All India Coordinated Research Project on Weed Management

TECHNICAL PROGRAMME

2024-25 and 2025-26

ICAR-Directorate of Weed Research
Maharajpur, Adhartal, Jabalpur
482004 (M.P.)

WP 1 Development of location-specific sustainable weed management practices

WP 1.1 Weed management in major crops and cropping systems

WP 1.1.1. Sustainable management of major weeds in dry direct-seeded rice (DSR)

Network Centres: CSKHPKV Palampur, CCSHAU Hisar, OUAT Bhubaneswar, UAS Bengaluru, BCKV Kalyani, GBPUAT Pantnagar, AAU Anand, PAJANCOA & RI Puducherry, BAU Sabour, ICAR-DWR and BUAT Banda

Objectives:

1. To study the weed dynamics and productivity of rice influenced by weed management practices in dry DSR.
2. To determine bio-efficacy of herbicide combinations for managing major weeds in dry DSR.
3. To monitor weed flora shift as influenced by weed management practices.

Treatments:

1. Pendimethalin 38.4% + pyrazosulfuron ethyl 0.85% ZC 785 g/ha as PE *fb* florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha PoE (25 DAS).
2. Pretilachlor 30.0% + pyrazosulfuron ethyl 0.75% WG 615 g/ha PE *fb* florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha PoE (25 DAS).
3. Pyrazosulfuron ethyl 22.5 g/ha as PE *fb* florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha PoE (25 DAS).
4. Pendimethalin 38.4% + pyrazosulfuron ethyl 0.85% ZC 785 g/ha as PE *fb* bispyribac-sodium 25 g/ha + [(metsulfuron methyl + chlorimuron ethyl) (RM)] 4 g/ha (TM) as PoE (25 DAS) / Bispyribac-sodium 38% + chlorimuron ethyl 2.5%+ metsulfuron Methyl 2.5% (w/w) WG 43 (15.63+25) g/ha (RM) PoE (25 DAS).
5. Penoxsulam + pendimethalin (RM) 625 g/ha as PE *fb* fenoxaprop-ethyl 67g/ha + ethoxysulfuron 18 g/ha (Tank-mix) as PoE (25 DAS).
6. Florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha PoE (18-20 DAS).
7. Bispyribac-sodium + chlorimuron ethyl + metsulfuron methyl (RM) 43 g/ha as PoE (18-20 DAS).
8. Partially weedy check.

Experimental details:

Design: RBD, Replication: Three

Observations:

1. Phytosociological study of major weeds at 20, 40, 60 DAS and at harvest
2. Weed dry weight at 20, 40, 60 DAS and at harvest
3. Weed control efficiency at 20, 40 and 60 DAS
4. Yield and yield attributes
5. Economics

* Seed rate and variety specific to the area for DSR will be used.

WP 1.1.2. Weed management in puddled wet direct-seeded rice (DSR)

Network Centres: IGKV Raipur, OUAT Bhubaneswar, AAU Jorhat, BCKV Kalyani, TNAU Coimbatore and BAU Sabour

Objectives:

1. To study the weed dynamics and productivity of rice influenced by weed management practices in puddled wet DSR.
2. To determine bio-efficacy of herbicide combinations for managing major weeds and to find out suitable weed management practices for puddled wet DSR.
3. To monitor weed flora shift as influenced by weed management practices.

Treatments:

1. Pendimethalin 38.4% + pyrazosulfuron ethyl 0.85% ZC 785 g/ha as PE *fb* bispyribac-sodium 25 g/ha + [(metsulfuron methyl + chlorimuron ethyl) (RM)] 4 g/ha (TM) as PoE (25-30 DAS)/bispyribac-sodium 38% + chlorimuron ethyl 2.5%+ metsulfuron Methyl 2.5% (w/w) WG 43 g/ha (RM) PoE (25-30 DAS).
2. Penoxsulam + pendimethalin (RM) 625 g/ha as PE *fb* fenoxaprop-ethyl 67g/ha + ethoxysulfuron 18 g/ha (Tank-mix) as PoE (25-30 DAS).
3. Pretilachlor 30.0% + pyrazosulfuron ethyl 0.75% WG 615 g/ha PE *fb* florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha PoE (25-30 DAS).

4. Florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha as PoE (25 DAS).
5. Florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha as PoE (25 DAS) *fb* mechanical weeding through ambika weeder/low land weeder/brush cutter with rotary attachment at 40 DAS.
6. Pretilachlor 30.0% + pyrazosulfuron ethyl 0.75% WG 615 g/ha PE *fb* mechanical weeding through ambika weeder/low land weeder/brush cutter with rotary attachment at 30-35 DAS.
7. Mechanical weeding through ambika weeder/low land weeder/brush cutter with rotary attachment at 20 and 40 DAS.
8. Partially weedy check.

Sowing will be executed through drum seeder (direct paddy seeder) machine to place the pre-germinated seeds in rows immediately after puddling.

Experimental details:

Design: RBD, Replication: Three

Observations:

1. Phytosociological study of major weeds at 20, 40, 60 DAS and at harvest
2. Weed dry weight at 20, 40, 60 DAS and at harvest
3. Weed control efficiency at 20, 40 and 60 DAS
4. Yield and yield attributes
5. Economics

WP 1.1.3. Effect of irrigation timing after application of pre-emergence herbicide and weed management in dry direct-seeded rice

Network Centres: IGKV Raipur and OUAT Bhubaneswar**.**

Objectives:

1. To study the weed dynamics and productivity of rice influenced by weed management practices in dry DSR.
2. To determine bio-efficacy of herbicide combinations for managing major weeds and to find out suitable weed management practices for dry DSR.
3. To monitor weed flora shift as influenced by combination of irrigation timing and weed management practices.

Treatments:

Main plot: Timing of irrigation after herbicide (Pretilachlor 30.0% + pyrazosulfuron ethyl 0.75% WG 615 g/ha as PE) application

1. IR 1: 1 day after application (DAA)
2. IR 2: 3 DAA
3. IR 3: 5 DAA
4. IR 4: Application of irrigation immediately after sowing *fb* immediate application of herbicide within 1 day after sowing

Sub-plot: Weed management with the application of post-emergence herbicides (PoE)

1. Fenoxaprop-ethyl 67 g/ha + ethoxysulfuron 18 g/ha (Tank-mix) as PoE (25-30 DAS) DAS).
2. Bispyribac-sodium + chlorimuron ethyl + metsulfuron Methyl (RM) 43 g/ha as PoE (25-30 DAS).
3. Florpyrauxifen-benzyl 2.13% w/w + Cyhalofop-butyl 10.64% w/w EC (RM) 150 g/ha PoE (25-30 DAS).
4. Partially weedy check.

Experimental details:

Design: Split-plot, Replications: Three

Observations:

1. Phytosociological study of major weeds at 20, 30, 60 DAS and at harvest.
2. Weed dry weight at 20, 30, 60 DAS and at harvest.
3. Weed control efficiency against major weeds at 20, 30 and 60 DAS.
4. Yield and yield attributes.
5. Economics.

WP 1.1.4. Drone based application of herbicides

Comparative assessment of bio-efficacy of herbicides applied through drone and knapsack sprayer/power sprayer in different crops.

Network Centres: PJTSAU Hyderabad, IGKV Raipur, GBPUAT Pantnagar, PDKV Akola, TNAU Coimbatore, MPUAT Udaipur, RVSKVV Gwalior, SKUAST Jammu and ANGRAU Guntur

Objectives:

1. To study the bio-efficacy of herbicides applied through drone and knapsack sprayer in crops.
2. To study the effect of treatments on weeds and productivity of crops.

Note: In drone experiment the volume of water will be 25 lit/ha for Drone, and in knapsac sprayer 500 lit/ha (PE), 375 lit/ha (PoE/EPoE) and 250 lit/ha (Power sprayer). Drone experiment will be conducted in RBD with three replications)

Centre: PJTSAU, Hyderabad

Drone based application of herbicides in transplanted rice

Treatments:

No.	Treatment	Dose	Time of application
1.	Bispyribac sodium 10% SC applied with drone	25 g/ha	PoE (20-25 DAT)
2.	Penoxsulam 1.02 % + cyhalofop-butyl 5.1% OD applied with drone	135 g/ha	PoE (20-25 DAT)
3.	Triafamone 20% + ethoxysulfuron l0% WG applied with drone	66.5 g/ha	PoE (20-25 DAT)
4.	Florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC applied with drone	150 g/ha	PoE (20-25 DAT)
5.	Bispyribac sodium 10% SC applied with knapsack sprayer	25 g/ha	PoE (20-25 DAT)
6.	Penoxsulam 1.02 % + cyhalofop-butyl 5.1% OD applied with knapsack sprayer	135 g/ha	PoE (20-25 DAT)
7.	Triafamone 20% + ethoxysulfuron l0% WG applied with knapsack sprayer	66.5 g/ha	PoE (20-25 DAT)
8.	Florpyrauxifen-benzyl 2.13% w/w + Cyhalofop-butyl 10.64% w/w EC applied with knapsack sprayer	150 g/ha	PoE (20-25 DAT)
9.	Weed free (2 HW at 20 and 40 DAS)		
10.	Weedy check		

- Design: RBD, Replications: Three
- Spray volume with drone: 25 lit/ha
- Spray height with drone: 2 m above the crop canopy
- Spray volume with knapsack sprayer : 375 lit/ha

Observations:

1. Phytosociological study of weed flora at 20, 40, 60 DAT and harvest
2. Weed dry weight at 20, 40, 60 DAT and harvest
3. Weed control efficiency at 20, 40, 60 DAT and harvest
4. Phyto-toxicity of herbicides on rice crop (If any)
5. Yield and yield attributes of rice
6. Economics

Centre: IGKV, Raipur

Drone based application of herbicides in dry direct-seeded rice (DSR).

Treatments:

1.	Pyrazosulfuron ethyl 20 g/ha as PE through drone
2.	Penoxsulam + cyhalofop-p-butyl (RM) 135 g/ha as PoE (20 DAS) through drone
3.	Bispyribac-sodium 25 g/ha as PoE (20 DAS) through drone
4.	Metsulfuron + chlorimuron (RM) 4 g/ha as PoE (20 DAS) through drone
5.	Pyrazosulfuron ethyl 20 g/ha as PE through knapsack sprayer
6.	Penoxsulam + cyhalofop-p-butyl (RM) 135 g/ha as PoE (20 DAS) through knapsack sprayer

7.	Bispyribac-sodium 25 g/ha as PoE (20 DAS) through knapsack sprayer
8.	Metsulfuron + chlorimuron (RM) 4 g/ha as PoE (20 DAS) through knapsack sprayer
9.	Partially weedy check

Design: RBD Replications: Three

- Spray volume with drone: 25 lit/ha
- Spray height with drone: 2 m above the crop canopy
- Spray volume with knapsack sprayer: 375 lit/ha for PoE/EPoE and 500 lit/ha for PE

Observations:

1. Phytosociological study of weed flora at 20, 40, 60 DAS and harvest
2. Weed dry weight at 20, 40, 60 DAS and harvest
3. Weed control efficiency at 20, 40 and 60 DAS
4. Phyto-toxicity of herbicides on rice crop (If any)
5. Yield and yield attributes of rice
6. Economics

Centre: GBPUAT, Pantnagar

Drone based application of herbicides in transplanted rice

Treatments:

S. No.	Treatments	Dose (g/ha)	Time of application
1.	Florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC (RM) 150 g/ha drone spraying 25 lit/ha	150	PoE
2.	Bispyribac Sodium 10% SC 25 g/ha drone spraying 25 lit/ha	25	PoE
3.	Penoxsulam 1.02 % + cyhalofop-butyl 5.1% OD (RM) 135 g/ha drone spraying 25 lit/ha	135	PoE
4.	Florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC (RM) 150 g/ha Knapsack spraying 375 lit/ha	150	PoE
5.	Bispyribac Sodium 10% SC 25 g/ha Knapsack spraying 375 lit/ha	25	PoE
6.	Penoxsulam 1.02 % + cyhalofop-butyl 5.1% OD (RM) 135 g/ha Knapsack spraying 375 lit/ha	135	PoE
7.	Weedy check	-	-

- Design: RBD, Replications: Three
- Spray volume with drone: 25 lit/ha
- Spray height with drone: 2 m above the crop canopy
- Spray volume with knapsack sprayer: 375 lit/ha

Observations:

1. Phytosociological study of weed flora at 20, 40, 60 DAT and harvest
2. Weed dry weight at 20, 40, 60 DAT and harvest
3. Weed control efficiency at 20, 40, 60 DAT and harvest
4. Phyto-toxicity of herbicides on rice crop (If any)
5. Yield and yield attributes of rice
6. Economics

Centre: PDKV, Akola

Drone based application of herbicides in soybean

Treatments:

S.No.	Treatment
1.	Diclosulam 84% WDG 26 g/ha as PE (0-3 DAS) through drone
2.	Diclosulam 84% WDG 26 g/ha as PE (0-3 DAS) through power sprayer
3.	Propaquizafop 2.5%+ imazethapyr 3.75% ME 125 g/ha as POE (15-20 DAS) through drone
4.	Propaquizafop 2.5%+ imazethapyr 3.75% 125 g/ha as POE (15-20 DAS) through power sprayer
5.	Farmers practice (1 Hoeing and 1 HW)
6.	Weedy check

- Design: RBD Replications: Three

- Spray volume with drone: 25 lit/ha
- Spray height with drone: 2 m above the crop canopy
- Spray volume with power sprayer: 250 lit/ha

Observations:

1. Phytosociological study of weed flora at 20, 40, 60 DAS and harvest
2. Weed dry weight at 20, 40, 60 DAS and harvest
3. Weed control efficiency at 20, 40, 60 DAS and harvest
4. Phyto-toxicity of herbicides on soybean (If any)
5. Yield and yield attributes of soybean
6. Economics

Centre: TNAU, Coimbatore

Drone based application of herbicides in transplanted rice

Treatments:

No.	Treatment
1.	Florpyraxifen- benzyl 2.13% w/w + cyhalofop- butyl 10.64% w/w EC (RM) 150 g/ha as PoE, drone spraying 25 lit/ha
2.	Bispyribac sodium 25 g/ha as PoE, drone spraying 25 lit/ha
3.	Penoxsulam + cyhalofop- butyl (RM) 135 g/ha as PoE drone spraying 25 lit/ha
4.	Florpyraxifen- benzyl 2.13% w/w + cyhalofop- butyl 10.64% w/w EC (RM) 150 g/ha as PoE, Knapsack spraying 375 lit/ha
5.	Bispyribac sodium 25 g/ha (Farmers' practice) as PoE, Knapsack spraying 375 lit/ha
6.	Penoxsulam + cyhalofop- butyl (RM) 135 g/ha as PoE, Knapsack spraying 375 lit/ha
7.	Weedy check

- Design: RBD Replications: Three
- Spray volume with drone: 25 lit/ha
- Spray height with drone: 2 m above the crop canopy
- Spray volume with knapsack sprayer: 375 lit/ha

Observations:

1. Phytosociological study of weed flora at 20, 40, 60 DAT and harvest
2. Weed dry weight at 20, 40, 60 DAT and harvest
3. Weed control efficiency at 20, 40, 60 DAT and harvest
4. Phyto-toxicity of herbicides on rice (If any)
5. Yield and yield attributes of rice
6. Economics

Centre: MPUAT, Udaipur

Drone based application of herbicides in wheat and maize

Treatments of wheat:

S.No.	Treatment
1.	Carfentrazone + sulfosulfuron 20+25 g/ha (RM) as PoE at 35 DAS with drone
2.	Pinoxaden + metsulfuron 60+4 g/ha (TM) as PoE at 35 DAS with drone
3.	Mesosulfuron + iodosulfuron 12+2.4 g/ha (RM) as PoE at 35 DAS with drone
4.	Pendimethalin + pyroxasulfone 1000+127.5 g/ha (TM) as PE with drone
5.	Carfentrazone + sulfosulfuron 20+25 g/ha (RM) as PoE at 35 DAS with knapsack sprayer
6.	Pinoxaden + metsulfuron 60+4 g/ha (TM) as PoE at 35 DAS with knapsack sprayer
7.	Mesosulfuron + iodosulfuron 12+2.4 g/ha (RM) as PoE at 35 DAS with knapsack sprayer
8.	Pendimethalin + pyroxasulfone 1000+127.5 g/ha (TM) as PE with knapsack sprayer
9.	Weedy check

Treatments of maize:

S.No.	Treatment
1.	Atrazine + tembotrione (TM) (500 +120) g/ha as EPoE (15 DAS) with drone
2.	Atrazine + topramezone (500 + 25.2) g/ha TM as EPoE (15 DAS) with drone
3.	Atrazine + mesotrione (RM) 875 g/ha as PoE (20 DAS) with drone
4.	Atrazine 750 g/ha (PE) *fb* mechanical weeding at 35-40 DAS with drone
5.	Atrazine + tembotrione (TM) (500 +120) g/ha as EPoE (15 DAS) with knapsack sprayer

6.	Atrazine + topramezone (500 + 25.2) g/ha TM as EPoE (15 DAS) with knapsack sprayer
7.	Atrazine + mesotrione (RM) 875 g/ha as PoE (20 DAS) with knapsack sprayer
8.	Atrazine 750 g/ha (PE) *fb* mechanical weeding at 35-40 DAS with knapsack sprayer
9.	Weedy check

- Design: RBD, Replications: Three
- Spray volume with drone: 25 lit/ha
- Spray height with drone: 2 m above the crop canopy
- Spray volume with knapsack sprayer: 375 lit/ha for PoE/EPoE and 500 lit/ha for PE

Observations:

1. Phytosociological study of weed flora at 20, 40, 60 DAS and harvest
2. Weed dry weight at 20, 40, 60 DAS and harvest
3. Weed control efficiency at 20, 40, 60 DAS and harvest
4. Phyto-toxicity of herbicides on wheat and maize (If any)
5. Yield and yield attributes of wheat and maize
6. Economics

Centre: RVSKVV, Gwalior

Drone based application of herbicides in sorghum

Treatments:

S. No.	Treatments
1.	Atrazine 750 g/ha (PE) *fb* 2,4-D Ethyl ester 500 g/ha as PoE (20 DAS) application with drone
2.	Atrazine 750 g/ha (PE) *fb* 2,4-D Ethyl ester 500 g/ha as PoE (20 DAS) application with knapsack sprayer
3.	Atrazine 750 g/ha (PE) *fb* 2,4-D dimethylamine salt 750 g/ha as PoE (20 DAS) application with drone
4.	Atrazine 750 g/ha (PE) *fb* 2,4-D dimethylamine salt 750 g/ha as PoE (20 DAS) application with knapsack sprayer
5.	Atrazine + topramezone (TM) (500 +18.9) g/ha EPoE (15 DAS) application with drone
6.	Atrazine + topramezone (TM) (500 +18.9) g/ha EPoE (15 DAS) application with knapsack sprayer
7.	Atrazine 500 g/ha PE application with drone *fb* echanical weeding at 30 DAS
8.	Atrazine 500 g/ha PE application with knapsack sprayer *fb* Mechanical weeding at 30 DAS
9.	Weedy check

- Design: RBD, Replications: Three
- Spray volume with drone: 25 lit/ha
- Spray height with drone: 2 m above the crop canopy
- Spray volume with knapsack sprayer: 375 lit/ha for PoE/EPoE and 500 lit/ha for PE

Observations:

1. Phytosociological study of weed flora at 20, 40, 60 DAS and harvest
2. Weed dry weight at 20, 40, 60 DAS and harvest
3. Weed control efficiency at 20, 40, 60 DAS and harvest
4. Phyto-toxicity of herbicides on sorghum (If any)
5. Yield and yield attributes of sorghum
6. Economics

Centre: SKUAST, Jammu

Drone based application of herbicides in wheat.

Treatments:

S.No.	Treatments
1.	Pyroxasulfone 127.5 g/ha PE spray by Drone
2.	Pyroxasulfone 127.5 g/ha PE spray by Knapsack sprayer
3.	Clodinafop-propargyl + metsulfuron 60 + 4 g/ha PoE spray by Drone
4.	Clodinafop-propargyl + metsulfuron 60 + 4 g/ha PoE spray by Knapsack sprayer
5.	Pyroxasulfone 127.5 g/ha PE *fb* clodinafop-propargyl + metsulfuron 60 + 4 g/ha PoE spray

	by Drone
6.	Pyroxasulfone 127.5 g/ha PE *fb* clodinafop-propargyl + metsulfuron 60 + 4 g/ha PoE spray by Knapsack sprayer
7.	Metribuzin 200 g/ha at 30 DAS spray by Drone
8.	Metribuzin 200 g/ha at 30 DAS spray by Knapsack sprayer
9.	Weedy check

- Design: RBD, Replications: Three
- Spray volume with drone: 25 lit/ha
- Spray height with drone: 2 m above the crop canopy
- Spray volume with knapsack sprayer: 375 lit/ha for PoE/EPoE and 500 lit/ha for PE

Observations:

1. Phytosociological study of weed flora at 20, 40, 60 DAS and harvest
2. Weed dry weight at 20, 40, 60 DAS and harvest
3. Weed control efficiency at 20, 40, 60 DAS and harvest
4. Phyto-toxicity of herbicides on wheat (If any)
5. Yield and yield attributes of wheat
6. Economics

Centre: ANGRAU, Guntur

Drone based application of herbicides in blackgram.

Treatments:

S.No.	Treatments
1.	Propoaquizafop 2.5 % + imazethapyr 3.75 % (RM) 125 g/ha as PoE at 15 DAS using drone
2.	Fluazifop p butyl 11.1 + fomensafen 11.1 % SL 250 g/ha as PoE at 20 DAS using drone
3.	Imazethapyr 35 % + imazomax 35 % WG 70 g/ha as PoE at 20 DAS using drone
4.	Propoaquizafop 2.5 % + imazethapyr 3.75 % (RM) 125 g/ha as PoE at 15 DAS using knapsack sprayer
5.	Fluazifop p butyl 11.1 + fomensafen 11.1 % SL 250 g/ha as PoE at 20 DAS using knapsack sprayer
6.	Imazethapyr 35 % + imazomax 35 % WG 70 g/ha as PoE at 20 DAS using knapsack sprayer
7.	Weed check

- Design: RBD, Replications: Three
- Spray volume with drone: 25 lit/ha
- Spray height with drone: 2 m above the crop canopy
- Spray volume with knapsack sprayer: 375 lit/ha for PoE/EPoE and 500 lit/ha for PE

Observations:

1. Phytosociological study of weed flora at 20, 40 and 60 DAS
2. Weed dry weight at 20, 40 and 60 DAS
3. Weed control efficiency at 20, 40 and 60 DAS
4. Phyto-toxicity of herbicides on blackgram (If any)
5. Yield and yield attributes of blackgram
6. Economics

WP 1.1.5. Screening of chickpea cultivars for topramezone selectivity

Network Centres: PJTSAU Hyderabad, AAU Anand, MPUAT Udaipur, RVSKVV Gwalior, PDKV Akola, BUAT Banda and ANGRAU Guntur

Note: Each centre will select as many cultivars as possible based on availability and their zonal recommendations

Objective:

1. To study the effect of different doses of Topramezone on weeds, phyto-toxicity on chickpea plants and productivity of chickpea cultivars.

Centre: PJTSAU, Hyderabad
Treatments: 27:
Factor 1: Chickpea cultivars-9

1. JG 11 (Desi variety)
2. JG 14 (Desi variety)
3. NBeG 3 (Desi variety)
4. NBeG 47 (Desi variety)
5. NBeG 857 (Desi variety)
6. KAK 2 (Kabuli variety)
7. Phule G 95311 (Kabuli variety)
8. Jaki 9218 (Kabuli variety)
9. NBeG 119 (Kabuli variety)

Factor 2: Topramezone doses-3

1. Topramezone 336 g/l SC at 15.0 g/ha as PoE at 20 DAS
2. Topramezone 336 g/l SC at 20.0 g/ha as PoE at 20 DAS
3. Topramezone 336 g/l SC at 25.2 g/ha as PoE at 20 DAS

Weedy check and weed-free treatments will be maintained outside the lay out.
Design: Factorial RBD; Replications: Three
Observations:

1. Phyto-toxicity of topramezone on chickpea cultivars (if any).
2. Phytosociological study of weed flora at 20, 40 and 60 DAS
3. Weed dry weight at 20, 40 and 60 DAS
4. Weed control efficiency at 20, 40 and 60 DAS
5. Yield and yield attributes of chickpea cultivars
6. Economics

(Note: cultivars will be changed based on the seed availability)

Centre: MPUAT, Udaipur
Treatments: 27
Factor 1: Chickpea cultivars-9

1. JG 11 (Desi variety)
2. JG 14 (Desi variety)
3. NBeG 3 (Desi variety)
4. NBeG 47 (Desi variety)
5. NBeG 857 (Desi variety)
6. KAK 2 (Kabuli variety)
7. Phule G 95311 (Kabuli variety)
8. Jaki 9218 (Kabuli variety)
9. NBeG 119 (Kabuli variety)

Factor 2: Topramezone doses-3

1. Topramezone 336 g/l SC at 15.0 g/ha as PoE at 20 DAS
2. Topramezone 336 g/l SC at 20.0 g/ha as PoE at 20 DAS
3. Topramezone 336 g/l SC at 25.2 g/ha as PoE at 20 DAS

Weedy check and weed-free treatments will be maintained outside the lay out.
Design: Factorial RBD, Replications: Three
Observations:

1. Phyto-toxicity of topramezone on chickpea cultivars (if any).
2. Phytosociological study of weed flora at 20, 40 and 60 DAS
3. Weed dry weight at 20, 40 and 60 DAS
4. Weed control efficiency at 20, 40 and 60 DAS
5. Yield and yield attributes of chickpea cultivars
6. Economics

Centre: ANGRAU, Guntur
Treatments: 24
Factor 1: Chickpea cultivars-8

1. NBeG-452 (Desi)

2. JG-11 (Desi)
3. Jaki-9218 (Kabuli)
4. KAK-2 (Kabuli)
5. NBeG 3 (Desi)
6. NBeG 47 (Desi)
7. NBeG 119 (Kabuli)
8. NBeG 49 (Desi)

Factor 2: Topramezone doses-3

1. Topramezone 336 g/l SC at 15.0 g/ha as PoE at 20 DAS
2. Topramezone 336 g/l SC at 20.0 g/ha as PoE at 20 DAS
3. Topramezone 336 g/l SC at 25.2 g/ha as PoE at 20 DAS

Weedy check and weed-free treatments will be maintained outside the lay out.

Design: Factorial RBD, **Replications:** Three

Observations:

1. Phyto-toxicity of topramezone on chickpea cultivars (if any).
2. Phytosociological study of weed flora at 20, 40 and 60 DAS
3. Weed dry weight at 20, 40 and 60 DAS
4. Weed control efficiency at 20, 40 and 60 DAS
5. Yield and yield attributes of chickpea cultivars
6. Economics

Centre: RVSKVV, Gwalior

Treatments: 30

Factor 1: Chickpea cultivars-10

1. RVG 202 (Desi)
2. RVG 203 (Desi)
3. RVG 204 (Desi)
4. RVKG 121 (Kabuli)
5. RVKG 111 (Kabuli)
6. RVKG 151 (Kabuli Large)
7. RVG 210 (Desi)
8. BG (Pusa Manav) 20211
9. RVKG 2020 (Kabuli)
10. RVKG 2K21 (Kabuli Large)

Factor 2: Topramezone doses-3

1. Topramezone 336 g/l SC at 15.0 g/ha as PoE at 20 DAS
2. Topramezone 336 g/l SC at 20.0 g/ha as PoE at 20 DAS
3. Topramezone 336 g/l SC at 25.2 g/ha as PoE at 20 DAS

Weedy check and weed-free treatments will be maintained outside the lay out.

Design: Factorial RBD, Replications: Three

Observations:

1. Phyto-toxicity of topramezone on chickpea cultivars (if any).
2. Phytosociological study of weed flora at 20, 40 and 60 DAS
3. Weed dry weight at 20, 40 and 60 DAS
4. Weed control efficiency at 20, 40 and 60 DAS
5. Yield and yield attributes of chickpea cultivars
6. Economics

AAU Anand, PDKV Akola and BUAT Banda will follow similar technical programme with the cultivars as many as possible based on availability and there zonal recommendations.

WP 1.1.6. Management of *Phalaris minor* in wheat

Network Centres: AAU Anand, MPUAT Udaipur, SKUAST Jammu and RVSKVV Gwalior

Objectives:

1. To study the bio-efficacy of herbicide combinations against complex weed flora in wheat
2. To study the weed dynamics and productivity of wheat as influenced by weed management practices

Treatments:

1. Flumioxazin 50% SC 125 g/ha as PE
2. Pyroxasulfone 85% WG 127.5 g/ha as PE
3. Flumioxazin 50% SC 125 g/ha as PE *fb* clodinafop-propargyl 15% WP 60 g/ha as PoE
4. Pyroxasulfone 85% WG 127.5 as PE *fb* clodinafop-propargyl 15% WP 60 g/ha as PoE
5. Pendimethalin 35% + metribuzin 3.5% w/w SE 875+87.5 g/ha as PE
6. Carfentrazone ethyl 20% + sulfosulfuron 25% WG 20+25 g/ha as PoE
7. Clodinafop propargyl 15% + metsulfuron-methyl 1% WP 60+4 g/ha as PoE
8. Clodinafop propargyl 9% + metribuzin 20% WP (w/w) 54+120 g/ha as PoE
9. Fenoxaprop-p-ethyl 7.77% + metribuzin 13.6% w/w EC 100+175 g/ha as PoE
10. Sulfosulfuran 75%+ metsulfuron-methyl 5% WG 30+2 g/ha as PoE
11. HW at 20 and 40 DAS
12. Weedy check

Note: PE: 1-2 DAS, PoE: 25-30 DAS

Experimental Details

Design: RBD, Replication: Three

Observations:

1. Phytosociological study of weed flora at 20, 40, 60 DAS and at harvest
2. Weed dry weight at 20, 40, 60 DAS and at harvest
3. Weed control efficiency at 20, 40, 60 DAS and at harvest
4. Yield and yield attributes
5. Economics

Station trial

ST 1.1.1. Weed management in *tar-vattar* direct-seeded rice (DSR)

Centre: CCSHU, Hisar (PAU Ludhiana will assist in executing the technology)

Objectives:

1. To determine the bio-efficacy of herbicides for managing major weeds in *tar-vattar* DSR
2. To study the weed dynamics and productivity of *tar-vattar* DSR.
3. To monitor weed flora shift as influenced by weed management practices.

Treatments:

Main plot: Timing of first irrigation

1. IR 1- 7 days after sowing
2. IR 2 -14 days after sowing
3. IR 3 -21 days after sowing

Sub-plot: Weed management treatments:

1. Pendimethalin 38.4% + pyrazosulfuron ethyl 0.85% ZC 785 g/ha as PE *fb* florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha as PoE (20-25 DAS)
2. Pretilachlor 30.0% + pyrazosulfuron ethyl 0.75% WG 615 g/ha PE *fb* florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha as PoE (20-25 DAS)
3. Pyrazosulfuron ethyl 22.5 g/ha as PE *fb* florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha as PoE (20-25 DAS)
4. Pendimethalin 38.4% + pyrazosulfuron ethyl 0.85% ZC 785 g/ha as PE *fb* bispyribac sodium 25 g/ha + [(metsulfuron-methyl + chlorimuron-ethyl) (RM)] 4 g/ha (TM) as PoE (20-25 DAS)/ Bispyribac Sodium 38% + chlorimuron ethyl 2.5%+ metsulfuron Methyl 2.5% (w/w) WG 15.63+25 g/ha (RM) PoE (20-25 DAS)
5. Florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC 150 g/ha as PoE (20-25 DAS)
6. Partially weedy check

Experimental details:

Design: Split-plot, Replication: Three

Observations:

1. Phytosociological study of major weeds at 20, 40, 60 DAS and at harvest
2. Weed dry weight at 20, 40, 60 DAS and at harvest
3. Weed control efficiency against major weeds at 20, 40 and 60 DAS
4. Yield and yield attributes
5. Economics

* Seed rate and variety specific to the area for DSR will be used
(Each main plot will be separated by 2 m strong bunds so that water should not be moved from one main plot to another main plot while giving first irrigation. Each sub-plot will be separated by 0.5 m bund).

ST 1.1.2. Weed management in pearl millet and residual effect on succeeding mustard crop
Centre: CCSHAU, Hisar
Objectives:
1. To study the bio-efficacy of herbicides and herbicide combinations on weed growth in pearl millet.
2. To find out the phytotoxicity of herbicides if any.

Treatments:
Pearl millet
1. Atrazine 500 g/ha as PE
2. Atrazine + pendimethalin 500 + 250 g/ha as PE
3. Atrazine 500 g/ha as EPoE
4. Halosulfuron + atrazine 50 +480 g/ha as PoE
5. Halosulfuron + atrazine 56.25 +540 g/ha as PoE
6. Mesotrione + atrazine 625 g/ha as PoE
7. Mesotrione + atrazine 875 g/ha as PoE
8. Tembotrione 100 g/ha as PoE
9. Tembotrione + atrazine 80 + 500 g/ha as PoE
10. Weedy check
11. Weed free

Experimental details:
Design: RBD Replication: Three
Observations:
1. Weed density at 20, 40 and 60 DAS
2. Weed biomass at 20, 40 and 60 DAS
3. Weed control efficiency at 20, 40 and 60 DAS
4. Yield attributes and yields
5. Economics

(Mustard crop will be grown in the treated plots of pearl millet and germination count, phytotoxicity, observations on weed flora and yields of mustard crop will be taken)

ST 1.1.3. Weed management in cluster bean and residual effect on succeeding mustard crop
Centre: CCSHAU, Hisar
Objective:
1. To study the effect of herbicides on weed dynamics and productivity of cluster bean

Treatments:
1. Pendimethalin 580.5 g ai/ha PE
2. Pendimethalin 580.5 g ai/ha PRE
3. Imazethapyr 75 g/ha PoE
4. Pendimethalin + imazethaper (PE) 1000 g ai/ha PRE
5. Fluazifop-p-butyl + fomesafen (RM) 250 g/ha at 2-3 leaf stage of weed
6. Propaquizafop + imazethapyr (RM) 125 g/ha at 2-3 leaf stage of weed
7. Sodium acifluorfen + clodinofop-propargyl 245 g/ha at 2-3 leaf stage of weed
8. Imazethapyr + imazamox (RM) 70 g a.i./ha at 2-3 leaf stage of weed
9. Quizalofop ethyl + Imazethapyr- 32.81 + 65.625
10. Weedy check
11. Weed free

Experimental details:
Design: RBD Replication: Three
Observations:
1. Weed density at 20, 40 and 60 DAS
2. Weed biomass at 20, 40 and 60 DAS
3. Weed control efficiency at 20, 40 and 60 DAS

4. Yield attributes and yields
5. Economics

(Mustard crop will be grown in the treated plots of pearl millet and germination count, phytotoxicity, observations on weed flora and yields of mustard crop will be taken)

ST 1.1.4. Bio-efficacy of herbicides against complex weed flora in *kharif* blackgram

Centre: AAU, Anand

Objectives:

1. To evaluate the bio-efficacy of different herbicides on weeds in *kharif* blackgram.
2. To study the effect of different herbicides on growth and yield of *kharif* blackgram.
3. To study the herbicide residues in soil and blackgram seed.
4. To study the effect of different herbicides on soil microbial population.

Treatments:

S. No.	Treatments	Dose (g /ha)	Application Time
1.	Pendimethalin 30% EC + oxyfluorfen 23.5% EC (TM)	500+120	PE
2.	Pendimethalin 30% + imazethapyr 2% EC (RM)	800	PE
3.	Imazethapyr 10% SL	75	PE
4.	Imazethapyr 35% + imazamox 35% WG (RM)	70	PE
5.	Imazethapyr 10% SL	75	PoE
6.	Imazethapyr 35% + imazamox 35% WG (RM)	70	PoE
7.	Propaquizafop 2.5% + imazethapyr 3.75% w/w ME (RM)	125	PoE
8.	Quizalofop ethyl 7.5% + imazethapyr 15% w/w EC (RM)	98.435	PoE
9.	Sodium Acifluorfen 16.5% + clodinafop propargyl 8% EC (RM)	245	PoE
10.	Fluazifop-p-butyl 11.1% w/w + fomesafen 11.1% w/w SL (RM)	250	PoE
11.	IC *fb* HW at 15 and 30 DAS	-	-
12.	Weedy check	-	-

Note: DAS = Days after sowing; HW = Hand weeding; IC = Intercultural operations; PE = Pre-emergence (1-2 DAS); PoE = Post-emergence (15-20 DAS)

Experimental Details

Design: RBD, Replication: Three, Plot size: 3.6 m x 5 m

Observations:

1. Plant stand (no./m row length) at 15 DAS
2. Plant height (cm) at 30 and 60 DAS and at harvest
3. Weed density (no./m^2) and weed dry biomass (g/m^2) (monocot and dicot group wise) at 25 and 50 DAS and at harvest
4. Phytotoxicity on crop, if any at 7 and 14 days after herbicide application (0 to 10 scales)
5. Weed control efficiency (%)
6. Weed index (%)
7. Seed and stover yield (kg/ha)
8. Residue analysis of soil and blackgram seed at harvest
9. Soil microbial population (CFU/g) at 0, 10, 30 days after application of herbicides and at harvest

ST 1.1.5. Bio-efficacy of herbicide against complex weed flora in rice nursery

Centre: AAU, Anand

Objectives:

1. To evaluate the bio-efficacy of different herbicides against complex weed flora in rice nursery.
2. To study the effect of different herbicides on growth of rice seedling.
3. To study the phyto-toxicity of different herbicides applied in rice nursery.

Treatments:

S. No.	Treatments	Dose (g/ha)	Application Time
1.	Pendimethalin 38.7% CS	750	PPI
2.	Pendimethalin 30% EC	750	PE

3.	Oxyfluorfen 23.5% EC	150	PE
4.	Oxadiargyl 80% WP	90	PE
5.	Pyrazosulfuron ethyl 10% WP	10	PE
6.	Pretilachlor 30.0% + pyrazosulfuron Ethyl 0.75% WG (RM)	600 + 15	PE
7.	Bispyribac sodium 10% EC	20	EPoE
8.	Bispyribac Sodium 20% + pyrazosulfuron Ethyl 15% WDG (RM)	20+15	EPoE
9.	Penoxsulam 1.02 % + cyhalofop-butyl 5.1% OD (RM)	120	EPoE
10.	Triafamone 20% + ethoxysulfuron l0% WG (RM)	44 + 22.5	EPoE
11.	Florpyrauxifen-benzyl 1.31% w/w +penoxsulam 2.1% w/w OD (RM)	15.63 + 25	EPoE
12.	Florpyrauxifen-benzyl 2.13% w/w + cyhalofop-butyl 10.64% w/w EC (RM)	150	EPoE
13.	Fenoxaprop-p-ethyl 6.7% w/w EC	56.6	EPoE
14.	Penoxsulam 21.7% SC	20	EPoE
15.	HW at 15 DAS	-	-
16.	Weedy check	-	-

Note: PPI = 1-2 days before sowing (1-2 DBS) PE = Pre-emergence (1-2 DAS)
HW = Hand weeding EPoE= Early post-emergence (10-15 DAS)

Experimental Details

Design: RBD, Replication: Three, Plot size: 4 m x 5 m

Observations:

1. Plant stand (no./net plot) at 30 DAP
2. Plant height (cm) at 30 and 60 DAP and at harvest
3. Weed density (monocot and dicot group wise) at 30 and 60 DAP (no./m^2)
4. Weed dry biomass (monocot and dicot group wise) at 30 and 60 DAP and at harvest (g/m^2)
5. Phytotoxicity on crop, if any at 7 and 14 DAHA (EPoE and PoE) and 14 and 21 DAHA (PE) (0 to 10 scales)
6. Weed control efficiency (%)
7. Weed index (%)
8. Tuber yield (t/ha)
9. Residue analysis of soil and tuber at harvest
10. Soil microbial population at 0, 10, 30 days after application of herbicides and at harvest

ST 1.1.6. Bio-efficacy of herbicides against complex weed flora in potato

Centre: AAU Anand

Objectives:

1. To evaluate the bio-efficacy of herbicides on weeds in potato.
2. To study the effect of herbicide on growth and yield of potato.
3. To assess the herbicide residues in soil and potato tuber.
4. To study the effect of different herbicide on soil microbial population.

Treatments:

S.No.	Treatments	Dose (g/ha)	Application Time
1.	Pendimethalin 30% EC	750	PE
2.	Pendimethalin 30% EC	1000	PE
3.	Oxyfluorfen 23.5% EC	188	PE
4.	Oxyfluorfen 23.5% EC + pendimethalin 30% EC (TM)	120 + 500	PE
5.	Metribuzin 70% WP	350	PE
6.	Metribuzin 70% WP	525	PE
7.	Metribuzin 70% WP	525	EPoE
8.	Mertibuzin70% WP	525	PoE
9.	Paraquat 24% SL	500	EPoE
10.	2,4-D Dimethyl Amine salt 58% SL	464	PoE
11.	HW at 20 and 40 DAP	-	-

12.	Weedy check	-	-

Note: PE = Pre-emergence (1-2 DAP) HW = Hand weeding
EPoE = Early post-emergence (10-15 DAP) PoE= Post-emergence (25-30 DAP)

Experimental Details

Design: RBD, Replication: Three, Plot size: 4 m x 5 m

Observations:

1. Plant stand (no./net plot) at 30 DAP
2. Plant height (cm) at 30 and 60 DAP and at harvest
3. Weed density (monocot and dicot group wise) at 30 and 60 DAP (no./m^2)
4. Weed dry biomass (monocot and dicot group wise) at 30 and 60 DAP and at harvest (g/m^2)
5. Phytotoxicity on crop, if any at 7 and 14 DAHA (EPoE and PoE) and 14 and 21 DAHA (PE) (0 to 10 scales)
6. Weed control efficiency (%)
7. Weed index (%)
8. Tuber yield (t/ha)
9. Residue analysis of soil and tuber at harvest
10. Soil microbial population at 0, 10, 30 days after application of herbicides and at harvest

ST 1.1.7. Weed management in pigeonpea + soybean (1:4) intercropping system

Centre: PDKV, Akola

Objectives:

1. To develop weed management practices in pigeonpea + soybean intercropping system.
2. To study the effect of treatments on weeds and system productivity.
3. To monitor weed flora shift due to weed management.

Treatments:

1. Pendimethalin 38.7% CS 678 g/ha PE *fb* Hoeing
2. Pendimethalin 30% + imazethapyr 2% EC (RM) 960 g/ha PE
3. Diclosulam 84 WDG 26 g/ha PE
4. Imazethapyr 10% SL 75 g/ha at 7-14 DAS
5. Imazethapyr 35%+ imazamox35% WG (RM) 70 g/ha PoE at 20 DAS
6. Propaquizafop 2.5% + imazethapyr 3.75% ME (RM) 50 +75 g/ha at 15-20 DAS
7. Quizalofop ethyl 7.5% + imazethapyr 15% EC (RM) 98.435 g/ha 15-20 DAS
8. Farmers' Practice (two hoeing at 15 & 30 DAS + 1HW at 20 DAS)
9. Weedy check

Experimental Details

Design: RBD, Replications: Three

Observations:

1. Phytosociological study of weed flora at 20, 40, 60 DAS and at harvest of intercrop
2. Weed dry weight at 20, 40, 60 DAS and at harvest of intercrop
3. Weed control efficiency at 20, 40, 60 DAS and at harvest of intercrop
4. Yield and yield attributes of soybean and pigeonpea
5. Phto-toxicity of herbicides if any
6. Economics

ST 1.1.8. Weed management in pigeonpea + blackgram (2:2) intercropping system

Centre: BUAT, Banda

Objectives:

1. To develop weed management practices in pigeonpea + blackgram intercropping system.
2. To study the effect of treatments on weeds and system productivity.
3. To monitor weed flora shift due to weed management.

Treatments:

1. Pendimethalin 30 EC 1000 g/ha as PE
2. Propaquizafop+ imazethapyr (RM) 125 g/ha as PoE
3. Pendimethalin 30 EC 1000 g/ha as PE *fb* propaquizafop 100g/ha
4. Pendimethalin 30 EC 1000 g/ha as PE *fb* imazethapyr 100g/ha as PoE
5. Pendimethalin 30 EC 1000 g/ha as PE *fb* imazethapyr + imazamox (RM) 70 g/ha as PoE
6. Pendimethalin 30 EC 1000 g/ha as PE *fb* quizalofop methyl 50 g/ha as PoE

7. Weedy check

Experimental Details

Design: RBD, Replications: Three

Observations:

1. Phytosociological study of major weeds at 20, 40, 60 DAS and at harvest of intercrop
2. Weed dry weight at 20, 40, 60 DAS and at harvest of intercrop
3. WCE at 20, 40, 60 DAS and at harvest of intercrop
4. Yield and yield attributes of pigeonpea and blackgram
5. Economics

ST 1.1.9. Weed Management in direct-seeded/drill sown finger millet

Centres: MPUAT Udaipur and GBPUAT Pantnagar

Objectives:

1. To study the bio-efficacy and phyto-toxicity of herbicides in direct-seeded/drill sown finger millet.

Treatments:

S.No	Treatment
1.	Pyrazosulfuron-ethyl 15 g/ha as PE
2.	Atrazine 500 g/ha as PE
3.	Oxadiargyl 80% WP 80 g/ha at 0-3 DAS+ HW at 30 DAS/ bensulfuron methyl 0.6%+pretilachlor 6% GR (RM) at 0-3 DAS *fb* HW at 30 DAS
4.	Pendimethalin 38.7% CS 465 g/ha at 0-3 DAS + HW at 30 DAS
5.	Isoproturon 75% WP 500 g/ha at 0-3 DAS + HW at 30 DAS/ pyrazosulfuron-ethyl 15g/ha as PE *fb* Bispyribac Sodium + chlorimuron ethyl + metsulfuron methyl (RM) 43 g/ha as PoE (18-20 DAS).
6.	Bispyribac sodium 10% SC 15 g/ha at 15-20 DAS + HW at 35 DAS
7.	Pyrazosulfuron-ethyl 15 g/ha as PE *fb* 2, 4-D sodium salt 800 g/ha as PoE
8.	Atrazine 500 g/ha as PE *fb* 2, 4-D sodium salt 800 g/ha as PoE
9.	Pyrazosulfuron-ethyl 15 g/ha as PE *fb* metsulfuron-methyl + chlorimuron-ethyl 4 g/ha PoE
10.	Atrazine 500 g/ha as PE *fb* metsulfuron-methyl + chlorimuron-ethyl 4 g/ha PoE
11.	Inter-cultivation and hand weeding at 20 and 40 DAS
12.	Weedy check

Experimental Details

Design: RBD Replications: three

Observations:

1. Phytosociological study of weed flora at 20, 40 and 60 DAS
2. Weed dry weight at 20, 40 and 60 DAS
3. Weed control efficiency at 20, 40 and 60 DAS
4. Phyto-toxicity of herbicides on finger millet plants (If any)
5. Yield and yield attributes of finger millet
6. Economics

ST 1.1.10. Weed management in transplanted finger millet.

Centres: AAU Jorhat and OUAT Bhubaneswar

Objective:

1. To study the bio-efficacy of herbicides in transplanted finger millet.

Treatments:

S. No.	Treatment
1.	Pyrazosulfuran-ethyl 15 g/ha as PE
2.	Atrazine 500 g/ha as PE
3.	Pretilachlor 500 g/ha as PE
4.	Inter-cultivation at 20 DAS *fb* HW at 40 DAS
5.	Bispyribac sodium 20 g/ha at 20-25 DAT
6.	Pretilachlor + pyrazosulfuron WG 615 g/ha as PE
7.	Pretilachlor + bensulfuron 600 g/ha

8.	Pretilachlor + bensulfuron 660 g/ha
9.	Weedy check
10.	Weed-free check

Experimental details:

1. Design: RBD Replication: Three

Observations:

2. Phytosociological study of weed flora at 20, 40 and 60 DAS
3. Weed dry weight at 20, 40 and 60 DAS
4. Weed control efficiency at 20, 40 and 60 DAS
5. Phyto-toxicity of herbicides on finger millet (if any)
6. Yield and yield attributes of finger millet
7. Economics

ST 1.1.11. Evaluation of different paddy straw management techniques for their weed suppression potential in mustard

Centre: PAU, Ludhiana

Objectives:

1. To study the combination of paddy straw management and weed management practices for controlling weeds in mustard.

Treatments:

Factor A (Main plot)

1. Surface Seeding (Using Surface Seeder)
2. Happy Seeder Sowing
3. Straw removal *fb* ZTD
4. Incorporation of residues *fb* sowing

Factor B (Sub-plot): Weed management treatments

1. Pyroxasulfone 100 g/ha PoE after first irrigation
2. IWM: Pyroxasulfone 100 g/ha PoE + hand weeding of left over weeds after first irrigation
3. Weedy check

Experimental details:

Design: Split plot, Replications: Three

Observations:

1. Weed density (21 DAS, 42 DAS and at harvest)
2. Weed biomass (21 DAS, 42 DAS and at harvest)
3. Crop plant height (21, 42 DAS and at harvest)
4. Weed control index (%)
5. Yield attributes and yields

ST 1.1.12. Effect of planting methods, first irrigation timing and weed management practices on weeds dynamics and productivity of autumn potato.

Centre: PAU, Ludhiana

Objectives:

1. To evaluate the effects of planting methods, irrigation and herbicide application timing on weed dynamics, soil enzymatic activities and productivity of autumn potato.
2. To assess the residual effect of herbicides, applied in potato and on succeeding summer mung bean.

Treatments:

Factor A (Main plot). Planting method and first post sowing irrigation

1. Ridge planting (60 cm × 20 cm) with first post sowing irrigation within 2 days of planting
2. Ridge planting (60 cm × 20 cm) with first post sowing irrigation at 20 days after planting
3. Broad bed planting (2 rows) (120 cm × 20 cm) with first post sowing irrigation within 2 days of planting
4. Broad bed planting (2 rows) (120 cm × 20 cm) with first post sowing irrigation at 20 days after planting

Factor B (Sub-plot). Weed management treatments

1. Unsprayed check
2. Metribuzin 350 g/ha as pre-emergence
3. Pre-mix of flufenacet (24%) and metribuzin (17.5%) 622.5 g/ha as pre-emergence
4. Pre-mix of flufenacet (24%) and metribuzin (17.5%) 622.5 g/ha as early post-emergence
5. Metribuzin 175 g/ha as pre-emergence followed by 175 g/ha as post-emergence

Experimental Details:

Design: Split-plot, Replications: Three

Observations:

1. Emergence count at 20 days after planting (DAP)
2. Plant height at 30, 50 and 70 DAP
3. Dry matter accumulation at 30, 50 and 70 DAP
4. Total tuber yield (kg ha^{-1})
5. Marketable (> 35 g tubers) tuber yield (kg/ha)
6. Weed count at 30, 50 and 70 DAP
7. Weed biomass at 30, 50 and 70 DAP
8. Weed control efficiency (%) at 30, 50 and 70 DAP
9. Economics

ST 1.1.13. Weed management in maize through tank mixture of halosulfuron methyl with other herbicides and their residual effect on succeeding vegetable crops

Centre: PAU, Ludhiana

Treatments (Main plot): Weed management in maize

1. Halosulfuron-methyl @ 50.62 g/ha
2. Halosulfuron-methyl @ 67.5 g/ha
3. Halosulfuron-methyl @ 84.5 g/ha
4. Tembotrione @ 110.0 g/ha
5. Topramezone @ 33.6 g/ha
6. Halosulfuron-methyl @ 67.5g/ha + tembotrione @ 110.0 g/ha
7. Halosulfuron-methyl @ 67.5g/ha + topramezone @ 33.6 g/ha
8. Halosulfuron-methyl @ 50.62g/ha + tembotrione @ 82.5 g/ha
9. Halosulfuron-methyl @ 50.62g/ha+ topramezone @ 25.2 g/ha
10. Weedy check

Sub-plot: Vegetable crops

1. Potato
2. Pea
3. Cauliflower

Experimental details:

Design: Split-plot, Replications: Three

Observations:

1. Weed density and weed biomass in maize and succeeding vegetables crops at 30 days intervals and at harvest.
2. Weed control efficiency (%) in maize
3. Crop plant height (at 30 days interval and at harvest)
4. Phyto-toxicity of herbicides if any
5. Yield attributes and yields of maize and succeeding vegetable crops
6. Economics

ST 1.1.14. Evaluation of pre-and post-emergence herbicides in blackgram and its residual effect on succeeding barley crop under rainfed conditions (Collaboration with pulse Research Station, Samba, SKUAST Jammu)

Centre: SKUAST, Jammu

Objectives

1. To find out suitable pre and post-emergence herbicides for controlling weed in blackgram.
2. To assess residual effect of different herbicides on succeeding barley crop.

Treatments:

S.No.	Treatments
1.	Imazethapyr 60 g/ha as PoE
2.	Imazethapyr 75 g/ha as PoE
3.	Pendimethalin + imazethapyr (RM) 800 g/ha as PE
4.	Clodinofop propargyl 60 g/ha as PoE
5.	Imazethapyr + imazamox 70 g/ha as PoE
6.	Imazethapyr + imazamox 80 g/ha as PoE
7.	Weedy check

Experimental details:

Design: RBD, Replication: Three

Observations

1. Weed density at 20, 40 & 60 DAS
2. Weed dry weight at 20, 40 & 60 DAS
3. Weed control efficiency at 20, 40 & 60 DAS
4. Yield and yield attributes
5. Economics
6. Phyto-toxicity study on blackgram if any
7. Germination count and yield of succeeding barley crop
8. Economics

ST 1.1.15. Weed management in sunflower

Centres: PJTSAU Hyderabad and BCKV Kalyani

Objectives:

1. To study bio-efficacy and phyto-toxicity of pre and post- emergence herbicides in sunflower.

Treatments:

S. No.	Treatment	Dose	Time of application
1.	Pendimethalin 38.7 % CS	677.25 g/ha	PE
2.	Oxyflourfen 23.5% EC	100 g/ha	PE
3.	Pyroxasulfone 85% w/w WG	127.5 g/ha	PE
4.	Metolachlor 50% EC	1000 g/ha	PE
5.	Chlorimuron ethyl 25% WP	9 g/ha	PE
6.	Bentazone 480 SL	960 g/ha	PoE (20 DAS)
7.	Quizalofop ethyl 4% + Oxyfluorfen 6% EC (RM)	100 g/ha	PoE (20 DAS)
8.	Fluazifop-p-butyl 11.1% w/w + Fomesafen 11.1% w/w SL (RM)	250 g/ha	PoE (20 DAS)
9.	Sodium acifluorfen 16.5% + Clodinafop propargyl 8% EC (RM)	245 g/ha	PoE (20 DAS)
10.	2 HW at 20 and 40 DAS		
11.	Weedy check		

Experimental details:

Design: RBD, Replications: Three

Observations:

1. Phytosociological study of weed flora at 20, 40, 60 DAS and at harvest
2. Weed dry weight at 20, 40, 60 DAS and at harvest
3. Weed control efficiency at 20, 40, 60 DAS and at harvest
4. Phyto-toxicity of herbicides on sunflower plants (If any)
5. Yield and yield attributes of sunflower
6. Economics

ST 1.1.16. Weed management in dry direct-seeded rice in *ahu* season.

Centre: AAU, Jorhat

Objectives:

1. To study the bio-efficacy of herbicides in dry direct-seeded rice.
2. To find out suitable weed management practices for dry direct-seeded rice.

Treatments:

1. Pretilachlor 750 g/ha PE *fb* bispyribac-sodium 25 g/ha at 20-25 DAS
2. Pretilachlor 750 g/ha PE *fb* pyrazosulfuron 20 g/ha at 20-25 DAS
3. Pyrazosulfuron 20 g/ha PE *fb* bispyribac-sodium 25 g/ha at 20-25 DAS
4. Pretilachlor 750 g/ha PE *fb* hand weeding at 20-25 DAS
5. Pyrazosulfuron 20 g/ha PE *fb* hand weeding at 20-25 DAS
6. Metsulfuron Methyl + chlorimuron ethyl 4 g/ha at 20-25 DAS
7. Intercropping Sesbania and use as mulch 45 DAS/penoxsulam 20 g/ha at 20-25 DAS
8. Application of paddy straw *fb* hand weeding on 30 DAS
9. Intercropping of rice bean and use as mulch 45 DAS
10. Mechanical weeding at 20-25 DAS and hand weeding at 40-45 DAS
11. Weedy check
12. Weed-free check

Experimental details:

Design: RBD, Replication: Three

Observations:

1. Phytosociological study of major weeds at 20, 40, 60 DAS and at harvest
2. Weed dry weight at 20, 40, 60 DAS and at harvest
3. Weed control efficiency at 20,40, 60 DAS and at harvest
4. Yield and yield attributes
5. Economics

ST 1.1.17. Weed management in drum-seeded wetland rice

Centre: KAU, Thrissur

Objectives:

1. To study the weed dynamics and productivity of wet seeded rice as influenced by various broad-spectrum herbicides.
2. To study the efficacy of combination herbicides for managing complex weed flora in direct seeded puddled rice.

Treatments:

1. Penoxsulam + butachlor 820 g/ha (EPoE) *fb* florpyrauxifen benzyl 31.5 g/ha (PoE)
2. Penoxsulam + pendimethalin 625 g/ha (EPoE) *fb* florpyrauxifen benzyl 31.5 g/ha (PoE)
3. Pretilachlor + pyrazosulfuron ethyl 600 + 15 g/ha (EPoE) *fb* florpyrauxifen benzyl 31.5 g/ha (PoE)
4. Pyrazosulfuron ethyl 20 g/ha (EPoE) *fb* florpyrauxifen benzyl 31.5 g ai/ha (PoE) triafamone + ethoxysulfuron 18 g/ha
5. Hand weeding at 20 and 40 DAS
6. Weedy check

Note: Early post emergent herbicides will be sprayed 6-10 days after sowing of pre-germinated rice seeds

Experimental details: Design: RBD, Replication: Three

Observations:

1. Phyto-sociological study of major weeds at 20,40,60 DAS and at harvest
2. Weed dry weight at 20,40,60 DAS and at harvest
3. Weed control efficiency at 20,40, 60 DAS and at harvest
4. Yield and yield attributes
5. Economics

ST 1.1.18. Efficacy of tank mix application of herbicides with Sampoorna KAU multi-mix in rice

Centre: KAU, Thrissur

Objectives:

1. To study compatibility, weed control efficiency and economics of tank mix application of "Sampoorna" multinutrient mix of KAU with post-emergence herbicides in rice.

Treatments:

1. Bispyribac sodium 30 g/ha+ Sampoorna
2. Cyhalofop butyl+ penoxsulam (RM) 135 g/ha + Sampoorna
3. 2,4-D Na salt 1000 g/ha + Sampoorna
4. Metsulfuron methyl+ chlorimuron ethyl (RM) 4 g/ha + Sampoorna
5. Bispyribac sodium 30 kg /ha
6. Cyhalofop butyl+ penoxsulam (RM)135 g/ha
7. 2,4-D Na salt 1000 g/ha
8. Metsulfuron methyl+ chlorimuron ethyl (RM) 4 g/ha
9. Hand weeding at 20 & 40 DAT + Sampoorna
10. Hand weeding at 20& 40 DAT (without Sampoorna)
11. Weedy check (No Sampoorna)

Note: "Sampoorna" KAU multimix is a multinutrient formulation of Kerala Agricultural University recommended for foliar application. It contains Mg, S, B, Zn, Cu, Fe, Mn, and Mo and crop specific mixtures are available for rice, banana and vegetables. In rice, it is recommended to apply as foliar spray at tillering and panicle initiation stages (30 and 50 DAT), in the main field. There is possibility of saving labour cost involved in one application, if post emergent herbicides are compatible.

Note: Herbicides will be applied at 20 DAT. Herbicide application with Sampoorna at 20 DAT, and follow up spray of Sampoorna at 50 DAT (@ 10g/L). Fertilizers will be applied as per recommendations of Package of Practices of KAU. In the case of narrow spectrum herbicides, other weeds will be removed by hand weeding.

Experimental details: Design: RBD, Replication: Three

Observations:

1. Phyto-sociological study of major weeds at 20,40,60 DAS and at harvest
2. Weed dry weight at 20,40,60 DAS and at harvest
3. Weed control efficiency 20,40, 60 DAS and at harvest
4. Yield and yield attributes
5. Economics

ST 1.1.19. Soil residue analysis of pre-emergent herbicides in various soil types

Centre: KAU, Thrissur

Objective:

1. To assess the residues of soil applied herbicides and its persistence in various soil types.

Note: Soil types – Two different soil types will be included (Clay loam & Sandy loam).

Treatments:

1. Penoxsulam + butachlor 820 g/ha
2. Penoxsulam + pendimethalin 625 g/ha
3. Pretilachlor + pyrazosulfuron 615 g/ha *foliar (Mention the methodology of foliar application)
4. Pretilachlor + pyrazosulfuron 615 g/ha * soil applied
5. Pyrazosulfuron 30 g/ha
6. Control

Design: RBD Replications: 3

Methodology – Samples will be collected at 2 hrs after spraying, 10, 20, 30, 60 & 90 days from each treatment application.

ST 1.1.20. Effect of different herbicide combinations for control of complex weed flora in Fennel (*Foeniculum vulgare* Mill.) (In collaboration with ICAR-NRCSS)

Centre: MPUAT, Udaipur

Objective:

1. To study the bio-efficacy of combination of herbicides against weeds and their effect on growth and yield of fennel.

Treatment:

S.No.	Weed management treatment	Dose (g/ha)	Time of application
1.	Pendimethalin 30% EC	1000	PE
2.	Pendimethalin 30% EC *fb* hoeing 40 DAS	750	PE
3.	Pendimethalin 30% EC *fb* quizalofop-ethyl 5%	750 *fb* 40	PE *fb* PoE (3-4 leaf stage)
4.	Oxadiargyl 6% EC	100	PE
5.	Oxadiargyl 6% EC *fb* hoeing 40 DAS	75	PE
6.	Oxadiargyl 6% EC *fb* quizalofop-ethyl 5%	75 *fb* 40	PE *fb* PoE (3-4 leaf stage)

7.	Oxadiargyl 6% EC	50	PoE (3-4 leaf stage)
8.	Oxyfluorfen 23.5%	100	PE
9.	Oxyfluorfen 23.5% *fb* hoeing 40 at DAS	75	PE
10.	Oxyfluorfen 23.5% *fb* quizalofop-ethyl 5%	75 *fb* 40	PE *fb* PoE (3-4 leaf stage)
11.	Two hoeing 20 & 40 DAS		
12.	Weedy check		

Experimental details: Design: RBD Replication: 3

Observations:

1. Plant stand (no./m row length) at 15 DAS and at harvest
2. Plant height (cm) at 30 and 60 DAS and at harvest
3. Weed count (no./m2) and weed dry biomass (g/m2) (Monocot and Dicot group wise) at 20, 40, 60 DAS and at harvest
4. Phyto-toxicity on crop, if any at 7 and 14 days after herbicide application (0 to 10 scales)
5. Weed control efficiency at 20, 40, 60 DAS and at harvest
6. Yield attributes and yields
7. Residue analysis of soil, plant and pod at harvest
8. Economics

ST 1.1.21. Long-term herbicide trial in transplanted lowland rice-blackgram cropping system

Centre: TNAU, Coimbatore

Objectives:

1. To develop effective weed management practices in rice-blackgram cropping system
2. To study the effect of herbicides on weeds, productivity of rice and blackgram, and overall system productivity.

Treatments:

Main-plot: Weed management in rice

1. Bensulfuron-methyl + pretilachlor 660 g/ha as PE *fb* HW at 40 DAT
2. Bensulfuron-methyl + pretilachlor 660 g/ha as PE *fb* bispyribac-sodium 25 g/ha as PoE
3. Pyrazosulfuron-ethyl 20 g/ha as PE *fb* HW at 40 DAT
4. Pyrazosulfuron-ethyl 20 g/ha as PE *fb* penoxsulam+ cyhalofop- butyl 135g/ha as PoE
5. 2 HW at 20 and 40 DAT
6. Partially weedy (Weeds will be removed at 60 DAT after taking weed observations)

Sub-plot: Weed management in blackgram

1. Pendimethalin + imazethapyr 1.0 kg/ha as PE
2. Clodinafop–propargyl + acifluorfen sodium 185 g/ha as EPoE
3. 1 HW at 25 DAS
4. Partially weedy (weeds will be removed at 60 DAS after taking weed observations)

***Green manuring (*Dhaincha*) after summer blackgram with 1 HW at 20-25 DAS**

Design: Split-plot Replications: Three

Observations:

1. Phytosociological study of weed flora at 20, 40 and 60 DAT/DAS in rice and blackgram
2. Weed dry weight at 20, 40 and 60 DAT/DAS
3. Weed control efficiency at 20, 40 and 60 DAT/DAS
4. Weed seed bank dynamics and depletion
5. Yield and yield attributes of rice and blackgram
6. Economics

ST 1.1.22. Weed management in jute-maize cropping system

Centre: BCKV, Kalyani

Objective:

1. To develop weed management practices in jute-maize cropping system.
2. To study the effect of treatments on weeds, weed flora shift and system productivity.

Treatments:

Main plot: Weed management in jute

1. HW at 15 DAS *fb* quizalofop ethyl 5 EC 60 g/ha as PoE at 25 DAS
2. Ipfencarbazone 90 g/ha as PE* *fb* HW at 15 DAS

3. Pretilachlor 50 EC 450 g/ha as PE* *fb* HW at 25 DAS
4. Nail weeder at 15 DAS *fb* quizalofop ethyl 5 EC 60 g/ha at 25 DAS
5. Weedy check

Sub-plot: Weed management in maize

1. Atrazine + mesotrione (RM) 875 g/ha as PoE (20 DAS)
2. Atrazine + topramezone (TM/RM) (500 + 25.2 TM or 775 RM) g/ha as EPoE (15 DAS)
3. Paired-row maize (45 cm spacing of paired row and 60 cm spacing between 2 paired rows) + legume intercropping (Specific to the centre) *fb* 1 HW at 25 DAS
4. Weedy check

Note: * Irrigation should not be given after application of pre-emergence herbicides. Herbicides will be applied to the moist soil

Observations:

1. Phytosociological study of weed flora at 20, 40, 60 DAS and at harvest in jute and maize.
2. Weed dry weight at 20, 40, 60 DAS and at harvest in jute and maize.
3. Weed control efficiency at 20, 40, 60 DAS and at harvest in jute and maize.
4. Yields and yield attributes of jute and maize.
5. Economics.

ST 1.1.23. Weed management practices for controlling *Rottboellia cochinchinensis* in maize

Centre: UAS, Bengaluru

Objectives:

1. To study the bio-efficacy of pre and early post-emergence herbicides for controlling *Rottboellia cochinchinensis* in maize.
2. To develop effective weed management practices for controlling *Rottboellia cochinchinensis* in maize at farmers' fields.

Treatments:

1. Paired-row maize (45 cm spacing of paired row and 60 cm spacing between 2 paired rows) + legume intercropping *fb* 1 HW at 25-30 DAS
2. Pyroxasulfone 127.5 g/ha as PE *fb* isoxaflutole + thiencarbazone-methyl 90+36 g/ha as EPoE
3. Stale seedbed *fb* isoxaflutole + thiencarbazone-methyl 90+36 g/ha as EPoE
4. Stale seedbed *fb* mesotrione 2.27 % + atrazine 22.7% SC 875 g/ha as PoE
5. Atrazine + tembotrione (TM) (750 +120) g/ha as EPoE (15 DAS)
6. Atrazine + topramezone (TM) (750 + 25.2) g/ha as EPoE (15 DAS)
7. Atrazine 750 g/ha as PE *fb* tembotrione 120 g/ha as PoE (25 DAS)
8. Atrazine 750 g/ha as PE *fb* topramezone 25.2 g/ha as PoE (25 DAS)
9. Atrazine750 g/ha (PE) *fb* mechanical weeding at 30-35 DAS
10. Weeded check

Experimental details:

Design: RBD Replication: Three

Observations

1. Phytosociological study of weed flora at 20, 40, 60 DAS and at harvest
2. Weed dry weight at 20, 40, 60 DAS and at harvest
3. Weed control efficiency against major weeds at 20, 40, 60 DAS and at harvest
4. Phyto-toxicity of herbicides if any and weed control ratings
5. Yield attributes and yields
6. Economics

ST 1.1.24. Integrated weed management in mulberry crop – A holistic approach

Centre: UAS, Bengaluru

Objectives:

1. To study the effect of weed management on quality and yield of Mulberry.
2. To work out the economics of Mulberry cultivation as influenced by weed management practices.

Treatments:

1. Weedy check
2. Hand weeding twice [one immediately after pruning and the second on 25 days after pruning (DAP)]

3. Hand weeding immediately after pruning and mulching (hand weeding immediately after pruning followed by mulching within a week after hand weeding with plastic mulch)
4. Early post emergence application of propaquizafop 10 % EC 100 g/ha + wheel hoe weeder at 40, 60 and 80 days after pruning
5. T_4 + mulching with plastic mulch at 20 days after application of T_4 treatment
6. Post emergence application of paraquat dichloride 24 % SL 1.25 kg/ha
7. T_6 + mulching with plastic mulch at 20 days after application of T_6 treatment
8. Hand weeding immediately after pruning and intercropping with fodder cowpea
9. Mechanical weeding by using power tiller
10. Post emergence application of indaziflam 20 + Glyphosate IPA 540 SC (1.65 % w/w + 44.63 % w/w) (Alion plus) 1050 g/ha at 2- 4 days after pruning

Experimental details:

Design: RBD, Replication: Three

Observations:

1. Weed count at 20, 40 and 60 DAP
2. Growth parameters – Plant height/ shoot length of mulberry, number of branches/plants, leaf area, 100 leaf weight
3. Leaf yield
4. Quality parameters - total soluble protein, leaf moisture, total chlorophyll and total soluble sugar content in leaves
5. Nutrient analysis in soil and plant – Before and after imposition of the treatments

ST1.1.25. Bio-efficacy of new generation ready mix herbicides under varied nutrient management in dry direct-seeded rice (DSR)

Centre: OUAT, Bhubaneswar

Objectives:

1. To study the weed dynamics and productivity of rice as influenced by nutrient and weed management in DSR.
2. To determine the bio-efficacy of herbicide and under nutrient management in DSR

Treatments:

Main plot

1. STBFR (soil test-based fertilizer recommendation, NPK)
2. STBFR (25% more)
3. STBFR (25% less)

Sub plot

1. Pendimethalin + Pyrazosulfuron (RM) 785 g/ha as PE *fb* triafamone + ethoxysulfuron (RM) 66.5 g/ha as PoE (25-30 DAS)
2. Pendimethalin + Penoxulam (RM) 625 g/ha *fb* penoxsulam + cyhalofop butyl (RM) 135 g/ha as PoE (25-30 DAS)
3. Pendimethalin 38.7 % CS 678 g/ha PE *fb* one HW at 30 DAS
4. 2 HW at 20 & 40 DAS
5. Partially weedy check (1 HW at 60 DAS)

Experimental details:

Design: Split-plot, Replication: Three

Observation:

1. Phytosociological study of weed flora at 20, 40 and 60 DAS
2. Weed dry weight at 20, 40 and 60 DAS
3. Weed control efficiency at 20, 40 and 60 DAS
4. Weed control efficiency at 20, 40 and 60 DAS
5. Nutrient uptake by weeds & crops (20, 40 & 60 DAS)
6. Yield and yield attributes
7. Economics

ST 1.1.26. Weed management in Soybean

Centre: AAU, Jorhat

Objectives:

1. To study the bio-efficacy of herbicides in soybean
2. To find out suitable weed management practices for soybean

Treatments:

1. Imazethapyr 100 g/ha PE
2. Imazethapyr 75 g/ha as PE *fb* HW
3. Oxyfluorfen 150 g/ha as PE
4. Oxyfluorfen 150 g/ha as PE *fb* HW
5. Pendimethalin + imazethapyr (RM) 800 g/ha as PE
6. Sulfentrazone + clomazone (RM) 725 g/ha as PE
7. Sodium acifluorfen + clodinafop propargyl 245 g/ha as PoE (20 DAS)
8. Propaquizafop + imazethapyr 125 g/ha as EPoE
9. Mechanical weeding at 20-25 and 40-45 DAS
10. 2 HW at 20-25 and 40-45 DAS
11. Weedy Check

Experimental details: Design: RBD, Replication: Three

Observations:

1. Weed density and dry biomass at 25, 45 DAS and at harvest
2. Weed control efficiency at 25, 45 DAS and at harvest
3. Crop growth parameters
4. Yield attributes and yield
5. Weed shifts
6. Weed seed bank studies
7. Economics

ST 1.1.27. Integrated weed management on growth and yield of summer sesame (*Sesamum indicum L.*)

Centre: PAJANCOA & RI Puducherry

Objective:

1. To evaluate the effect of integrated weed management on crop phyto-toxicity and growth of summer sesame.

Treatments:

S.No.	Treatment	Dose	Time of application
1.	Pendimethalin	0.75 kg/ ha	1-3 DAS
2.	Oxyfluorfen	0.075 kg/ ha	1-3 DAS
3.	Quizalofop	0.50 kg/ha	20 DAS
4.	Propaquizafop	0.60 kg/ha	20 DAS
5.	Pendimethalin + 1 HW	0.75 kg/ ha	1-3 DAS & 40 DAS
6.	Oxyfluorfen + 1 HW	0.075 kg/ ha	1-3 DAS & 40 DAS
7.	Quizalofop +1 HW	0.50 kg/ha	20 DAS & 40 DAS
8.	Propaquizafop+1 HW	0.60 kg/ha	20 DAS & 40 DAS
9.	Hand weeding twice		20 & 40 DAS
10.	Weedy check		

Experimental details: Design: RBD, Replication: Three

Observations:

1. Germination percentage
2. Phyto-toxicity effect if any
3. Plant and weed parameters at 30 days interval
4. Weed control efficiency at 30 days interval
5. Yield parameters and yield
6. Economics

ST 1.1.28. Integrated weed management in greengram.

Centre: SKNAU, Jobner

Objectives:

1. To find out effective weed management practices for controlling weeds in greengram.

Treatments:

S.No.	Treatment
1.	1 Hand Weeding at 20-25 DAS (Farmer's practice)
2.	Weeding with manually operated mechanical weeder at 20-25 DAS
3.	Paired row sowing* + straw mulching between pairs @ 2.5-3 t/ha
4.	Paired row sowing* + Weeding with manually operated mechanical weeder at 20-25 DAS
5.	Paired row sowing* + Post-emergence application of Propaquizafop 2.5% + Imazethapyr 3.75% w/w (RM) 125 g/ha at 15-20 DAS
6.	Pre-emergence application of Pendimethalin 35 + Imzethapyr 2% (RM) 750 g/ha + Weeding with manually operated mechanical weeder at 30-35 DAS
7.	Post-emergence application of Propaquizafop 2.5% + Imazethapyr 3.75% w/w (RM) 125 g/ha at 15-20 DAS
8.	Post-emergence application of Sodium Acifluorfen 16.5% + Clodinofop-propargyl 8% EC 245 g/ha at 15-20 DAS
9.	Weed-free
10.	Weedy check

*Distance between rows = 20cm, distance between two pairs of rows = 40cm

Experimental details:

Design: RBD Replication: Three

Observations:

1. Plant stand at 30 DAS
2. Weed density at 20, 40 and 60 DAS
3. Weed biomass at 20, 40 and 60 DAS
4. Weed control efficiency at 20, 40 and 60 DAS
5. Weed Index
6. Phyto-toxicity rating if any
7. Yields and yield attributes
8. Economics

ST 1.1.29. Evaluation of different doses of ready-mix post-emergence herbicide in pearl millet.

Centre: SKNAU, Jobner

Objectives:

1. To study the bio-efficacy of post-emergence ready-mix herbicide for controlling weeds in peal millet.

Treatments:

S. No.	Treatment
1.	Pre-emergence application of atrazine 50% 500 g/ha followed by 1 hand weeding at 30-35 DAS
2.	Pre-emergence application of atrazine 50% 500 g/ha followed by tembotrione 42 SC 90 g/ha.
3.	Early post-emergence application of mesotrione 2.27% + atrazine 22.7% (RM) 300 g/ha at 15-20 DAS
4.	Early post-emergence application of mesotrione 2.27% + atrazine 22.7% (RM) 400 g/ha at 15-20 DAS
5.	Early post-emergence application of mesotrione 2.27% + atrazine 22.7% (RM) 500 g/ha at 15-20 DAS
6.	Early post-emergence application of mesotrione 2.27% + atrazine 22.7% (RM) 600 g/ha at 15-20 DAS
7.	Early post-emergence application of mesotrione 2.27% + atrazine 22.7% (RM) 700 g/ha at 15-20 DAS
8.	Early post-emergence application of mesotrione 2.27% + atrazine 22.7% (RM) 800 g/ha

	at 15-20 DAS
9.	Weed-free
10.	Weedy check

Experimental design: Design: RBD, Replication: Three

Observations:

1. Plant stand at 30 DAS
2. Weed density at 20, 40, 60 DAS and at harvest
3. Weed biomass at 20, 40, 60 DAS and at harvest
4. Weed control efficiency at 20, 40, 60 DAS and at harvest
5. Weed Index
6. Phyto-toxicity rating if any
7. Yields and yield attributes
8. Economics

ST 1.1.30. Evaluation of different doses of three-way ready-mix herbicides (2,4-D sodium salt 44% + metribuzin 35 % + pyrazosulfuron ethyl 1 % WDG) for the post-emergence application in wheat.

Centre: SKNAU, Jobner

Objectives:

1. To study the bio-efficacy of three-way ready-mix post-emergence herbicides (2,4-D sodium salty 44% + metribuzin 35 % + pyrazosulfuron ethyl 1 % WDG) for controlling weeds in wheat.

Treatments:

S. No.	Treatment
1.	Weedy check
2.	Post-emergence application (30-35 DAS) of 2,4-D sodium salt 44% + Metribuzin 35 % + Pyrazosulfuron ethyl 1 % WDG (RM) 200 g/ha
3.	Post-emergence application (30-35 DAS) of 2,4-D sodium salt 44% + Metribuzin 35 % + Pyrazosulfuron ethyl 1 % WDG (RM) 250 g/ha
4.	Post-emergence application (30-35 DAS) of 2,4-D sodium salt 44% + Metribuzin 35 % + Pyrazosulfuron ethyl 1 % WDG (RM) 300 g/ha
5.	Post-emergence application (30-35 DAS) of 2,4-D sodium salt 44% + Metribuzin 35 % + Pyrazosulfuron ethyl 1 % WDG (RM) 350 g/ha
6.	Post-emergence application (30-35 DAS) of 2,4-D sodium salt 44% + Metribuzin 35 % + Pyrazosulfuron ethyl 1 % WDG (RM) 400 g/ha
7.	Post-emergence application (30-35 DAS) of 2,4-D sodium salt 44% + Metribuzin 35 % + Pyrazosulfuron ethyl 1 % WDG (RM) 450 g/ha
8.	Post-emergence application (30-35 DAS) of 2,4-D sodium salt 44% + Metribuzin 35 % + Pyrazosulfuron ethyl 1 % WDG (RM) 500 g/ha
9.	Post-emergence application (30-35 DAS) of 2,4-D sodium salt 44% + Metribuzin 35 % + Pyrazosulfuron ethyl 1 % WDG (RM) 600 g/ha
10.	Weed-free
11.	Weedy check

Experimental details: Design: RBD, Replication: Three

Observations:

1. Plant stand at 30 DAS
2. Weed density at 20, 40, 60 DAS and at harvest
3. Weed biomass at 20, 40, 60 DAS and at harvest
4. Weed control efficiency at 20, 40, 60 DAS and at harvest
5. Weed Index
6. Phyto-toxicity rating if any
7. Yields and yield attributes
8. Economics

ST 1.1.31. Validation of herbicide tolerant inoculum consortia on growth and yield parameters of soybean under the influence of herbicides.

Centre: UAS, Dharwad

Treatments:

	Factor – I (Herbicides)		**Factor-II (Herbicide tolerant microbial consortium)**
H_1	Diclosulum 84 % WDG **26** g/ha (PE)	M_1	Herbicide tolerant mycorrhizal consortium
H_2	Imazathepyre 10 % SL **100** g/ha (PoE)	M_2	Herbicide tolerant PPFM consortium spray (15^{th}, 30^{th} and 45^{th} DAS)
H_3	Diclosulum 84 % WDG **26** g/ha (PE) + Imazathepyre 10 % SL @ **100** g/ha (PoE)	M_3	Herbicide tolerant mycorrhizal and PPFM consortium spray (15^{th}, 30^{th} and 45^{th} DAS)
H_4	Weed-free check	M_4	UIC (Uninoculated control)

Methods of Application:

- Herbicide tolerant mycorrhizal consortium (Soil application at the time of sowing)
- Herbicide tolerant PPFM consortium (Sprayed at 30th and 45th DAS)

AMF consortia	
Herbicide tolerant mycorrhizal consortium	AMFHT - 17 Glomus intraradices AMFHT - 23 Glomus leptotichum AMFHT - 54 Glomus mosseae
PPFM consortia	
Herbicide tolerant PPFM consortium	PPFMH - 1 PPFMH - 27 PPFMH - 31 PPFMH - 59

Observation:

1. Growth parameter:
   Plant height (30 and 60 DAS)
2. Weed parameters:
   Weed density/m^2 (30 and 60 DAS)
   Weed dry weight (g/ m^2) (30 and 60 DAS)
3. Physiological parameters (SPAD)
   Relative chlorophyll content (45 DAS)
   Microbiological parameters (45 DAS)
   Dehydrogenase and Phosphatase
4. Yield attributes and seed yield

ST 1.1.32. Weed management in sweetcorn

Centre: SKUAST, Kashmir

Objectives:

1. To study the bio-efficacy of herbicides and their effect on weeds.
2. To study the effect of weed management treatments on growth and productivity of sweetcorn.

Treatments:

S.N.	**Pre-emergence application (2 DAT)**	**Post-emergence application (30 DAT)**
1.	Atrazine 50% WP (250 g/ha)	Tembotrione 42% SC (96.6 g/ha)
2.	Atrazine 50% WP (250 g/ha)	Tembotrione 42% SC (120.75 g/ha)
3.	Atrazine 50% WP (250 g/ha)	Topramezone 33.6% SC (20.16 g/ha)
4.	Atrazine 50% WP (250 g/ha)	Topramezone 33.6% SC (25.2 g/ha)
5.	Atrazine 50% WP (250 g/ha)	Halosulfuron methyl 75% WG (54.0 g/ha)
6.	Atrazine 50% WP (250 g/ha)	Halosulfuron methyl 75% WG (67.5 g/ha)
7.	Mechanical weeding (Power weeder) (Time of execution)	
8.	Weedy check	

Experimental details:

Design: RBD, Replication: Three, Plot size: 4.5 m x 5.00 m, Spacing: 60 cm x 20 cm

Observations:

1. Weed density and biomass at 30 and 60 DAT and base year observations
2. Crop growth parameters (plant height, LAI, dry matter production) at 30 and 60 DAT
3. Green cob and stover yields at harvest
4. Monitoring of weed flora shift
5. Economics
6. Effect on soil micro-flora
7. Phyto-toxicity on crop plants if any
8. Nutrient status before and after the cropping cycle

ST 1.1.33. Weed management in onion and garlic

Centre: SKUAST, Kashmir

Objectives:

1. To study the bio-efficacy of herbicides and their effect on weeds.
2. To study the effect of weed management treatments on growth and productivity of onion and garlic.

Treatments:

1. Pendimethalin 38.7% CS 580 g/ha PE (2 DAT/DAS)
2. Oxyfluorfen 23.5% EC 120 g/ha PE (2 DAT/DAS)
3. Pendimethalin 38.7% EC 580 g/ha PE *fb* oxyfluorfen 12%+propaquizafop 5% EC 148.75 g/ha PoE (140 DAT/DAS)
4. Oxyfluorfen 23.5% EC 120 g/ha PE (2 DAT/DAS) *fb* oxyfluorfen 12% + propaquizafop 5% EC 148.75 g/ha PoE (140 DAT/DAS)
5. Pendimethalin 38.7% EC 580 g/ha PE (2 DAT/DAS) *fb* oxyfluorfen 6% + quizalofop-p-ethyl 4% EC 100 g/ha PoE (140 DAT/DAS)
6. Oxyfluorfen 23.5% EC 120 g/ha PE (2 DAT/DAS) *fb* oxyfluorfen 6% + quizalofop-p-ethyl 4% EC 100 g/ha PoE (140 DAT/DAS)
7. Weed-free
8. Partially weedy check

Experimental details:

1. Design: Completely randomized block design
2. Replication: Three,
3. Plot size: 1.05 m x 5.00 m
4. Spacing: 15 cm x 10 cm

Observations:

1. Weed density (Number/m^2) and weed dry matter (g/m^2) 160 DAT/DAS
2. Dry matter accumulation by crop at 160 DAT/DAS
3. Leaf area index at 160 DAT/DAS
4. Bulb yield (t/ha)
5. Phyto-toxicity on crop, if any
6. Economics of weed management

ST 1.1.34. Weed management in Apple nurseries

Centre: SKUAST, Kashmir

Objectives:

1. To study the effect of weed management practices on weeds dynamics, weed flora shift in the clonal rootstocks and grafted nurseries.
2. To study the effect of weed management practices on growth parameters of nursery plants.

Treatments:

S. N.	Early season (Spring)	Mid-season (Summer)
Clonal Rootstock Nursery of Apple		
1.	Hand hoeing	Pendimethalin 30 % EC (1.0 kg/ha) *fb* carfentrazone 40% DF (20.0 g/ha)
2.	Hand hoeing	Pendimethalin 30 % EC (1.0 kg/ha) *fb* glufosinate ammonium 13.5% SL 600 g/ha
3.	Hand hoeing	Oxyfluorfen 23.5% EC (100 g/ha) *fb* carfentrazone 40% DF (20.0 g/ha)

4.	Hand hoeing	Oxyfluorfen 23.5% EC (100 g/ha) *fb* glufosinate ammonium 13.5% SL 600 g/ha
5.	Hand hoeing	Hand hoeing
6.	Weedy check	Weed check
7.	Weed free	Weed free
Grafted Nursery of Apple		
1.	Pendimethalin 30 % EC (1.0 kg/ha)	Carfentrazone 40% DF (20.0 g/ha)
2.	Oxyfluorfen 23.5% EC (100 g/ha)	Carfentrazone 40% DF (20.0 g/ha)
3.	Hand hoeing	Carfentrazone 40% DF (20.0 g/ha)
4.	Plastic mulching	Plastic mulching
5.	Hand hoeing	Hand hoeing
6.	Weedy check	Weed check
7.	Weed-free	Weed-free

Observations:

Clonal rootstocks nursery:

1. No. of layers per mother stocks
2. Plant height (cm)
3. Percent graftable layers
4. Root biomass per layers
5. Weed density and dry matter

Grafted nursery:

1. Plant height (cm)
2. Scion girth (mm)
3. No. of branches per plant
4. No. of leaves per plant
5. Leaf area (cm^2)
6. Survival percentage

ST 1.1.35. Weed management in high-density apple orchard.

Centre: SKUAST, Kashmir

Objectives:

1. To study the effect of weed management practices on weeds and weed flora shift in high-density apple orchard.
2. To study the effect of weed management practices on growth parameters and productivity of orchard plants.

Treatments:

S.No.	Treatment
1	Pendimethalin 30%EC + atrazine 50%WP (250 + 500 g/ha) PE (Spring period)
2	Oxyfluorfen (100 g/ha) PE (Spring period)
3	Pendimethalin 30% EC + atrazine 50%WP (250 + 500 g/ha) PE (Spring period) *fb* glyphosate 41% SL (1.0 kg/ha) PoE (Summer period)
4	Pendimethalin 30% EC + atrazine 50%WP (250 + 500 g/ha) PE (Spring period) *fb* carfentrazone 40% DF (20.0 g/ha) PoE (Summer period)
4	Oxyfluorfen 23.5%EC (100 g/ha) PE (Spring period) *fb* glyphosate 41% SL (1.0 kg/ha) PoE (Summer period)
5	Oxyfluorfen 23.5%EC (100 g/ha) PE (Spring period) *fb* carfentrazone 40% DF (20.0 g/ha) PoE (Summer period)
6	Pendimethalin 30% EC + atrazine 50% WP (250 + 500 g/ha) PE (Spring period) *fb* Weed mulching (Summer period)
7	Oxyfluorfen 23.5%EC (100 g/ha) (Spring period) *fb w*eed mulching (Summer period)
8	Weed-free
9	Weedy check

Experimental details: Design: RBD, Replication: Three

Observations:

1. Shoot extension growth (cm)
2. Leaf area (cm^2)
3. Fruit setting (%)
4. No. of fruits per plant
5. Fruit weight (g)
6. Fruit size (Fruit length and Fruit breadth) (cm)
7. Fruit yield per plant (kg)
8. Firmness (kg cm^{-2})
9. TSS (Brix value)
10. Acidity (%)
11. Weed density and weed dry matter (45 and 90 Days after treatment application) and weed control efficiency

WP 1.2 Weed Management under conservation tillage-based cropping systems

Objectives

1. To monitor weed and pest dynamics, crop-cum-energy productivity, resource use efficiency, profitability under long-term conservation tillage and weed management practices
2. Study on weed seed dynamics
3. To study change in physico-chemical and biological properties of soil

Technical programme

1. Duration: 2022-2028 (six years)
2. Design: Split-plot
3. Replications: not less than three

Main plot:

1. Conventional tillage (CT): CT-CT-CT
   CT+R-CT+R-CT+R
2. Resource conservation technology (RCT): ZT-ZT-ZT
   ZT+R-ZT+R-ZT+R

Subplot:

1. HR: Herbicide rotation
2. IWM: Integrated weed management (herbicides *fb* hand weeding) *fb* weed seed harvest
3. Partially weedy (removal of weeds after critical competition period)

Observations to be recorded

1. Species wise and total weed density at 30 & 60 DAS and biomass at 60 DAS
2. Monitoring of weed shifts over base year
3. Phytosociological parameters: relative frequency, abundance, importance value index and other diversity indices
4. Weed seed bank study at 0-10 and 10-20 cm depths
5. Monitoring of herbicide residues (wherever facilities are available)
6. Monitoring of periodical incidence of insect-pest, disease, nematode rodents etc. in crops and cropping system
7. Crop growth and yield attributes
8. Energy and economic parameters
9. Soil health-related parameters (Bulk density and Soil organic carbon) and other parameters (in collaboration with soil science department)
10. It has been suggested to conduct a bioassay after 3 years to know the herbicide resistance and weed flora shift

WP 1.2.1. Weed management in rice-wheat-legume cropping system under conservation tillage

Network Centres: GBPUAT Pantnagar, SKUAST Jammu, CCSHAU Hisar and PAU Ludhiana

Treatment	**Rice (DSR)**	**Wheat**	**Greengram/green manure**
Main plot	**Tillage**		
	CT	CT	CT
	CT+R	CT+R	CT+R
	ZT	ZT	ZT

	ZT+R	ZT+R	ZT+R
Sub plot	**Weed management**		
Herbicide rotation	**1st year**: Pendimethalin 678 g/ha (2 DAS) *fb* bispyribac sodium 25 g/ha (20 DAS) **2nd year:** Pretilachlor + pyrazosulfuron 615 g/ha (2 DAS) *fb* cyhalofop+ penoxsulam 135 g/ha (20 DAS) **3rdyear:** Pendimethalin+pyrazosulfuron 920 g/ha (2 DAS) *fb* triafamone+ethoxysulfuron 66.5 g/ha (20 DAS)	**1st year:** Clodinafop + metsulfuron 64 g/ha (30 DAS) **2nd year:** Mesosulfuron + iodosulfuron 14.4 g/ha (30 DAS) **3rd year:** Sulfosulfuron + metsulfuron 32 g/ha (30 DAS)	**1st year:** Pendimethalin + imazethapyr 1.0 kg/ha (2 DAS) **2nd year:** Imazethapyr 100 g/ha (20 DAS) **3rd year:** Pendimethalin 678 g/ha (2 DAS)
IWM	Pendimethalin 678 g/ha (2 DAS) *fb* bispyribac sodium 25 g/ha (20 DAS) *fb* hand weeding (40 DAS) *fb* weed seed harvest	Clodinafop+ metsulfuron 64 g/ha (30 DAS) *fb* HW (45 DAS) *fb* weed seed harvest	Pendimethalin 678 g/ha (2 DAS) *fb* hand weeding (30 DAS)
Weedy check	Partially weedy (weeds removed after critical period)	Weedy check	Weedy check

WP 1.2.2. Weed management in rice-maize-legume cropping system under conservation tillage
Network Centres: IGKV Raipur and OUAT Bhubaneswar

Treatment	**Rice (DSR)**	**Maize**	**Cowpea/greengram**
Main plot	**Tillage**		
	CT	CT	CT
	CT+R	CT+R	CT+R
	ZT	ZT	ZT
	ZT+R	ZT+R	ZT+R
Sub plot	**Weed management**		
Herbicide rotation	**1st year:** Pendimethalin 678 g/ha (2 DAS) *fb* bispyribac sodium 25 g/ha (20 DAS) **2nd year:** Pretilachlor + pyrazosulfuron 615 g/ha (2 DAS) *fb* cyhalofop+ penoxsulam 135 g/ha (20 DAS) **3rd year:** Pendimethalin+pyrazosulfuron 920 g/ha (2 DAS) *fb* triafamone+ethoxysulfuron 66.5 g/ha (20 DAS)	**1st year:** Atrazine 1.0 kg/ha (2 DAS) *fb* topramezone 25.2 g/ha (20 DAS) **2nd year:** Pyroxasulfone 127.5 g/ha (2 DAS) *fb* tembotrione 120 g/ha (20 DAS) **3rd year:** Atrazine +mesotrione 875 g/ha (20 DAS)	**1st year:** Pendimethalin + imazethapyr 1.0 kg/ha (2 DAS) **2nd year:** Imazethapyr 100 g/ha (20 DAS) **3rd year:** Pendimethalin 678 g/ha (2 DAS)
IWM	Pendimethalin 678 g/ha (2 DAS) *fb* bispyribac sodium 25 g/ha (20 DAS) *fb* hand weeding (40 DAS) *fb* weed seed harvest	Atrazine 1.0 kg/ha (2 DAS) *fb* topramezone 25.2 g/ha (20 DAS) *fb* hand weeding (40 DAS) *fb* weed seed harvest	Pendimethalin 678 g/ha (2 DAS) *fb* hand weeding (30 DAS)
Unweeded check	Partially weedy (weeds removed after critical period)	Weedy check	Weedy check

WP 1.2.3. (A)Weed management in maize-mustard/green gram-legume based cropping system under conservation tillage

Network Centres: UAS Bengaluru, CCSHAU Hisar and RVSKVV Gwalior

Treatment	Maize	Mustard	Greengram	Green manure
Main plot	**Tillage**			
	CT	CT	CT	CT
	CT+R	CT+R	CT+R	CT+R
	ZT	ZT	ZT	ZT
	ZT+R	ZT+R	ZT+R	ZT+R
Sub plot	**Weed management**			
Herbicide rotation	**1st year:** Atrazine 1.0 kg/ha (2 DAS) *fb* topramezone 25.2 g/ha (20 DAS) **2nd year:** Pyroxasulfone 127.5 g/ha (2 DAS) *fb* tembotrione 120 g/ha (20 DAS) **3rd year:** Atrazine + mesotrione 875 g/ha (20 DAS)	**1st year:** Pendimethalin 339 g/ha (2 DAS) *fb* pinoxaden 50 g/ha (after first irrigation **2nd year:** Pendimethalin 339 g/ha (2 DAS) *fb* fenoxaprop 100 g/ha (after first irrigation) **3rd year:** Oxadiargyl 90 g/ha (2 DAS) *fb* clodinafop 60 g/ha (after first irrigation)	**1st year:** Pendimethalin + imazethapyr 1.0 kg/ha (2 DAS) **2nd year:** Imazethapyr 100 g/ha (20 DAS) **3rd year:** Pendimethalin 678 g/ha (2 DAS)	-
IWM	Atrazine 1.0 kg/ha (2 DAS) *fb* topramezone 25.2 g/ha (20 DAS) *fb* hand weeding (40 DAS) *fb* weed seed harvest	Pendimethalin 339 g/ha (2 DAS) *fb* hand weeding (30 DAS) *fb* weed seed harvest	Pendimethalin 678 g/ha (2 DAS) *fb* hand weeding (30 DAS)	-
Unweeded check	Weedy check	Weedy check	Weedy check	-

WP 1.2.3. (B) Weed management in Maize-Sunflower-*Sesbania* green manure based cropping systemunder conservation tillage

Centre: PJTSAU, Hyderabad

	Maize (kharif)	Sunflower (rabi)	Sesbania (summer)
Tillage: Four			
	CT	CT	CT
	CT+R	CT+R	CT+R
	ZT	ZT	ZT
	ZT+R	ZT+R	ZT+R
Weed management: Three			
HR	Pyroxasulfone 127.5 g/ha (PE) *fb* atrazine + mesotrione 875 g/ha (PoE)	Pendimethalin 750 g/ha (PE) *fb* clethodim 25% EC 180 g/ha (PoE)	-
IWM	Pyroxasulfone 127.5 g/ha (PE) *fb* HW at 30 DAS *fb* WSH	Pendimethalin 750 g/ha (PE) *fb* HW at 30 DAS *fb* WSH	-
Weedy	Weedy check	Weedy check	Weedy check

WP 1.2.4. Weed management in soybean-wheat-legume cropping system under conservation tillage

Network Centres: CSKHPKV Palampur, MPUAT Udaipur and PDKV Akola

Treatment	Soybean	Wheat	green manure
Main plot	**Tillage**		
	CT	CT	CT
	CT+R	CT+R	CT+R
	ZT	ZT	ZT
	ZT+R	ZT+R	ZT+R
Sub plot	**Weed management**		
Herbicide rotation	**1st year:** Diclosulam 28 g/ha (2 DAS) *fb* imazethapyr 100 g/ha (20 DAS) **2nd year:** Sulfentrazone+clomazone 725 g/ha (2 DAS) *fb* propaquizafop + imazethapyr 125 g/ha (20 DAS) **3rd year:** Pendimethalin+imazethapyr 1.0 kg/ha (2 DAS) *fb* imazethapyr + imazamox 70 g/ha (20 DAS)	**1st year:** Clodinafop + metsulfuron 64 g/ha (20 DAS) **2nd year:** Mesosulfuron + iodosulfuron 14.4 g/ha (20 DAS) **3rd year:** Sulfosulfuron + metsulfuron 32 g/ha (20	-
		DAS)	
IWM	Pendimethalin+imazethapyr 1.0 kg/ha (2 DAS) *fb* hand weeding (30 DAS) *fb* weed seed harvest	Clodinafop+ metsulfuron 64 g/ha (30 DAS) *fb* HW (45 DAS)	-
Unweeded check	Weedy check	Weedy check	-

WP 1.2.5. Weed management in cotton-based cropping system under conservation tillage

Centre: TNAU, Coimbatore

Treatment	Cotton	Maize/baby corn	green manure
Main plot	**Tillage**		
	CT	CT	CT
	CT+R	CT+R	CT+R
	ZT	ZT	ZT
	ZT+R	ZT+R	ZT+R
Sub plot	**Weed management**		
Herbicide rotation	**1st year:** Pyrithiobac sodium 3.1% w/w + pendimethalin 34% w/w ZC 742 g/ha (2DAS) *fb* pyrithiobac sodium 6% EC + quizalofop ethyl 4% EC w/w MEC 125 g/ha (4-6 weed leaf stage) *fb* directed spray (inter-row) of glufosinate ammonium 13.5% SL 450 g/ha at 50-55DAS **2nd year:** Pendimethalin 30% EC 1.0 kg/ha (2 DAS) *fb* pyrithiobac sodium 6% EC + quizalofop ethyl 4% EC w/w MEC 125g/ha (4-6 weed leaf stage) *fb* directed spray (inter-row) of paraquat dichloride 24% SL 500 g/ha at 50-55 DAS **3rd year:** Diuron 80 WP 750 g/ha (2 DAS) *fb* pyrithiobac sodium 6% EC + quizalofopethyl 4% EC w/w MEC 125 g/ha (4-6 weed leaf stage) *fb* directed spray (inter-row) of glufosinate ammonium 13.5% SL 500 g/ha at 50-55 DAS	**1st year:** Atrazine 500 g/ha + pendimethalin 450 g/ha (2 DAS) *fb* topramezone 25.2 g/ha (20 DAS) **2nd year:** Pyroxasulfone 127.5 g/ha (2 DAS) *fb* tembotrione 120 g/ha(20 DAS) **3rd year:** Atrazine + mesotrione875 g/ha (20 DAS)	-

IWM	Pyrithiobac sodium 3.1% w/w + pendimethalin 34% w/w ZC 742 g/ha (2 DAS) *fb* HW at 30 and 60 DAS *fb* WSH	Atrazine 1.0 kg/ha (2 DAS) *fb* topramezone 25.2 g/ha (20 DAS) *fb* HW (40 DAS) *fb* WSH	-
Unweeded check	Weedy check	Weedy check	-

WP 1.3 Weed management strategies in natural farming/organic agriculture

WP 1.3.1. Weed management in turmeric + pigeon pea intercropping system under natural farming

Centre: AAU, Anand

Objective:

1. To monitor the effect of treatments on weed dynamics and crop productivity in turmeric + pigeon pea intercropping system under natural farming

Sl. No.	Treatments
T_1	Stale seedbed *fb* mulching of crop residue 5 t/ha at 0-3 DAP *fb* HW at 75 DAP
T_2	Stale seedbed *fb* HW + mulching of crop residue 5 t/ha at 30 DAP *fb* HW at 75 DAP
T_3	Stale seedbed *fb* live mulch of sunhemp (cutting and spread at 30-35 DAP) *fb* HW at 75DAP
T_4	Mulching of crop residue 5 t/ha at 0-3 DAP *fb* HW at 30 and 75 DAP
T_5	Live mulch of sunhemp (cutting and spread at 30-35 DAP) *fb* HW at 75 DAP
T_6	Soil mulch (IC *fb* HW at 20, 50, and 80 DAP)
T_7	Partial weedy (Weeds will be removed at 75 DAP after taking observation)
T_8	Mulching of crop residue 5 t/ha at 0-3 DAP *fb* HW at 30 and 75 DAP (Conventional)

Note: Natural farming protocol will be followed in **Treatment T_1 to T_7** while, recommended practices in treatment **T_8**

Natural farming practices (Protocol for treatment T_1 to T_7)

- Intercropping: Turmeric + pigeonpea (vegetable) (2:1)
- Seed treatment: *Bijamrut* (300 mL/kg seed for both crops)
- *Ghan Jivamrut* (3 t/ha) + FYM (3 t/ha) soil application at sowing
- *Jivamrut* (1250 L/ha) at sowing, 30, 45, 60, 75, 90,105,120,135 and 150 DAP as soil application
- Foliar spray of *Jivamrut* 1.0 L/10 L of water at 45 DAP and Jivamrut 2.5 L/10 L at 75 105 and 135 DAP
- *Achhadan*: Crop residue: 5 t/ha (as per treatment)
- Plant protection: *Agniastra*, *Brahmastra* and *Neemastra*, if required

Note: Quantity of FYM will be reduced 25% from second year onwards

Experimental details

1.	Crop & Variety	:	Turmeric (GNT 2)	Pigeonpea (AVPP 1)
2.	Season	:	*Kharif* & *rabi* 2024-25	*Kharif* & *rabi* 2024-25
3.	Seed rate	:	2500 kg/ha rhizome	15 kg/ha
4.	Spacing	:	45 x 15 cm	90 x 45 cm
5.	Method of sowing	:	Planting	Dibbling
6.	Fertilizer for T_8	:	$N_{100} + P_{50} + K_{50}$ kg/ha	$N_{20} + P_{40} + K_0$ kg/ha
7.	Design	:	Large plot CRD	
8.	Replication	:	3 quadrate (3.6 x 4.5 m)	
9.	Plot size	:	10 x 15 m	

Observations:

1. Weed density and dry biomass at 25, 50 and 75 DAP
2. Crop growth parameters
3. Yield attributes and yield
4. Weed shifts
5. Weed seed bank studies
6. Economics

WP 1.3.2. (i) Weed management in organically grown rice-based cropping system (rice – vegetable pea – sweet corn) (Collaboration with Network project on organic farming)

Centre: GBPUAT, Pantnagar

Objectives:

1. To get viable weed management practices in rice-based cropping system under organic production
2. To achieve maximum remuneration by intensification of organic cropping system
3. To find out the effect on soil moisture, micro-flora, fauna and nutrients after completing the cropping cycle.

Main Plot:

Season	***Kharif***	***Rabi***	***Spring***
M1	Stale seed bed - Direct seeded rice +*Sesbania* between rows	Vegetable pea	Sweet corn
M2	Direct seeded rice (without stale bed)	Vegetable pea	Sweet corn
M3	*Sesbania* (Green manure) *fb* Transplanted rice	Vegetable pea	Sweet corn
M4	Transplanted rice	Vegetable pea	Sweet corn

Note: At the place of incorporation, *Sesbania* will be sown as an alternate planting system and it may incorporate with the help of conoweeder after 25-30 days of seeding. In M-2 treatment only conoweeder will be drawn after 25-30 DAS without *Sesbania*.

Sub Plot:

S1: Mechanical weeding (Two pass of Cono weeder)
S2: Mechanical weeding (one pass of Cono weeder) fb one Hand Weeding
S3: One Mechanical weeding (By hoe) & one hand weeding (25 and 45 DAS/DAT)

Note: Vegetable Pea -During *Rabi* season incorporation of rice crop residue fb one mechanical weeding (by power weeder) at 20-25 DAS *fb* hand weeding at 40-45 DAS

Sweet corn: During Spring season incorporation of vegetable pea crop residue *fb* one mechanical weeding (by power weeder) *fb* earthing

After harvest of sweet corn shredding of maize residue and incorporate in soil

Design: Split Plot; Replication: 03; Plot size-3m x 5m

Observations:

1. Weed density and dry biomass at 30, 60 DAS & at harvest
2. Crop growth parameters
3. Yield attributes and yield
4. Weed shifts
5. Weed seed bank studies
6. Soil chemical and microbiological studies
7. Economics

ii. Comparison of weed management in rice-vegetable pea- sweet corn cropping system under natural farming, organic farming and chemical farming.

Objectives:

1. To study the dynamics and dry matter accumulation of weed in different production systems.
2. To find out the economics of rice-based cropping system under different production systems.
3. To study the soil health under different production systems.

A. Natural production systems.

Seed treatment: With Beejamrit in all the crops.

Nutrient management: With herbal kunap jal/Jeevamrit in all the crops.

Weed management: With cover crops/ mulches

Plant protection: With Neemastra /Dashparni ark in all the crops.

Transplanted Rice: Sesbania green manure- transplanted rice

Weed management: Water stagnation up to 15 DAT fb uprooting of weeds at 45 DAT, which will be used as mulch in the field.

Vegetable Pea: During Rabi season mulching of rice crop residue

Weed management: Uprooting of weeds at 25 and 45 DAS and will be used as mulch.

Sweet corn: During Spring season mulching of vegetable pea crop residue in between the rows of corn

Weed management: Uprooting of weeds at 25 and 45 DAS and will be used as mulch.

After harvest of sweet corn residue will be shredded and incorporation in soil

B. Organic production systems

Nutrient management: A uniform dose of FYM 10 t/ha followed by vermi-compost 5 t/ha at 30-35 DAS/DAT will be applied in every crop season

Transplanted Rice: Sesbania green manure- transplanted rice (Weed management- one pass of cono weeder at 25DAT fb one hand weeding at 45DAT)

Vegetable Pea: During Rabi season incorporation of rice crop residue

Weed management: One mechanical weeding (by hoe) at 20-25 DAS fb one hand weeding at 40-45 DAS

Sweet corn: During Spring season incorporation of vegetable pea crop residue

Weed management: one mechanical weeding (by power weeder) at 20-25 DAS fb earthing at 45DAS

After harvest of sweet corn, shredding of maize residue and incorporated in soil

C. Chemical production systems -

Transplanted Rice-

Nutrient management: N120, P60 and K40 Kg/ha, (Full dose of P and K and half dose of N will be as basal and rest amount of N will be applied at tillering and panicle initiation stage)

Weed management: Penoxsulam 1.02%+Cyhalofop5.1%OD (RM) 135g/ha at 15-20DAT fb one hand weeding at 45DAT

Vegetable Pea- During *Rabi* season incorporation of rice crop residue

Nutrient management: N20-30, P50-60 and K50Kg/ha

Full dose of N, P and K is given at the time of sowing

Weed management: Pendimethalin 1.0Kg/ha (pre-emergence) fb one hand weeding at 20-25 DAS

Sweet corn: During Spring season incorporation of vegetable pea crop residue

Nutrient management: N120, P60 and K40 Kg/ha

Weed management: Atrazine50WP 1.0Kg/ha as pre-emergence fb Tembotrione 34.4SC 120g/ha (Post-emergence) at 20-25 DAS

After harvest of sweet corn residue will be shredded and incorporated in soil.

WP 1.3.3. Weed management in natural farming systems in direct-seeded scented rice and cowpea (vegetable)

Network centres: IGKV Raipur, BCKV Kalyani

Objective:

1. To study the effect of weed management on weed dynamics and crop productivity of scented rice and cowpea (vegetable) in natural farming

Treatments:

	Scented rice	Cowpea (vegetable)
1.	Stale seedbed *fb* live mulch (dhaincha/Sesbania) and *in-situ* incorporation at 30-35 DAS	Stale seedbed *fb* live mulch (fenugreek) and *in-situ* incorporation at 30-35 DAS
2.	Stale seedbed *fb* straw mulch incorporation of previous rice crop	Stale seedbed *fb* rice straw mulching @ 4-5 t/ha of previous crop
3.	Straw mulch incorporation of previous rice crop *fb* 1 HW at 25-30 DAS	Straw mulching @ 4-5 t/ha of previous rice crop 20 DAS
4.	Live mulch with dhaincha/Sesbania and *in-situ* incorporation *fb* at 30-35 DAS	Intercropping with spinach up to 35 days (1:1 additive series)
5.	Residue incorporation of previous crop before sowing *fb* one mechanical weeding through Cono/Ambika paddy weeder at 25-30 DAS	Closer sowing (20 cm row spacing) + Straw mulching @ 4-5 t/ha *fb* 1 HW
6.	Soil mulch *fb* HW at 20 and 40 DAS	Soil mulch *fb* HW at 20 and 40 DAS
7.	ICM practices	ICM practices

Natural farming production system through

Beejamrit + Ghan Jeevamrit @ 250 kg/ha + Jeevamrit @ 500 l/ha at 15 days interval with irrigation water
Beejamrit – seed treatment, Ghanjeevamrit- basal dose
Plant protection using with Neemastra, Brahmastra
Treatment in *rabi* will be superimposed on *kharif* plots
Rice spacing: 20 cm row to row; Cowpea spacing: 40 cm row to row
Design: RBD, Replications: 3, Plot size: 05 X 04 m

Observations:

1. Weed density and dry biomass at 30, 60 DAS & at harvest
2. Crop growth parameters
3. Yield attributes and yield
4. Weed shifts
5. Weed seed bank studies
6. Soil chemical and microbiological studies
7. Economics

WP 1.3.4. Weed management in coconut plantation

Centre: KAU, Thrissur

Objective:

1. To develop weed control techniques in coconut plantation under natural farming

Treatments:

1. Horsegram - Horse gram- @20 kg/ha
2. Horse gram +marigold - horse gram
3. *Indigofera tinctoria* @ 3 kg/ha
4. Hybrid napier
5. Coconut fronds mulch @ 20 t/ha
6. Ploughing alone (three times /year)
7. Unweeded control

Design: RBD Replication: 3

Observations:

1. Weed density and dry biomass
2. Crop growth parameters and yield
3. Weed shifts
4. Weed seed bank studies
5. Soil chemical and microbiological studies
6. Economics

WP 1.3.5. Evaluation of weed management practices in maize-fennel under Natural Farming system

Centre: MPUAT, Udaipur

Objective:

1. To develop weed management practices in maize-fennel under Natural Farming system

Treatments:

	Maize	**Fennel**
1.	Hand weeding at 20 and 40 DAS	Hand weeding at 20 and 40 DAS
2.	One weeding at 20 DAS by animal drawn weeder +one hand weeding at 40 DAS	One weeding at 20 DAS by animal drawn weeder +one hand weeding at 40 DAS
3.	Intercropping with black gram (2:2)	Intercropping with chickpea (1:2)
4.	Stale seed bed + reduced spacing (up to 25%) +mulching with previous crop residues + one hand weeding at 20 DAS	Stale seed bed + reduced spacing (up to 25%) +mulching with previous crop residues + one hand weeding at 20 DAS
5.	Maize : blackgram (2:2) intercropping	Fennel : Chickpea(1:2) intercropping
6.	Stale seed bed preparation +Maize : blackgram (2:2)	Stale seed bed preparation +Fennel : Chickpea(1:2)
7.	Stale seed bed preparation +Maize : blackgram (2:2) + 1 hand weeding at 50 DAS	Stale seed bed preparation +Fennel : Chickpea(1:2)+ 1 hand weeding at 50 DAS

8.	Stale seed bed preparation +Maize : blackgram (2:2) + straw mulch (5 t/ha) at 30 DAS	Stale seed bed preparation +Fennel : Chickpea(1:2)+ straw mulch (5 t/ha) at 30 DAS
9.	Maize : blackgram (2:2) + Stale seed bed preparation + straw mulch (5 t/ha) at 30 DAS+1 hand weeding at 50 DAS	Fennel : Chickpea(1:2) + Stale seed bed preparation + straw mulch (5 t/ha) at 30 DAS+1 hand weeding at 50 DAS
10.	Control (Direct sowing & no other treatment)	Control (Direct sowing & no other treatment)

Other details of experiment

(i)	Test crop	**:**	Maize and Fennel
(ii)	Variety	**:**	-
(iii)	Season	**:**	*Kharif & Rabi Season*
(v)	Experimental design	**:**	RBD
(vi)	No. of treatments	**:**	10
(vii)	No. of replication	**:**	3
(viii)	Total no. of plots	**:**	30
(ix)	Plot size	**:**	Gross size: 9m x 6m = 54m^2 Net size: 8.4m x 6m= 50.4m^2

Natural farming practices (Protocol for treatment T_1 to T_7)

- Intercropping: Maize + blackgram (2:2) and (1:2)
- Seed treatment: *Bijamrut* (300 mL/kg seed for both crops)
- *Ghan Jivamrut* (3 t/ha) + FYM (3 t/ha) soil application at sowing
- *Jivamrut* (1250 L/ha) at sowing, 30, 45, 60, 75, 90,105,120,135 and 150 DAP as soil application
- Foliar spray of *Jivamrut* 1.0 L/10 L of water at 45 DAP and Jivamrut 2.5 L/10 L at 75 105 and 135 DAP
- *Achhadan*: Crop residue: 5 t/ha (as per treatment)
- Plant protection: *Agniastra, Brahmastra* and *Neemastra,* if required

Note: Quantity of FYM will be reduced 25% from second year onwards

Observations:

1. Weed density species-wise (no./m^2) and dry matter (g/m^2) at 45 and 75 DAS.
2. Crop growth parameters
3. Yield attributes and yield
4. Economic analysis
5. Soil physico-chemical properties
6. Soil microbial biomass

WP 1.3.6. Weed management practices in organically grown cotton

Centre: PDKV, Akola

Objective:

1. To monitor the effect of weed management on weed dynamics and crop productivity in organically grown cotton.

Treatments:

1. Stale seedbed + Hand weeding at 20 & 40 DAS
2. Intercrop Greengram (2:1)
3. Mulching of *Sunhemp* (2:1) at 30-35 DAS
4. Weeding with power weeder at 20 DAS (weed mulch)
5. Straw mulch (5 t/ha) at 20 DAS
6. Farmers practice 3 hoeings 20 Days interval *fb* 2 HW 20 & 40 DAS
7. Weedy check

(Application of FYM 10 t/ha & Seed Treatment with biofertlizers)

Design: RBD ; Replication: 3

Observations:

1. Weed density and dry biomass at 30, 60 DAS & at harvest
2. Crop growth parameters
3. Yield attributes and yield

4. Weed shifts
5. Weed seed bank studies
6. Soil chemical and microbiological studies
7. Economics

WP 1.3.7. Weed management in green gram-onion cropping system under organic agriculture

Centre: PJTSAU, Hyderabad

Objective:

1. To monitor the effect of weed management on weed dynamics and crop productivity in greengram-onion organic cropping system

Treatments:

No.	Green gram *(Kharif*)	Onion *(Rabi)*
1.	Hoeing at 15 and 30 DAS + intra row HW	Hoeing at 20 and 40 DAT + intra row HW
2.	Stale seed bed *fb* HW at 15 & 30 DAS	Rice husk mulch 3 t/ha
3.	Poly mulch + intra row manual weeding at 30 DAS	Poly mulch + intra row manual weeding at 30 DAT
4.	Rice straw mulch 5 t/ha *fb* intra row HW at 30 DAS	Rice straw mulch 5 t/ha+ intra row HW at 30 DAT
5.	Sorghum leaf extract @ 30% on 3 DAS *fb* MW/HW at 30 DAS	Sorghum leaf extract @ 30% on 3 DAT *fb* MW/HW at 30 DAT
6.	*Eucalyptus* leaf extract @ 30% on 3 DAS *fb* MW/HW at 30 DAS	*Eucalyptus* leaf extract @ 30% on 3 DAT *fb* MW/HW at 30 DAT
7.	Gunny bag mulching *fb* intra row HW at 30 DAS	Gunny bag mulching *fb* intra row HW at 30 DAT
8.	Unweeded control	Unweeded control

Design: RBD; Replications: 3

Observations:

Greengram:

1. Phytosociological study of weed flora at 15 and 30 DAS.
2. Weed dry weight at 15 and 30 DAS.
3. Weed control efficiency at 15 and 30 DAS.

Onion:

1. Phytosociological study of weed flora at 20, 40 and 60 DAS/T
2. Weed dry weight at 20, 40 and 60 DAS/T
3. Weed control efficiency at 20, 40 and 60 DAS/T

For both crops

1. Phyto-toxicity on crops (if any)
2. Yield and yield attributes of greengram and onion
3. Economics

WP 1.3.8. Weed management in brinjal- barnyard millet- green manure cropping system under natural farming

Centre: TNAU, Coimbatore

Objectives:

1. To monitor the effect of treatments on weed dynamics and crop productivity
2. To study the dynamics of micro-flora and nutrient status of the soil
3. To study the economics of weed management practices

Treatments: Brinjal (*Kharif*)- barnyard millet (*Rabi*) - green manure

Sl. No.	***Kharif* and *Rabi***
1.	Multi-varietal techniques (mulching after 20 DAS) fb HW at 40 DAP
2.	Stale seed bed fb HW at 40 DAP

3.	Intercrop green leaf vegetable (20 DAS) fb HW at 40 DAP
4.	Live mulch of cowpea (20 DAS) fb HW at 40 DAP
5.	Previous crop mulch @ 5 t/ha fb HW at 40 DAP
6.	Hand Weeding at 20 & 40 DAP
7.	Unweeded control

Design : RBD, Replication : Three

Observations:

1. Weed density and dry biomass at 30, 60 DAS & at harvest
2. Crop growth parameters
3. Yield attributes and yield
4. Weed shifts
5. Weed seed bank studies
6. Soil chemical and microbiological studies
7. Economics

WP 1.3.9 Weed management in rice-*toria*-greengram cropping system under natural farming

Centre: AAU, Jorhat

Objective:

1. To monitor the effect of treatments on weed dynamics and crop productivity in rice-*toria*-greengram cropping system under natural farming

Treatments:

1.	Stale seedbed *fb* mulching of crop residue 5 t/ha at 0-3 DAS *fb* HW at 45 DAS
2.	Stale seedbed *fb* HW + mulching of crop residue 5 t/ha at 30 DAS *fb* HW at 45 DAS
3.	Intercropping *Sesbania* and use as mulch at 45 DAS
4.	Mulching with Sunhemp 5 t/ha at 0-3 DAS *fb* HW at 45 DAS
5.	Mulching of crop residue 5 t/ha at 0-3 DAS *fb* HW at 25th and 45 DAS
6.	Weedy
7.	Weed free

Natural farming practices (Protocol for treatment T_1 to T_7)

1. Seed treatment of *Bijamrut* (300 mL/kg seed
2. Soil application of *GhanJivamrut* (3 t/ha) + FYM (3 t/ha) at sowing
3. Soil application of*Jivamrut* (1250 L/ha) at sowing, 30, 45, 60,75,90,105,120,135 and 150 DAP as soil application
4. Foliar spray of *Jivamrut* 1.0 L/10 L of water at 45 DAP and *Jivamrut* 2.5 L/10 L at 75105and 135 DAP
5. *Achhadan*: Crop residue: 5 t/ha (as per treatment)
6. Plant protection: *Agniastra, Brahmastra* and *Neemastra,* if required

Observations:

1. Weed density and dry biomass at 25, 45, 65 DAS and at harvest
2. Crop growth parameters
3. Yield attributes and yield
4. Weed shifts
5. Weed seed bank studies
6. Economics
7. Weed shifts
8. Weed seed bank studies
9. Economics

WP 1.3.10. Weed management in pearl millet - chickpea cropping system under natural farming

Centre: RVSKV, Gwalior

Objective:

1. To find out the best weed management practice in pearl millet-chickpea cropping system under natural farming

Treatments:

Sl. No.	Pearl millet (*Kharif*)	Chickpea (*Rabi*)
1.	Reduced spacing (30 cm) fb 1 hoeing at 20 DAS	Reduced spacing (30 cm) fb 1 hoeing at 20 DAS

2.	Normal spacing (40 cm) fb 1 hoeing at 20 DAS	Normal spacing (40 cm) fb 1 hoeing at 20 DAS
3.	Stale seed bed fb 1 hoeing 20 DAS	Stale seed bed fb 1 hoeing at 20 DAS
4.	Sesbania in situ mulch at 30 DAS	intercropping with Fenugreek
5.	Intercropping with green gram	Intercropping with mustard
6.	Previous crop residue mulch	Previous crop residue mulch
7.	Two hand weeding at 20 & 40 DAS	Two hand weeding at 20 & 40 DAS
8.	Unweeded check	Unweeded check

- Design : RBD
- Replication : Three
- Plot size: 4.0 x 3.2 m^2
- Sesbania broadcasting in between two rows of pearlmillet @ 25 kg/ha

Natural production systems:

- Seed treatment: With Beejamrit in both season.
- Nutrient management: With herbal kunapjal / Jeevamrit / Ghanjivamrit in both season.
- Weed management: As per treatment
- Plant protection: With Neemastra / Dashparni ark in both season.

Observation:

1. Weed density and biomass of 30 & 60 DAS
2. Growth and yield parameters of pearlmillet& chickpea
3. economics of the treatment
4. Sesbania biomass at incorporation
5. Soil nutrient status before sowing of experiment and after harvesting

WP 1.3.11. Weed management in naturally grown little millet -horse gram cropping system

Center: UAS, Bengaluru

Objective:

1. To find out the best weed management practice in little millet -horse gram under natural farming

Treatments:

1. Stale seed bed followed by crop residue mulch at 0-3 DAS
2. Stale seed bed followed by one-hand weeding at 30 DAS
3. Inter-cultivation followed by hand weeding at 20 and 40 DAS.
4. Little millet + Black gram at 2:1 ratio (Replacement series)
5. Reduced spacing (22.5 cm) followed by one-hand weeding at 25 DAS
6. Two-hand weeding at 20 and 40 DAS
7. Control (No weed management, other practices being same)

Observations:

1. Weed density at 30 and 60 DAS
2. Weed dry weight at 30 and 60 DAS
3. Weed control efficiency 30 and 60 DAS
4. Yield and yield attributes
5. Economics of different treatments
6. OC, N,P,K status before and after harvest of crops

WP 1.3.12. Evaluation of mechanical weeding in basmati rice and beetroot under organic farming

Centre: SKUAST, Jammu (Collaboration: Division of Vegetable Science, SKUAST-J)

Objective:

1. To find out suitable weed management practices for basmati rice and beetroot under organic farming

Treatments:

Sl. No.	Basmati rice	Beetroot
1.	Cono weeder at 20 DAT with plant spacing 25 x 10 cm	Cycle wheel hoe at 20 DAS
2.	Cono weeder at 20 DAT & 40 DAT with plant spacing 25 x 10 cm	Cycle wheel hoe at 20 DAS & 40 DAS

3.	Azolla 2.0 t/ha with normal plant spacing 20 x 10 cm	Single wheel hoe at 20 DAS
4.	Azolla 2 t/ha with close plant spacing 15 x10 cm	Single wheel hoe at 20 DAS & 40 DAS
5.	MSM 2.5 t/ha with normal plant spacing 20 x 10 cm	Twin wheel hoe at 20 DAS
6.	MSM 2.5 t/ha with close plant spacing 15 x 10 cm	Twin wheel hoe at 20 DAS & 40 DAS
7.	Weedy check	Weedy check

Source of Nutrients: FYM/Vermicompost (as per recommended dose of N)
Design: RBD Replications: 03

Observations:

1. Weed density at 30 and 60 DAT/DAS
2. Weed dry weight at 30 and 60 DAT/DAS
3. Weed control efficiency 30 and 60 DAT/DAS
4. Yield and yield attributes
5. Economics of different treatments
6. OC, N,P,K status before and after harvest of crops

WP 1.3.13. Weed management in organically raised sugarcane-ratoon system

Centre: PAU, Ludhiana

Objective:

1. To develop integrated weed management options for organically raised sugarcane-ratoon system

Treatments:

1. Sugarcane + Cane trash mulch @ 8-10 t/ha
2. Sugarcane + Paddy straw mulch @ 8-10 t/ha
3. Sugarcane + Summer green gram + Mulch @ 6 t/ha
4. Sugarcane + Summer black gram + Mulch @ 6 t/ha
5. Sugarcane + Cowpea + Mulch @ 6t/ha
6. Sugarcane + Summer green gram + One mechanical weeding
7. Sugarcane + Summer black gram + One mechanical weeding
8. Sugarcane + Cowpea + One mechanical weeding
9. Sole sugarcane (Mechanical weedings)
10. Sole sugarcane (partially weed- weeds removed after critical period)

* In addition, two long strips will be kept, One for chemical farming (ready mix of clomazone + sulfentrazone as pre-emergence) and One for Natural farming. During summer 2022, green manure crop will be raised followed by raising of berseem (*Egyptian clover*) crop for enhancing the fertility level of the experimental field and after harvest/incorporation of berseem, the spring sugarcane crop will be raised in February 2023.

Design: RBD; Replications: 3

Observations:

1. Weed density (30, 60 and 90 DAS)
2. Weed biomass (30, 60, 90 DAS)
3. Intercrop yield and yield attributes
4. Sugarcane growth and yield attributes

WP 1.3.14. (i)Weed management in organically grown maize-wheat cropping system (continuing trial)

Centre: CSKHPKV, Palampur

Objectives:

1. To evolve remunerative/economically viable weed management practice in maize - wheat / organic production system
2. To find out effect on soil moisture, micro-flora, fauna and nutrients after the completion of cropping cycle.

Treatments:

Sl.No.	Maize (*Kharif*)	Wheat (*Rabi*)
1.	Hand weeding/hoeing (HW)	Hand weeding on 30 & 60 DAS

2.	Stale seed bed + HW	Stale seed bed + HW
3.	Raised stale seed bed + HW	Raised stale seed bed + HW
4.	Mulch 5 t/ha + HW	Mulch 5 t/ha + HW
5.	Stale seed bed + mulch 5 t/ha + HW	Stale seed bed + mulch 5 t/ha + HW
6.	Raised stale seed bed + mulch5t/ha + HW	Raised stale seed bed + mulch@5 t/ha + HW
7.	Intercropping (soybean) + hoeing/HW	Intercropping (mustard) + hoeing/HW
8.	* Maize / soybean + hand weeding	*Wheat/mustard + hoeing + earthing up
9.	Mulch + manual weeding *fb* relay crop of mustard (green)	Mulch + manual weeding fb summer crop of buckwheat
10.	Mechanical weeding/weeding with hoes	Hoeing

Common organic practices [seed/seedling treatment with beejamrit, 30 kg/ha N equivalent dose in *Kharif* and 120 kg/ha in *Rabi* from sources like FYM/Vermicompost/other organic manures followed by three sprays of jeevamrit/panchgavya/amritpani/vermivash at the vegetative stage of the crop] will be followed for raising of crops along with imposed treatments including the check.

Observations:

1. Plant stand at 40 DAP and at harvest
2. Weed density & weed dry biomass (species-wise and total) at periodic intervals
3. Growth, yield attributes and yield of different crops in the system
4. Economics

(ii) Weed management in maize – wheat cropping system under natural farming

Centre: CSHPKV, Palampur

Objectives:

1. To evolve remunerative / economically viable weed management practices in maize -wheat cropping system under natural farming
2. To study the effect of weed management practices on productivity of maize – wheat cropping system under natural farming

Treatments:

Sl.No.	**Maize (*Kharif*)**	**Wheat (*Rabi*)**
1.	Maize alone (check, no weed control)	Wheat alone (check, no weed control)
2.	Maize alone (with mulch 5 t / ha)	Wheat alone (with mulch 5 t / ha)
3.	Maize + soybean (check, no weed control)	Wheat + gram (check, no weed control)
4.	Maize + soybean + 1 HW at 20 DAS	Wheat + gram + 1 HW at 20 DAS
5.	Maize + soybean (with mulch 5 t / ha)	Wheat + gram (with mulch 5 t / ha)
6.	Maize + soybean (with mulch 5 t / ha) + 1 HW at 20 DAS	Wheat + gram (with mulch 5 t / ha) + 1 HW at 20 DAS
7.	Maize + soybean + 2 HW at 20 & 50 DAS	Wheat + gram + 2 HW at 20 & 50 DAS
8.	Maize + soybean (with mulch 5 t / ha) + 2 HW at 20 & 50 DAS	Wheat + gram (with mulch 5 t / ha) + 2 HW at 20 & 50 DAS
9.	Maize alone (weed free) 3 - 4 HW as required	Wheat alone (weed free) 3 - 4 HW as required
10.	Maize + soybean (weed free) 3 - 4 HW as required	Wheat + gram (weed free) 3 - 4 HW as required

Experimental details:
Treatments : 10
Replication : 3
Design : RBD
Observations:

1. Plant stand at 40 DAP and at harvest
2. Weed density & weed dry biomass (species-wise and total) at periodic intervals
3. Growth, yield attributes and yield of different crops in the system
4. Economics

WP 1.3.15. Weed management practices in organically grown cotton
Centre: ANGRAU, Guntur

Objective:

1. To monitor the effect of weed management on weed dynamics and crop productivity in organically grown cotton.

Treatments:

1. Stale seedbed + Hand weeding at 20 & 40 DAS
2. Plastic mulch at sowing on broad beds
3. Cotton + Cowpea* (2:1)
4. Cotton + Sunhemp* (2:1)
5. Weeding with power weeder at 20 & 40 DAS
6. Straw mulch (5 t/ha) at 20 DAS
7. Farmers practice (3 hoeing 20 Days interval fb 2 line weeding 20 & 40 DAS)
8. Pendimethalin PRE fb Pyrithiobac Sodium + Quizalofop-ethyl (RM) @ 1125 ml/ ha at 20-25 DAS
9. Weed check

Note: Incorporated at 45 DAS
Design: RBD; **Replication:** 3
Observations:

1. Weed density and dry biomass at 30, 60 DAS & at harvest
2. Crop growth parameters
3. Yield attributes and yield
4. Microbiological load studies
5. Economics

WP1.4. Management of parasitic weeds
WP 1.4.1. Management of *Striga* in sugarcane
Network centres: UAS Dharwad and PJTSAU Hyderabad
Objectives:

1. To study the effect of different herbicides on the emergence of *Striga*
2. Evaluation of native UAS-D AMF consortium against *Striga* emergence in sugarcane
3. To study the visual phyto-toxicity on sugarcane crop

Treatments:

1.	2,4-D sodium salt 44% + metribuzin 35% + pyrazosulfuron ethyl 1.0% WDG 2400 g a.i./ha as post-emergence
2.	Atrazine 1.0 kg/ha on 3 DAP + HW on 45 DAP + earthing up on 60 DAP + POE 2,4-D Na salt 5 g/L + urea 20 g/L on 90 DAP *fb* trash mulching at 5 t/ha on 120 DAP
3.	UAS-D AMF consortium*+ T2
4.	UAS-D AMF alone
5.	Desmodium intercrop
6.	Untreated check

* Pre-colonization of the sugarcane sets with UAS-D AMF consortia (@ 2 kg/m^2. Soil application of consortium (@ 20 kg/ha mixed with 200 kg Vermicompost) at the time of planting

Observations:

1. No. of *Striga* emerged per/m^2 at 60, 90,120 DAP and at harvest
2. Dry biomass of *Striga* per/m^2 at 60, 90,120 DAP and at harvest
3. Phyto-toxicity symptoms on sugarcane (if any).
4. Yield attributes and yield of sugarcane.
5. Residual toxicity on the succeeding crop
6. Economics of *Striga* management.

WP 1.4.2. Management of *Orobanche* in mustard

Network centres: CCSHAU Hisar, MPUAT Udaipur, SKNAU Jobner, RVSKV Gwalior and AAU Anand

Objective:

1. To find out a suitable management option for *Orobanche* in mustard

Treatments:

1. Pyrazosulfuron 10% WP 20 g/ha PPI
2. Pendimethalin 38.4% + pyrazosulfuron ethyl 0.85% ZC 785 g/ha PPI
3. Pendimethalin 38.4% + pyrazosulfuron ethyl 0.85% ZC 588.75 g/ha PPI
4. Pretilachlor 30% + pyrazosulfuron 0.75% WG 615 g/ha PPI
5. Pretilachlor 30% + pyrazosulfuron 0.75% WG 461.25g/ha PPI
6. Pyroxasulfuron 100 g/ha POST
7. Pendimethalin CS + metsulfuron SC 4 g/ha PE
8. Neem cake 200 kg/ha fb pendimethalin 30% EC 500 g/ha herbigation at 35 DAS
9. Poultry manure 2.0 t/ha fb pendimethalin 30% EC 500 g/ha herbigation at 35 DAS
10. Karanj Cake 200 kg/ha fb pendimethalin 30% EC 500 g/ha herbigation at 35 DAS
11. Manual removal of *Orobanche* shoots
12. Unweeded

Design: RBD Replication: 3

Observations:

1. Visual Phytotoxicity on mustard plants at 0, 7, 14 and 21 days after germination
2. No. of *Orobanche* shoots emerged 30, 45, 60 and 90 DAS
3. *Orobanche* shoot dry weight (g/plant) 30, 45, 60 and 90 DAS
4. Growth characters
5. Yield and Economics

WP 1.4.3. Management of *Cuscuta* in linseed

Centre: IGKVV, Raipur

Objectives:

1. To study the effect of different herbicides on the emergence of *Cuscuta* in linseed
2. To study the visual phyto-toxicity on linseed crop, if any

Treatments:

1.	Oxyfluorfen 140 g/ha PE
2.	Pendimethalin 1000 g/ha PE
3.	Metribuzin 250 g/ha PE
4.	Metsulfuron 4 g/ha PoE 20 DAS
5.	Imazethapyr 75 g/ha PoE 20 DAS
6.	Pendimathelin @ 1000 g/ha at 10 DAS as EPoE
7.	Amarbel liquid formulation @100 ml/15 lit of water POST
8.	Weed free (*Cuscuta* free)
9.	Unweeded Control (*Cuscuta* infected)

Design: RBD, Replication: 3, Plot size: 5.0 X 4.0 m

Season: *Rabi* 2024-25 and 2025-26

Observations:

1. No. of *Cuscuta* emerged per/m^2 at weekly interval
2. Biomass of *Cuscuta* per/m^2 at 15,30 and 60 DAS and atharvest
3. Visual phyto-toxicity(0-10scale)

4. Crop growth and yield
5. Economics

WP 1.4.4. Management of *Cuscuta* in lucerne
Centre: MPUAT, Udaipur
Objectives:
1. To study the effect of different herbicides on the emergence of *Cuscuta*
2. To study the visual phyto-toxicity on Lucerne crop, if any

Treatments:

1.	Pendimethalin	480 g/ha (EPoE10DAS)
2.	Pendimethalin	640 g/ha (EPoE10DAS)
3.	Pendimethalin + imazethapyr (RM)	500 g/ha (EPoE10DAS)
4.	Pendimethalin + imazethapyr (RM)	750 g/ha (EPoE10DAS)
5.	Oxyfluorfen	80 g/ha PE
6.	Imazethapyr	75 g/ha PoE
7.	Imazethapyr after first cutting	75 g/ha PoE
8.	Imazethapyr after first cutting *fb* imazethapyr after last cutting	50 g/ha (15 DAS) + 50 g/ha (15 DAS)
9.	Imazethapyr + imazamox (Pre-mix)	50 g/ha (EPoE10DAS)
10.	Fluazifop-p-butyl + fomesafen (Pre-mix)	250 g/ha (EPoE10DAS)
11.	Amarbel liquid formulation	100 ml/15 lit of water POST
12.	Weedy check	

Year of commencement: 2024
Design: RBD, Replication: 3
Observations:
1. Days to emergence of *Cuscuta* threads
2. Fresh weight of *Cuscuta* twines at 30 and 60 DAS (gm/m^2)
3. Visual photo-toxicity on berseem (0-10 scale)
4. Green fodder yield in different cuttings
5. Number and length of *Cuscuta* at 30 and 60 DAS
6. Seed yield of *Cuscuta* per square meter
7. Economics
8. Effect on succeeding crop

WP 1.4.5. Screening of antagonistic bacteria against *Orobanche* infestation in mustard
Centre: CCSHAU, Hisar
Objective:
1. To evaluate strains of bacteria for control of *Orobanche* in mustard

Treatment:
1. Seed treatment of ten strains of bacteria

Replication: 3, Design: RBD
Observation:
1. *Orobanche* infestation (no./m^2)
2. Yield attributes and yield
3. Microbial studies

WP 1.4.6. Control of parasitic weed *Loranthus*
Centre: AAU, Jorhat
Treatments:
1. Cutting down the affected branch of the host plant
2. Cutting down the affected branch of host plants *f.b*. application of bordeaux paste
3. 2,4-D amine salt 1% on the host plant trunk
4. 2,4-D amine salt 1% on the pest trunk
5. Glyphosat 10 mg ai /lit on the host plant trunk
6. Glyphosat 10 mg ai /lit on the pest trunk
7. Atrazin 10 mg ai /lit on the host plant trunk
8. Atrazin 10 mg ai /lit on the pest trunk

9. Diesel on the host plant trunk
10. Diesel on the pest trunk

Application of all the chemicals except T_1 and T_2 will be done around the infected branch/trunk or pest with cotton cloth strip soaked in herbicide/diesel at just below the point of attachment to the host plant or just above the point of attachment to the pest trunk after removing the outer skin to about 2 cm length

Observation:

1. Regeneration of the pest in the treated plant and their growth parameters

WP 1.4.7. Chemical control of parasitic weed *Loranthus (Dendrophthoe falcata)* in mango orchards

Center: KAU, Thrissur

Objective:

1. To arrive at herbicidal management measures against the parasitic weed *Loranthus* on mango trees

Treatments:

1. 2,4- D Na salt 80WSP 1 %
2. 2,4- D Na salt 80WSP 1 % + Cu SO_4 (2%)
3. Metribuzine 70 WP 0.5 %
4. Glufosinate ammonium 15 SL 1 %
5. Ethrel (39 SL) @ 2.5 %
6. Unsprayed check

Design:RBD, Replications -3

Note: In all treatments except ethrel, urea (5%) will be tank mixed to increase efficacy and sticker will be also added @ 2ml/L of spray fluid

Observation:

1. Regeneration of the pest in the treated plant and their growth parameters

WP-1.5 Management of herbicide resistance in weeds

WP 1.5.1 Monitoring the development of herbicide resistance in weeds

Cooperating centres: All centres including voluntary centres

Guidelines

- All centres need to be more vigilant regarding the development of herbicide resistance in weeds in their respective area.
- Conduct a systematic survey and collect a sufficient population of reported resistant and then go for further study on herbicide resistance.
- Collect samples/seeds from the area where the herbicide is not yet applied to establish the resistance in weeds.

WP1.5.2 Management of resistant *Phalaris minor* and other weeds with new herbicide combinations

Centre: - GBPUAT Pantnagar

Objective:

1. To find out suitable options for effective management of resistant *Phalaris minor* and other weeds in wheat under variable paddy residue management scenarios

Treatments:

A (Tillage and residue management-3):

1. Conventional tillage (without residue)
2. Zero till with residue retention on surface (Happy seeder)
3. Conventional tillage with residue incorporation (Super seeder)

B (Weed control-4):

1. Unsprayed control
2. Pyroxasulfone 100 g + pendimethalin 800 g/ha (Pre-emergence)
3. Pyroxasulfone 127.5 g + metribuzin 150 g/ha (Pre-emergence)
4. Pinoxaden 50 g + metribuzin 175 g/ha (Post emergence)

Design: Split-plot (A in main plot and B in subplot); Replications: 3

Observations:

1. Weed density (25 DAS, 50 DAS, at harvest)
2. Weed biomass (25 DAS, 50 DAS, at harvest)
3. Crop growth parameters (plant height and crop biomass at harvest)
4. Grain yield and attributes

WP1.5.3 Management of resistance developed in *Cyperus difformis* against bispyribac-sodium in rice

Centre: IGKV, Raipur

Objective:

1. To find out suitable options for effective management of herbicide resistant *Cyperus difformis* in rice

Treatments:

1.	Pyrazosulfuron 20 g/ha PE
2.	Bispyribac Na 25 g/ha 20 DAT
3.	Pyrazosulfuron 20 g/ha PE *fb* penoxsulam 22.5 g/ha 20 DAT (RM)
4.	Pyrazosulfuron 20 g/ha PE fb metsulfuron +chlorimuron 4 g/ha 20DAT
5.	Florpyrauxifen-benzyl + penoxsulam 40.63 g/ha PoE 20 DAT (RM)
6.	Bentazone 960 g/ha PoE 20 DAT
7.	Triafamone + ethoxysulfuron 67.50 g/ha PoE 20 DAT (RM)
8.	Unweeded control

Season: *Kharif* 2024 & 2025

Design: RBD; Replication: 4

Observations:

1. Weed density (25 DAS, 50 DAS, at harvest)
2. Weed biomass (25 DAS, 50 DAS, at harvest)
3. Crop growth parameters (plant height and crop biomass at harvest)
4. Grain yield and attributes

WP-1.5.4 Assessment of weed resistance for atrazine in maize in Telangana State.

Centre: PJTSAU, Hyderabad

Objective:

1. To assess the weed resistance for atrazine in maize

Methodology:

- Seeds of the following weeds will be collected from the farmers' fields and ARS, Karimanagar where the maize is grown for more than 10 years and atrazine herbicide used continuously after *Kharif* season, 2024.
- Pot study will be conducted with the following treatments in CRD with factorial design during *Rabi* season, 2024.

Factor I: Weed Species: Four

W_1: *Digitaria sanguinalis*
W_2: *Rottoboellia cochinchinensis*
W_3: *Digera arvensis*
W_4: *Commelina benghalensis*

Factor II: Atrazine doses: Six

H1: Atrazine 0.75 kg a.i./ha
H2: Atrazine 1.0 kg a.i./ha
H3: Atrazine 1.25 kg a.i./ha
H4: Atrazine 1.50 kg a.i./ha
H5: Atrazine 2.00 kg a.i./ha
H6: unsprayed control

Design: CRD with factorial concept; Replications: Three

WP 1.5.5 Management of herbicide-resistant *Phalaris minor* in wheat

Centre: CCSHAU, Hisar

Objective:

1. To study the efficacy of different pre-emergence herbicides alone and in combination with PoE herbicides for control of resistant *P. minor* in wheat

Treatments:

1. Pyroxasulfone 127.5 (PRE)
2. Pendimethalin + metribuzin 875 + 87.5 (PRE)
3. Pyroxasulfone + pendimethalin 127.5 + 1500 (PRE)
4. Pendimethalin + metsulfuron-methyl (TM) 1500 + 4 g/ha (PRE)
5. Pyroxasulfone + metsulfuron-methyl (TM) 127.5 + 4 g/ha (PRE)
6. Pendimethalin + metribuzin 875 + 87.5 (EPoE)
7. Pyroxasulfone + pendimethalin 127.5 + 1500 (EPoE)
8. Pendimethalin + metsulfuron-methyl (TM) 1500 + 4 g/ha (EPoE)
9. Pyroxasulfone + metsulfuron-methyl (TM) 127.5 + 4 g/ha (EPoE)
10. Metribuzin + clodinafop 210 + 60 (PoE)
11. Weed free
12. Weedy

Design: RBD; **Replications:** 03

Observations:

1. Weed density at 60 and 90 DAS
2. Weed dry weight at 60 and 90 DAS
3. Phyto-toxicity on the crop at 10 and 20 DAT
4. Yield and yield attributes of wheat

WP 1.5.6. Monitoring and management of herbicide resistance to different herbicides in *P. minor* biotypes from HAU farm and farmers' fields (Pot study)

Centre: CCSHAU-Hisar

Objectives:

1. To evaluate the inheritance of resistance to alternate herbicides in different biotypes of *P. minor*.
2. To compute the GR_{50} values of different herbicides.

Treatments: Different biotypes of *P. minor* collected from farmers' fields will be subjected to the following treatments for resistance studies.

S No.	Herbicide	Dose (g/ha)	Time of Application
1.	Clodinafop	30	2-4 Leaf stage
2.	-do-	60	,,
3.	-do-	120	,,
4.	Sulfosulfuron	12.5	,,
5.	-do-	25	,,
6.	-do-	50	,,
7.	Mesosulfuron+ iodosulfuron (RM)	7.2	,,
8.	-do-	14.4	,,
9.	-do-	28.8	,,
10.	Pinoxaden	25	,,
11.	-do-	50	,,
12.	-do-	100	,,
13.	Clodinafop + metribuzin	135	,,
14.	-do-	270	,,
15.	-do-	540	,,
16.	Pyroxasulfone	64	PRE
17.	-do-	128	,,
18.	-do-	256	,,
19.	Untreated check	--	--

Design:CRD; **Replications:** 3

Observations:

1. Per cent control of *P. minor* at 30 days after spray.
2. Weed dry weight (g/pot) at 30 days after spray.
3. Computation of GR_{50} values of different herbicides

WP 2. Management of weeds in non-cropped and aquatic areas

WP 2.1. Management of weeds in non-cropped area

Centre: UAS, Bangalore

Weeds represent a significant biotic constraint in agricultural systems, competing with cultivated crops for resources and potentially causing yield losses. Weeds in non-crop areas, such as natural habitats, urban landscapes, roadsides and vacant lands, can have significant impacts on ecosystems, biodiversity, human health, and infrastructure. While these areas may not be cultivated for agricultural purposes, the presence of weeds can still cause a range of problems: **Ecological Impact**- Competition with Native Plants, Habitat Degradation, Altered Fire Regimes; Human Health and Safety-Allergies and Respiratory Issues, Pest Habitat, **Economic Impact**- Infrastructure Damage, Reduced Aesthetic Value; Invasive Spread, Fragmentation and Spread, Mechanical disturbances, such as mowing and construction activities, can fragment weed populations and facilitate their spread into new areas, increasing the likelihood of invasion and establishment.

Weeds are a major problem for agriculture, causing significant losses in crop yields. Nationally, they result in the loss of 2.7 million tons of grain. However, the impact is even more pronounced in India, where the economic toll of weeds on agricultural production exceeds USD 11 billion annually. This impacts not just India's economy but also global efforts to combat hunger.

To deal with this issue, India has increasingly relied on herbicides over the last ten years due to urbanization and rising wages. However, this has led to the growth of herbicide-resistant weeds, making the problem worse. New herbicides with different modes of action are needed to manage herbicide-resistant weeds. Keeping this in view, this present study was conducted to evaluate the efficacy of different herbicides against weeds in non-cropped areas.

Treatment details:

1. Indaziflam 20 + Glyphosate IPA 540 SC (1.65 %w/w + 44.63 % w/w) (Alion plus) @ 1050 ml /ha
2. Indaziflam 20 + Glyphosate IPA 540 SC (1.65 %w/w + 44.63 % w/w) (Alion plus) @ 2100 ml /ha
3. Tiafenacil 70 WG @ 105 ml / ha + Adjuvant
4. Tiafenacil 70 WG @ 140 ml / ha + Adjuvant
5. Tiafenacil 70 WG @ 175 ml / ha + Adjuvant
6. Paraquat 24 % SL @ 6 ml per liter of water
7. Glyphosate 71 % SG @ 6 ml per liter of water
8. Unweeded check

Observations

1. Weed count prior to herbicide application and at 7, 14, 28 and 35 days after herbicide spray
2. Weed dry weight at 7, 14, 28 and 35 days after herbicide spray will be taken
3. Weed control efficiency at 7, 14, 28 and 35 days after herbicide spray will be calculated

WP 2.2. Study of *Mimosa diplotricha* in kaziranga national park (KNP) and its vicinity

Centre: AAU, Jorhat

Objective:

1. Management of Mimosa in KNP
2. Extent of invasion of Mimosa in the grassland
3. Role played by climate change on increasing severity in Mimosa in KNP
4. Study of the human animal conflict as a result of endangered biodiversity will be evaluated

A. Within the territory of KNP

Activity 1: Estimation of area coverage by the weeds by a) ground survey b) Drone survey

Activity 2: Regeneration rate & impact assessment study

a) Manual weeding by cutting followed by burning
b) Manual followed by burning followed natural flooding
c) Manual followed by burning followed mulching with locally available plant biomass

B. Outside of KNP

T_1: Foliar application of Glyphosate 41% @5ml/lit water + Surfactant

T_2: Foliar application of Glyphosate 41% @10ml/lit water + Surfactant

T_3: Foliar application of Glyphosate 71% @10ml/lit premixed ammonium sulfate ($2g/m^2$) + Surfactant

T_4: Foliar application of 2,4-D @1Kg/ha

WP 2.3. Evaluation of fodder/toxicity value of common facultative weeds
Centre: AAU, Jorhat
(In collaboration with the AICRP on Forage Crops and Utilization)
Rationale: The common cattle, goats, buffalos, horses and other herbivores in villages are usually fed upon roadside and crop-fallow weedy herbs and grasses. Thus, the quality of such food plants determines the quality of health of such animals, as well as their milk, meat and working capacity used by human society. Simultaneously, effective grazing in a place reduces the possibility of weed seed production and dispersion to neighbouring croplands.
Objective: To evaluate the fodder value of common facultative weeds
Materials and Methods:

- Common facultative weeds along the roadsides and crop-fallow lands will be collected, cleaned, taxonomically authenticated and their fodder quality will be estimated.
- For chemical investigation, samples will be oven dried at 55°C for 48 hours and stored
- Proximate analysis of the grasses will be done according to the Association of Official Analytical Collaboration International (AOAC, 2000).
- The dry matter (DM) will be calculated
- The crude protein (CP) will be measured by Kjeldhal apparatus.
- Ash will be calculated by burning the samples in furnace.
- The neutral detergent fiber (NDF) and acid detergent fiber (ADF) will be determined by van Soest *et al*. (1991) methods.

NB: In addition to these we will take at least two or three network trials suitable for our state

WP 2.4 Evaluation of new herbicide for the management of parthenium hysterophorus in non-cropped areas
Centre: TNAU, Coimbatore
Objective:
1. To evaluate the new herbicide and its optimum dose for the management of *Parthenium* in non-cropped areas.

Sr. No.	Treatment
1.	Glufosinate ammonium 13.5% SL @ 500g/ha
2.	Glufosinate ammonium 13.5% SL @ 750g/ha
3.	Glufosinate ammonium 13.5% SL @ 500g/ha + 2,4 D Na salt @1.25 kg/ha
4.	Glufosinate ammonium 13.5% SL @ 750g/ha+ 2,4 D Na salt @1.25 kg/ha
5.	Glyphosate 41 % SL @ 3.0 kg/ha
6.	2,4 D Na salt 80 % WP @ 3.0 kg/ha
7.	Untreated check

WP 2.5. Organic acids for management of invasive aquatic weed *Salvinia molesta*
Centre: KAU, Thrissur
Objective:
*1.*To study the efficacy of organic acids as ecofriendly alternative to chemical herbicides for aquatic weed *Salvinia molesta*
Design: CRD factorial, Replications -3

Sr. No.	Treatment
1.	Acetic acid 2.5 % @ 2ml/l
2.	Acetic acid 5% @2ml/l
3.	Acetic acid 10% @2 ml/l
4.	Lactic acid 2.5% @ 2 ml/l
5.	Lactic acid 5% @ 2 ml/l
6.	Lactic acid 10% @ 2 ml/l
7.	Unsprayed check

WP 2.6. Testing of product (Product Code AGLC#14) from ag bio systems to control *Water hyacinth, parthenium hysterophorus, lantana camara*

Network Centres: ***Lantana camara*****-** UAS Bengaluru, CSKHPKV Palampur and SKUAST Jammu

Parthenium hysterophorus**-** AAU Anand, MPUAT Udaipur, IGKV Raipur and DWR Jabalpur

Water hyacinth**-**KAU Thrissur, IGKV Raipur, BCKV Kalyani, PJTSU Hyderabad, PAJNCOA & RI Puducherry and DWR Jabalpur

Sample preparation/ Direction to use

- 12 ml of AGLC#14 in 1 liter of water+ Add 5-6 ml Organic acid Buffer (Formic acid) in per liter of water to set spray water pH for spraying water.
- pH has corrected to pH 4-5 by adding organic weak acid as acidic buffer.
- This addition is required for cuticular penetration of leaves surface for better penetration of metabolites
- After 3 days, second application with similar dosage is used for maximum control of weed
- Drying percentage and biomass of weed in different treatment should be recorded

Treatment	
1.	Fresh water
2.	Organic acids
3.	Product with water
4.	Product with water + organic acid

WP 2.7. Biological control of *Salvinia molesta*

Network centres: IGKVV Raipur, CCSHAU Hisar and PDKV Akola

Technical programme:

- Select at least two perennial ponds/lacks/ stagnated or slow flowing aquatic body infested with Salvinia molesta for study *.
- Take Salvinia molesta dry weight by five random samples of one square meter each from the site with the help of quadrate.
- Release 1000 to 2000 adult beetles in one pond releasing 200 to 250 adult at different spots of the water body.
- Efforts should be made to release the bioagent in the deepest water point of the pond with the help of fishermen.
- Count adult weevils from the 5 samples from 0.25 m^2 quadrate taken on quarterly basis.
- Count the damaged growing buds from the same samples.
- After counting the adult and damaged buds, the biomass should be dried for taking dry weight.
- Note dieback type or dryness symptoms on Salvinia on 0-100%
- Observe the clear water appearance on the basis of percent considering whole aquatic body for example 0 to 100%. scale
- After complete control and clearance of water, observe further re-emergence of *Salvinia molesta* in the same pond and follow the procedure.

The water bodies which are likely to dry during summer season should not be selected because in such sites *Salvina molesta* plants will anchor on the soil which will kill the bioagent inside. Those sites should also not be selected which are likely to flooded during rainy season as all the such Salvinia *molesta* along with bioagent will wash away with the flood. Therefore, more visible impact of bioagent can be demonstrated in ponds, lakes and reservoirs having water throughout the year.

Note: Those centers which are not having established sites with the bioagent, they may indent for bioagent in advance to DWR to receive the culture.

It is advised to take the photograph of the aquatic body keeping any permanent mark in the picture before release of the bioagent and in due courses the picture should be taken from that angle only to see the impact of bioagent on long term basis.

Table formation
Year/ Month:

Sample No.	Adults (No/m^2)	Damaged growing points (no./m^2)	Dry weight (g/m^2)	Damage (0-5 scale)	Clear water surface (10 to 100%)
1 to 5					
Av ±SD					

WP 2.8. Biological control of water hyacinth by *Neochetina* spp.

Network centres: AAU Anand, MPUAT Udaipur, RVSKVV Gwalior, IGKV Raipur, CCSHAU Hisar, PDKV Akola, PAJNCOA & RI Puducherry and BCKV Kalyani

Technical programme and observations

- Select at least two to three perennial ponds/lacks aquatic body infested with water hyacinth in your university jurisdiction. It is not necessary that pond should be located in your city.
- Take Water hyacinth density by three random samples of one square meter each from the site and dry weight with the roots
- Release 500 to 1000 adult beetles in one pond distributing 100 to 200 at different sites in the water body
- Observe population build-up of the bioagent from the same pond by taking 25 plants at six monthly basis
- Count carefully the grubs and adults from each plant and present the data on average basis*
- Note dieback symptoms on water hyacinth plants on 0-4 scale, (0-No attack; 1- negligible, 2-25%; 3-50%; 4-75%; 5-complete dry up of whole plant).
- Observe the clear water appearance on the basis of percent taking into account whole aquatic body for example. 25 to 100%.
- After clearance of water observe further re-emergence of the water hyacinth in the same pond and follow the procedure.

* The water bodies which are likely to dry during summer season should not be selected because in such sites water hyacinth plants will anchor on the soil which will kill the bioagent inside. Those sites should also not be selected which are likely to inundated during rainy season as all the such water hyacinth along with bioagent will wash away with the flood. Therefore, more visible impact of bioagent can be demonstrated in ponds, lakes and reservoirs having water throughout the year. In cold region, dieback type of symptoms may appear during winter season, therefore, it should be avoided during winter season.

It is advised to take the photograph of the aquatic body keeping any permanent mark in the picture before release of the bioagent and in due courses the picture should be taken from that angle only to see the impact of bioagent on long term basis.

Table formation
Year/ Month :

Plant No.	Adult s	Feeding scarce on Leave	Dry weight (g/m^2)	Damage (0-5 scale)	Clear water surface (10 to 100%)
1 to 25					
Av ±SD					

WP 2.9. Identification of weeds of national importance (WoNI)

Network centres: All

Objective:

1. To identify the weeds of national importance for their management

Testing of weed species for WoNI is data dependent. Where the data cannot be supplied for a species the score will be reduced accordingly. Consistency of data is critical as the ranking of WoNI is based on weed species relativities. Data will be screened to assess the validity of estimates provided so as not to disadvantage other weed candidates.

Submission Date

In order to progress the WoNI, it is essential that deadlines be met. For this reason. Data not provided by the due date will be interpreted as non-provision of data.

This list of National Significance may be developed based on the following key criteria:

Criteria for Weeds of National Significance

Invasiveness' and 'impacts' criteria
Potential for spread' criterion
Current distribution
Potential distribution
Socioeconomic and environmental values' criterion
Economic data for agricultural and forestry weeds (primary industries)
Environmental values
Biodiversity indicators
Threatened species data
Number of threatened conservation areas
Conservation indicators
Weeds in Interim Biogeographic Regionalisation of Australia
(IBRA) regions
Monoculture potential
Social values

Data collection

1. Questionnaire has to be filled up based on own survey, from primary and secondary information following the guidelines (will be given)
2. Data should be collected from each district of the state based on the guidelines
3. Each center has to get information from the regional station/KVKs and all other possible sources. They should send the questioner to maximum possible sources from where data can be collected. Should be compiled at their own level in first hand and all collected information should be sent to DWR.
4. Statistical analysis of collected data will be done at the Directorate based on the weight of each criteria

Questionnaire: Weeds of National Importance

AICRP-WM center name:

Climate : Tropical/ Sub-tropical/Temperate

Weed Botanical name :

Weed English name/common name

Weed Local name

A. Invasiveness

What is the weed's ability to establish amongst existing vegetation?

1 Poor	**2**	**3**	**4**	**5**	**6 very strong**	**Don't Know**

What is the tolerance of seedlings/juveniles of the weed to routine weed control practices?

1 Highly susceptible	**2**	**3**	**4**	**5**	**Extremely resistant**	**Don't Know**

How competitive is the weed when it is established?

1 Non competitive	**2**	**3**	**4**	**5**	**6 Highly suppressive**	**Don't Know**

What is the likelihood of long-distance dispersal (>1km) by water, flying birds, wild terrestrial vertebrates, and/or wind?

1 Extremely unlikely	**2**	**3**	**4**	**5**	**6 Extremely frequent**	**Don't Know**

What is the likelihood of long-distance dispersal (>1km) by accidental and/or intentional human movement, human transport, produce contaminant, and/or domestic terrestrial vertebrates?

1 Extremely unlikely	**2**	**3**	**4**	**5**	**6 Extremely frequent**	**Don't Know**

B. Impacts

How long does an infestation of the weed last?

1 Rapidly replaced	**2**	**3**	**4**	**5**	**6 Extremely long**	**Don't Know**

What reduction in the amount of desired vegetation is caused by the weed?

1 Very little impact on adjacent species	**2**	**3**	**4**	**5**	**6 Total reduction of other species**	**Don't Know**

Does the weed limit the recruitment of desired vegetation?

1 No limitation	**2**	**3**	**4**	**5**	**6 Totally**	**Don't Know**

Does the weed form thick infestations which physically limit the movement of humans, animals, vehicles or water?

1 No impediment Poor	**2**	**3**	**4**	**5**	**6 Major impact**	**Don't Know**

Does the weed cause negative ecosystem changes?

1 None	**2**	**3**	**4**	**5**	**6 Major impact**	**Don't Know**

Potential for Spread

Current Distribution (Optional Answer – short description of known distribution)

Potential Distribution (Optional Answer – short description of potential distribution)

C. Social Impacts

List of major social impacts like loss of biodiversity, health issue, chocking of navigation/ reduction in fish production etc with brief description where necessary like

Impact Description

……

……

WP-3 Fate of herbicide residues in different agroecosystems

WP 3.1 Assessment of herbicide residues under program WP-1.1 Weed management in selected major crops and cropping systems

Network centres: Ludhiana, Hyderabad, Coimbatore, Anand*, Hisar*, Bengaluru*, Thrissur*

Objective:

1. To estimate herbicide residues and persistence in major crops and cropping systems specific to the state

Methodology

- Collect soil samples at 0 (2 h) 0 (2 h), 10, 20 30, 60, 90 day & harvest from each treatment of major crops and cropping systems for residue analysis.
- Submit chromatograms of each replicated samples along with report.
- Analyse plant samples at harvest only (grain and straw, at harvest) for residue analysis.
- Report LOD, LOQ and any matrix effect, interferences if any.

Note*: Anand*, Hisar*, Bengaluru*, Thrissur* collaborate with AINP on pesticide residue operative in the same university for herbicide residue analysis

WP 3.2 Assessment of herbicide residues in the long-term experiments under program WP-1.2 Weed Management under conservation tillage-based cropping

Network centres: PAU Ludhiana, PJTSAU Hyderabad, TNAU Coimbatore, AAU Anand*, CCSHAU Hisar*, UAS Bengaluru*

Objective:

1. To estimate herbicide persistence and residues in long-term conservation tillage-based cropping

Centre	TP	Cropping system
HAU, Hisar	WP 1.2.1	Rice-wheat legume based cropping system
PAU-Ludhiana,	WP 1.2.3	Maize based cropping system
PJTSAU, Hyderabad	WP 1.2.3	Maize based cropping system
TNAU Coimbatore	WP 1.2.5	Cotton based cropping system

Methodology

- Collect samples from ongoing experiments under AICRP-WM high value crops or other AICRPs or departments
- Collect other high-value crops such as spices, tea, coffee, etc. samples at harvest (grain, straw, seeds or other edible part of plant) of that location.
- Herbicide residues will be estimated as per standard procedure of residue analysis mentioned as note.
- Submit chromatograms of each replicated samples along with report.

Note*: Anand*, Hisar*, Bengaluru* collaborate with AINP on pesticide residue operative in the same university for herbicide residue analysis

WP 3.3 Assessment of herbicide residues in high value crops

Network centres: PAU Ludhiana, PJTSAU Hyderabad, TNAU Coimbatore, AAU Anand*, CCSHAU Hisar*, UAS Bengaluru

Objective:

- To estimate herbicide residues in high-value crops

Centre	Crop	Crop
PAU-Ludhiana,	Autumn Potato Field pea	Metribuzin Haosulfuron
TNAU Coimbatore	Chilli Cabbage	Oxyflourfen, Pendimethalin, Metolachlor
PJTSAU, Hyderabad,	Chilli Turmeric	Herbicides???

Methodology

- Samples will be collected from ongoing experiments under AICRP-WM high value crops or other AICRPs or departments
- Collect soil samples at 0 (2 h) day & harvest from each treatment for residue analysis in the long-term conservation agriculture experiment.
- Collect high-value crops such as spices, tea, coffee, etc. samples at harvest (grain, straw, seeds or other edible part of plant).

- Herbicide residues will be estimated as per standard procedure of residue analysis mentioned as note.
- Submit chromatograms of each replicated samples along with report.

Note*: Anand*, Hisar*, Bengaluru*collaborate with AINP on pesticide residue operative in the same university for herbicide residue analysis

WP 3.4 Assessment of leaching potential of new herbicide molecules

Network centres: PAU Ludhiana, CSKHPKV Palampur, PJTSAU Hyderabad and TNAU Coimbatore

Objective:

1. To estimate leaching potential of new herbicide molecules in the two different textured soils

Centre	Herbicide	Year
PAU Ludhiana, PJTSAU Hyderabad, TNAU Coimbatore	Topramezone	First year
PAU-Ludhiana, PJTSAU Hyderabad, TNAU Coimbatore	Pyrithiobac- sodium	Second year

Methodology

- Use soils with a minimum organic carbon content of 0. 5%. Soils with very high carbon content (e.g. >10%) may not be acceptable legally e.g. for pesticide registration purposes.

Mention test conditions as below:

- Details of soil collection site;
- Properties of soils, such as pH, organic carbon and clay content, texture and bulk density (for disturbed soil)
- Dates performance of the leaching studies;
- Length and diameter of leaching columns; Total soil weight of soil columns;
- Amount of herbicide used (µg/g) as per recommended field dose (x and 2x)
- Amount, frequency and duration of application of artificial rain, Temperature, number of replications (at least two);
- Methods for analysis of herbicide residues in the various soil segments and leachates
- Reference substance in the various soil segments and leachates
- The leaching experiment should be conducted at ambient temperature in PVC columns (at least 10-20 cm internal diameter and 90-100 cm long or more).
- Tables of results expressed as concentrations (quantity of residues) and as % of applied dose for soil segments and Leachates;
- Leachate volumes and Graphical plot of % found in the soil segments versus depth of soil segment;
- Submit chromatograms of each replicated samples along with report.
- Follow the standard methodologies for herbicide residue analysis.

WP 3.5 Assessment of herbicide residues at farmer field

Network centres: PAU Ludhiana, PJTSAU Hyderabad and TNAU Coimbatore

Methodology

- Collect soil samples and plant samples (grain, straw or other edible part of plant) at harvest from farmers' field for residue analysis by standard procedures mentioned as note*.
- Soil and ground water samples from farmers' fields which were under continuous use of herbicides (at least with a history of 10 years) to be collected at least 10 samples from each centre to be analysed and give background information.
- Submit chromatograms of each replicated samples along with report.

Note: Provide this information in all experiments common format for reporting residue data under WP 3

- Season and year
- Crop/ variety
- Soil type
- Nutrient Status
- Recommended dose NPK
- Instrumentation: GC/HPLC/GC-MS/LC-MS etc.
- Replications: Three-Six
- Report LOD and LOQ

- Recovery experiment at LOQ and 10 times of LOQ (Example if LOQ is 0.01 µg/g then recovery should be conducted at 0.01 and 0.1 µg/g).
- Give chromatograms of all samples in all studied commodities (0 days to harvest) and standards.
- Report any matrix effect, interferences, if any.
- Follow the standard methodologies for herbicide residue analysis.
- Provide Chromatogram of all matrix (soil, Plants) at all sampling stage along with standards (LOD and LOQ)

Note: Follow standard protocols while taking observations and reporting data. Detailed methodology will be sent to the centres by DWR.

WP- 4 Demonstration and impact assessment of weed management technologies & SCSP

WP 4.1. On-farm research trials
Centre: AAU, Anand
Number of OFR: 4

WP-4.1.1: Weed management in *kharif* groundnut 2024-26 (2 OFR)

Sr. No	Treatment	Dose (g/ha)	Application time
T_1	Pendimethalin 30% + imazethapyr 2% EC (RM)	800	PE (1-2 DAS)
T_2	Propaquizafop 2.5% + imazethapyr 3.75% w/w ME	125	PoE (15-20 DAS)
T_3	Farmers' Practice (IC fb HW at 20 and 40 DAS)	-	-

WP-4.1.2: Weed management in onion 2024-26 (2 OFR)

Sr. No.	Treatment	Dose g/ha	Application time
T_1	Pendimethalin 30% EC fb oxyfluorfen 23.5% EC	750 fb 120	PE fb PoE
T_2	Propaquizafop 5% + oxyfluorfen 12% EC	148.75	PoE
T_3	Farmers' Practice (HW at 20 and 40 DATP)	-	-

Centre: CCSHAU, Hisar
WP 4.1.3 Management of herbicide resistant in *P. minor* (OFR-3)
Location: Farmers' fields in Fatehabad and Karnal districts
Objective: To assess the efficacy of different herbicides against resistant populations of *P. minor*
Treatments:

1. Pyroxasulfone 127.5 g/ha + pendimethalin 1.5 kg/ha (PE)
2. Aclonifen + diflufenican (RM) 1000 + 200 g/ha (PE)
3. Clodinafop+ metribuzin (RM) 60+210 g/ha at 35 DAS (PoE)

WP 4.1.4 On Farm Trials on use of herbicides in green gram (OFR-3)
Location: Farmers' fields in Hisar district
Treatments:

1. Pendimethalin 1000 g/ha (PE)
2. Propaquizafop + imazethapyr (RM) 50 + 75 g/ha (PoE)
3. Two hand weeding's at 20 and 40 DAS

Centre: GBPUAT, Pantnagar
WP 4.1.5 Weed Management in transplanted rice, maize, soybean, wheat and sugarcane
***Kharif* Season (OFR-07)**
Transplanted rice (03)
Treatments:

1. Penoxsulam 0.97% + Butachlor 38.8% SE 820 g/ha (Apply up to 7 DAT)
2. Penoxsulam 1.02%+ Cyhalofop-butyl 5.1% OD 135 g/ha (Apply15-20 DAT).
3. Farmers' practice (Pretilachlor 750 g/ha PE)

Maize (02)
Treatments:

1. Atrazine 500 g/ha + Topramezone 25.2 g/ha (TM) (20 DAS)
2. Atrazine 500 g/ha + Tembotrione 120 g/ha (TM) (20 DAS)
3. Farmers' practice (Tembotrione 120 g/ha 20 DAS)

Soybean (02)
Treatment:

1. Sodium acifluorfen 16.5% + Clodinafop propargyl 8% EC 165 + 80 g/ha (20 DAS)
2. Fluazifop-p butyl 11.1% w/w + Fomesafen 11.1% w/w SL 250 g/ha **(**20 DAS)
3. Farmers' practice (Imazethapyr 10% SL 100 g/ha 20 DAS)

***Rabi* Season:**

Wheat (OFR-05)

Treatment:

1. Sulfosulfuron + Metsulfuron-methyl 30 + 2 g/ha (30 DAS)
2. Clodinafop propargyl + Metribuzin 174 g/ha (54+120 g/ha) (30 DAS)
3. Farmers' practice (Sulfosulfuron 25 g/ha at 30 DAS)

***Spring* Season:**

Sugarcane (OFR-02)

Treatments:

1. Ametryne 80 WDG 2.0 kg/ha (PE)
2. Mesotrione 2.27%+Atrazine 22.7%SC 875 g/ha (PoE)
3. Farmers' practice (2,4-D Dimethyl amine salt 58% SL 2.5 kg/ha at 30 DAS)

Centre: TNAU, Coimbatore

WP 4.1.6 Weed Management in blackgram (5 OFR)

Treatments:

1. Clodinafop propargyl 8% + Sodium acifluorfen 16.5% (245 g/ha), EPOE
2. Pendimethalin 30% + Imazethapyr 2% 1.0 kg/ha (PE) fb HW at 30-35 DAS
3. Farmers' practice (Pendimethalin 1 kg/ha (PE) fb hand weeding at 30-35 DAS)

Centre: IGKV, Raipur

W.P. 4.1.7 Weed management in *kharif* rice

Number of OFR: 05

Location: Dhamtari district

Treatment:

T_1	Pyrazosulfuron 20 g/ha (PE, at 0-7 DAS) fb bispyibac-Na 25 g/ha (20 DAS)
T_2	Pyrazosulfuron 20 g/ha (PE) fb penoxsulam + cyhalofop-butyl 135 g/ha (20 DAS)
T_3	Farmer's practice (bispyribac-Na 25 g/ha at 20 DAS)

W.P. 4.1.8 Weed management in *rabi* maize

Number of OFR: 05**, Location:** Narayanpur

Treatment-

T_1	Topramezone 25.2 g/ha as PoE at 2-4 leaf stage (20-25 DAS)
T_2	Atrazine 750 g/ha as PE at 3-5 DAS fb tembotrione120 g/ha as PoE at 2-4 leaf stage (20-25 DAS).
T_3	Farmers' practice (Atrazine 750 g/ha as PE at 3-5 DAS fb 1 HW at 30-35 DAS)

Centre: KAU, Thrissur

W.P. 4.1.9 Weed management in rice

Number of OFR: 04

Treatment:

1. Florpyrauxifen-benzyl ester 31.5 g/ha
2. Penoxsulam + Cyhalofop butyl 135 g/ha
3. Bispyribac sodium 25 g/ha (Farmers' practice)

Centre: CSKHPKVV, Palampur

W.P. 4.1.10 Weed management in rice, soybean, pea

OFR-15

Rice: (Transplanted) **(**OFR-**5)**

Treatments:

1. Pyrazosulfuron – 20 g/ha (PE) fb Bispyribac Sodium 25 g/ha (30 DAS), PoE
2. Bispyribac sodium – 25 g/ha (30 DAS), PoE
3. Farmers' practice - Butachlor – 1.5 kg/ha, PE

Soybean: (OFR-**5)**
Treatments:

1. Quazalofop ethyl 60 g/ha + chlorimuron ethyl 4 g/ha (25-30 DAS)
2. Imazethapyr 100 g/ha (PoE)
3. Farmers practice (one HW 20 DAS)

Pea: (OFR-**5)**
Treatments:

1. Imazethapyr 80 g/ha, PoE
2. Pendimethalin 1.0 kg/ha (30% EC), PE
3. Farmer' practice (HW at 30 and 60 DAS)

Centre: PJTSAU, Hyderabad
No. of OFR-5
Location: Warangal, vikarabad
W.P. 4.1.11 Management of S*triga* in sugarcane
Treatments:
T_1: Soil application of UASD-AMF consortium 20 kg/ha mixed with 500 kg of vermicompost
T_2: TNAU package **(**post-emergence spraying of 2,4-D @ 6 g (0.6%) + Urea @ 20 g (2%)/litre of water at 90 DAP + Trash mulching 5 t/ha at 120 DAP)
T_3: Farmers' practice (atrazine @ 1.0 kg/ ha at 3 DAP (PE) *fb* directed application of glyphosate @ 10 ml/lit at 45 DAP *fb* one HW at 90 DAP
Note: Glyphosate application in field crops should be avoided. Centre is suggested to use any alternate herbicide such as glufosinate ammonium 500 g/ha

Centre: - SKUAST, Jammu
W.P. 4.1.12 Weed management in wheat
Number of OFR-3
Location- R.S. Pura (Jammu), Bishnah & R.S. Pura (Jammu) and Samba

S. No.	**Treatments**
1.	Pyroxasulfone 127.5 g/ha (PE)
2.	Pinoxaden 45 g/ha + metribuzin 175 g/ha (PoE)
3.	Pyroxasulfone 102 g/ha + pendimethalin 800 g/ha (PE)
4..	Metribuzin 200 g/ha at 30-35 DAS (Farmer's practice)

Weed management in marigold (3 OFRs)

S. No.	**Treatments**
1.	Pendimethalin 1.5 kg/ha as PE *fb* quizalofop-ethyl 50 g/ ha as PoE
2.	Oxyfluorfen 200 g/ha as PE *fb* quizalofop-ethyl 50 g/ ha as PoE
3.	Pendimethalin 1.5 kg/ha as PE *fb* 1 HW
4.	HW at 30 DAS (Farmer's practice)

Weed management in chickpea (3 OFRs)

S. No.	**Treatments**
1.	Imazethapyr + pendimethalin (RM) 1000 g/ha as PE
2.	Topramezone 25.2 g/ha at 20-25 DAS
3.	One hand weeding at 30 DAS (Farmer's practice)

Centre: OUAT, Bhubaneswar

W.P. 4.1.13 Weed management in DSR, *Rabi* Maize

Number of OFR: 4

***Kharif* 2024 (2 no. of OFR) on dry DSR**		
Treatment details	**Dose**	**Time of application**
T_1-Pretilachlor *fb* penoxsulam+cyhalofop butyl (RM)	750 g/ha *fb* 135 g/ha	2 DAS fb 21 DAS
T_2- Pendimethalin+penoxsulam (RM) *fb* fenoxaprop + ethoxysulfuron (TM)	625 g/ha (RM) *fb* 67 g/ha+18g/ha (TM)	2 DAS *fb* 21 DAS
T_3- pretilachlor *fb* manual weeding	750 g/ha	2 DAS *fb* 21 DAS (Manual weeding)
***Rabi* 2024 (2 no. of OFR) on *rabi* maize**		
Treatment details	Dose	Time of application
T_1- Atrazine *fb* tembotrione	1 kg/ ha *fb* 120 g/ha	2 DAS *fb* 21 DAS
T_2-Pendimethalin fb tembotrione + atrazine (TM)	1 kg/ ha *fb* (120 + 500) g/ha	2 DAS *fb* 21 DAS
T_3- Manual weeding	-	20 DAS

Centre: AAU, Jorhat

W.P. 4.1.14 Weed Management in Wet Seeded *Kharif* Rice

Number of OFR: 6

Location:

T1: Pretilachlor 750 g/ha PE fb Bispyribac-sodium 25 g/ha at 20-25 DAS

T2: Pyrazosulfuron 20 g/ha PE fb Bispyribac-sodium 25 g/ha 20-25 DAS fb Hand Weeding at 40-45 DAS

T3: Two mechanical weeding at 15 & 30 DAS

W.P. 4.1.15 Weed Management in Organically Grown Aromatic Rice (Transplanted)

T_1: Hand weeding on 25 DAT and 45 DAT

T_2: Application of paddy straw @ 5 t/ha on 3 DAT fb Hand weeding on 45 DAT

T_3: Paddy Weeder at 25 DAT + Hand Weeding at 45 DAT

Centre: PDKV, Akola

W.P. 4.1.15 Weed management in soybean, cotton, Maize and wheat

Weed management in soybean (2 OFR)

Sr. No.	**Treatment**	**Dose (kg/ha)**	**Application time**
T_1	Propaquizafop 2.5% + Imazethapyr 3.75% w/w ME	0.125	EPoE
T_2	Imazethapyr 10% SL	0.100	EPoE
T_3	Farmer practice (1 Hoeing and 2 Hand weeding)	--	--

Weed management in cotton (2 OFR)

Sr. No.	**Treatment**	**Dose (kg/ha)**	**Application time**
T_1	Pendimethalin 30 EC *fb* directed spray of Paraquat 24 SL	1.0 & 0.60	2-3 DAS fb 45 DAS
T_2	Pyrithiobac Sodium 10% EC	0.075	20-25 DAS
T_3	Farmer practice (2 Hoeing 10 days interval and 2 Hand weeding)	--	--

Weed management in maize (2 OFR)

Sr. No.	**Treatment**	**Dose (kg/ha)**	**Application time**
T_1	Atrazine 50% WP *fb* Tembotrione 34.4% SC	1.0 *fb* 0.120	EPoE(15-20 DAS)
T_2	Atrazine 50% WP *fb* Topramezone 336 g/l w/v SC	1.0 *fb* 0.025	EPoE(15-20

			DAS)
T_3	Farmers practice (IC *fb* HW at 20-25 DAS)	--	--

Weed management in wheat (2 OFR)

Sr. No.	Treatment	Dose (g/ha)	Application time
T_1	Clodinafop Propargyl + Metsulfuron Methyl	60+4	POE (25-30 DAS)
T_2	Metsulfuron Methyl 20% WP	4	POE (25-30 DAS)
T_3	Farmers practice (3 HW at 20, 40 & 60 DAS)	--	--

Centre: BCKV, Kalyani

W.P. 4.1.16 Weed management in rice, Maize and lentil

Crop: Rice

Number of OFR: 3**, Location:** Nadia and 24 Parganas (North)

T_1	Oxadiagryal PE 0.1 kg/ha *fb* passing of cono weeder
T_2	Pretilachlor PE 0.70 kg/ha *fb* passing of cono weeder
T_3	2 hand weeding at 20 & 40 DAS (Farmers' practice)

Crop: Maize

Number of OFR: 3**, Location:** Nadia, 24 Parganas (North) and Murshidabad

T_1	Topramezone+Atrazine (25.2+500 g/ha) EPoE *fb* IC + HW at 40 DAS
T_2	Tembotrione +Atrazine (120+500 g/ha) EPoE *fb* IC + HW at 40 DAS
T_3	HW at 20 and 40 DAS (Farmers' practice)

Crop: Lentil

Number of OFR: 3 **Location:** Nadia, 24 Parganas (North) and Murshidabad

T_1	Quizalofop-ethyl 5EC 50 g/ha PoE at 25 DAS
T_2	Pendimethalin 30EC 1000 g/ha PE at 3 DAS fb Quizalofop-ethyl 5EC 50 g/ha at 25 DAS
T_3	Hand Weeding at 20 DAS (Farmers' practice)

Centre: -MPUAT, Udaipur

W.P.4.1.17 -Weed management in wheat

No. of OFR-2

Sr. No	Treatment	Dose (g/ha)	Application time
T_1	Clodinafop + metsulfuron (RM)	60+4	PoE (30-35 DAS)
T_2	Carfentrazon+sulfosulfuron (RM)	20+25	PoE at 35 DAS
T_3	IC fb HW at 20 and 40 DAS (FP)		

W.P.4.1.18-Weed management in *kharif* soybean (2 OFR)

Sr. No	Treatment	Dose (g/ha)	Application time
T1	Imazethapyr fb IC	75	PoE (15-20 DAS)
T2	Sulfentrazone + clomazone	725 g/ha	PE
T3	IC fb HW at 20 and 40 DAS (FP)	-	-

Centre: - PAU, Ludhiana

Location: Ludhiana, Tarn Taran, Sangrur

W.P. 4.1.19 Weed management in vegetable pea (*Rabi*)

T_1- Surface seeding of Peas with surface seeder machine (ensuring *in-situ* PSM @ 7 t/ha)

T_2- Pendimethalin @ 750 g/ha + one hand weeding

T_3 Two hand weeding

W.P. 4.1.20 Weed management in DSR (*Kharif)*

T_1- Penoxsulam 1% + pendimethalin 24% (25%SE) RM at 625 g/ha (PE) *fb* anilofos 375 g/ha at first irrigation fb post emergence herbicide (depending upon type of weed flora)

T_2- Pendimethain @ 750 g/ha + Pyrazosulfuron ethyl TM @ 25 g/ha (PE) *fb* PoE (depending upon type of weed flora)

T_3- Pendimethalin @ 750 g/ha (PE) *fb* bispyribac sodium @ 25 g/ha (PoE)

Centre: - RVSKVV, Gwalior

WP 4.1.21 Weed management in pearlmillet (2 OFR)

T_1	:	Atrazine + Mesotrione (RM) 656 g/ha as PoE (20 DAS)
T_2	:	Atrazine 750 g/ha (PE) fb 2,4-D ethyl Ester 500 g/ha (PoE)
T_3	:	Farmer's practices (one hand weeding at 30 DAS)

WP 4.1.22 Weed management in wheat crop (2 OFR)

T_1	:	Pyroxasulfone 127.5 g/ha + Metribuzin 150 g/ha (PE)
T_2	:	Clodinafop propargyl 60 g/ha + metsulfuron 4 g/ha as PoE (30 DAS)
T_3	:	Farmer's practices (one hand weeding at 30 DAS)

WP 4.1.23 Weed management in Chickpea (2 OFR)

T_1	:	Pendimethalin+Imazethapyr (RM) 750 g/ha as PE
T_2	:	Fluazifop-p-butyl + fomesafen (RM) 100 g/ha as PoE
T_3	:	Farmer's practices (one hand weeding at 30 DAS)

Centre: - UAS, Bengaluru

Locations: KSDA Chikkaballapura – 3
KSDA Bangalore Rural – 3
EE Kolar – 3
KVK Tumkur – 2
KVK Ramanagara – 3
KVK, Doddaballapura – 3
KVK, Chintamani- 3

WP 4.1.24 Weed management in Soybean (20 OFR at 7 locations during 1st year)

T_1: Diclosulum 84% WDG 26 g a.i/ha (PE)
T_2: Fluazifop-p-butyl 11.1% + Fomesafon 11.1% SL @ 250 g a.i/ha
T_3: Two hand weeding at 20 and 40 DAS (Farmer's practice)

WP 4.1.25 Weed management in Field Bean (20 OFR at 7 locations during 2nd year)

T_1: Diclosulum 84% WDG 26 g a.i/ha (PE)
T_2: Imazethypyr 10% SL 75 g a.i./ha + surfactant (EPoE)
T_3: Two hand weeding at 20 and 40 DAS (Farmer's practice)

WP 4.1.26 Weed management in Soybean (20 OFR at 7 locations during 2nd year)

T_1: Sulfentrazone 28%+ Clomazone 30% WP (RM) @ 725 g a.i/ha as PE
T_2: Sodium acifluorfen 16.5% + Clodinafop propargyl 8% EC @ 245 g a.i/ha as PoE
T_3: Two hand weeding at 20 and 40 DAS (Farmer's practice)

WP 4.2. Front line demonstrations

Centre: AAU, Anand

WP-4.2.1: Weed management in soybean 2024-25 (5 FLDs)

Sl. No.	Treatment	Dose g/ha	Application time
T_1	Propaquizafop 2.5% + imazethapyr 3.75% w/w ME (RM)	125	EPoE
T_2	Farmers' Practice (IC + HW at 20 and 40 DAS)	-	-

Centre: CCSHAU, Hisar

Number of FLDs: 2

Location: Farmers' fields in Fatehabad and Karnal districts

WP4.2.2 Management of herbicide-resistant *Phalaris minor* in wheat

T_1- Pyroxasulfone + pendimethalin 127.5 + 1500 (PRE)
T_2- Clodinafop propargyl + Metribuzin 54+120 g/ha (30 DAS) (farmer practice)

Centre: - KAU,Thrissur

W.P 4.2.3 FLD on wetland transplanted/ direct sown rice (3 locations, 2 seasons)

T_1 - Pretilachlor + pyrazosulfuron ethyl (RM) 615 g/ha at 0-6 DAT or 10 DAS

T_2-Farmers' practice Bensulfuron + pretiachlor @ 660 g/ha at 0-6 DAT or 10 DAS

Centre: - MPUAT, Udaipur

W.P.- 4.2.4 20 FLD's in *Rabi* and 10 in *Kharif* season crops

Maize (5)

T_1- Atrazine 50%WP + tembotrione -500 +120 g/ha at 20 DAS (Tank mix)

T_2- farmers practice (Atrazine 50%WP 500 g/ha PE)

Maize (5)

T_1-Atrazine 50%WP + topramazone-500 +25.2 g/ha g/ha at 20 DAS (Tank mix)

T_2- farmers practice (Atrazine 50%WP 500 g/ha PE)

Soybean (5)

T_1-Imazethapyr 3.75% SL + propaquizafop 2.5% EC (125 g/ha RM) PoE 21 DAS

T_2- farmers practice (Imazethapyr 75 g/ha PoE (15-20 DAS)

Soybean (5)

T_1- Sulfentrazone + clomazone - 725 g/ha (PE)

T_2- farmers practice (Imazethapyr 75 g/ha PoE (15-20 DAS)

Wheat (5)

T_1-Carfentrazon + sulfosulfuron (RM) 20+25 g/ha PoE at 35 DAS

T_2- farmers practice (Metsulfuron Methyl 20% WP 40 g/ha POE (25-30 DAS)

Wheat (5)

T_1- Carfentrazone 20 g/ha PoE at 35 DAS

T_2- farmers practice (Metsulfuron Methyl 20% WP 40 g/haPOE (25-30 DAS)

Centre: GBPUAT, Pantnagar

W.P. 4.2.5 Weed management in transplanted rice, maize, soybean, wheat and sugarcane

***Kharif* Season:** FLD-06

Location: Udaipur

a) Transplanted rice (FLD-02)

T_1: Cyhalofop-butyl + Penoxsulam 135 g/ha 25 DAS

T_2: Farmers' practice (Pretilachlor 50EC 750 g/ha, PE)

b) Maize (FLD-02)

T_1: Topramezone 25.2 g/ha 20 DAS

T_2: Farmers' practice (Atrazine 500 g/ha PE)

c) Soybean (FLD-02)

T_1: Fluazifop-p butyl 11.1% w/w + Fomesafen 11.1% w/w SL 250 g/ha (20 DAS)

T_2: Farmers' practice (Imazethapyr 10%SL 100 g/ha 20 DAS)

***Rabi* Season: Wheat** (FLD-03) (specify location pls)

T_1: Clodinafop propargyl + Metribuzin 54+120 g/ha (30 DAS)

T_2: Farmers' practice (Sulfosulfuron + Metsulfuron-methyl 30 + 2 g/ha 30 DAS)

***Spring* Season: Sugarcane** (FLD-03) (specify location pls)

T_1: Ametryne 80 WDG 2.0 kg/ha (PE)

T_2: Farmers' practice (2,4-D Di methyl amine salt 58%SL 2.5 kg/ha 30 DAP)

Centre: - PAU, Ludhiana

W.P. 4.2.6 *Tarr-Wattar* DSR using Lucky Seed Drill with press wheels

Number of FLD: 5

Location: Bathinda, Amritsar,TarnTaran, Ludhiana, Ferozpur

T_1: Penoxsulam 1% + Pendimethalin 24% (RM) at 625 g/ha (PE)

T_2: Pendimethalin @ 750 g/ha + Pyrazosulfuron ethyl @ 25 g/ha (TM) PE

W.P. 4.2.7 Surface Seeding of wheat

Number of FLD: 5

Location: Bathinda, Amritsar,TarnTaran, Ludhiana, Ferozpur

T_1: Surface seeding of wheat w/o herbicide

(Weed suppression with in-situ paddy straw mulch)

T_2: Conventional sowing *fb* post-emergence herbicide(..Please specify the herbicide)

Centre: PJTSAU, Hyderabad

W.P. 4.2.8 Weed Management in Transplanted rice

Number of FLD: 5

Location: Warangal/Vikarabad/Nagarkurnool district

IP: Florpyrauxifen-benzyl 2.13% w/w + Cyhalofop-butyl 10.64% w/w EC at 150 g/ha as PoE *fb* hand weeding at 40 DAT

FP: Triafamone 20% (44 g/ha) + ethoxysulfuron 10% WG (22.5 g/ha) 66.5 g/ha as POE *fb* hand weeding at 40 DAT

W.P. 4.2.9 Weed Management in cotton

Number of FLD: 5

Location: Warangal/Vikarabad/Nagarkurnool district

IP: Pyrithiobac Sodium 3.1 % + Pendimethalin 34.0 % ZC at 742 g/ha as PE *fb* MW at 25 & 50 DAS

FP: Pyrithiobac Sodium 6% + Quizalofop-ethyl 4% EC 125 g/ha PoE at 20 DAS *fb* MW at 40 & 60 DAS

Centre: - RVSKVV, Gwalior

W.P. 4.2.10 Weed management in Pearl millet

Number of FLDs: 02

T_1	:	Atrazine 500 g/ha *fb* 2,4-D 500 g/ha EPoE (15 DAS)
T_2	:	Farmer's practices (one hand weeding at 30 DAS)

W.P. 4.2.11 Weed management in wheat

Number of FLDs: 04

T_1	:	Clodinafop-propargyl + metribuzine (RM) 54+120 g/ha PoE
T_2	:	Farmer's practice (Using 2,4-D 500 g/ha herbicide)

Centre: TNAU, Coimbatore

W.P. 4.2.12 Weed management in groundnut

Number of FLDs: 5

Location: Coimbatore

T_1 – Quizalofop ethyl 5% + imazethapyr 10% EC 100 g/ha (EPOE) *fb* HW at 40 DAS

T_2 – Farmers' Practice (2 Hand weeding at 20 and 40 DAS)

Centre: CSKHPKVV, Palampur

W.P. 4.2.13 Weed management in transplanted rice and maize

Number of FLDs: 12 (3 each)

Location: Kangra and hamirpur

1. Rice (transplanted rice) Butachlor 1.0 kg/ha (PE) fb bispyribac sodium 25 g/ha (PoE) Farmers Practice (Hand weeding twice 20 and 45 DAS)
2. Maize Tembotrione 120 g/ha + atrazine 500 g/ha (PoE) Farmers practice (hoeing 20 DAS + earthing up 45 DAS)
3. Wheat Clodinafop 60 g/ha + MSM 4 g/ha (PoE) Farmers practice (Please specify …?)
4. Pea Pendimethalin + imazethapyr (RM) 800 g/ha (PE) *fb* quizalafop 50 g/ha (PoE) Farmers practice (pendimethalin 1kg/ha *fb* one HW)

Centre: OUAT, Bhubaneswar
W.P. 4.2.14 Weed management in transplanted rice and groundnut
Number of FLDs:20
Location: Bagoi, kujanga, Jagatsinghpur, morada and Nuagaon

Crop- transplanted rice (10)		
Treatment details	**Dose**	**Time of application**
T_1-Pretilachlor *fb* Bispyribac Na.	750 g/ha *fb* 25 g/ha	2 DAT *fb* 25 DAT
T_2- One Manual Weeding (Farmer practice)	-	25 DAT
Crop- groundnut (10)		
Treatment details	**Dose**	**Time of application**
T_1- Pendimethalin + imazethapyr (RM)	750 g/ha	2 DAS
T_2- One Manual Weeding (Farmer practice)	-	25 DAS

Centre: BCKV, Kalyani
W.P. 4.2.15 Weed management in transplanted rice
Number of FLDs: 5
Location: Nadia, 24 Parganas and Murshidabad
Crop: Transplanted Rice

T_1	Pretilachlor 750 g/ha PE fb Bispyribac-Na 25 g/ha at 25 DAT
T_2	Hand weeding at 25 DAT (Farmers' practice)

Centre: UAS, Bengaluru
W.P. 4.2.16 Weed management in kodo millet and foxtail millet
Number of FLDs: 6 (each 3)
Location: Ramnager
Kodo millet
Treatments:

T_1: Metsulfuron Methyl + chlorimuron Ethyl WP-20 WP (2+2) 4 g/ha (PoE)
T_2: One interculture and hand weeding at 20 and 40 DAS (Farmer's practice)

Foxtail millet
Treatments:

T_1: Metsulfuron Methyl + Chlorimuron Ethyl WP-20 WP (2+2) 4 g a.i/ha (PoE)
T_2: One interculture and hand weeding at 20 and 40 DAS (Farmer's practice)

Centre: SKUAST, Jammu
W.P. 4.2.17 Weed management in maize and wheat
Number of FLDs: 75
Location: Gharota, Samba and Kathua
maize (25 FLDs)

S. No.	**Treatments**
1.	Tembotrione 100 g/ha + atrazine 500 g/ha at 15-20 DAS
2.	Atrazine 1.0 kg/ha (Farmer's practice)

maize (25 FLDs)

S. No.	**Treatments**
1.	Topramezone + atrazine 25.2 + 500 g/ha at 15-20 DAS
2.	Atrazine 1.0 kg/ha (Farmer's practice)

wheat (25 FLDs)

S. No.	**Treatments**
1.	Clodinafop-propargyl + metsulfuron (60 +4 g/ha) at 30-35 DAS
2..	Metribuzin 200 g/ha at 30-35 DAS (Farmer's practice)

Centre: AAU, Jorhat
W.P. 4.2.18 Weed management in wet direct seeded kharif rice and transplanted aromatic rice
Number of FLDs: 6 (each 2)
Location:
Wet direct seeded kharif rice
Pretilachlor 750 g/ha PE fb Bispyribac-sodium 25 g/ha at 20-25 DAS
Wet direct seeded kharif rice
Pyrazosulfuron 20 g/ha PE fb Bispyribac-sodium 25 g/ha 20-25 DAS and Hand Weeding at 40-45 DAS
transplanted aromatic rice
Application of paddy straw @ 5 t/ha on 3 DAT fb Hand weeding on 45 DAT

Centre: IGKV, Raipur
W.P. 4.2.19 Weed management in rice and maize
Number of FLDs: 30 (each 15)
Demonstration area: Ambikapur/Mainpat and Kanker district
Season: *Kharif*, **Crop**: Rice

T_1	Pyrazosulfuron 20 g/ha (PE) *fb* penoxsulam + cyhalofop-butyl 135 g/ha 25 DAS
T_2	Farmers' practice (Bispyribac-Na 25 g/ha at 20 DAS)

Season: *Rabi*, **Crop**: maize

T_1	Atrazine 750 g/ha as PE at 3-5 DAS fb tembotrione 120 g/ha as PoE at 2 - 4 leaf stage (25 DAS)
T_2	Farmers' practice (Atrazine 750 g/ha as PE at 3-5 DAS followed by 1 HW at 30-35 DAS)

Centre: PDKV, Akola
W.P. 4.2.20 Weed management in soybean and wheat
Number of FLDs: 30
Location: Dhaba and Cheleka village
Soybean (20 FLD)

Sr.No.	Treatment	Dose (g/ha)	Application time
T_1	Diclosulam 84% WDG	26	PE (0-3 DAS)
T_2	Farmers practice (1 Hoeing and 2 Hand weeding)	--	--

Wheat (10 FLD)

Sr.No.	Treatment	Dose (g/ha)	Application time
T_1	Clodinafop Propargyl + Metsulfuron Methyl	64	PoE (30-35 DAS)
T_2	Farmers practice (Metsulfuron Methyl 20% WP)	4	PoE (30-35 DAS)

Common suggestions for all the centres for conducting OFRs/FLDs

1. Suggested to take minimum of 3 treatments including one as farmers practice in OFR trials
2. Specify the farmer's practice (including the detail of weed management activities)
3. It was also suggested to mention the number of OFR and localities where OFRs will be conducted.
4. The Centres are suggested to take geo-tagged photos with OFR/FLD detail boards and share to the headquarter for incorporation in different reports and compilations.

Guidelines for OFRs

1. OFR trials should be conducted in a farmer participatory research mode after due identification and prioritization of a problem related to weed infestation in cropped / non-cropped areas.
2. Emphasis on OFR trials should be on refining a technology under real farming situation based on the research work done in on-station trials.
3. A set of promising technologies (2) may be identified and implemented in a scientific manner. Farmer's practice should be specified invariably kept as a check treatment for comparison.
4. Such OFR trials should be conducted at prominent locations where there is greater visibility.
5. Total area of the OFR trials can be 500 m^2, with each treatment / technology.

Guidelines for FLDs

1. In FLDs compare the best weed management treatment with farmers practice
    a. (Two treatments only)
2. Specify the farmer's practice (including the detail of weed management activities)
3. It is also suggested to mention the number of FLDs as per your convenience.
4. All the FLDs of a given season should be conducted in a specified crop
5. Area of each FLD should be of 0.5-1 acre.
6. Each FLD should go to a separate farmer
7. Effort should be made to include farmers of all categories (big, small and marginal) to conduct the FLDs.
8. Only one improved technology should be demonstrated in the FLDs, along with farmers practice.
9. Such FLDs should be conducted at prominent locations where there is greater visibility.
10. Selection of a prominent location should be given preference over the farmer as such.
11. Display boards should be fixed at each site, including the details of technologies, season / year and name of village / farmer/centre.
12. Timings of visits should be so arranged that sufficient time is available for undertaking sowing, treatment application, recording of data and interaction with the farmers.
13. There should be one day meet / Sangosthi programme during each season, in which, about 60-75 farmers can be invited.
14. FLDs may be conducted in one locality for a period of 2 year only, after which, another area should be selected.
15. Data records on weeds (during season and at the end), crop performance and economics (like ICBR) should be properly maintained
16. Good quality geo-tagged photographs / video clips can be made for important operations / meetings with farmers. Local media person may be invited to show the technologies demonstrated.
17. State agriculture department officials may be involved and informed about the work done by the AICRP centre.
18. A bulletin / success story based on the work done for two years should be brought out

Observations to be recorded

1. Preliminary information / data about the site / village / farmer will be collected through a appropriate means (PRA tool) before starting the programmes.
2. Details of inputs applied and practices / operations followed during the cropping season should be recorded.
3. Data on weed growth (population, dry weight) and yield performance should be recorded for each OFR and FLD.
4. Yield data should be taken accurately from 3-4 representative sampled areas of about 15-20 m^2.
5. A realistic economic analysis considering the actual costs involved and price of produce should be worked out. An appropriate statistical analysis of the data shall also be done.
6. Farmers perception / opinion about the technology intervention and its success or otherwise should be given due emphasis.
7. Adoption study and Impact analysis of the demonstrated weed management technologies should be done.

WP 4.3. Impact assessment of weed management technologies

Objective:

1. To assess the impact of weed management technologies developed and disseminated by AICRP-WM centres

Coordinating centres: All centres

Guidelines for data collection:

1. Collect data on the area and yield of only major crops in the state.
2. Data on herbicide consumption should be collected at the district level after consultation with the state departments and (or) other reliable private agencies.

3. **S.No. 5** is very important and it is solely pertaining to the impact of weed management technologies released from the centres and hence due care should be taken while obtaining and compiling the data.
4. Conduct a few focus group discussions with the farmers and (or) any other stakeholders from the area wherein the centre already conducted OFR/FLD of the developed weed management technologies
5. Provide the name of the district(s) and number of farmers surveyed/participated in the said focus group discussions
6. Collect and compile data on cost savings in weed management, yield increase, approximate area covered, per cent of farmers adopted, reasons for non-adoption, etc. through the said survey/ focus group discussions
7. The impact assessment exercise is compulsory for all the AICRP-WM centres
    1. Name of the centre:
    2. Number of technologies developed:
    3. Area under crops (major crops in the state):

Sl.No.	**Name of crop**	**Average area (ha)***	**Average yield (tonnes/ha) ***

*The average area/yield should be on the basis of last three years data available.

1. Herbicide consumption pattern in the district ----------(Name of the district)

Sl.No.	Name of the Herbicide	Consumption (tonnes)				
		2017	2018	2019	2020	2021

2. Weed management technologies released and their impact:

Name of the districts:_____ No. of farmers surveyed/participated in focus group discussion: _____

S.No.	**Crop**	**Name of the technology**	**Year of inclusion in the state PoP[#]**	**Cost of the technology (Rs./ha)**	**Cost saving in weed management (Rs./ha)***	**Yield increase (Kg/ha)***	**Percent of farmers adopted (%)[$]**	**Approximate area covered (ha)**	**Percent of area covered (%) ** (we have added one new column in table 5)**	**Reasons for non-adoption, if any** (List the reasons in the order of most serious to least serious)
										1. 2. 3.
										1. 2.

Note: The information on average cost-saving and yield increase should be on the basis of data from larger plots, which reflect the district.

Package of practices; ***** In comparison to the existing farmer's practice; **$** In relation to the total number of farmers in the district

6. Remarks by centre in-charge:

Signature of centre

Protocol for collecting data on aquatic weed infestation in India:

- Data on aquatic weed infestation should be collected through primary as well as secondary sources.
- Number of aquatic bodies in the state (where centre is located) should be collected.
- Area of each aquatic body along with coordinates (latitude & longitude) should also be collected from related sources.
- Level of infestation of weeds present in water bodies such as water hyacinth, Salvinia etc. should be collected in terms of percentage of area infested or in exact area infested by each weed.

Proforma for collecting data is as follows:

Name of the water body	:	
Type of water body (pond/lake/canal/dam/river)	:	
Place	:	
District & State	:	
Date of data collection	:	
Coordinates (latitude & longitude)	:	
Area of the water body (in acre)	:	
Name of weeds present in the water body and level of infestation	:	S.No. | Name of weed | Water body Area infested with weed (%) 1. | | 2. | | 3. | | 4. | | 5. | |
Weed management, if any	:	
Problem arises due to weed infestation in the water body	:	

Area infested with Parthenium hysterophorus in the state

S. No.	**District name**	**Area**		**(%) area infested with *Parthenium***
1.		Cropped area	:	
		Non-cropped area	:	
2.		Cropped area		
		Non-cropped area		
3.		Cropped area		
		Non-cropped area		

Protocol for on-line data submission and analysis through Information system for AICRP-WM:

- There will be three level of user: Administrator, Sub-administrator and end user.
- Administrator and Sub-administrator will be at Headquarter level while End user will be the scientist of the centre.
- Programme and experimental details will be entered by Sub-administrator of the system at Headquarter level.
- End user will be created and approved by Sub-administrator at Headquarter level.
- After login into the system, end user has to submit the data of the experiment assigned by the Sub-administrator as per Technical programme.
- End user can't make change in the data after final submission.
- Submitted data will go to the Sub-administrator. He/she can return the data to the centre if not found as per requirement.
- Sub-administrator can generate or delete the experiments as per technical programme and see the data submission details with status.
- If Sub-administrator approves the data of any experiments, it will go to the Administrator for approval otherwise system will revert back to end user by adding some remarks.
- Administrator has all rights to see, approve or reject the data submitted by the centres.