ANNUAL PROGRAMME OF RESEARCH WORK KHARIF (2016)

BARANI AGRICULTURAL RESEARCH INSTITUTE,
C H A K W A L

INTRODUCTION

Barani Agricultural Research Institute, Chakwal is entrusted with the task for the evolution of varieties of different crops possessing desirable agronomic traits, drought tolerance with high yield potential and development of crop production technology best suited for the barani tract. Crop management in the barani tract almost entirely depends upon natural precipitation. Punjab Barani tract consists of 3.10 million hectares, having different ecological zones with varied soil type and rainfall pattern.

BARI, Chakwal is a multi-disciplinary institute, having different divisions viz. Crop Breeding, Agronomy, Soil Science, Plant Protection, Horticulture, Economics & Statistics and Agricultural Engineering, to carry out research work in the respective field/discipline. In addition, at present four research stations namely; Barani Agricultural Research Station, Fatehjang, Groundnut Research Station, Attock, Gram Breeding Research Sub-Station, Attock and Horticultural Research Station, Soan Valley, Nowshera, are working under the administrative and technical control of this Institute. The Institute is conducting research on almost all the major kharif crops of barani area viz. Groundnut, Mung , Mash, Sorghum, Millets, Soybean Cowpeas & Vegetables etc. The main objectives of the Institute are:

- Collection, Maintenance and Evaluation of Germplasm of Different Crops for Utilization in Hybridization Programme.

- Development of High Yielding, Drought Tolerant and Disease Resistant Crop Varieties of Cereals, Food Legumes, Oilseeds, Fodders, Fruits and Vegetables.

- Standardization of Appropriate Production Technologies for Field and Fruit Crops.

- Production of Breeder's Seed and Propagation of True to Type Fruit Plants.

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CROP BREEDING DIVISION (GROUNDNUT)

EXPERIMENT-1

TITLE: COLLECTION, MAINTENANCE AND EVALUATION OF GROUNDNUT GENEPOOL

OBJECTIVE: To maintain the genetic stock for further evaluation and future use in the hybridization programme.

RESEARCH WORKER (S): Muhammad Fida Hassan and Dr. Muhammad Tariq

DURATION: 2016 (Continuous)

LOCATION: Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY:

Entries = 220
(Virginia =138, Spanish = 79 & Valencia = 03)

Design = Augmented
Plot Size = Single row of 4m length
Spacing (Rx P) = 60cm x 15cm

Maximum number of local and exotic varieties/strains will be collected from different sources and maintained under medium rainfall conditions. Data will be recorded regarding germination, days to flower initiation, days to flowering (50%), height of main stem, No. of primary & secondary branches, No. of pods/plant and No. of 2 or 3 seeded pods/plant and pod yield/plant.

PREVIOUS YEAR'S RESULTS: 214 entries of groundnut genepool were sown for further evaluation.

Table: Range of various characters

S. No.	Characters	Range
1	Days to flower initiation	22 – 42
2	Days to flowering (50%)	31 – 49
3	Height of main stem (cm)	19 – 55
4	No. of primary branches/plant	3 – 8
5	No. of secondary branches/plant	5 – 20
6	No. of pods/plant	21 – 65
7	Pod yield g/m^2	52 - 510

Entries in yield group

Sr. No.	Yield Range g/m^2	No. of entries
1	10 - 100	77
2	100 - 200	62
3	200 - 300	60
4	300 - 400	12
5	400 - 550	9

EXPERIMENT-2

TITLE GENETIC IMPROVEMENT THROUGH HYBRIDIZATION

OBJECTIVE To create segregation and genetic diversity through crossing for groundnut crop improvement.

RESEARCH WORKER (S) M. Fida Hassan

DURATION 2016 (Continuous)

LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY Following crosses will be attempted:

S. No.	Crosses	Characters to be incorporated
1-	No. 334 X PG-686	Spreading + good filling + Good taste X High yielding
2-	BM-14 X BARI-2016	Good taste & good filling X High yielding + Early maturing
3-	No. 334 X BARI-2011	Spreading + good filling X High yielding

PREVIOUS YEAR'S RESULTS Three crosses were attempted to create segregation and genetic diversity in groundnut crop. All crosses were successful.

EXPERIMENT-3

TITLE STUDY OF FILIAL GENERATIONS (F_1, F_2, F_3, F_4, F_5, F_6 & F_7)

OBJECTIVE To develop high yielding, three/four-seeded pods, better adapted, drought and disease tolerant groundnut cultivars/lines and creation of genetic diversity.

RESEARCH WORKER (S) M. Fida Hassan

DURATION 2016 (Continuous)

LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/
METHODOLOGY

Filial Generations	Crosses/Entries will be Studied
F_1	3 Crosses
F_2	7 Progenies
F_3	26 Progenies
F_4	13 Progenies
F_5	28 Progenies
F_6	17 Progenies
F_7	12 Progenies

PREVIOUS YEAR'S
RESULTS

Filial Generations	Crosses/Entries Studied	Crosses/Entries Selected
F_1	03 Crosses	3 Crosses
F_2	09 Progenies	7 Progenies
F_3	34 Progenies	26 Progenies
F_4	38 Progenies	13 Progenies
F_5	40 Progenies	28 Progenies
F_6	36 Progenies	17 Progenies
F_7	18 Progenies	12 Progenies

Eight entries were selected from F_7 and included in the Preliminary Yield Trial.

EXPERIMENT-4

TITLE STUDY OF MUTATED GENERATIONS (M_7)

OBJECTIVE To create and select new segregates through irradiation and single plant selection for further crop improvement.

RESEARCH WORKER (S) M. Fida Hassan

DURATION 2016 (Continuous)
LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/
METHODOLOGY

PREVIOUS YEAR'S RESULTS

Mutated Generations	Entries Studied	Entries Selected
M_7	14 radiated prog.	05 mutated plants

EXPERIMENT-5

TITLE — PRELIMINARY YIELD TRIAL

OBJECTIVE — To evaluate the yield performance of new promising groundnut genotypes tolerant to diseases under rainfed conditions.

RESEARCH WORKER (S) — M. Fida Hassan and Dr. Muhammad Tariq

DURATION — 2016 (Continuous)

LOCATION — Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY

Entries = 10 (including 2 checks)

Design = RCBD
Replications = 3
Plot Size = 4m x 1.8m
Spacing (Rx P) = 45cm x 20cm
Fertilizer = 25-80-25 NPK kg/ha and 500 kg Gypsum/ha at flowering stage or at the end of July.

Data regarding plant height, primary/secondary branches, No. of pods/plant, 20 pod length, shelling %, 100 grain weight and pod yield/plant will be recorded.

PREVIOUS YEAR'S RESULTS

Dry Pod Yield of Various Entries of Groundnut Preliminary Yield Trial

S. No.	Entry	Pod Yield (kg/ha)	S. No.	Entry	Pod Yield (kg/ha)
1	15CG005	2222	5	15CG001	2083
2	15CG004	2176	6	BARI-2011 (c)	1806
3	15CG006	2176	7	Golden (c)	1759
4	15CG007	2130		15CG002	1620
302.48 302.48302		LSD (0.05) = 302.4		CV (%) = 8.0	

EXPERIMENT-6

TITLE — REGULAR YIELD TRIAL

OBJECTIVE — To evaluate the yield performance of new promising genotypes, tolerant to diseases under rainfed conditions.

RESEARCH WORKER (S) M. Fida Hassan and Dr. Muhammad Tariq

DURATION 2016 (Continuous)

LOCATION Barani Agricultural Research Institute, Chakwal.

TREATMENTS/ METHODOLOGY

Entries = 10 (including 2checks)

Layout = RCBD
Replications = 3
Plot Size = 4m x 1.8m
Spacing (RxP) = 45cm x 20cm
Fertilizer = 25-80-25 NPK kg/ha and 500 kg Gypsum / ha at flowering stage

Data regarding plant height, primary and secondary branches, No. of pods/plant, pod yield/plant, 20-pods length, 3-seeded pods/plant, taste, oil contents, protein contents, 100-grain wt. and shelling %age will be recorded.

PREVIOUS YEAR'S RESULTS

Dry Pod Yield of Various Entries of Groundnut in Regular Yield Trial

S. No.	Entry	Pod Yield (kg/ha)	S. No.	Entry	Pod Yield (kg/ha)
1	13CG003	3472	5	14CG008	3241
2	13CG009	3472	6	BARI-2011 (c)	3102
3	13CG002	3426	7	Golden (c)	3056
4	14CG005	3241	8	14CG003	2963
	LSD (0.05) = 279.3			CV (%) = 7.9	

EXPERIMENT-7

TITLE MICRO YIELD TRIAL

OBJECTIVE To evaluate the yield performance of advance promising lines of groundnut under rainfed conditions.

RESEARCH WORKER M. Fida Hassan and Dr. Muhammad Tariq

DURATION 2016 (Continuous)

LOCATION Barani Agricultural Research Institute, Chakwal, Talagang, Jund and Attock.

TREATMENTS/ METHODOLOGY

Entries = 09 (including two checks)

Layout = RCBD
Replications = 3
Plot Size = 4m x 2.7m
Spacing (Rx P) = 45cm x 20cm
Fertilizer = 25-80-25 NPK kg/ha and 500 kg Gypsum /ha at flowering stage

Data regarding plant height, primary/secondary branches, no. of pods/plant, pod yield/plant, 20-pod length, 3-seeded pods/plant, 100-grain wt, shelling %age and pod yield/plant will be recorded.

PREVIOUS YEAR'S RESULTS

Average Pod Yield of Various Entries in Micro Yield Trial

S. No.	Entries	BARI, Chakwal
1	12CG010	3765
2	12CG005	3364
3	12CG007	3333
4	12CG002	3148
5	12CG009	3117
6	12CG003	3056
7	12CG001	2870
8	BARI-2011 (c)	3133
9	Golden (c)	2222
	LSD(0.05) = 240.9	CV (%) = 12.3

EXPERIMENT-8

TITLE: NATIONAL UNIFORM GROUNDNUT YIELD TRIAL

OBJECTIVE: To test promising candidate varieties developed by breeders of the country, on a wide range of agro-climatic conditions, for their yield potential, disease resistance and adaptability.

RESEARCH WORKER (S): M. Fida Hassan

DURATION: 2016 (Continuous)

LOCATION: Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY: Detail of the material will be communicated by the Coordinator, NARC, Islamabad

Layout = RCBD

Replications = 3
Plot Size = 4m x 1.8m

PREVIOUS YEAR'S RESULTS

Dry Pod Yield of Various Entries of National Uniform Groundnut Yield Trial

Sr. No.	Entry	Pod Yield (kg/ha)	Sr. No.	Entry	Pod Yield (kg/ha)
1	1	2500	5	5	3889
2	2	2755	6	6	2870
3	3	2639	7	7	3565
4	4	3009	8	8	2847

EXPERIMENT-9

TITLE NUCLEUS SEED PRODUCTION

OBJECTIVE To produce and ensure regular supply of pure seed of approved varieties/advance lines for distribution to the farmers in the area.

RESEARCH WORKER(S) M. Fida Hassan and Dr. Muhammad Tariq

DURATION 2016
LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/METHODOLOGY

Following material will be sown in 2016.

S. No.	Name of variety/line	Plant to Progenies	Blocks
1	BARI-2011	160	60
2	BARI-2016	160	70

Following BNS and Pre-basic seed was produced during 2015.

S. No.	Name of variety/line	BNS (kg)	Pre-basic (kg)
1	BARI-2011	25	130
2	02CG002	30	150

Mash (*Vigna mungo* L.)

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EXPERIMENT-1

TITLE COLLECTION, MAINTENANCE AND EVALUATION OF GERMPLASM

OBJECTIVE

To select lines possessing high yield potential with resistance to disease/insect pests and to make new collections with desirable characteristics

RESEARCH WORKER (S)

Dr. Ghulam Rabbani and Dr. Muhammad Tariq

DURATION

2016

LOCATION

Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY

Entries	=	206
Layout	=	augmented
Plot Size	=	4m x 0.3m
Rows/Entry	=	1

Maximum number of local and exotic varieties/strains will be collected from different sources and maintained under medium rainfall conditions. Single plant and line selection will be made on yield basis. Data recording will be carried out for categorizing genepool:

- Plant height (cm)
- Primary branches/plant (#)
- Days to flowering (50%)
- Pods/plant (#)
- Pod length (cm)
- Seeds/pod (#)
- Days to maturity (90 %)
- 100 seed weight (gm)
- Seed Yield (g/plot)

The data of these parameters will be completed in phases.

PREVIOUS YEAR'S RESULTS

Table: Range of various Mash traits recorded

Sr. No.	Character studied	Range (Means)
1	Plant height (cm)	20.6 - 59.2
3	Pr. Branches/plant (#)	1.2 - 3.8
4	Days to flowering (50%)	40 - 56
5	Pods/plant (#)	9.2 – 39.4
6	Pod length (cm)	2.94 - 6.72
7	Seeds /pod (#)	5.2– 7.6
8	Days to maturity (90%)	67 - 79
9	100 seed wt. (g)	4.00 – 4.97
10	Seed yield (g/plot) $1.2m^2$	20 - 200

Entries in Yield Group

S. No.	Yield Range (g/1.2m^2)	No. of Entries
1	01-50	13
2	51-100	62
3	101-150	84
4	151-200	22

Five lines were selected on yield and yield component basis and will be further evaluated in preliminary yield trial.

EXPERIMENT-2

TITLE MASH HYBRIDIZATION PROGRAMME

OBJECTIVE To create genetic variability among the desirable genotypes

RESEARCH WORKER (S) Javed Iqbal, Dr. Ghulam Rabbani and Muhammad Shafiq Tariq

DURATION 2016

LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY Ten crosses will be carried out during Kharif-2016:

PREVIOUS YEAR'S RESULTS 15 crosses were attempted and all crosses were successful

S.NO	High yield	X	More pods/ plant
1	10CM-702	X	Chakwal Mash
2	10CM-702	X	Arooj
3	10CM-703	X	Chakwal Mash
4	10CM-703	X	Arooj
5	Chakwal Mash	X	Arooj
6	Chakwal Mash	X	10CM-707
7	Arooj	X	10CM-707
8	Arooj	X	10CM-702
9	10CM-702	X	10CM-703
10	10CM-707	X	11CM-707

EXPERIMENT-3

TITLE STUDY OF FILIAL GENERATIONS

OBJECTIVE To combine desirable economic traits for the development of new variety through selection

RESEARCH WORKER (S) Javed Iqbal, Dr Ghulam Rabbani and Muhammad Shafiq Tariq

DURATION 2016

LOCATION Barani Agricultural Research Institute, Chakwal

Filial generations ($F_1 – F_6$) will be promoted on the basis of desirable traits.

Filial Generations	No. of Entries
F_1	10 Crosses
F_2	15 Crosses
F_3	150 Progenies
F_4	64 Progenies
F_5	32 Progenies
F_6	15 Progenies

PREVIOUS YEAR'S RESULTS

Filial Generations	Crosses/progenies studied	Crosses/plants/ progenies selected
F_1	10	10
F_2	30	150
F_3	16	64
F_4	08	32
F_5	08	13
F_6	03	03

EXPERIMENT-4

TITLE MASH PRELIMINARY YIELD TRIAL

OBJECTIVE To test the yield performance of different mash promising entries under rainfed conditions

RESEARCH WORKER (S) Dr Ghulam Rabbani
DURATION 2016

LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY

Test Entries	Checks	Total Entries
10	02	12

Layout = RCBD
Replications = 3
Plot Size = 4m x 1.2m
Row Spacing = 30 cm

Sowing Time = June 25 - July 20

PREVIOUS YEAR'S RESULTS

Table: Seed yield as reflected by various genotypes

S. No	ENTRIES	Yield kg/ha
1	14CM-701	660
2	14CM-707	619
3	14CM-706	604
4	14CM-708	577
5	14CM-703	535
6	CH-MASH(c)	500
7	14CM-705	465
8	14CM-702	444
9	14CM-709	417
10	14CM-704	410
11	Arooj (c)	369
	LSD (0.05)	96.84
	CV (%)	9.56

EXPERIMENT-5

TITLE MASH REGULAR YIELD TRIAL

OBJECTIVE To evaluate seed yield performance of promising lines selected from preliminary yield trial

RESEARCH WORKER (S) Dr Ghulam Rabbani

DURATION 2016

LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY

Test Entries	Checks	Total Entries
09	02	11

Layout = RCBD
Replications = 3
Plot Size = 4m x 1.2m
Row Spacing = 30 cm.
Sowing Time = June 25 - July 20

PREVIOUS YEAR'S
RESULTS

Table: Seed yield as reflected by various genotypes:

Sr. No.	Entries	Seed Yield (kg/ha)
1-	13CM-710	813
2-	13CM-705	792
3-	13CM-706	785
4-	13CM-703	771
5-	CH-MASH(c)	771
6-	13CM-708	756
7-	13CM-712	756
8-	13CM-702	723
9-	13CM-701	702
10-	13CM-709	702
11-	13CM-704	673
12-	13CM-711	667
13-	13CM-707	652
14-	Arooj (c)	631
	LSD (0.05)	86.69
	CV (%)	7.39

EXPERIMENT-6

TITLE — MASH MICRO YIELD TRIAL

OBJECTIVE — To evaluate yield performance of advance lines against approved varieties under various ecological zones

RESEARCH WORKER (S) — Dr Ghulam Rabbani and Dr Muhammad Tariq

DURATION — 2016

LOCATIONS
i. Barani Agricultural Research Institute, Chakwal.
ii. Farmer, s field Gujar Khan.
iii. Adaptive Research Farm Kot Nainan.

TREATMENTS/ METHODOLOGY

Test Entries	Checks	Total Entries
12	02	14

Layout	=	RCBD
Plot Size	=	4m x 1.2m
Replications	=	3
Row Spacing	=	30 cm.
Sowing Time	=	June 25 - July 20

PREVIOUS YEAR'S RESULTS

Table: Seed yield as reflected by various genotypes

S. No	ENTRIES	Yield kg/ha
1	12CM-709	861
2	12CM-702	806
3	12CM-707	771
4	12CM-708	771
5	12CM-706	764
6	CH-MASH(c)	764
7	12CM-705	750
8	12CM-704	743
9	12CM-701	660
10	12CM-703	646
11	Arooj (c)	632
	LSD (0.05) CV (%)	86.69 7.39

EXPERIMENT-7

TITLE — MASH NATIONAL UNIFORM YIELD TRIAL

OBJECTIVE — To evaluate the promising lines/varieties developed by breeders of the country on a wide range of agro-climatic conditions for yield potential, disease resistance and adaptability.

RESEARCH WORKER (S) — Dr Ghulam Rabbani and Dr Muhammad Tariq

DURATION — 2016

LOCATION — Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY — Detail of entries/treatments and methodology etc. will be provided by the Coordinator (Pulses), NARC, Islamabad.

PREVIOUS YEAR'S RESULTS — Table: Seed yield as reflected by various genotypes

Sr. No.	**Entries**	**Seed Yield (kg/ha)**
1	1	486
2	4	486
3	6	479
4	8	472
5	3	424
6	2	417

7	5	410
8	7	396
	LSD(0.05) CV (%)	138.74 11.33

EXPERIMENT-8

TITLE — NUCLEUS SEED PRODUCTION

OBJECTIVE — To produce pure and true to type seed of advance Mash lines and commercial varieties of this Institute in order to facilitate their availability to the farming community of the area.

RESEARCH WORKER (S) — Dr Ghulam Rabbani and Dr Muhammad Tariq

DURATION — 2016

LOCATION — Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY — Following material will be sown:

Name of Variety/Line	Plant to Row Progenies	Blocks
Chakwal Mash	200	50

PREVIOUS YEAR'S RESULTS — The following Basic and Pre-basic seed was produced during 2013:

Variety	BNS (kg)	Pre-Basic (kg)
Chakwal Mash	05	20

Sorghum

EXPERIMENT-1

TITLE — COLLECTION, MAINTENANCE AND EVALUATION OF SORGHUM GERMPLASM

OBJECTIVE — To collect, maintain,characterize and evaluate sorghum accessions

RESEARCH WORKER (S) — Muhammad Saghir & Dr. Muhammad Tariq

DURATION — 2016

LOCATION — Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY	Entries	=	33
	Design	=	Augmented
	Plot Size	=	5m x 0.3m
	Row/Entry	=	One
	Fertilizer	=	60:60:0NPKkg/ha.

Data regarding germination, plant height, , No. of leaves/ plant, leaf area,green fodder yield and grain yield will be recorded.

PREVIOUS YEAR'S RESULTS

Thirty one lines were maintained. Data of plant height, No. of leaver/ plant, leaf area and green fodder yield were recorded.

Table: Range of various sorghum traits recorded

Sr. No.	Traits	Range
1	Plant height (cm)	131 – 265
2	No. of leaves per plant	9.2 – 12.6
3	Leaf area (cm^2)	245 – 438
4	Fodder yield (t/ha)	31 – 53

Entries	Fodder Yield kg/plot
11	4.2-5.1
17	5.2 -6.2
4	6.0-7.1

EXPERIMENT-2

TITLE

GENETIC IMPROVEMENT THROUGH HYBRIDIZATION AND EVALUATION OF FILIAL GENERATIONS

OBJECTIVE

Hybridization of various genotypes possessing high green fodder yield, drought resistance and disease tolerance to obtain new combinations.

RESEARCH WORKER (S) Muhammad Saghir

DURATION 2016

LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY

Crosses = 6

1.Chakwal Sorghum 2. 013CS041(High yield potential)
3. 012CS049 (More leaf area) 4. 06CS004(Drought tolerant)

These parents will be crossed in a half diallel fashion to create variability for subsequent selection and evaluation.

PREVIOUS YEAR'S RESULTS

Thirteen new crosses were attempted and found successful. Seed of successful crosses was harvested for further studies. Eight F3 progenies will be planted and evaluated for desirable traits.

EXPERIMENT-3

TITLE

PRELIMINARY SORGHUM FODDER YIELD TRIAL

OBJECTIVE

To evaluate yield performance of selected entries under Barani conditions

RESEARCH WORKER (S)

Muhammad Saghir , and Dr. Muhammad Tariq

DURATION

2016

LOCATION

Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY

Entries	=	8
Layout	=	RCBD
Replications	=	3
Plot Size	=	5m x 1.8m
Fertilizer	=	60:60:0NPK kg/ha
Row Spacing	=	30cm
Sowing time	=	15th July - 30th July

Data regarding germination, plant height, No. of leaves/plant, green fodder yield, disease reaction and grain yield will be recorded.

PREVIOUS YEAR'S RESULTS

Table: Average of green fodder yield of various sorghum entries

Sr. No.	Entries	Fodder Yield (t/ha)
1-	015CS041	48.30
2-	015CS044	47.50
3-	015CS045	45.00
4-	Chakwal sorghum	44.50
5-	JS-2000	41.50
6-	015CS046	39.8
7-	015CS043	38.00
8	015CS042	37.80
	LSD (0.05) =	7.62
	CV(%) =	13.58

EXPERIMENT-4

TITLE REGULAR SORGHUM FODDER YIELD TRIAL

OBJECTIVE To evaluate yield performance of promising lines promoted from the preliminary fodder yield trial

RESEARCH WORKER (S) Muhammad Saghir,

DURATION 2016

LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY

Entries	=	7
Layout	=	RCBD
Plot Size	=	5m x 1.8m (6 rows)
Fertilizer	=	60:60:0 NPKkg/ha.
Row Spacing	=	30cm
Sowing time	=	15th July - 30th July

Data regarding germination, plant height, No. of leaves/plant, green fodder yield, disease reaction and grain yield will be recorded.

PREVIOUS YEAR'S RESULTS

Table: Fodder yield of various Sorghum strains

Sr. No.	Entry	Fodder Yield (t/ha)
1-	014CS034	46.4
2-	014CS031	45.2
3-	Chakwal sorghum	43.7
4-	014CS036	42.1
5-	JS-2000	41.2
6-	013CS064	38.4
7-	013CS062	34.5
	LSD (0.05) =	7.43
	CV(%) =	11.42

EXPERIMENT-5

TITLE MICRO SORGHUM FODDER YIELD TRIAL

OBJECTIVE To evaluate yield performance of advance lines under various ecological zones

RESEARCH WORKER Muhammad Saghir, and Dr.Muhammad Tariq

DURATION 2016

LOCATION Barani Agricultural Research Institute, Chakwal
Barani Agricultural Research Station, Fatehjang
Adaptive Research Farm Bhaun

TREATMENTS/ METHODOLOGY

Entries	=	6
Layout	=	RCBD
Replications	=	3
Plot Size	=	5m x 1.8m
Fertilizer	=	60:60:0 NPKkg/ha
Row Spacing	=	30cm
Sowing time	=	15th July - 30 July

Data regarding germination, plant height, No. of leaves/tiller, No. of tillers/plant, green fodder yield, disease reaction and grain yield will be recorded.

PREVIOUS YEAR'S RESULTS

Table: Average fodder yield of two locations BARI & BARS Fatehjang.

Sr. No.	Entry	Fodder Yield (t/ha)
1-	013CS035	48.6
2-	012CS049	45.5
3-	07CS017	44.2
4-	Chakwal sorghum	43.8
5-	011CS045	41.5
6-	012CS041	38.2

PEARL MILLET (*Pennisetumamericanum*)
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EXPERIMENT-6

TITLE COLLECTION, MAINTENANCE AND EVALUATION OF PEARL MILLET GERMPLASM

OBJECTIVE To collect, maintain and evaluate germplasm and its utilization in hybridization programme

RESEARCH WORKER (S) Muhammad Saghir, and Dr. Muhammad Tariq

DURATION 2016

LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY

Entries	=	35
Design	=	Augmented
Plot Size	=	5m x 0.6m
No. of Rows/Entry	=	2
Row spacing	=	30cm
Fertilizers	=	60:60:0 NPKkg/ha

Data regarding germination, plant height, No. of leaves/tiller, No. of tillers/plant, , green fodder yield, disease reaction and grain yield will be recorded.

PREVIOUS YEAR'S RESULTS 34 lines were maintained and data of plant height, No. of leaves//tiller, No of tillers/plant, leaf area and fodder yield were recorded.

Table: Range of various pearl millet traits recorded

Sr. No.	Traits	Range
1	Plant Height (cm)	195 – 289
2	No. of leaves per tiller	9.2– 12.6
3	Leaf area (cm^2)	217 – 340
4	Fodder yield (t/ha)	33 – 59

Entries	Fodder yield kg/plot
11	4.2-5.6
13	5.0-6.4
7	6.4-7.1
3	7.3-7.5

Vegetables

EXPERIMENT-1

TITLE COLLECTION, MAINTENANCE AND EVALUATION OF CHILLIES GERMPLASM

OBJECTIVES To find out desirable size and high yielding genotypes best suited for Pothwar area.

RESEARCH WORKER(S) Naveeda Anjum, Imtaiz Akram Naizi and Dr.Muhammad Tariq

DURATION Continuous

LOCATION Barani Agricultural Research Institute, Chakwal.

METHODOLOGY

Total entries	=	25
Layout	=	Augmented
Row x Plant spacing	=	75 x 45 cm
Sowing Date	=	5-01-2016
Transplanting data	=	Mid of March

PARAMETERS TO BE RECORDED: days to 50% flowering, days to 1st green fruit picking no. of fruits/plant, fruit weight/plant(g) single fruit weight fruit shape(long round etc) fruit length(cm) fruit width(cm) and yield/ plot(kg/plot)

PREVIOUS YEARSRESULTS

Range of various Chillies traits recorded

Sr.No	Traits	Min	Max
1	Plant height (cm)	37.2	110.2
2	Days to flower initiation	31	45
3	No. of Primary branches	3	9
4	No. of Secondary branches	7	16
5	Fruit length (cm)	1.5	8.3
6	Yield per plant(g)	220	730

EXPERIMENT-2

TITLE GENETIC IMPROVEMENT THROUGH HYBRIDIZATION

OBJECTIVE To create segregation and genetic diversity through crossing for chilies improvement.

LOCATION Barani Agricultural Research Institute, Chakwal

RESEARCH WORKER(S) Naveeda Anjum, Imtaiz Akram Naizi and Dr.Muhammad Tariq

DURATION 2016 (Continuous)

TREATMENTS/ METHODOLOGY Ten crosses will be attempted:

PREVIOUS YEARSRESULTS

Ten crosses were attempted. Only two crosses were successful.

EXPERIMENT -3

TITLE: PERMINARLY YIELD TRAIL OF CHIILIES

OBJECTIVES To find out high yielding genotypes best suited for Pothwar area.

RESEARCH WORKER(S) Naveeda Anjum and Dr. Muhammad Tariq

LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY
Entries = 7 (including 1 check)
Design = RCBD
Replications = 3
Plants/rep = 8
Spacing (Rx P) = 75cm x 45
D.O.S = 4-01-2016
D.O.T =Mid of march

Data to be recorded: days to 50% flowering, days to ist green fruit picking, no. of fruits/plant, fruit weight/plant(g), single fruit weight, fruit shape(long round etc), fruit length(cm), fruit width(cm), yield/ plot(kg/plot)

Previous year data

Varieties/line	Yield/rep (g)
LP1	5766.7
1788	5090
16166-33	9933.4
99PE1689	8083.4
1781	4711.7
16162	4950
Big daddy	8553.4

EXPERIMENT -4

TITLE: NARC TRAIL OF CHIILIES

LOCATION Barani Agricultural Research Institute, Chakwal.

OBJECTIVES To screen out the best lines in pothwar climatic condition.

RESEARCH WORKER(S) NaveedaAnjum, Imtaiz Akram Naizi and Dr.Muhammad Tariq

TREATMENTS/ METHODOLOGY

Entries = 7 (including 1 checks)

Design = RCBD
Replications = 3
Plot Size = 4 x 1. 5m (02 Ridges)
Spacing (Rx P) = 50cm x 75cm
D.O.S = 9-12-2014
D.O.T = last week of march

Data to be recorded: days to 50% flowering, days to ist green fruit picking, no. of fruits/plant, fruit weight/plant(g), single fruit weight, fruit shape(long round etc), fruit length(cm), fruit width(cm), yield/ plot(kg/plot)

PREVIOUS YEARSRESULTS

Sr no	Varieties	Total yield (grams)
1	V1	16335
2	V2	15737
3	V3	10645
4	V4	23425
5	V5	7384
6	V6	22327
7	V7	36308
	CV	2.43
	LSD(0.05%)	9.02

Sr No	Lines	R1	R2	R3	Average
1	NARC 1	2070	1540	1390	5000
2	NARC 2	1690	1850	3650	7190
3	NARC 3	1499	1540	860	3899
4	NARC 4	1690	1970	3075	6735
5	NARC 5	1781	2084	1775	5640
6	NARC 6	1300	1710	2940	5950

EXPERIEMNT -5

TITLE: NATIONAL UNIFORM YIELD OF TOMATOES

LOCATION Barani Agricultural Research Institute, Chakwal.

OBJECTIVES To select best line in pothwar climatic condition.

RESEARCH WORKER(S) Naveeda Anjum, Imtaiz Akram Naizi and Dr.Muhammad Tariq

TREATMENTS/ METHODOLOGY

Entries = 10 (including 1 checks)
Design = RCBD
Replications = 3

Plot Size = 4 x 1. 5m
Spacing (Rx P) = 50cm x 75cm
D.O.S =2-1-2016
D.O.T =Mid of march of March

Data regarding.days to 50% flowering, days to 1st green fruit picking, no. of fruits/plant, fruit weight/plant(g), single fruit weight, fruit shape(long round etc), fruit length(cm), fruit width(cm), yield/ plot(kg/plot)

PREVIOUS YEARSRESULTS

Sr No	Lines (determinate)	Replications	YIELD(g)
1	TOM-1401	R1V1	6135
		R2V1	7387
		R3V1	8201
2	TOM-1411	R1V2	9460
		R2V2	8704
		R3V3	8885
3	TOM-1417	R1V3	16973
		R2V3	17727
		R3V3	18834
4	TOM-1441	R1V4	12513
		R2V4	12433
		R3V4	11175
5	TOM-1447	R1V5	20700
		R2V5	22383
		R3V5	21503
6	TOM-1449	R1V6	11859
		R2V6	12483
		R3V6	13264
7	TOM-1405	R1V7	19296
		R2V7	18203
		R3V7	16095
8	TOM-1409	R1V8	11518
		R2V8	11684
		R3V8	13381
9	TOM-1422	R1V9	6698
		R2V9	4464
		R3V9	5520
10	TOM-1439	R1V10	6111
		R2V10	7252
		R3V10	5361
11	TOM-1444	R1V11	13200
		R2V11	12023
		R3V11	11337

EXPERIEMNT -6

TITLE: NARC TRAIL OF TOMATOES

OBJECTIVES To find out high yielding genotypes best suited for Pothwar area.

RESEARCH WORKER(S) NaveedaAnjum, Imtaiz Akram Naizi and Dr.Muhammad Tariq

LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY

Entries	= 4
Design	= RCBD
Replications	= 3
Plot Size	= 4 x 1. 5m (02 Ridges)
Spacing (Rx P)	= 50cm x 75c
D.O.S	=10-12-2014
D.O.T	=07-02-2015

Data of following parameters will be recorded Days to 50% flowering, Days to 1st fruit picking, No. of fruits/ plant, Fruit weight/ plant, Single fruit weight, Fruit shape, Yield/plot(kg/plot)

PREVIOUS YEARSRESULTS

Sr. No.	**Lines**	**Replications**	**Days to 50% flowering**	**Days to first fruit picking**	**Yield(g)**
1	NARC 1	R1V1	17	34	6110
		R2V1	22	36	4358
		R3V1	24	33	5389
		R4V1	21	33	3381
2	NARC 2	R1V2	17	35	3683
		R2V2	22	34	4089
		R3V2	21	34	3731
		R4V2	29	34	4815
3	NARC 3	R1V3	17	37	12993
		R2V3	17	35	11091
		R3V3	17	37	8543
		R4V3	21	36	9601
4	NARC 4	R1V4	17	32	8960
		R2V4	17	30	11610
		R3V4	17	33	12098
		R4V4	17	35	12050
					LSD(0.05 %) =9.10

EXPERIEMNT -7

TITLE: NATIONAL UNIFORM YIELD TRAIL OF CHILLIES

OBJECTIVES To find out high yielding genotypes best suited for Pothwar area.

RESEARCH WORKER(S) Naveeda Anjum, Imtaiz Akram Naizi and Dr.Muhammad Tariq

LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY

Entries	= 11
Design	= RCBD
Replications	= 3
Plot Size	= 4 x 1. 5m (02 Ridges)
Spacing (Rx P)	= 50cm x 75cm
D.O.S	= 10-12-2014
D.O.T	= 10-02-2015

Data of following parameters will be recorded Days to 50% flowering, Days to ist fruit picking, No. of fruits/ plant, Fruit weight/ plant, Single fruit weight, Fruit shape, Yield/plot(kg/plot)

Sr. No	Lines	R1	R2	R3	Average
1	CH-14101	3206	3590	2140	8936
2	CH-14107	4723	2538	2403	9664
3	CH-14116	4583	3098	3165	10846
4	CH-14120	3915	3300	3010	10225
5	CH-14127	4690	4114	3950	12754
6	CH-14132	5430	6381	6795	18606
7	CH-14136	4290	4003	3551	11844
8	CH-14140	2915	3575	3893	10383
9	CH-14150	4103	3956	3891	11950
10	Big daddy(check)	6287	4490	5676	16453

EXPERIMENT-8

TITLE NURSERY PREPARATION OF SUMMER VEGETABLES UNDER PLASTIC TUNNEL FOR EARLY FIELD PRODUCTION

OBJECTIVES To induce the early production of summer vegetables
To enhance the farmers income
To produce healthy seedlings

RESEARCH WORKER(S) Naveeda Anjum, Imtaiz Akram Naizi and Dr. Muhammad Tariq

DURATION 03 years
LOCATION Barani Agricultural Research Institute, Chakwal.

TREATMENTS/ METHODOLOGY
Nursery Sowing = 1st week of January
Nursery Transplanting = During March
Nursery tunnel size 16ft x 5ft x 7ft

Nursery Raising and transplanting

Sowing will be done in the 1st week of January in poly bags and in multiport trays under plastic tunnel. These plants will be transplanted in the field during March when the suitable temperature prevails for flowering and fruiting. By this technique we can get the crop one and a half month early than the normal crop.
Data regarding harvesting time and fruit yield will be recorded.

PREVIOUS YEAR'S RESULTS

Crop	**1st picking date**	**Yield kg/plant**
Tomato	01/05/2014	5
Cucumber	08/04/2014	6.5
Bitter gourd	28/04/2014	12.75

SOIL SCIENCE SECTION
EXPERIMENT-1

TITLE: FERTILIZER REQUIREMENTS OF NEW PROMISING LINE OF MASH UNDER RAINFED CONDITONS
OBJECTIVE: To find out standard fertilizer dose for mash advance line under rainfed conditions
RESEARCH WORKERS: Dr. Rizwan Latif and Madeeha Khan
DURATION 2015-17
LOCATION Barani Agricultural Research Institute, Chakwal
VARIETY 10CM702
TREATMENTS/ METHODOLOGY Fertilizer dose:

S. No.	**Fertilizer dose(N-P-K) kg /ha**	**S. No.**	**Fertilizer dose(N-P-K) kg /ha**
1	0-0-0	6	20-30-30
2	0-60-30	7	20-90-30
3	20-60-30	8	20-60-0
4	40-60-30	9	20-60-60
5	20-0-30		

Lay out: RCBD
Plot Size: 5 m x 1.2 m
Replications: 3

a) FERTILIZER APPLICATION

All the fertilizers will be applied at sowing time

b) i. DATA RECORDING

Following parameters will be recorded:

1. Plant density
2. No. of pods/plant
3. No. of seeds/pod
4. Seed and biomass yield

ii. LAB. ANALYSIS Soil samples from 0-15 cm and 15-30 cm depths will be collected before sowing and after harvest for analyzing pH, EC, OM, N and available P contents to assess soil fertility.

PREVIOUS YEAR'S RESULTS

Table: Effect of Fertilizer Doses & Application Methods on Yield of Mash

S. No.	**Fertilizer dose(N-P-K) kg /ha**	**Seed yield (kg/ha)**
1	0-0-0	632
2	0-60-30	708
3	20-60-30	679
4	40-60-30	668
5	20-0-30	629
6	20-30-30	673
7	20-90-30	659
8	20-60-0	766
9	20-60-60	811
$LSD_{0.05}$ = 147.8 CV % = 12.33		

Pre-sowing soil analysis:

Depth (cm)	pH	OM (%)	N (%)	Av. k (mg/kg)	Moisture (%)	Texture
0-15	8.0	0.52	0.025	105	6.60	Sandy loam
15-30	8.1	0.44	0.023	125	7.80	-do-

Post harvest soil analysis:

Depth (cm)	pH	OM (%)	N (%)	Av. k (mg/kg)	Moisture (%)	Texture
0-15	8.1	0.56	0.027	128	4.1	Sandy loam
15-30	8.1	0.50	0.026	140	4.8	-do-

EXPERIMENT-2

TITLE FERTILIZER REQUIREMENTS OF NEW PROMISING LINES OF GROUNDNUT UNDER RAINFED CONDITIONS

OBJECTIVE To find out the optimum fertilizer dose of new promising line of Groundnut crop under rainfed conditions.

RESEARCH WORKER(S) Dr. Rizwan Latif and Madeeha Khan

DURATION 2013-2017

LOCATION Barani Agricultural Research Institute, Chakwal

TREATMENTS

TREATMENTS/
METHODOLOGY The advance line will be sown.
Lay out Split plot
Plot Size 5 m x 1.2 m
Replications 3

S. No	N kg/ha	P kg/ha	K kg/ha
1	0	0	0
2	20	60	30
3	20	80	30
4	20	100	30
5	20	120	30

a) FERTILIZERAPPLICATION

All the fertilizers will be applied at sowing time

b) i. DATA RECORDING

Following parameters will be recorded:

1. Plant density
2. No. of pods/plant
3. Pod yield
4. 100 seed weight

ii. LAB. ANALYSIS

Composite soil samples from 0-15 cm and 15-30 cm depths will be collected before sowing and analyzed for pH, EC, OM, and available P contents to assess soil fertility.

PREVIOUS YEAR'S RESULTS

S. No.	N kg/ha	P kg/ha	K kg/ha	**pod yield (kg/ha)**		
				BARI-11	**10CG008**	**10CG009**
1	0	0	0	3173	3700	3636
2	20	60	30	3443	3960	3951
3	20	80	30	3056	4018	3735
4	20	100	30	3093	3711	4101
5	20	120	30	3240	3803	4023
LSD $_{0.05}$ = 643.2 *CV % = 10.40*						

Pre-sowing soil analysis:

Depth (cm)	pH	OM (%)	N (%)	Av. k (mg/kg)	Moisture (%)	Texture
0-15	8.0	0.52	0.025	105	6.60	Sandy loam
15-30	8.1	0.44	0.023	125	7.80	-do-

Post harvest soil analysis:

Depth (cm)	pH	OM (%)	N (%)	Av. k (mg/kg)	Moisture (%)	Texture
0-15	8.1	0.56	0.027	128	4.1	Sandy loam
15-30	8.1	0.50	0.026	140	4.8	-do-

EXPERIMENT-3

TITLE — MONITORING OF SOIL MOISTURE STATUS UNDER DIFFERENT FORMS OF MICROCATCHMENTS AT BARI RESEARCH FARM

OBJECTIVE — To monitor the availability of soil moisture under different forms of catchments. The results will reveal the importance of micro catchment in water storage and will help in identifying the level of slope ideal for moisture conservation.

RESEARCH WORKER(S) Dr. Rizwan Latif and Madeeha Khan

DURATION Continue nature

LOCATION BARI-FARM

TREATMENTS/
METHODOLOGY

1. V shape or triangular micro catchments
2. Square/rectangular shape micro catchments

FIELD DATA
RECORDING

Soil moisture data will be recorded from two depths 0-15 cm and 15-30 cm and from two points within one micro catchment, one close to the plant(basin) and other near the berm of the catchment after every 15 days and the data will finally be used in the economic analysis of various fruit plants.

PREVIOUS YEAR'S
RESULTS

Area	Depth (cm)	Moisture %									
		08/04 15	15/5/ 15	04/06/ 15	17/6/ 15	3/7/20 15	15/7/ 15	18/08/ 15	02/09/ 15	16/09/ 15	02/10/ 15
Triangular micro catchment (bank)	0-6	11.68	7.69	7.69	7.69	4.06	4.58	6.93	7.92	8.46	10.50
	6-12	13.49	13.08	13.08	10.19	6.42	5.66	7.24	7.89	11.53	9.72
Triangular micro catchment (basin)	0-6	15.79	8.51	8.51	8.71	7.49	6.53	7.39	11.74	11.64	10.53
	6-12	14.39	10.55	10.55	8.63	9.77	7.26	7.35	11.92	15.14	10.90
Square microcatchment (bank)	0-6	9.72	7.42	7.42	8.71	6.96	7.89	6.54	12.54	7.78	8.30
	6-12	15.75	10.24	10.24	10.68	6.00	10.19	9.62	13.61	10.49	6.87
Square microcatchment (basin)	0-6	30.80	3.52	3.52	4.51	5.26	5.19	5.49	8.08	4.49	7.14
	6-12	6.04	5.17	5.17	3.78	4.90	12.94	8.03	7.56	4.80	5.54
Area	Depth (cm)	Moisture %									
		3/11/ 2014	15/11/ 14	3/12/20 14	15/12/ 14	5/1/20 15	16/1/ 15	3/2/20 15	3/3/20 15	16/3/20 15	
Triangular micro catchment (bank)	0-6	9.03	11.95	8.3	4.81	7.23	12.64	11.9	11.52	12.45	
	6-12	9.7	14.42	13.33	7	12.61	14.95	18.38	13.55	13.31	

Triangular micro catchment (basin)	0-6	11.77	10.64	13.3	7.08	9.04	9.5	15.38	12.96	17.13	
	6-12	12.46	12.27	14.09	9.18	13.6	11.97	21.95	15.25	15.99	
Square microcatch ment (bank)	0-6	8.29	5.58	5.16	6.92	5.49	6.5	14.1	11.11	11.14	
	6-12	8.88	6.58	5.82	9.06	7.59	8.14	14.76	9.88	12.72	
Square microcatch ment (basin)	0-6	7.12	6.44	4.98	6.71	5.86	7.67	6.79	5.17	10.48	
	6-12	7.92	8.04	6.87	7.88	8.81	7.51	7.72	6.72	10.74	

AGRONOMY DIVISION (KHARIF- 2016)

EXPERIMENT-1

TITLE: SOWING DATE CUM VARIETAL TRIAL ON GROUNDNUT UNDER RAINFED CONDITIONS

OBJECTIVE: To find out the most appropriate planting time for new groundnut lines/strains to get maximum yield under rainfed conditions

RESEARCH WORKER: Mazher Iqbal and Nasarullah Khan Aadal.
DURATION 2015-16

LOCATION: Barani Agricultural Research Institute, Chakwal

TREATMENTS/
METHODOLOGY:

A- Sowing Dates (Main Plots)

D1= 1st March	D5= 1st May
D2= 15th March	D6= 15th May
D3= 1st April	D7= 1st June
D4=15th April	D8= 15th June

B- Genotypes (Sub-Plots)

V1 = 010CG008
V2 = 011CG005

Layout = Split Plot Design
Replications = 3
Plot size = 1.8 m x 5 m
Fertilizer = 30-80-30 NPK kg ha^{-1}
Row Spacing = 45 cm
Seed rate = 100 kg kernels ha^{-1}

Data regarding germination, plant height, pods plant^{-1}, pod length, kernels pod^{-1} & 100-kernel weight and pod yield will be recorded

PREVIOUS YEAR'S RESULTS:

Table 1: pod yield (kg ha^{-1}) of Groundnut at different sowing dates

Sowing Dates	010CG008	011CG005	Means
1st Mar2015	2500.0	2520.0	**2510.3**
15th Mar2015	2563.2	2623.3	**2593.3**
1st April 2015	3650.0	4266.7	**3958.3**
15th April 2015	3400.0	3873.3	**3636.7**
1st May2015	3540.0	3563.3	**3551.7**
15th May2015	2940.0	2956.7	**2948.3**
1st June2015	2456.0	2766.7	**2611.7**
15th June2015	2550.0	2400.0	**2475.0**
Means	**2950.0**	**3121.2**	
LSD (0.05) for sowing dates = 293.8			
LSD (0.05) for genotypes = 178.4			
LSD (0.05) for sd x g = 504.7			
CV (%) = 9.60			

EXPERIMENT-2

TITLE — PERFORMANCE OF A NEW MASH LINE SOWN ON VARIOUS SOWING DATES UNDER RAINFED CONDITIONS

OBJECTIVE — To find out the appropriate sowing time for a new mash line to obtain maximum yield

RESEARCH WORKER — Nasarullah Khan Aadal and Mazher Iqbal.

DURATION — 2015-16

LOCATION — Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHODOLOGY

Sowing dates

D1 = 10th June
D2 = 20th June
D3 = 1st July
D4 = 10th July
D5 = 20th July
D6 = 1st August

B- Genotypes

V1=10CM703
V2=10CM707

Layout = R.C.B.D.
Replications = 3
Plot size = 1.2 m x 5 m

Fertilizer = 30-60-30 NPK kg ha^{-1}
Row Spacing = 30 cm
Data regarding germination, plant height, pods $plant^{-1}$, pod length, seeds pod^{-1}, 1000-seed weight and seed yield will be recorded.

PREVIOUS YEAR'S RESULTS

Table 2: Grain yield of Mash at different Sowing dates.

Sowing Dates	10CM703	10CM707	Means
10th June2015	866.7	927.7	**897.2**
20th June2015	960.0	1032.3	**996.2**
1stJuly 2015	1171.0	983.0	**1077.0**
10th July2015	936.7	1004.3	**970.5**
20th July2015	863.7	898.0	**880.2**
1st August2015	897.0	707.7	**802.3**
Means	**950.0**	**925.2**	
LSD (0.05) for sowing dates = 245.81			
LSD (0.05) for genotypes = 118.77			
LSD (0.05) for hd x g = 290.93			
CV (%) = 17.45			

PLANT PATHOLOGY

EXPERIMENT-1 EFFECT OF ADDITION OF LIME AND FYM AT SOWING TIME ON PREHARVEST AFLATOXIN CONTAMINATION IN GROUNDNUT

OBJECTIVE: To determine the effect of lime or farm yard manure application for reduction of pre-harvest Aflatoxin contamination in groundnut.

RESEARCH WORKER(S) Syed Kamil Husnain and Dr. Muhammad Ijaz

DURATION 2016

TREATMENTS/ Lime and farm yard manure (FYM) will be added to groundnut at time of sowing to see their effect on Aflatoxin contamination.

T1: Addition of lime 50 DAP 100Kg/ha
T2: Addition of FYM 2.5t/ha
T3: Addition of lime + FYM
T4: Addition of Gypsum before sowing.
T5: Addition of residue of cereal crops (CCR).
T6: Addition of Gypsum+ FYM before sowing.
T7: CCR+ Gypsum
T8: CCR+ FYM+ Gypsum
T9: Control

Plot size = 3.6m X 5m
Reps = 4

Lay out: = RCBD

PREVIOUS YEAR'S RESULTS:

No	Treatments	Yield
1	Addition of lime 50 DAP 100Kg/ha	2778
2	Addition of FYM 2.5t/ha	2630
3	Addition of lime + FYM	2889
4	Addition of Gypsum before sowing.	3259
5	Addition of residue of cereal crops (CCR).	3185
6	Addition of Gypsum+ FYM before sowing.	2778
7	CCR+ Gypsum	2852
8	CCR+ FYM+ Gypsum	2815
9	Control	2741
	LSD(0.05)	562.3
	CV(5)	10.26

EXPERIMENT-2 EVALUATION OF MASHBEAN GERMPLASM FOR RESISTANCE AGAINST YELLOW MOSAIC VIRUS

OBJECTIVE: To evaluate disease resistance in mash bean genotype against YMV.

RESEARCH WORKER(S) Syed Kamil Husnain and Dr. Muhammad Ijaz

DURATION 2016

No. of Entries = As provided by breeder
Plot size = 2 m x 0.60 m
No. of seeds per row = 15
Replications = 3
Layout = RCBD

Mash test genotypes will be sown under natural field conditions. After germination, the crop will be regularly monitored for the presence of white fly and development of yellow mosaic disease. Disease severity will be recorded at weekly interval using 0-5 arbitrary scale (Bashir, 2005) which is described as follows:

0 -All plants free of disease symptoms highly resistant (HR)
1- 1 - 10% Infection Resistant (R)
2 -11 -20% infection moderately resistant (MR)
3- 21-30% infection moderately susceptible (MS)
4- 30-50 % infections Susceptible (S)
5- More than 50% highly susceptible (HS)

PREVIOUS YEAR'S RESULTS:

No	Varieties	Disease incidence (%)	No	Varieties	Disease incidence (%)
1	11CM-701	21	17	12CM-708	19
2	11CM-702	25	18	12CM-709	22
3	11CM-703	23	19	13CM-701	18
4	11CM-704	20	20	13CM-702	23
5	11CM-705	12	21	13CM-703	16
6	11CM-706	22	22	13CM-704	28
7	11CM-707	15	23	13CM-705	29
8	11CM-709	18	24	13CM-706	24
9	11CM-710	29	25	13CM-707	23
10	12CM-701	23	26	13CM-708	22
11	12CM-702	26	27	13CM-709	26
12	12CM-703	27	28	13CM-710	21
13	12CM-704	22	29	13CM-711	25
14	12CM-705	28	30	13CM-712	23
15	12CM-706	12	31	CH.MASH	25
16	12CM-707	11	32	AROOJ	29

EXPERIMENT-3 SCREENING OF MASH ADVANCE LINES AGAINST ROOT ROT (*Macrophomina phaseolina*) UNDER SICK FIELD CONDITIONS.

OBJECTIVE: To find out resistant mash genotype against root rot.

RESEARCH WORKER(S) Syed Kamil Husnain and Dr. Muhammad Ijaz

DURATION 2016

No. of Entries = As provided by breeder
Plot size = 2 m x 0.60 m
No. of seeds per row = 14
Replications = 3
Layout = RCBD

Mash test genotypes will be sown in naturally infested fields (A8-2 & A-9). Disease incidence data will be recorded at seedling, flowering and pod development stage.

PREVIOUS YEAR'S RESULTS: Experiment could not conduct due to unavailability of sick field.

ENGINEERING

EXPERIMENT – 1:

TITLE: RESPONSE OF MAIZE VARIETY ON BED IRRIGATION METHOD UNDER RAINFED CLIMATE

OBJECTIVES:

1- To determine effect of bed irrigation method on maize yield and yield components.

2- To compare water saved and final yield of different irrigation methods.

RESEARCH WORKERS: Marjan Aziz, Jamil Akhter and Dr. Muhammad Tariq

PROJECT DURATION: 2015-2016

LOCATION: Barani Agricultural Research Institute, Chakwal

TREATMENTS/ METHOLOGY

T1VI = Bed sowing with 608 (hybrid, sweet and waxy)

T1V2 = Bed sowing with Yellow (hybrid 6285)

Layout = RCBD

Varieties = 02

Bed width = 0.76 m

Water channel width = 0.45

Data to be collected:

Pre sowing and post harvest soil analysis, Moisture content at surface, Days taken to germination, Cob height (cm), No. of cobs/plant, No. of grains/cob, Grain wt./cob, Days taken to maturity, Yield (kg/ha).

PREVIOUS YEAR'S RESULTS

Crop Data of Maize varieties planed on bed planting method

Variety	Treatments	Replications	No,of obs	Plant height	No.of cobs/plant	cob length	No.of grains/cob	Grain wt./cob	Yield (kg/ha)
				cm		cm		(g)	
V1	T1	R1	1	104	2	19.4	500	141	9225
			2	114	2	19	450	112	7550
			3	110	2	16	503	147	7400
		Mean		109	2	18.1	484	133	8058
		SD		5	0	1.9	30	19	1013
		CV		5	0	10.2	6	14	13
		R2		129	2	18	537	121	10350
				125	2	17.2	450.00	146	9125
				104	2	16.5	509	151	8125
		Mean		119	2	17.2	499	139	9200
		SD		13	0	0.8	44	16	1114
		CV		11	0	4.4	9	12	12
		R3		115	2	19	510	148	10200
				122	2	18	480	115	9450
				129	2	16.5	560	150	10550

		Mean		122	2	17.8	517	138	10067
		SD		7	0	1.3	40	20	562
		CV		6	0	7.1	8	14	6
V2	T1	R1		229	2	20	548	143	5550
				195	2	17	500	140	4875
				213	2	19	580	147	4625
		Mean		212	2	19	543	143	5017
		SD		17	0	2	40	4	478
		CV		8	0	8	7	2	10
		R2		192	2	20	572	125	3940
				183	2	19	550	146	4900
				200	2	18	623	121	5125
		Mean		192	2	19	582	131	4655
		SD		9	0	1	37	13	629
		CV		4	0	5	6	10	14
		R3		183	2	18	600	130	4265
				200	2	20	530	140	5625
				197	2	17	580	146	4750
		Mean		193	2	18	570	139	4880
		SD		9	0	2	36	8	689
		CV		5	0	8	6	6	14

EXPERIMENT#2

TITLE: Soil Moisture Analysis Using Irrometer Sensors In Olive Orchard Microcatchment and Olive Planted in Water Box Devices.

OBJECTIVES:

1- To analyze the availability of soil moisture in the olive Microcatchment structures using Irrometer sensors.

2- To monitor the status of soil moisture content in olive planted in water boxes using Irrometer sensor.

3- To predict when to irrigate.

RESEARCH WORKERS: Marjan Aziz and Dr. Muhammad Tariq

PROJECT DURATION: 2014-2016

LOCATION: Barani Agricultural Research Institute, Chakwal

TREATMENTS/
METHOLOGY

Soil moisture analysis before installing the Irrometer sensors

Olive planted in Microcatchment, 03 Irrometer devices will be installed at three different depths (0-60cm, 0-90 cm, 0-120 cm).

Data of Irrometer soil moisture tension will be taken after 7 days using Water Mark soil moisture meter.

Moisture data for olive planted in water boxes will be taken as mentioned in above point.

BARANI AGRICULTURAL RESEARCH STATION, FATEHJANG

ANNUAL RESEARCH PROGRAMME - KHARIF (2016)

EXPERIMENT-1

TITLE **COLLECTION, MAINTENANCE AND EVALUATION OF SORGHUM GERMPLASM**

OBJECTIVE To evaluate sorghum lines/ genotypes possessing high grain /fodder yield potential from collected germplasm.

RESEARCH WORKER (S) Muhammad Imran Khan and Waheed Arshad

DURATION Continuous

LOCATION Barani Agricultural Research Station, Fateh Jang.

TREATMENTS/ METHODOLOGY Entries : 45
Plot Size : 2 rows of 5m length
Data regarding days to 50% heading, days to maturity, plant height, and grain/fodder yield per plot will be recorded. New genotypes will be collected for further testing.

PREVIOUS YEAR'S

RESULTS 40 entries were evaluated last year. Seed of the entries was collected from the selected plants for the maintenance of germplasm. Data on yield and its components are presented as under:

Data of yield & its components in Sorghum Germplasm

Sr. #	Characters	Range
1	Days to 50% flowering	58-88
2	Days to 50% maturity	103-135 days
3	Plant height	145-265 cm
4	Grain Yield	510-740 kg/ha

5	Fodder yield	21-29 t/ha

EXPERIMENT 2

TITLE **GENETIC IMPROVEMENT THROUGH HYBRIDIZATION IN SORGHUM**

OBJECTIVE Hybridization of various genotypes possessing high fodder/grain yield and drought resistant to obtain new recombinants.

RESEARCH WORKER (S) **Muhammad Imran Khan, Muhammad Zeeshan, Waheed Arshad and Shiraz Ali**

DURATION Continuous

LOCATION Barani Agricultural Research Station, Fateh Jang.

TREATMENTS/

METHODOLOGY Parents possessing desirable characters like stay green; disease and drought tolerance and fodder/grain yield will be recombined. This year 15 crosses are planned among the selected genotypes of sorghum. Moreover crosses/progenies with desirable characters will be selected from various sorghum filial generations to further proceed for varietal development.

PREVIOUS YEAR'S RESULTS Last year 12 crosses were attempted, out of which 5 were successful. Moreover, Forty nine entries in filial generations F_1, F_2, F_3, F_4 and F_5 of sorghum were evaluated for their performance and 08 F_1, 06 F_2, 20F_3 and 06 F_4 and 02F_5entries were selected.

Filial Generation	Entries Studied	Entries Selected
Fresh Crosses	12 Attempted	07 Successful
F_1	08	08
F_2	08	06
F_3	23	20
F_4	07	06
F_5	03	02

EXPERIMENT-3

TITLE **SORGHUM PRELIMINARY FODDER YIELD TRIAL**

OBJECTIVE To evaluate elite Sorghum lines under rain fed conditions for their fodder yield.

RESEARCH WORKER (S) Muhammad Imran Khan, Muhammad Zeeshan and Shiraz Ali

DURATION 2016
LOCATION Barani Agricultural Research Station, Fateh Jang.
TREATMENTS/ along with METHODOLOGY The research material will be supplied by BARI, Chakwal sowing plan.
PREVIOUS YEAR'S RESULTS

Sr. No.	Name of Entry/ Code	Fodder Yield (t/ha)
1	3	42.36
2	8	38.19
3	5	37.73
4	2	37.50
5	7	36.81
6	4	36.81
7	1	35.42
8	6	34.72
LSD = 5.12		CV(%) = 7.11

EXPERIMENT-4

TITLE **MUNG NATIONAL UNIFORM YIELD TRIAL**

OBJECTIVE To evaluate elite Mung genotypes under rain fed conditions for their grain yield.

RESEARCH WORKER (S) Muhammad Imran Khan, Waheed Arshad, Shiraz Ali and Ali Nawaz

DURATION 2016
LOCATION Barani Agricultural Research Station, Fateh Jang.
TREATMENTS/ The research material will be supplied by NARC, Islamabad along with sowing plan
METHODOLOGY .
PREVIOUS YEAR'S RESULTS

Sr. No.	Name of Entry/ Code	Grain Yield (kg/ha)	Sr. No.	Name of Entry/ Code	Grain Yield (kg/ha)
1	106	868.06	11	107	482.64
2	119	715.28	12	109	475.69
3	117	684.03	13	120	475.69
4	114	600.69	14	116	461.81

5	111	579.86	15	113	454.86
6	112	572.92	16	103	451.39
7	115	513.89	17	102	420.14
8	110	510.42	18	105	350.69
9	118	493.06	19	108	343.75
10	101	489.58	20	104	309.03
LSD = 192.14				CV(%) = 9.45	

EXPERIMENT-5

TITLE **MASH NATIONAL UNIFORM YIELD TRIAL**

OBJECTIVE To evaluate Mash genotypes under rain fed conditions for their grain yield performance.

RESEARCH WORKER (S) Muhammad Imran Khan, Muhammad Zeeshan, Shiraz Ali and Ali Nawaz

DURATION 2016

LOCATION Barani Agricultural Research Station, Fateh Jang.

TREATMENTS/ METHODOLOGY The research material will be supplied by NARC, Islamabad along with sowing plan.

PREVIOUS YEAR'S RESULTS

Sr. No.	Name of Entry/ Code	Grain Yield (kg/ha)
1	103	600.69
2	106	559.03
3	108	437.50
4	101	420.14
5	105	388.89
6	104	378.47
7	102	361.11
8	107	312.50
LSD = 165.11		CV(%) = 10.33