected from contaminated agricultural field irrigated with untreated city sewage water. Design: CRD

	Replication: 3 Soil Analysis: Soil samples will be analyzed for lead before sowing and after harvesting of crop Plant Analysis: Ear leaf and stalk samples will be analyzed for lead contents.
PREVIOUS RESULTS	First year of Kharif

TITLE-10	**LONG-TERM EFFECT OF ORGANIC AND INORGANIC FERTILIZER USE ON SOIL CARBON AND NITROGEN SEQUESTRATION**
OBJECTIVE	To study the carbon and nitrogen dynamics and their sequestration potential in inorganic, organic and integrated treated plots since 1978.
RESEARCHERS	A.Majeed, A. H. Shah, Mahmood S.Javid and A. Khan
DURATION	2011- 2013
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	The soil samples of a long term field study (since 1978) having the following treatments will be collected from 0-15 and 15-30 cm depth. • control • Only N from chemical fertilizer • NP from chemical fertilizer • NPK from chemical fertilizer • FYM on the basis of nitrogen • ½ nitrogen from fertilizer and ½ from FYM • ½ NP from fertilizer The soil aggregates will be separated through wet sieving (2.0, 0.25 and 0.05 mm) and carbon and nitrogen will be measured. The bulk density will also be measured to calculate the soil organic stock on per hectare by depth basis.
PREVIOUS RESULTS	First year of Kharif

TITLE-11	**MAGNESIUM STATUS OF SOILS AND PLANTS**
OBJECTIVE	It is generally felt that magnesium (Mg) is not deficient in our soils. But its deficiency has been observed in some crops at early growth stages especially in cotton. This survey is planned to assess the available magnesium in soil and total magnesium in plant in various districts of the Punjab.
RESEARCHERS	T. Majeed, F. Bibi, S. Javid and A. Kahn
DURATION	2011 - 2013
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	For this survey study, soil and plant samples will be collected initially from the AARI research area and from various districts of Punjab. These samples will be analyzed for available and water soluble Mg in soil and total Mg content in plant samples.
PREVIOUS RESULTS	First year of Kharif

TITLE-12	**EVALUATION OF FOLIAR APPLICATION OF POTASSIUM VS. SOIL APPLICATION FOR RICE**
OBJECTIVE	The study is planned to test efficiency of foliar applied potassium with soil applied potassium fertilizer on rice yield.
RESEARCHERS	A.H. Shah, A. Majeed, S. Javid and A. Khan
DURATION	2012 - 2014
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	Treatments: 1. Control 2. Recommended NP 3. Recommended NPK (K as soil application) 4. Recommended NP + 2 % KNO3 as foliar application after 15 & 45 days of transplanting. 5. Recommended NP + 3 % KNO3 as foliar application after 15 & 45 days of transplanting.

	6. Recommended NP + ½ soil applied K + 2 % KNO3 as foliar application at panicle initiation. Recommended NPK @ 150-90-60 kg/ha Source of Potassium = Potassium nitrate Design: RCBD Replication: 3 Soil analysis: Pre sowing soil analysis for pH, EC, K. P. OM. Plant analysis: Grain samples will be analyzed for N, P and K. Yield data: The rice grain and straw yield data will be recorded.
PREVIOUS RESULTS	First year of Kharif

TITLE-13	**EFFECTS OF GREEN MANURING ON SOIL PROPERTIES AND CROP GROWTH UNDER RICE-WHEAT CROPPING SYSTEM**
OBJECTIVES	The study is planned to evaluate the impact of green manuring (Sesbania aculeate) in combination with different levels of NPK on crops yield and soil physico-chemical properties in rice-wheat cropping system.
RESEARCHERS	S. Ehsan, F. Bibi, S. Javid, and A. Khan
DURATION	2011- 2014
LOCATION	Soil Chemistry Section, ISCES,AARI, Faisalabad
METHODOLOGY	Treatments: 1. Control 2. NPK no green manuring 3. Recommended NPK + green manuring 4. 75 % of recommended NPK + green manuring. 5. 50 % of recommended NPK + green manuring. Recommended dose of NPK for wheat and rice will be applied as 120-100-60 and 120-90-60 kg ha-1, respectively. For rice, all P, K and ½ N will be applied at transplanting and remaining ½ N after one month of transplanting. Grain and straw yields of wheat and rice will be recorded. Basic soil analysis (ECe, pHs,

	OM, Texture, bulk density, N, P, K, Zn, Fe, B, Mn and Cu concentrations before sowing and after harvest of each crop will be determined. Plant Analysis: N, P, K, Zn, Fe, B, Mn and Cu contents and uptake of NPK by wheat and rice crops. Design: RCBD with three replications.
PREVIOUS RESULTS	Wheat is in field.

TITLE-14	**EFFECT OF INDUSTRIAL EFFLUENTS ON THE UPTAKE OF HEAVY METALS BY SUMMER VEGETABLES (A LYSIMETER STUDY)**
OBJECTIVE	Continuous application of industrial effluents may load the soil with heavy metals. This study is planned to examine the buildup of these contaminants in soil and vegetables under controlled conditions.
RESEARCHERS	F. Habib, I. Saleem, A. Niaz and A. Khan
DURATION	2011 – 2016
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	Irrigation water: i. Industrial effluent ii. Canal water Vegetables: i. Okra ii. Long Cucumber NPK will be applied according to the recommended rate for Okra and for Long Cucumber (60-50-60) kg/ha. Design: CRD Replication: 3 Soil analysis: Zn, Cu, Fe, Mn, Pb, Ni, Cr, Cd before and after harvest of vegetables. Water analysis: EC, pH, Zn, Cu, Fe, Mn, Ni, Cr, Pb, Cd in industrial waste water and canal water. Plant analysis: Zn, Cu, Fe, Mn, Pb, Ni, Cr, Cd at each harvest. Yield data: The vegetable yield data will be recorded.
PREVIOUS RESULTS	

Heavy metal concentration (mg/kg) in industrial effluents / waste waters (average of 20 irrigations)

	Zn	Cu	Fe	Mn	Pb	Ni	Cd	Cr
Mean	0.08	0.23	0.04	0.02	0.43	0.06	0.07	ND
SD	0.01	0.05	0.03	0.01	0.11	0.01	0.02	ND
Range	0.02-0.10	0.10-0.59	0.001-0.095	0.011-0.035	0.40-0.57	0.03-0.085	0.036-0.110	ND

Heavy metal concentration (mg/kg) in Okra

Heavy metals (mg/kg)	Industrial Effluent Irrigated plots	Canal irrigated plots
Zn	30.16	41.11
Cu	6.31	10.27
Fe	40.23	61.2
Mn	65.85	23.5
Pb	0.20	ND
Ni	0.43	ND
Cd	0.66	ND
Cr	0.08	ND

Effect of irrigation water sources on vegetables yield (kg/plot)

Source of water	Okra (Sum of 29 pickings)
Industrial Effluents	5.24
Canal irrigated	5.15
% increase over canal irrigated	1.74%

TITLE-15	**EFFECT OF DIFFERENT ORGANIC SOURCES ON THE AVAILABILITY OF APPLIED PHOSPHORUS IN DIFFERENT TEXTURED SOILS (POT STUDY)**
OBJECTIVE	The organic matter decreases the sorption of phosphorus. The present study is planned to find out the organic source which can reduce maximum P sorption and hence improve the P availability.
RESEARCHERS	F. Bibi, S. Ehsan, S. Javid and A.Khan
DURATION	2011 - 2013
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	Soil Two soil textures will be tested i.e. i. Sandy Clay Loam ii. Clay loam Phosphorus level: 200 mg/kg Organic sources i. Press mud ii. Processed City waste iii. FYM iv. Poultry litters The organic sources will be added on the basis of organic matter content. Design: CRD with factorial arrangement of treatments Replication: Three Ten kg soil in each pot will be incubated in wire house with phosphorus and organic sources. During the course of study the soils will be kept at field capacity level. The soil samples at 1, 10,20,30,60, 120 and 180 days will be collected for Olsen P estimation.

Basic Soil Analysis

Texture	pH_s	EC_e (dS m^{-1})	Av. P (ppm)	Ext. K (ppm)	O.M (%)
Clay Loam	8.02	0.71	4.04	140	0.40
Sandy clay loam	7.92	1.47	8.09	135	0.72

Olsen P recovered after 1st day (ppm)

Treatments	Clay loam	Sandy clay loam	Mean
Control	147 e	214 d	181 C
PM	197 c	241 c	219 AB
CW	233 a	243 b	238 A
FYM	187 d	249 a	218 AB
PL	209 b	208 e	208 B
Means	194 B	231 A	

LSD = Treatment 20.2, Textural class 12.8

Olsen P recovered after 10 days (ppm)

Treatments	Clay loam	Sandy clay loam	Mean
Control	123 d	190 d	157 C
PM	188 c	235 a	212 A
CW	231 a	216 b	224 A
FYM	186 c	176 e	181 BC
PL	208 b	200 c	204 AB
Means	188 A	203 A	

LSD = Treatment 25, Textural class 16

Olsen P recovered after 20 days (ppm)

Treatments	Clay loam	Sandy clay loam	Mean
Control	128 d	182 c	155 D
PM	182 c	216 a	199 AB
CW	219 a	214 a	217 A
FYM	182 c	173 d	178 C
PL	195 b	189 b	192 BC
Means	181 A	195 B	

LSD = Treatment 19, Textural class 12.0

Olsen P recovered after 30 days (ppm)

Treatments	Clay loam	Sandy clay loam	Mean
Control	113 e	164 e	138 B
PM	176 c	195 b	185 A
CW	210 a	183 c	197 A
FYM	183 b	169 d	176 A
PL	167 d	204 a	185 A
Means	170 A	183 A	

LSD = Treatment 22, Textural class 14.0

Olsen P recovered after 60 days (ppm)

Treatments	Clay loam	Sandy clay loam	Mean
Control	97 d	76 d	86 D
PM	127 b	136 b	132 B
CW	171 a	157 a	164 A
FYM	108 c	134 b	121 BC
PL	110 c	120 c	115 C
Means	123 A	124 A	

LSD = Treatment 13, Textural class 8.3

Olsen P recovered after 120 days (ppm)

Treatments	Clay loam	Sandy clay loam	Mean
Control	31 e	59 b	45 AB
PM	37 d	50 c	43 B
CW	75 a	37 e	56 AB
FYM	50 c	44 d	47 AB
PL	58 b	63 a	60 A
Means	50 A	51 A	

LSD= Treatment 16, Textural class 10.4

TITLE-16	**INTEGRATED USE OF BIO-SLURRY AND CHEMICAL FERTILIZERS FOR VEGETABLES PRODUCTION**
OBJECTIVE	To compare the efficiency of biogas slurry with FYM alone or with different fertilizers combination for vegetable production.
RESEARCHERS	A. Mahmood, A. Majeed, Z. A. Ahmad and S. Javid
DURATION	2011- 2012
LOCATION	Soil Chemistry Section, ISC&ES, AARI Faisalabad and at farmer's field
METHODOLOGY	Vegetable: Okra Treatments: 1. RD of NPK 2. Slurry on basis of RD of N through fertigation 3. Solid on basis of RD of N 4. FYM on basis of RD of N 5. ½ N from slurry + ½ N from fertilizer 6. ½ N from solid + ½ N from fertilizer 7. ½ N from FYM + ½ N from fertilizer RD NPK 50-50-75 kg/ha Design: RCBD

	Replication: 3 Slurry and FYM analysis The analysis of slurry (fresh and dry) and FYM will be done for N, P, K, Zn, Cu, Fe and Mn before application. Soil analysis The fertility status of the field will be evaluated. Yield data The data regarding vegetable yield will be collected.

PREVIOUS RESULTS

Composition of liquid slurry, dried slurry and farm yard manure

	N	**P**	**K**	**Fe**	**Cu**	**Zn**	**Mn**
	%			**ppm**			
Liquid Slurry	0.79	0.87	1.03	3100	43	123	430
Dried Slurry	0.98	0.93	1.08	3600	49	130	450
FYM	0.68	0.67	1.13	2500	39	76	410

Effect of bioslurry and chemical fertilizer on chilli yield

Treatments	**Yield (t/ha)**	**N (%)**	**P (%)**	**K (%)**
T1	3.06 A	2.15 bc	0.27a	2.63ab
T2	1.86 C	2.06 cd	0.24bc	2.53bc
T3	1.73 C	2.20 ab	0.23bc	2.53bc
T4	1.87 C	1.96 d	0.23 bc	2.30c
T5	2.60 AB	2.26 a	0.26ab	2.57abc
T6	2.07 BC	2.08 c	0.22c	2.87a
T7	1.71 C	2.20 ab	0.24bc	2.53bc
LSD	**0.55**	**0.11**	**0.03**	**0.33**
Soil Analysis: pH: 8.23 ; EC : 2.09 dSm-1 ; O.M : 0.68% ; Av. P : 10.03 ppm, Av. K: 160 ppm				

TITLE-17	**TO STUDY THE NITROGEN USE EFFICIENCY IN RICE THROUGH BED PLANTING**
OBJECTIVE	The bed planting of rice will not only save the water but also save the fertilizer. This study is planned to monitor the saving of water and nitrogen by bed planting of rice.
RESEARCHERS	A. Majeed, A. H. Shah, A. Niaz and A. Khan
DURATION	2011 - 2013
LOCATION	Soil Chemistry Section, ISC&ES, AARI, Faisalabad
METHODOLOGY	Treatments: N levels kg/ha 1. 75 2. 100 3. 125 4. 150 5. 150 (conventional method of transplanting) 7. control (conventional method of transplanting) In beds, the above nitrogen levels will be applied at the top of bed by topdressing. The basal dose of P,K and Zn @ 90, 60 and 10 kg/ha respectively will also be applied Design: RCBD with 3 Replications Soil analysis: Basic soil analysis before sowing of rice. Plant analysis: Grain and straw samples will be analyzed for N, P,K and Zn . Yield data: Rice grain and straw yield data will be recorded

PREVIOUS RESULTS

Treatments (N levels kg/ha	Grain Yield t/ ha	Straw Yield t/ ha	Grain NPK & Zn			
			N (%)	P (%)	K (%)	Zn (ppm)
1. Control (Bed)	2.24 e	6.72 d	1.2 cd	0.15 bc	0.27 bc	26 c
2. 75 kg/ ha	2.76 d	9.50 c	1.30 bc	0.22 a	0.31 ab	38 ab
3. 100 kg/ ha	2.98 cd	10.39 bc	1.36 ab	0.20 a	0.32 a	40 a
4. 125 kg/ ha	3.26 bc	10.73 b	1.34 ab	0.21 a	0.34 a	38 ab
5. 150 kg/ ha	3.36 b	10.56 bc	1.47 a	0.21 a	0.33 a	38 ab
6. 150 kg/ ha (Conventional)	3.74 a	13.38 a	1.30 bc	0.19 ab	0.31 ab	35 ab
7. 100 kg/ ha (Bed sowing 5 line)	3.91 a	11.40 b	1.34 ab	0.22 a	0.33 a	34 b
8. Control (Conventional)	2.0 e	7.12 d	1.11 d	0.14 c	0.25 c	24 c
LSD	0.30	1.19	0.13	0.4	0.04	4.91
Soil Analysis: pHs 8.17, ECe 1.62 dS/m, O.M. 0.61 %, Avail. P 8.32 ppm, Ext. K 203 ppm. Texture: Sandy clay loam						

TITLE-18	**NITRATE STATUS OF SOIL PROFILE UNDER LONG TERM FERTILIZER USE**
OBJECTIVE	This study has been planned to evaluate nitrate status at different depth where continuous nitrogen is being applied through organic and inorganic sources.
RESEARCHERS	A. H. Shah, S. Ehsan, A. Niaz and A. Khan
DURATION	2011 - 2012
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	The soil samples from two long term studies (where some plots receive nitrogen from organic and inorganic sources and some do not from last 33 and 24 years respectively). The samples up-to 120 cm depth with 20 cm interval will be collected and will be analyzed for NO3-N.

PREVIOUS RESULTS

Nitrate content (mg kg^{-1}) in soil profile

Depth (cm)	TREATMENTS						
	Control	N	½ NP	NP	NPK	½ N from FYM ½ N from urea	FYM
0-20	2.6	12.62	14.57	12.87	9.06	13.80	14.77
20-40	4.9	14.02	15.70	13.68	10.64	13.74	15.79
40-60	3.8	14.48	15.41	12.41	10.31	15.48	17.58
60-80	6.4	15.16	14.64	14.29	8.67	14.15	17.67
80-100	7.15	16.40	14.54	15.94	11.74	13.68	18.81
100-120	3.67	17.50	15.57	15.97	11.85	14.80	17.70

TITLE-19	**TO STUDY THE EFFICIENCY AND ECONOMICS OF PHOSPHOCOMPOST ON MAIZE YIELD**
OBJECTIVE	The efficiency and economics of phosphocompost made from rock phosphate and organic manure will be tested for maize crop.
RESEARCHERS	A. Majeed, A. H. Shah, Z. A. Ahmad and A. Khan
DURATION	2011 - 2013
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	Treatments: 1. Control 2. Recommended dose of NPK from fertilizer 3. Phosphocompost (enriched with SSP on the basis of P) 4. Phosphocompost (enriched with rock phosphate on the basis of P) The analysis of phosphocompost will be done before application. Recommended rate of fertilizer = 275-125-75 kg/ha Design: RCBD with 3 Replications

	Soil analysis: Basic soil analysis before sowing of maize. Phosphocompost analysis: N, P, K, Zn, Cu, Fe and Mn Plant analysis: Grain and straw samples will be analyzed for N, P,K& Zn Yield data: Maize grain and straw yield data will be recorded

PREVIOUS RESULTS

Treatments	**Grain yield t/ha**	**Leaf**		
		% N	**% P**	**% K**
1. Control	4.97 d	1.78 c	0.15 c	1.61 b
2. RD of NPK	7.40 c	2.24 b	0.18 ab	1.83 ab
3. RD of NPK+ FYM	7.73b	2.44 ab	0.19 ab	1.91 a
4. Phosphocompost (enriched with SSP)	8.32 a	2.62 a	0.20 a	2.07 a
5. Phosphocompost (enriched with Rock Phosphate)	7.28 c	2.29 b	0.17 bc	2.05 a
LSD	0.23	0.28	0.025	0.25
Soil Analysis: pHs 7.93, ECe 1.73 dS/m, O.M. 0.59 %, Avail. P 10.3 ppm, Avail. K 184 ppm. Texture: Sandy clay loam				

TITLE-20	**TO STUDY THE EFFICIENCY OF PHOSPHORIC ACID FOR MAIZE PRODUCTION**
OBJECTIVE	This study is planned to compare the efficiency of phosphoric acid (made from local rock phosphate) with traditional phosphatic fertilizers.
RESEARCHERS	F. Bibi, T. Majeed, Z. A Ahmad, S. Javid and A. Kahn
DURATION	2011 - 2014

LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	Treatments i. Control ii. Recommended dose (RD) P from SSP iii. RD of P from DAP iv. RD of P from phosphoric acid RD of NPK for maize = 275-125-75 kg/ha, the phosphate will be applied as band placement. Design RCBD Replication Three Soil analysis Basic soil analysis Plant analysis The maize grain and stalk samples at maturity will be analyzed for N, P, K, Zn, Cu, Fe, B, and Mn. Yield data The maize grain and stalk yield data will be recorded.

PREVIOUS RESULTS

Grain yield of maize crop

Treatments	Grain t/ha
Control	5.48 C
RD of P from SSP	6.27 A
RD of P from DAP	6.27 A
RD of P from phosphoric acid	6.03 B
LSD	0.213

TITLE-21	TO DETERMINE THE CONCENTRATION OF HEAVY METALS IN PHOSPHATIC FERTILIZERS
OBJECTIVE	This study is planned to monitor the concentration of Cd, Mn, Zn, Cu and Co (heavy metals) in phosphatic fertilizers manufactured by different formulators with varying source of rock phosphate.
RESEARCHERS	A. Mahmood, A. Majeed, A. Niaz and S. Javid
DURATION	2011 - 2015
LOCATION	Soil Chemistry Section, ISC&ES, Faisalabad
METHODOLOGY	Different phosphatic fertilizers formulated locally by different formulators from different sources of rock phosphate around the country and those from foreign origin will be obtained and analyzed for P, Cd, Mn, Zn, Cu and Co. The origin of the rock phosphate will be noted.

PREVIOUS RESULTS

Heavy Metal Contents in Phosphatic Fertilizers

Fertilizer	Metals (mg/kg)	Range	Average	Safe Limit	Sample above safe limit %
SSP	Zn	38.6 - 357	197.8	420	-
	Cu	58.6 - 92.4	75.5	-	-
	Fe	3658 -11218	7438	-	-
	Mn	61.4 - 574	317.7	-	-
	Pb	ND - 26.78	13.39	61	-
	Ni	85.9 - 150.2	118.05	50	100
	Cd	ND – 10.75	5.37	10	25
	Cr	26.6 - 363.8	195.2	100	16.67
NP	Zn	94.7 - 255	174.85	420	-
	Cu	62.3 - 78.9	70.6	-	-
	Fe	417.2 - 27850	14133.6	-	-
	Mn	46.8 - 535	290.9	-	-

	Pb	ND - 7.75	3.87	61	-
	Ni	60.1 - 133.1	96.6	50	100
	Cd	ND - 0.65	0.325	10	-
	Cr	10.62 - 131.2	70.9	100	12.5
DAP	Zn	46.7 - 447	246.8	420	14.29
	Cu	63.1 - 183	123.0	-	-
	Fe	387.8 - 8398	4392.9	-	-
	Mn	26 - 96.6	61.3	-	-
	Pb	ND	-	61	-
	Ni	81.6 - 154.5	118.0	50	100
	Cd	ND - 15.84	7.92	10	42.86
	Cr	9.44 - 402.6	206.0	100	50
NPK	Zn	124 -153	138.5	420	-
	Cu	51.9 - 67.6	59.7	-	-
	Fe	373 - 1861	1117	-	-
	Mn	132 - 421	276.5	-	-
	Pb	11.30 - 13.09	12.2	61	-
	Ni	116 -124.5	117	50	100
	Cd	ND - 0.204	0.102	10	-
	Cr	26.2 - 28.03	27.1	100	-

TITLE-22	**ASSESSMENT OF NUTRIENTS CONCENTRATION IN CLCV AFFECTED AND NORMAL COTTON PLANTS (SURVEY STUDY)**
OBJECTIVE	This study is planned to assess the nutrient concentration in CLCV affected and normal plants from cotton growing areas of the Punjab.
RESEARCHERS	A.Nawaz, S. Ehsan, S. Javid and A. Khan
DURATION	2010 - 2013
LOCATION	Cotton growing districts of the Punjab.
METHODOLOGY	Leaves samples of CLCV affected and non-affected plants at pre flowering and boll formation will be collected along with soil samples and analyzed for N, P, K, Ca, Mg, S, Zn, Cu, B, Fe and Mn contents.

PREVIOUS RESULTS

Macro Nutrient Concentration (N, P, K, Ca, Mg, S) in Healthy and CLCV Affected Cotton Plants from Farmers Field (Av. of 45 samples).

Stat. Parameters	N		P		K	
	<----------%----------→					
	Healthy	Affected	Healthy	Affected	Healthy	Affected
Mean	2.25	1.59	0.20	0.19	1.95	1.37
SD	0.20	0.15	0.04	0.02	0.30	0.15
Range	0.86-3.16	0.49-2.02	0.12-0.26	0.10-0.23	1.06-2.98	0.87-2.16
	Ca		Mg		S	
	<----------%----------→					
	Healthy	Affected	Healthy	Affected	Healthy	Affected
Mean	0.89	0.74	0.62	0.51	0.19	0.11
SD	0.33	0.10	0.15	0.10	0.06	0.04
Range	0.16-1.08	0.11-0.96	0.20-0.81	0.13-0.76	0.10-0.32	0.09-0.24

Micro Nutrient Concentration (B, Zn, Fe) in Healthy and CLCV Affected Cotton Plants from Farmers Field (Av. of 45 samples).

Stat. Parameter	B		Zn		Fe	
	<----------mg kg^{-1} ----------→					
	Healthy	Affected	Healthy	Affected	Healthy	Affected
Mean	41.26	19.33	34.12	21.96	65.39	45.96
SD	2.47	1.78	2.72	2.10	3.40	2.00
Range	16.8-53.1	9.3-30.2	23.4-52.6	8.5-31.4	30.1-80.9	31.6-57.9

Soil analysis from CLCV affected cotton crop.

Site	Soil Depth cm	pHs	ECe dS m^{-1}	O.M	Ext. K	Av.P	Ext. B
				(%)	←----------(mg kg^{-1})----------→		
CRI. Fsd.	0-15	8.00	2.12	0.88	125	11.32	0.26
“	15-30	8.00	2.13	0.81	124	10.63	0.28
CRI. Fsd.	0-15	8.10	2.69	0.70	136	9.52	0.36
“	15-30	8.10	2.76	0.65	133	9.36	0.39
ISCES, Fsd.	0-15	8.10	2.35	0.76	151	8.66	0.34
“	15-30	8.10	2.01	0.71	147	8.13	0.31
Agronomic Res Area, fsd	0-15	8.00	1.52	0.83	209	10.39	0.38
“	15-30	8.00	1.63	0.79	201	9.89	0.39
Sahiwal	0-15	7.90	1.26	0.74	179	6.42	0.42
“	15-30	7.90	1.35	0.72	174	6.23	0.40
Thekrewala	0-15	7.95	1.36	0.94	211	9.86	0.23
“	15-30	7.95	1.37	0.90	197	8.13	0.20

TITLE-23	**LONG TERM EFFECT OF INORGANIC AND ORGANIC FERTILIZER ON P FRACTIONS IN SOILS**
OBJECTIVE	Soil P fractionation gives an idea about the soil phosphorus supplying capacity to plants. This experiment will be conducted to evaluate the effect of different nutrient application and crop management practices on the changes of soil P fractions at different depths.
RESEARCHERS	F. Habib, I. saleem, A. Niaz and S. Javid
DURATION	2009 - 2012
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	The soil samples from two long term studies (where some plots receive phosphorus and some do not from last 30 and 21 years respectively) will be used. The samples will be collected from 0-15 and 15-30 cm depth. The same sample will be analyzed for water soluble P, sodium bicarbonate P, sodium hydro oxide P, sulfuric acid P and total P. The changes in different fractions of P will be noted.

PREVIOUS RESULTS

Soluble P status at four depths after 35 years ($CaCl_2$ - P ppm)

Treatments	0-15 cm	15-30 cm	30-45 cm	45-60 cm
Control	0.4	0.4	0.3	0.4
N	0.3	0.4	0.3	0.3
NP	0.4	0.4	0.3	0.3
NPK	0.4	0.3	0.3	0.3
FYM	0.3	0.3	0.4	0.3
1/2 FYM+ 1/2 Urea	0.4	0.3	0.4	0.3
1/2 NP	0.3	0.4	0.4	0.3

Olsen P status at four depths after 35 years ($NaHCO_3$-P ppm)

Treatments	0-15 cm	15-30 cm	30-45 cm	45-60 cm
Control	8.7	7.2	6.4	5.3
N	9.1	7.4	6.5	5.3
NP	12.3	11.2	8.4	6.4
NPK	16.2	14.4	12.4	9.4
FYM	17.0	13.8	12.3	9.4
1/2 FYM+ 1/2 Urea	12.8	10.5	9.0	7.3
1/2 NP	11.4	9.0	7.2	5.4

NaOH extractable inorganic P status at four depths after 35 years (Al+Fe-P ppm)

Treatments	0-15 cm	15-30 cm	30-45 cm	45-60 cm
Control	8.1	6.8	5.2	3.7
N	4.0	2.2	2.5	1.9
NP	11.2	8.5	6.9	4.8
NPK	4.7	4.3	4.0	3.5
FYM	16.1	10.9	10.8	5.7
1/2 FYM+ 1/2 Urea	13.0	10.4	7.4	6.9
1/2 NP	9.7	6.8	6.3	5.7

Actual Organic P status at four depths after 35 years ($NaOH.P_0$-$NaOH.P_i$ ppm)

Treatments	0-15 cm	15-30 cm	30-45 cm	45-60 cm
Control	200	221	209	224
N	223	213	206	264
NP	206	209	219	227
NPK	238	226	261	241
FYM	374	320	335	329
1/2 FYM+ 1/2 Urea	269	232	274	229
1/2 NP	202	201	218	196

Acid P status at four depths after 35 years (Ca-P ppm)

Treatments	0-15 cm	15-30 cm	30-45 cm	45-60 cm
Control	686	529	614	621
N	645	611	659	606
NP	623	619	572	601
NPK	600	622	537	635
FYM	655	650	614	570
1/2 FYM+ 1/2 Urea	645	687	642	501
1/2 NP	681	668	545	582

Residual P status at four depths after 35 years (ppm)

Treatments	0-15 Cm	15-30 cm	30-45 cm	45-60 cm
Control	46.23	52.37	38.60	31.20
N	37.87	41.20	36.68	31.09
NP	65.23	48.93	42.50	39.30
NPK	52.03	60.70	44.67	37.40
FYM	92.10	62.90	41.47	37.90
1/2 FYM+ 1/2 Urea	52.10	40.46	48.27	59.17
1/2 NP	50.63	43.20	56.57	45.6

TITLE-24	**NITRATE STATUS OF SOIL AND WATER IN AREAS WHERE HIGH DOSES OF NITROGEN ARE BEING APPLIED**
OBJECTIVE	The nitrogen fertilizer may accumulate in soil or leach in to the ground water as nitrate, particularly in maize and potato growing areas where high doses of nitrogen are being used. This study is therefore planned to survey /monitor the nitrate in soil and underground water in these areas.
RESEARCHERS	A. H. Shah, A. Niaz, S. Javid and A. Khan
DURATION	2009 - 2013
LOCATION	Jhang and Toba Tek Singh Districts.
METHODOLOGY	A survey of Jhang and Toba Tek Singh Districts will be carried out and soil samples (from 0-15, 15-30, 30-60, 60-90 and 90-120 cm depth) and water samples (hand pump and tube well) will be collected. Soil and water analysis The soil and water samples will be analyzed for nitrates.
PREVIOUS RESULTS	NO3 concentration (mg kg-1) in soil and water samples from Chiniote and Hafizabad districts are given below.

NO_3 –N concentration (mg kg^{-1}) in 210 soil samples from Chiniot district.

Depth	Range	Mean	SD
0-15 cm	1.33-3.48	2.34	0.37
15-30 cm	1.18-4.01	2.45	0.23
30-60 cm	2.01-4.69	3.16	0.45
60-90 cm	2.03-5.83	4.21	0.76
90-120 cm	1.13-3.64	2.19	0.39

NO_3 concentration (mg/kg) in 75 soil samples from Hafizabad district.

Depth (cm)	Range	Mean	SD
0-15	1.47-2.93	2.26	0.24
15-30	2.34-5.71	2.81	0.47
30-60	2.37-6.18	4.05	0.72
60-90	2.74-7.03	4.15	0.44
90-120	2.03-2.87	2.24	0.55

NO_3^* concentrations (mg L^{-1}) in 80 water samples from district Chiniot and Hafizabad.

Tube well/Hand pump			
Instalment Depth (feet)	Range	Mean	SD
50	3.84-29.36	16.82	2.11
60	1.48-15.14	4.09	0.71
70	1.77-20.14	6.39	1.20
80	1.96-20.81	9.10	2.66
100	2.41-19.38	7.70	2.10
120	2.13-27.14	4.54	1.89
150	2.36-12.36	4.07	3.22
200	2.08-14.56	3.58	2.15
250	2.13-17.36	5.70	1.91
400	2.34-21.47	2.93	2.00
>400	1.41-12.55	6.82	2.11

*WHO standards for MAC is 50 mg L^{-1}

TITLE -25	**ZINC ADSORPTION CAPACITY OF SOILS VARYING IN TEXTURE**
OBJECTIVE	Zn is being widely recommended for various crops. Little information is available about its behavior in our soils. The present study is planned to see zinc adsorption capacity of our soils.
RESEARCHERS	I. Saleem, F. Bibi, A. Niaz, S. Javid and A. Khan
DURATION	2009 - 2012
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
METHODOLOGY	Nine soil series viz. Pindorian, Kotli, Hafizabad, Lyallpur, Missa, Gujranwala, Bhalwal, Matli, Rajar varying in calcium carbonate and clay content will be used. Zn solution of different concentrations ranging from 0-200 mg /l will be applied in 10 m molar $CaCl_2$. The soil will be equilibrated for 24 hours. The adsorption data will be plotted. The Langmuir and Freundlich model will be used to calculate maximum adsorption capacity of the soils.

PREVIOUS RESULTS			
Soil Series	Maximum Zn adsorption capacity µg/g	Soil Series	Maximum Zn adsorption capacity µg/g
Bhalwal	714	Kotli	555
Gujranwala	526	Matli	476
Rajar	666	Lyallpur	555
Pindorian	434	Sindhwan	200

TITLE-26	**HEAVY METAL STATUS OF SOIL AND VEGETABLES GROWN AROUND THE BIG CITIES (GUJRAT)**
OBJECTIVE	Sewage and industrial waste water is commonly used for growing of vegetables near big cities. These waters may contain heavy metals like lead, nickel and cadmium and may contaminate the soil and vegetables. This study is therefore planned to monitor the accumulation of these pollutants in soils and vegetables.
RESEARCHERS	A.Mahmood, T. Majeed, I. Saleem, S. Javid and A. Khan
DURATION	2009 – 2012
LOCATION	Gujrat
METHODOLOGY	A survey of Gujrat district will be carried out and soil (from 0-15 and 15-30 cm depth) and vegetables samples will be collected Soil, water and plant analysis The soil, water and vegetables samples will be analyzed for Zn, Cu, Fe, Mn, Pb, Ni and Cd.
PREVIOUS RESULTS	The survey was started in kharif 2009. Up to date 2800 soil, sewage/industrial water and vegetable samples have been collected. The heavy metal contents are as under.

SOIL ANALYSIS

Metals (mg/kg)	Range	Mean	Safe Lim-its	samples above safe limit	Range	Mean	Safe Limits	samples above safe limit %
	0-15 cm				15-30 cm			
Pb	2.11-30.86	12.91	300	Nil	1.24-20.14	10.69	300	Nil
Ni	0.28-1.76	1.13	75	Nil	0.09-3.66	1.87	75	Nil
Cd	0.05-0.52	0.12	3	Nil	0.001-0.73	0.36	3	Nil
Zn	1.3-8.02	4.78	300	Nil	0.03-13.1	5.05	300	Nil
Fe	8.6-35.03	19.03	-	-	0.10-12.23	6.16	-	-
Cu	1.06-5.42	2.7	140	Nil	0.14-14.73	7.44	140	Nil
Mn	8.7-30.08	23.37	-	-	0.21-16.14	8.17	-	-
Extractant used: DTPA				Total No of Samples = 100				

Industrial/Sewage Water

Metals (mg/kg)	Range	Mean	Safe Limit	Samples above safe limit %
Zn	0.1- 1.07	0.51	5.0	----------
Cu	0.24- 1.65	0.83	1.0	60
Fe	0.27- 0.94	0.52	2.0	----------
Mn	0.19- 1.65	0.65	1.5	72
Pb	0.03- 0.65	0.32	0.5	76
Ni	0.01- 0.23	0.07	1.0	----------
Cd	0.001- 0.04	0.008	0.1	24
No. of Samples = 100		(NEQS, 2000)		

Heavy metal contents of vegetable (leaf & fruit) samples

Metals (mg/kg)	Range	Mean	Safe Lim-its	Samples above safe limit	Range	Mean	Safe Limit	samples above safe limit %
	Leaf				Fruit			
Zn	38.4-153.2	81.99	10	100	31.9-95.1	48.44	10	100
Cu	12.2-199.3	40.67	5	100	10.7-179.8	21.18	5	100
Fe	144.7-356.1	270.5	150	94	152.6 - 287.5	186.66	150	100
Mn	26.9-151.7	66.49	6	100	30.8-125.7	57.68	6	100
Pb	30.8-97.2	41.82	5	100	18.9-84.6	41.82	2	100
Ni	10.3-35.5	22.87	10	100	9.4-35.8	18.38	10	92
Cd	2.9-10.3	5.36	0.02	100	1.2-9.87	5.26	0.02	100
Total No of Samples = 100				(WHO, 1996)				

TITLE-27	**NUTRIENTS REMOVAL BY DIFFERENT CROPS**
OBJECTIVE	Information on the removal of nutrients by s is limited. Therefore this study is planned to determine the removal of nutrients (N,P,K,Zn, Cu, Fe, Mn and B) from soil in maize-potato cropping system.
RESEARCHERS	I. Saleem, A.H.Shah, Z. A. Ahmad, S. Javid and A. Khan
DURATION	2006 - 2014
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad

METHODOLOGY	Crop Maize hybrid The maize grain and stalk samples will be collected from AARI and from farmer's field at Sahiwal and Okara districts. The grain and stalk yield will be recoded and samples will be will be analyzed for N, P, K, Fe, Zn, Cu, Mn and B and nutrients removal will be calculated.

PREVIOUS RESULTS

Vegetable		**Dry matter Yield (Edible+ whole plant) kg/ha**	**Nutrients removal**						
			N	**P**	**K**	**Zn**	**Cu**	**Fe**	**Mn**
			←------kg/ha--------→			**←----------g/ha---------→**			
Zucchini (Ghya Tori)	Fruit	1560	50.5	9.95	54.13	204	46.8	286.7	107.6
	Vines	10025	212.5	37	268.6	661	204.5	85.2	352.8
	Total	11585	263	46.95	322.73	865	251.3	1138.7	460.4
Chilies	Fruit	966	26	4.62	28.7	143	40.5	169	53.7
	Vines	6440	179	30.9	206	270	118.5	532	250.0
	Total	7406	205	35.52	234.7	413	159	701	303.7

TITLE-28	**LONG-TERM EFFECT OF FERTILIZER USE ON SOIL PROPERTIES AND CROPS YIELD**
OBJECTIVE	To determine the long-term effects of fertilizer use on soil properties and crops yield.
RESEARCHERS	Z. A. Ahmad, F. Habi, S. Javid and A. Khan
DURATION	Since 1978
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad
	Crop rotation: Maize fodder-Wheat
METHODOLOGY	Crop : Maize

	Treatments kg/ha	
	Control	0-0-0
	N	140-0-0
	NP	140-60-0
	NPK	140-60-60
	FYM	On N Basis
	½ N from urea + ½ N from FYM	-do-
	½ NP	70-30-0
	Total P, K and Ext. Cd once a year, ECe, pHs, OM, P & K after every crop.	

PREVIOUS RESULTS
Maize fodder yield and soil analysis before sowing of maize

Treatments	**Maize fodder yield t/ha**	**pH**	**ECe ($dS\ m^{-1}$)**	**OM (%)**	**P (ppm)**	**K (ppm)**
Control	16.67	8.20	2.10	0.45	7.4	195
N	25.56	8.20	1.90	0.45	7.4	210
NP	42.22	8.00	2.20	0.70	15.4	220
NPK	51.11	7.98	2.00	0.80	14.6	240
N from FYM	27.78	8.00	1.90	0.95	17.0	300
½Urea-N+½ FYM-N	26.67	8.20	2.00	0.85	14.0	220
½ NP	35.56	8.30	2.30	0.60	14.4	250

Original soil analysis: (0-15 cm): pH=7.6, EC=2.98 $dS\ m^{-1}$, P =7.0 mg/kg, K =250 mg/kg, OM = 0.95%.

TITLE-29	**COMPARATIVE EFFECT OF KCl (MOP) VS K_2SO_4 (SOP) ON SOIL HEALTH AND CROP YIELD**
OBJECTIVE	Muriate of potash (MOP) and sulphate of potash (SOP) are two common K sources. Due to higher salinity index of MOP than SOP its use was discouraged. The present long term trial is planned to study the effect of MOP on soil health and crop yield.
RESEARCHERS	Z. A Ahmad, F. Habib, S. Javid and A. Khan

DURATION	Continuous since 1985
LOCATION	Soil Chemistry Section, ISCES, Faisalabad
METHODOLOGY	Crop rotation : wheat-maize fodder Design: RCBD with 4 replications NPK 140-60-60 kg/ha Soil analysis: Ammonium Acetate extractable K, water soluble K and CI. Yield data: Maize fodder

PREVIOUS RESULTS

Treatments	Maize fodder t/ha	ECe (dS/m)	Ext . K (mg/kg)	Soluble CI (me/l)
Control	13.06 b	1.20	170	3.00
NP	28.61 a	1.30	220	2.98
NP+K(SOP)	26.39 a	1.40	240	3.10
NP+K(MOP)	24.99 a	1.35	210	3.15
Original soil analysis 1985-86 (0-15 cm): ECe= 1.16 dS/m, pHs = 7.4, CI = 2.7 me/L, O.M = 0.71%, Av. P=5.1 ppm, Av.K = 137 ppm.				

TITLE-30	**RATE OF RELEASE OF NUTRIENTS (NPK) FROM DIFFERENT SOURCES OF ORGANIC MANURES**
OBJECTIVE	The organic sources like press mud, farm yard manure, poultry litter and processed city waste are available for use. These materials have different C: N ratio and may differ in the release of nutrients. This experiment is planned to monitor the release of different plant nutrients like N, P and K from these sources.
RESEARCHERS	S. Ehsan, F. habib, Z. A. Ahmad and A. Khan
DURATION	2009 - 2012
LOCATION	Soil Chemistry Section, ISC&ES,AARI, Faisalabad

METHODOLOGY	Four organic sources i.e. FYM, press mud, poultry litter and processed city waste will be applied in field and maize will be sown. The organic sources will be added on the basis of N contents @ 0, 200 and 400 kg/ha. The soil samples will be collected and analyzed for N, P and K at 15 days interval during the 1st month and subsequently with one month interval.

PREVIOUS RESULTS:

P and K contents of organic sources

Organic source	N	P	K	Moisture
	←----------%----------→			
FYM	0.51	0.25	0.83	44
City waste	0.68	0.50	0.56	11
Press mud	2.0	1.10	2.0	9.
Poultry litter	1.20	0.58	0.70	9
Original soil analysis: (0-15 cm): pH=7.8, EC=1.01 dS m^{-1}, P =12.55 ppm,K =240 ppm, OM = 0.72%. Texture: Sandy clay loam				

Effect of different sources of organic manures on maize yield

Treatments	**Grain yield (t/ha)**
Control	4.31 D
FYM @ 200 kg N/ha	5.41CD
FYM @ 400 kg N/ha	6.70 AB
City waste @ 200 kg N/ha	5.89 BC
City waste @ 400kg N/ha	7.37 A
Press mud @200kg N/ha	5.74 BC
Press mud @ 400kg N/ha	6.80 AB
Poultry litter @ 200kg N/ha	6.85 AB
Poultry litter @ 400kg N/ha	6.80 AB
LSD	1.28

Release of ammonical and nitrate nitrogen from different organic sources (ppm)

Treatments	NH_4-N (ppm)			NO_3-N (ppm)		
	15 DAS	**45 DAS**	**75 DAS**	**15 DAS**	**45 DAS**	**75 DAS**
Control	2.7	2.9	0.9	0.7	0.8	0.8
FYM@200 kg N/ha	12.3	7.2	2.1	9.5	12.1	5.7
Pressmud@200 kg N/ha	3.6	3.4	2.1	1.9	5.7	3.7
Poultry litter@200kg N/ha	14.0	7.6	1.4	2.3	13.7	2.1
City waste @ 200kg N/ha	6.1	4.3	2.7	4.2	14.9	4.2
FYM @400 kg N/ha	15.9	7.6	2.7	10.6	16.5	6.3
Press mud@ 400kg N/ha	6.0	3.5	2.9	2.2	6.3	4.2
Poultry litter@ 400 kg N/ha	9.4	4.4	0.7	6.1	15.9	1.9
City waste @ 400 kg N/ha	15.7	9.3	3.5	9.8	14.3	4.7

Release of P and K from different organic sources (ppm)

Treatments	P (ppm)			**K (ppm)**		
	15 DAS	**45 DAS**	**75 DAS**	**15 DAS**	**45 DAS**	**75 DAS**
Control	7.2	6.5	4.5	199	200	200
FYM@200 kg N/ha	9.2	11.9	10.2	232	234	316
Pressmud@200 kg N/ha	10.8	12.9	11.0	222	284	299
Poultry litter@200kg N/ha	9.0	14.4	10.6	247	359	297
City waste @ 200kg N/ha	10.6	14.8	12.1	244	320	301
FYM @400 kg N/ha	12.9	14.8	13.3	259	369	334
Press mud@ 400kg N/ha	11.4	15.0	11.7	247	400	287
Poultry litter@ 400 kg N/ha	10.3	14.7	11.0	269	443	332
City waste @ 400 kg N/ha	14.6	15.9	14.8	279	417	342

TITLE-31	**ENHANCING NITROGEN USE EFFICIENCY IN RICE BY BLENDING UREA WITH NEEM SEED POWDER**
OBJECTIVE	The neem seed powder coating on urea reduces the NH3 volatilization and decrease the rate of nitrification. This study is planned to evaluate the effect of neem seed powder coating on nitrogen use efficiency.
RESEARCHERS	A. Nawaz, A. Majeed, Z. A. Ahmad, S. Javid and A. Khan
DURATION	2010 - 2013
LOCATION	Soil Chemistry Section, ISC&ES, AARI, Faisalabad
METHODOLOGY	**Treatments** T1 Control T2 Urea (recommended rate of N)1/2 at sowing and ½ at tillering stage T3 Urea + 15 % w/w neem seed powder (1/2 at sowing and ½ at tillering stage) T4 Urea + 30 % w/w neem seed powder (1/2 at sowing and ½ at tillering stage) T5 Urea + 15 % w/w neem seed powder + coal tar + kerosene oil (1:2) (1/2 at sowing and ½ at tillering stage) T6 Urea + 30 % w/w neem seed powder + coal tar + kerosene oil (1:2) (1/2 at sowing and ½ at tillering stage) T7 ½ Urea + 30 % w/w neem seed powder (as full basal dose) T8 ½ Urea + 30 % w/w neem seed powder + coal tar + kerosene oil (1:2) (as full basa dose.) **Design** RCBD with three replications Soil analysis ammonical and nitrate nitrogen will be monitored with 15 days intervals up to panicle stage Plant analysis paddy and straw will be analyzed for N, P and k. Rice grain and straw yield will be recorded at maturity.

PREVIOUS RESULTS

Treatments	**Paddy yield $t\ ha^{-1}$**	**Straw Yield $t\ ha^{-1}$**
Control	2.44 B	5.50 B
Urea (recommended rate of N)1/2 at sowing and ½ at tillering stage	3.77 A	8.36 A
Urea + 15 % w/w neem seed powder (1/2 at sowing and ½ at tillering stage)	3.77 A	8.39 A
Urea + 30 % w/w neem seed powder (1/2 at sowing and ½ at tillering stage)	3.82 A	7.81 AB
Urea + 15 % w/w neem seed powder + coal tar + kerosene oil (1:2) (1/2 at sowing and ½ at tillering stage)	3.68 A	7.78 AB
Urea + 30 % w/w neem seed powder + coal tar + kerosene oil (1:2) (1/2 at sowing and ½ at tillering stage)	3.72 A	8.08 A
½ Urea + 30 % w/w neem seed powder (as full basal dose)	3.55 A	7.19 AB
½ Urea + 30 % w/w neem seed powder + coal tar + kerosene oil (1:2) (as full basal dose.)	3.63 A	7.56 AB
LSD	1.058	2.410

TITLE-32	**EFFECT OF HUMIC ACID ON NUTRIENT AVAILABILITY IN MAIZE CROP**
OBJECTIVE	Humic acid benefit plant growth by chelating unavailable nutrients and buffering soil pH. Humic acid can be inexpensively incorporated into soils with bio wastes. The objective of this study is to compare the effects of humic acid on the availability of nutrients.
RESEARCHERS	S.Ehsan, A. Nawaz, A. Niaz, S. Javid and A.Khan
DURATION	2010 – 2013
LOCATION	Soil Chemistry Section, ISC&ES, AARI, Faisalabad

METHODOLOGY	Treatments 1. Control 2. NPK (recommended dose) 3. RD NPK +Zn+B 4. RD NPK+Zn+B+15kg HA/ha 5. RD NPK+15kg HA/ha (solid) 6. RD NPK+ HA/ha (liquid) Half nitrogen and all P &K at sowing and half N at pre tasseling stage Design RCBD with 3 replication Soil Analysis Soil samples will be collected before the start of the experiment and nalyzed for fertility status. Plant Analysis At earring stage plant samples will be analyzed for N, P, K, Zn, Cu, Fe and Mn. Yield data Maize grain yield data will be recorded

Treatments	**Grain yield (t/ha)**
Control	3.29 d
NPK	5.65 c
NPK+B+Zn	7.28 ab
NPK+B+Zn+HA	6.27 bc
NPK+HA (S)	7.61 a
NPK+HA (L)	5.46 c
LSD	1.21

Plant analysis at ear leaf stage (micronutrients in ppm)

Treatments	Zn	Cu	Fe	Mn
Control	7.7	5.77	438	16.67
NPK	11.7	6.20	490	27.67
NPK+B+Zn	18.6	6.37	488	34.00
NPK+B+Zn+HA	35.5	12.47	575	54.00
NPK+HA (S)	31.7	9.13	576	45.00
NPK+HA (L)	21.6	6.80	576	43.33

Soil analysis after harvesting of maize (ppm)

Treatments	P	K	B	Zn	Cu	Fe	Mn
Control	6.50	160	0.35	0.80	0.92	4.59	11.10
NPK	7.00	166	0.37	0.85	0.98	6.22	12.23
NPK+B+Zn	7.16	184	0.40	0.92	1.14	6.48	13.42
NPK+B+Zn+HA	9.24	220	0.55	1.52	1.25	6.89	13.68
NPK+HA (S)	8.56	200	0.45	1.88	1.10	7.33	15.98
NPK+HA (L)	7.12	180	0.42	1.69	1.20	6.20	12.77
Pre-sowing Soil analysis	ECe 2.5 dS/m pH 7.7, Zn 1.92 Cu 1.26, Fe 4.41, P 9.0 ppm, K 200 ppm						

Pesticide Quality Control Labs

Faisalabad (1971)

Kala Shah Kaku (1985)

Multan (1985)

Bahawalpur (2005)

TITLE-1	**TESTING OF PESTICIDE SAMPLES FOR THEIR QUALITY UNDER AGRICULTURAL PESTICIDE ORDINANCE, 1971**
OBJECTIVE	To test the pesticide samples received in pesticide quality control laboratories from pesticide inspectors and purchasers of pesticides under the Agricultural Pesticide Ordinance (APO),1971 and Agricultural Pesticide Rules, 1973.
RESEARCH WORKER(S)	Dr. Sarfraz Hussain, Agricultural Chemist(Pesticides) Mr. Khalid Mehmood, AAC, Faisalabad. Mr. Muhammad Javaid Ahmad, ACC, Faisalabad. Dr. Muhammad Arif AO, Faisalabad Mr. Ghulam Yaseen, AO, Faisalabad. Mr. Sarfraz Nawaz, AO, Faisalabad. Miss Samreen Siddiq, AO, Faisalabad Mr. Hafeez Ullah Rafe AAC, KSK Mrs. Belqees Akhtar, AO, KSK Mr. Muhammad Adnan Rafique, AO, KSK. Dr. Ehsan ul Haq Mehmood, AAC, Multan Mr. Muhammad Altaf, AO, Multan Mr. Muhammad Akram, AO, Multan Mr. Khadim Hussain, AO, Multan Mr.Muhammad Naeem Akhtar, AO, Multan Mr.Muhammad Arshad, AAC, Bahawalpur Ms. Nadia Manzoor, AO, Bahawalpur Mr.Waseem Hassan, AO, Bahawalpur Mr. Muhammad Ramzan Kashif AO, Bahawalpur Ms.Farheen Nazli, AO, Bahawalpur
DURATION	Continuous
LOCATION	▪ Pesticide Quality Control Laboratory, Faisalabad. ▪ Pesticide Quality Control Laboratory,Kala Shah Kaku. ▪ Pesticide Quality Control Laboratory, Multan. ▪ Pesticide Quality Control Laboratory, Bahawalpur
TREATMENTS	-
PLAN OF WORK	Samples of pesticides (insecticides, herbicides, fungicides, etc.) registered under APO, 1971 will be received from the pesticide inspectors in pesticide laboratories at Faisalabad, Kala Shah Kaku, Multan and Bahawalpur. Registered specifications of these pesticide samples will be checked by following the standard test methods. Analysis reports of test results will be sent to the concerned quarters. Purchasers of pesticides will also be provided pesticide quality control analytical services on receipt of prescribed fee.

PREVIOUS RESULTS

Pesticide samples analyzed during Kharif 2010 under Section-17 of APO

Laboratory	Total	Fit	Unfit	Unfit %age
Faisalabad	956	926	30	3.14
Kala Shah Kaku	876	855	21	2.40
Multan	836	795	41	4.90
Bahawalpur	785	750	35	4.45
Total	3453	3326	127	3.68
		96.32	3.68	

Pesticide samples analyzed during Kharif 2010 under Section-20 of APO.

Laboratory	Total	Fit	Unfit
Faisalabad	10	6	4
%		60	40

TITLE-2	**STUDIES ON THE STORAGE STABILITY OF DIFFERENT PESTICIDE FORMULATIONS AT AMBIENT TEMPERATURE AND HUMIDITY**
OBJECTIVES	➧ To determine the storage stability/ shelf life of different pesticide formulations at ambient temperature and humidity ➧ To determine how long these products continue to conform to the registered specifications under ambient temperature and humidity storage conditions.
RESEARCH WORKER(S)	Dr.Sarfraz Hussain, Agricultural Chemist(Pesticides) Mr. Ghulam Yasin, AO, Faisalabad Mr. Sarfraz Nawaz, AO, Faisalabad. Mr. Hafeez Ullah Rafe AAC, KSK Ms. Belqees Akhtar, AO, KSK Mr. Adnan Rafique, AO, KSK Dr. Ehsan ul Haq Mehmood, AAC, Multan

	Mr. Altaf Ahmad, AO, Multan. Mr. Waseem Hasan, AO, Bahawalpur Ms. Nadia Manzoor, AO, Bahawalpur
DURATION	Continuous
LOCATION	▪ Pesticide Quality Control Laboratory, Faisalabad. ▪ Pesticide Quality Control Laboratory, Kala Shah Kaku. ▪ Pesticide Quality Control Laboratory, Multan. ▪ Pesticide Quality Control Laboratory, Bahawalpur.
TREATMENTS	Selected registered pesticides will be kept in store under local conditions of storage i.e. ambient temperature and humidity.
PLAN OF WORK	Selected pesticide formulations will be kept in store under local conditions of storage i.e. ambient temperature and humidity. Lambda cyhalothrin, Deltamethrin, Bromoxynil + MCPA will be studied at Faisalabad Lab. Cartap, Butachlor, Acetochlor, cypermethrin, Chlorpyrifos, Monomehypo and Emamectin Benzoate will be studied at Kala Shah Kaku. Bifenthurine, Cartap and Mancozeb will be studied at Multan Lab. Ambient temperature and humidity of the store will be recorded weekly. The products under study will be analyzed at the start of the experiment and subsequently after every three months for their physical and chemical characteristics. The experiment will be continued until these products continue to conform to the registered specifications.

PREVIOUS RESULTS

FAISALABAD LAB

Pesticides	Physical / a. i. test results on specified dates		Remarks
	05/10	08/10	
Lambda-Cyhalothrin 2.7%± 0.27	Creaming Nil 2.50 / 2.70	Creaming Nil 2.45 / 2.70	Fit
Deltamethrin 2.75% ± 0.28	Creaming Nil 2.55 / 2.75	Creaming 2 ml 2.48 / 2.75	Fit
Bromoxynil + MCPA 18.18% ± 1.09 18.18% ± 1.09	Creaming Nil 17.20 / 18.18 17.10 / 18.18	Creaming 4 ml 16.40 / 18.18 15.20 / 18.18	Unfit (Qualified the expiry period)

KALA SHAH KAKU LAB:

Pesticides	Physical / a. i. test results on specified dates		Remarks
	04/10	07/10	
Cartap 4% ±0.4	3.78	3.70	Fit
Butachlor 59% ± 2.5	58.16	58.02	Fit
Acetachlor 49% ± 2.45	47.90	47.06	Fit
Cypermethrin 11% ± 0.66	10.52	10.47	Fit
Chlorpyrifos 38% ±1.9	37.94	37.71	Fit
Monomehypo 5 %± 0.5	5.11	5.00	Fit

MULTAN LAB

Pesticides	Physical / a. i. test results on specified dates		Remarks
	7/10	10/10	
Bifenthrin 11% ± 0.66	10.70	10.40	Fit
Cartap 4% ±0.4	3.70	3.58	Unfit (Before 8 months to expiry date)

BAHAWALPUR LAB **First year**

TITLE-3	**STUDIES ON THE STORAGE STABILITY OF PESTICIDES AT HIGH TEMPERATURE i.e. 54 + 2 °C**
OBJECTIVE	To test the storage stability of different pesticide formulations by applying standard storage stability test at temperature 54 + 2 °C for 14 days
RESEARCH WORKER(S)	Dr. Sarfraz Hussain Mr. Ghulam Yasin, AO, Faisalabad. Mr Hafeez Ullah Rafe, AAC, KSK Ms. Belqees Akhtar, AO, KSK Mr. Adnan Rafique, AO, KSK Dr. Ehsan-ul- Haq Mehmood AAC, Multan Mr. Khadim Hussain Ao, Multan Mr. Muhammad Arshad AAC, Bahawalpur Mr. Waseem Hasan AO, Bahawalpur
DURATION	Continuous
LOCATION	Pesticide Quality Control Laboratories at Faisalabad, Kala Shah Kaku, Multan and Bahawalpur.
TREATMENTS	Some selected registered pesticides will be subjected to temperature treatment at 54 + 2 °C for 14 days in an oven as per CIPAC method. Lambda Cyhalothrin, Leufenuron, imidacloprid SL and Acetamiprid SP will be studied at Faisalabad, Cholorpyrifos, Acetamipirid SL, and Profenofos at Multan Lab., and Imidaclopirid WP, Butachlor and Mancozeb will be studied at Kala Shah Kaku.
PLAN OF WORK	The selected pesticides samples will be collected from different sources. Pesticides will be analyzed for their Physico-chemical characteristics before and after treating them at 54 + 2 °C for 14 days.
PREVIOUS RESULTS	Faisalabad Lab: Four pesticide formulations were tested (Leufenuron, Imidacloprid 20 SL, Cholorpyrifos and Clodinafop). All the formulations were found as per specifications and qualified the standard storage stability test.
	Kala Shah Kaku Lab: Four pesticides Samples (Imidacloprid 25 wp, Lambda 2.5 EC, Isoproturon 50 wp and Acetamiprid 20 SL) were tested. All the formulations were found as per specifications after treating at 54 + 2 °C for 14 days and qualified the standard storage stability test.

	Multan Lab: First year
	Bahawalpur Lab: First year

TITLE-4	**STANDARDIZATION OF ANALYTICAL METHODS FOR PESTICIDE FORMULATION ANALYSIS**
OBJECTIVE	Every year some new pesticides are being introduced into the market by companies to meet the ever changing demand of the pesticide trade. It is imperative to standardize analytical methods of those new products under prevailing local lab conditions and facilities before applying it for quality control of pesticides regulatory samples.
RESEARCH WORKER(S)	Dr. Sarfraz Hussain Mr. Ghulam Yaseen, AO, Faisalabad. Mr. Sarfraz Nawaz, AO, Faisalabad. Mr Haffez Ullah Rafe, AAC, KSK Ms. Belqees Akhtar, AO, KSK Dr. Ehsan ul Haq Mehmmood, AAC, Multan Mr. Khadim Hussain AO, Multan Mr. Muhammad Waseem, AO, Bahawalpur Ms. Nadia Manzoor, AO, Bahawalpur
DURATION	Continuous
LOCATION	Pesticide Quality Control Laboratory, Faisalabad. Pesticide Quality Control Laboratory, Kala Shah Kaku. Pesticide Quality Control Laboratory, Multan. Pesticide Quality Control Laboratory, Bahawalpur.
TREATMENTS	-
PLAN OF WORK	Methods of formulation analysis of new pesticides will be standardized according to local lab conditions and testing facilities available. Methods of existing pesticides will also be standardized according to the latest techniques, where necessary.
PREVIOUS RESULTS	Faisalabad Lab: Methods for the analysis of Mesosulfuron, Iodosulfurion and Trichlorfam were standardized.
	Kala Shah Kaku Lab: Methods for the analysis of Pinoxaden and Pyrozasulfuran were standardized.

	Multan Lab: Methods for Fenoxaprop-p-ethyl, Methoxyfenozide, Mendipromide and Phynoxadin were standardized
	Bahawalpur Lab: First year

PESTICIDE RESIDUE LAB KALA SHAH KAKU

TITLE-1	**BASKET MARKET SURVEY FOR PESTICIDE RESIDUES STUDY**
OBJECTIVES	To study the pesticide residue in fruits and vegetables.
RESEARCH WORKER (S)	Mr. Ghulam Abbas Mand Mr. Riaz Ahmad Mr. Majid Rahim
DURATION	2012
LOCATION	Fruit & Vegetable Market Lahore, Sheikhupura and Gujranwala
PLAN OF WORK	Random samples of fruits and vegetables will be collected from markets of Lahore, Sheikhupura and Gujranwala. These samples will be analysed for the residue of unknown pesticides on GCMS and LCMS
PREVIOUS RESULTS	New Experiment

TITLE-2	**RESIDUE STUDY OF WEEDICIDE IN RICE CROP**
OBJECTIVES	To study the weedicide residue in rice crop.
RESEARCH WORKER (S)	Mr. Ghulam Abbas Mand Mr. Riaz Ahmad Mr. Majid Rahim
DURATION	2012
LOCATION	Gujranwala District
PLAN OF WORK	Treatments T1 Control T2 Weedicide (Butachlor) @ 600 ml/acre T2 Weedicide (Butachlor) @ 800 ml/acre T2 Weedicide (Butachlor) @ 1000 ml/acre Design: RCBD with four replications

	The weedicide will be applied in 4-5 days after transplanting. The grain samples will be collected at harvesting and shall be analyzed for residual analysis.
PREVIOUS RESULTS	New Experiment

TITLE-3	**RESIDUE STUDY OF FUNGICIDE IN TOMATOES**
OBJECTIVES	To study the residue of fungicide in tomatoes.
RESEARCH WORKER (S)	Mr. Ghulam Abbas Mand Mr. Riaz Ahmad Mr. Majid Rahim
DURATION	2012
LOCATION	Gujranwala District
PLAN OF WORK	Treatments T1 Control T2 Topsin-M 70WP @150gm/100lit of water T3 Topsin-M 70WP @200gm/100lit of water T4 Topsin-M 70WP @300gm/100lit of water Design: RCBD with four replications The fungicide Topsin-M (Thiophenate Methyle)70WP will be applied against fungal disease at stages i.e. before flowering, flowering and fruiting time. The fruit samples will be collected at the time of harvesting and shall be analyzed for residue.
PREVIOUS RESULTS	New Experiment