

Centre: Pantnagar

| | |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1. Name of the officer - In charge (AICRP- Sorghum):</p> | <p>Dr. P.K. Shrotria Professor & Senior Sorghum Breeder</p> |
| <p>2. Associated Scientists (AICRP- Sorghum) and their discipline:</p> | <p>Dr. Yogendra Singh Professor & Senior Sorghum Pathologist</p> <p>Dr. P. K. Pandey Asstt. Professor/Assistant Sorghum Breeder</p> <p>Dr. Kranti Kumar Asstt. Professor/ Assistant Agronomist</p> |
| <p>2. Associated Scientists from state project:</p> | <p style="text-align: center;">-</p> |
| <p>3. Annual budget:</p> | <p>Rs. 86,42,838 (Expenditure incurred 2016-17)</p> |
| <p>4. Any other financial support:</p> | <p>25% of ICAR Budget from State</p> |

Major thrust at the centre

- ✓ **Development of high yielding single cut/multi cut varieties/hybrids with high nutritional quality, foliar disease resistance and good seed yield potential**
- ✓ **Development of single/three way cross multi cut/single cut hybrids with red grain and alternate cytoplasm CMS lines**
- ✓ **Development of potential restorers/ pollinators for use in fodder hybrid development**
- ✓ **Identification of genotypes with multiple resistances to foliar diseases (anthracnose, zonate leaf spot, and other) and stalk rot and their use in resistance breeding programme**
- ✓ **Isolation and evaluation of bio control agents to manage foliar diseases and stalk rot pathogens in forage sorghum**
- ✓ **Development of cost effective agronomic management practices for obtaining high yields and remunerative returns from forage sorghum**
- ✓ **Organizing Front Line Demonstrations and On Farm Trials to popularize improved varieties and hybrids of forage sorghum**

Seasonal information

| | Kharif | |
|------------------------------------------|--------------------------------------|-------------------------|
| Rainfall | 1176.90 mm and Rainy days: 53 | |
| Area covered (approx) | <i>Green Fodder Production</i> | <i>Grain Production</i> |
| | 200-250 ha | - |
| Total production (approx) | 6000-7000 ton | - |

Trials conducted

| Discipline | No. of AICSIP trials allocated | No. of station trials | No. of trials successfully conducted | | Shortfall |
|------------|--------------------------------|-----------------------|--------------------------------------|---------|-----------|
| | | | AICSIP | Station | |
| Breeding | 7 | 4 (2 SVT+ 2 Station) | 7 | 4 | No |
| Pathology | 10 | 1 | 10 | 1 | No |
| Agronomy | 4 | 1 | 4 | 1 | No |

Discipline: Plant Breeding

| Target | Achievements | Short fall |
|------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (A) AICSIP Trials | | |
| AVHT (SC) (Trial 1) | SPH 1822 (UTFSH 3) SPH 1797(UTFSH 2) SPH 1752 SPV 2317 (UTFS 85) | <ul style="list-style-type: none"> Hybrids were statically <i>at par</i> with check CSH 13 for GFY & DFY SPV 2317 showed 14.02% and 25.09%, superiority for GFY and DFY respectively, over check CSV 21 F Based on three years performance at all India, Identification Proposal of SPH 1797 & SPV 2317 is submitted |
| IVHT (SC) (Trial 2) | SPH 1858 SPH 1857 (UTFSH 4) SPV 2450 | <ul style="list-style-type: none"> For GFY no hybrids could out yield check CSH 13 For DFY SPH 1858 exhibited 4% superiority over CSH 13 SPH 1857 was <i>at par</i> for fodder yield (green and dry) with check SPV 2450 was best and <i>at par</i> with CSV 21 F |
| | | No |

Major achievements during 2016-17

Discipline: Plant Breeding

| Target | Achievements | Short Fall | |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| AICSIP Trials contd..... | | | |
| IAVHT (MC) (Trial 3) | <p>SPH 1840 SPH 1841 (UTMCH 1317) SPH 1807 (UTMCH 1315) SPH 1768 (UTMCH 1313) SPV 2422 SPV 2421</p> | <ul style="list-style-type: none"> • SPH 1840 (10.90% & 6.0%), SPH 1841 (9.0 & 25%), SPH 1807 (6.0% and 16.0) and SPH 1768 (5.8% & 22.0%) showed superiority for GFY and DFY respectively, over check CSH 24 MF • SPV 2422 significantly better than check SSG 59-3 for GFY (45.8 % superiority). For DFY it showed 25.0% superiority • Other promising variety was SPV 2421 (11.0% & 15.0%) | Nil |
| ASVT (Trial 4) | <p>SPV 2389, SPV 2391 SPV 2375, SPV 2383 (UTFS 87), SPV 2316</p> | <ul style="list-style-type: none"> • All these entries were significantly better than checks CSV 21F & CSV 30F with superiority ranging from 31-80.5% for seed yield | |
| Sorghum maize intergeneric derivatives (MC) (Trial 5) | <p>SML 18, SML 2, SML 14,</p> | <ul style="list-style-type: none"> • Best three entries giving 875-950q/ha GFY and 188-225q/ha DFY in two cuts • SML 18 was significantly best for both GFY & DFY . | |

Major achievements during 2016-17

Discipline: Plant Breeding

| | Achievements | Short Fall | |
|-------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| AICSIP Trials contd.... | | | |
| IAVHT Sweet Sorghum Trial | SPH 1861, SPH 1798, SPH 1859, SPH 1825, SPV 2458, SPV 2324, SPV 2461, SPV 2462 | <ul style="list-style-type: none"> For grain yield none of the hybrids and varieties were numerically superior than their respective checks (CSH 22 SS & CSV 24 SS) For fresh stalk yield SPH 1861 (25%), SPH 1798 (19.66%), SPH 1859 (14.28%) and SPV 2462 (9.26%) were superior than respective checks For juice yield SPH 1859 (35.80%), SPH 1861 (27.62%), SPH 1825 (25.0%) %, SPV 2458 (39.0%), SPV 2324 (32.0%), SPV 2462 (12.0%) were superior than respective checks | Nil |
| Sorghum germplasm characterization trial | 1000 lines | <ul style="list-style-type: none"> Under CRP-Agro-Biodiversity Project 1000 lines were evaluated/characterized for 26 diversified traits (seedling to seed maturity stage) in Augmented Block Design Characterization data have been submitted to IIMR | |

Major achievements during 2016-17

Discipline: Plant Breeding

Station Breeding Research

| Target | Achievements | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------|--------------------------------------------------|------------------------------------|
| B. Pre breeding: selection in segregating generations | | | | |
| Selection in segregating generations/ families for tallness, fodder yield, dual purpose, juiciness/ sweetness of stem, tillering and fast regeneration, BMR, disease resistance, grain quality etc. | Generations | | Crosses/ progenies planted | Crosses/ progenies selected |
| | F₁ | Attempted | 15 crosses | Will be planted in Kharif 2017 |
| | | Evaluated | 18 crosses | 11 crosses |
| | F₂ | | 31 crosses/8352 plants (Approx.) | 21 crosses /254 SPS |
| | F₃ | | 33 crosses /339 SPPs | 25 crosses /489 SPSs from 119 SPPs |
| | F₄ | | 39 crosses /349 SPPs | 16 crosses /198 SPSs from 80 SPPs |
| | F₅ | | 10 crosses/23 SPPs | 8 crosses /105 SPSs from 20 SPPs |
| | F₆ | | 5 crosses/36 Progeny bulks | 4 crosses /16 Progeny bulks |
| | F₇ | | 5 crosses/19 Progeny bulks | 4 crosses /8 Progeny bulks |
| | F7 onwards | | 27 crosses/80 progeny bulks | 26 crosses /61 Progeny bulks |
| Total | | 183 crosses/9198 single plant progenies + progeny bulks | 115 Crosses/1131 SPSs and Bulk selections | |

Major achievements during 2016-17

Discipline: Plant Breeding

Station Breeding Research *contd.....*

| Target | | Achievements | |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| C. Maintenance of Advanced generation material | | | |
| No. of advanced generation lines (F₆ onwards) in hand | Tillering and MC type | | 19 |
| | Resistance to foliar diseases | | 10 |
| | Sweetness of stem (TSS 14-16% at maturity) | | 7 |
| | SC/DP type [Tall (>350 cm), thick stem, juicy, bold/ good grain quality/ production] | | 30 |
| | Stay green/green at maturity | | 26 |
| | BMR (Tan, medium tall, brown mid rib and brown stem, juicy, sweet) | | 20 |
| | Red grain | | 3 |
| | Total | | 115 |
| MS lines | Development | 82 SPS of 11 B x B crosses in F₃ stage for development of white/red grain CMS lines for use in fodder hybrid development | |
| | Conversion | One new cross (A x B) attempted, two crosses in BC₂ stage, five crosses in BC₃ stage | |
| R lines | Development | <ul style="list-style-type: none"> ▪ 10 lines for multi cut hybrid development (high tillering, earliness and good pollen production) ▪ 10 lines with BMR expression for use in hybridization programme ▪ 5 lines good sweetness and juiciness of stem ▪ 12 lines with resistance to foliar diseases/stay green expression | |

Discipline: Plant Breeding Station Breeding Research *contd....*

| Target | Name of Trial | Entries contributed | Entries Promoted |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D. Cultivar development | | | |
| No. of varieties/hybrids contributed/promoted in State Trials | SVT (Multi cut) | Six test entries (varieties) and two checks | <ul style="list-style-type: none"> •UTMC 558 promoted to SVT III •UTMC 559 & UTMC 560 promoted to SVT II |
| | SVT (Single cut) | Nine test entries (varieties) with one check | <ul style="list-style-type: none"> •UTFS 88 and UTFS 93 promoted to SVT II |
| No. of entries contributed/promoted in AICSIP (Coordinated Trials) | IAVHT (Multi cut) | SPH 1768 SPH 1807 SPH 1841 SPH 1842 | <ul style="list-style-type: none"> •SPH 1807 (promoted to AVHT II) •SPH 1841 (promoted to AVHT I) |
| | AVHT (single cut) | SPH 1797 SPH 1822 SPV 2317 SPV 2383 | <ul style="list-style-type: none"> •SPH 1797 & SPV 2317 (completed three year testing & identification proposal is submitted) •SPH 1822 (4.8% superiority for DFY & GFY) |
| | IVHT (single cut) | SPH 1857 SPV 2443 | <ul style="list-style-type: none"> • SPH 1857(likely to be promoted to AVHT I) (7.4 % superiority for DFY) |
| Varieties identified for release | <ul style="list-style-type: none"> • UTMC 539 & UTMC 545 (multi cut varieties) and UTFS 79 & UTFS 83 (single cut varieties) identified for State release in Uttarakhand last year (April, 2016) • UTMC 552 & UTMC 554 (multi cut varieties) with average superiority of more than 10.0% over check identified for State Release in 17.4.2017 Meeting | | |

Single cut forage sorghum hybrid SPH 1797(UTFSH 2)

Proposed for Identification



| Parameter | SPH 1797 (UTFSH 2) | CSH 13 | % superiority |
|-------------------------------------|-----------------------|---------------|------------------|
| GFY (q/ha) | 559.61 | 518.13 | 8.01 |
| DFY (q/ha) | 155.37 | 137.56 | 12.95 |
| DDM Yield (q/ha) | 77.92 | 65.58 | 18.82 |
| Protein Yield (q/ha) | 12.66 | 10.88 | 16.36 |

Source: Three year All India average AICSIP Annual Progress Report 2014-15 to 2016-17

Single cut forage sorghum hybrid SPH 1797(UTFSH 2)

Proposed for Identification



| Parameter | SPH 1797 (UTFSH 2) | CSH 13 | % superiority |
|-----------------------|-----------------------|---------------|------------------|
| GFY (q/ha) | 611.08 | 575.32 | 6.22 |
| DFY (q/ha) | 151.88 | 135.92 | 11.74 |

Source: Three year Zone I average AICSIP Annual Progress Report 2014-15 to 2016-17

Single cut forage sorghum variety SPV 2317 (UTFS 85)

Proposed for Identification



| Parameter | SPV 2317 (UTFS 85) | CSV 21 F | CSV 30 F | % superiority | |
|-------------------------------------|-----------------------------|---------------|---------------|---------------|-------------|
| | | | | CSV 21F | CSV 30 F |
| GFY (q/ha) | 528.78 | 480.44 | 485.75 | 10.06 | 8.86 |
| DFY (q/ha) | 144.81 | 131.39 | 133.85 | 10.21 | 8.19 |
| DDM Yield (q/ha) | 71.76 | 67.03 | 65.69 | 7.06 | 9.24 |
| Protein Yield (q/ha) | 11.03 | 11.83 | 10.03 | - | 7.09 |

Source: Three year All India average AICSIP Annual Progress Report 2014-15 to 2016-17

Single cut forage sorghum variety SPV 2317 (UTFS 85)

Proposed for Identification



| Parameter | SPV 2317 (UTFS 85) | CSV 21 F | CSV 30 F | % superiority | |
|-----------------------|-----------------------------|---------------|---------------|---------------|-------------|
| | | | | CSV 21F | CSV 30 F |
| GFY (q/ha) | 489.33 | 404.27 | 447.74 | 21.04 | 9.24 |
| DFY (q/ha) | 158.34 | 125.95 | 148.18 | 25.72 | 6.86 |

Source: Three year Zone II average AICSIP Annual Progress Report 2014-15 to 2016-17

Multicut forage sorghum variety **UTMC 545** identified for State Release



| Parameter | UTMC 545 | Pant Chari 6 (State Check) |
|------------------------|----------|-------------------------------|
| GFY (q/ha) | 737.52 | 630.52 |
| DFY(q/ha) | 205.93 | 182.27 |
| DDM Yield (q/ha) | 152.00 | 105.64 |
| Protein Yield(q/ha) | 17.68 | 13.28 |
| HCN (ppm) | 88.14 | 81.19 |

Source: Three year average SVT Progress Report Kharif 2015

Discipline: Germplasm

| Sl. No | Target | Achievements | | |
|------------------|----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Germplasm maintained | 422 (Fodder/dual purpose, sweet sorghum, grain sorghum etc. types) | | |
| | | 74 A/B pairs of medium tall, early- medium CMS lines | | |
| 2 | Germplasm evaluated / characterized | Under CRP-Agro-Biodiversity Project 1000 lines were evaluated/characterized for 26 diversified traits (seedling to seed maturity stage) | | |
| 3 | Germplasm used in crossing block | 59 | | |
| 4 | Germplasm/ material distributed | HAU, Hisar | CSH 20 MF, CSH 24 MF for demonstration purpose | |
| | | PAU | CSH 20 MF and CSH 24 MF for experiment purpose | |
| | | NDDB | CSH 20 MF, CSH 24 MF, Pant Chari 5, Pant Chari 6, Pant Chari 7 and Pant Chari 8 for demonstration purpose | |
| | | IIMR | Dr. Rakshit | 11A ₂ /B ₂ , 12A ₂ /B ₂ , 32A ₂ /B ₂ , MR 750A ₂ /B ₂ (for evaluation/maintenance) |
| | | | Dr. Rajendra | UP Chari 1, UP Chari 2, Pant Chari 5, 2219A, 2219 B, UPMC 503, CSH 24 MF, ICSA 467, ICSB 467 and Pant Chari 6 (for DNA finger printing) |
| | | | DUS test | SPV 2317 (UTFS 85), SPH 1768 (UTMCH 1313) and its parents(2219 A , ICSB 467 and Pant Chari 6) SPH 1797 (UTFSH 2) and its parents (11A ₂ , 11B ₂ Pant Chari 5) |
| SVPUA &T, Meerut | UP Chari 2, Pant Cahri 3, Pant Chari 4, Pant Chari 5, Pant Chari 6, Pant Chari 7, Pant Chari 8 for student thesis research | | | |

Major achievements during 2016-17

Discipline: Plant Pathology

| Target | | Achievements |
|-----------------------------------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------|
| AICSIP Trials: Evaluation of breeders' material for foliar diseases (Anthracnose, ZLS) | | |
| Trial | Resistant/ moderately resistant genotypes | |
| AHT (GS) | - | None of the entries was found resistant against anthracnose and zonate leaf spot |
| AVT (GS) | CSV 23 | The entry were found moderately resistant against anthracnose and zonate leaf spot |
| IHT (GS) | - | None of the entries was found resistant against anthracnose and zonate leaf spot |
| IVT (GS) | - | None of the entries was found resistant against anthracnose and zonate leaf spot |
| IAVHT (Sweet Sorghum) | - | None of the entries was found resistant against anthracnose and zonate leaf spot |
| AVHT (Single cut) | B58586 | The entry was found moderately resistant against anthracnose and zonate leaf spot |
| IVHT (Single cut) | - | None of the entries was found resistant against anthracnose and zonate leaf spot |
| IAVHT (Multicut) | SPH 1768, B58586, SPH 1841 | These entries were found moderately resistant against both anthracnose and zonate leaf spot |
| NAN | PC 5 | The entry was found resistant against anthracnose |

Major achievements during 2016-17

Discipline: Plant Pathology

| Target | Achievements |
|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Station Pathological Research | |
| Experiment | |
| Efficacy of chemicals and bio control agents against anthracnose of sorghum | <ul style="list-style-type: none">• Combination of trifloxystrobin and penflufen treatment recorded minimum PDI and AUDPC and was found best in increasing green fodder yield over other treatments |
| Studies on variability in <i>C. graminicola</i> | <ul style="list-style-type: none">• Molecular characterization of 50 isolates of <i>C. graminicola</i> revealed a high level of variability among the isolates |

Major achievements during 2016-17

Discipline: Agronomy

| Target | Achievement | Short fall |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| AICSIP Trials | | |
| Response of Forage sorghum multi cut genotypes to different fertility levels (Trial No. 1KF) | <ul style="list-style-type: none"> ➤ At both the cuttings GFY and DFY increased significantly with increasing fertility levels ➤ Check SSG 59-3 produced significantly higher green fodder (524 q/ha) at first cut and dry fodder yield (143.8 q/ha and 55.8 q/ha) at both the cutting ➤ SPH 1768 gave significantly higher GFY at second cut (205.9 q/ha) ➤ Interaction effect of fertility levels and genotype indicates non significant effect. | No shortfall |
| Response of Forage sorghum single cut genotypes to different fertility levels (Trial No. 1KE) | <ul style="list-style-type: none"> ➤ Both green and dry fodder yield increased significantly with increasing fertility levels ➤ 125% RDF gave significantly highest green fodder and dry fodder yield. ➤ SPH 1797 gave significantly highest green fodder (591.7 q/ha) and dry fodder yield (147.3 q/ha) but was <i>at par</i> with SPV 2317 for dry fodder yield (145.7q/ha) only ➤ Forage nutritional quality traits viz. nitrogen % and protein % increased significantly with increasing dose of fertility ➤ SPH 1797 was best for Nitrogen % and protein % but was <i>at par</i> with SPV 2317 | No shortfall |

Major achievements during 2016-17

Discipline: Agronomy

| Target | Achievement | Short fall |
|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| AICSIIP Trials | | |
| <p>Intercropping of sweet sorghum fodder with forage legumes under different nutrient management. (Trial No. 5K)</p> | <ul style="list-style-type: none"> ➤ Among the main effects (intercropping systems), the treatment T₂ (sole cowpea) gave significantly highest green fodder yield (628.6 q/ha) ➤ The green fodder yield increased significantly with increase in nutrient supply ➤ 100% RDF gave significantly highest green fodder yield ➤ Intercropping of sole clusterbean (T₃) had significantly highest digestibility % but was <i>at par</i> with sole cowpea (T₂) | <p>No shortfall</p> |
| <p>Optimization of production factors under resources constraints (Trial No. 6K)</p> | <ul style="list-style-type: none"> ➤ Full package of practices (FPP) produced significantly highest green and dry fodder yield ➤ FPP minus plant protection and FPP minus seed treatment were <i>at par</i> with FPP ➤ Important management component had greater influence on green fodder yield and dry fodder yield ➤ Most important management component was found to be fertilizer application followed by weed management components | <p>No shortfall</p> |

Major achievements during 2016-17

Discipline: Extension including FLDs

| Sl. No | Target | | Achievements |
|--------|--------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | FLDs | AICSIP | <ul style="list-style-type: none"> • Thirty five (35) Front Line Demonstrations on 10 ha (0.20 to 0.40 ha each) with two forage sorghum varieties Pant Chari 5 and Pant Chari 6 were organized in six villages of Udham Singh Nagar districts • Pant Chari 5 & Pant Chari 6 gave an average GFY of 415.78 q/ha & 536.94 q/ha with 62.09% & 109.33% superiority respectively, over local variety (256.50 q/ha) used by farmers • Improved practice (IP) by using 40% more inputs and seed of improved varieties resulted in 114.65% higher net return as compared to farmers practice (FP) • For IP & FP the B/C ratio was 1.89 & 1.30, respectively |
| | | KVK Matela | <ul style="list-style-type: none"> • Twenty (20) FLDs on 0.50 ha (.025 ha each) were conducted in nearby villages of KVK Matela with promising forage sorghum hybrid UTMCH 1313 along with local variety • UTMCH 1313 (1042.50 q/ha) gave (61.50%) GFY superiority over local check (645.50 q/ha) • For IP & FP, B/C ratio was 2.43 & 1.51 respectively |

Constraints

| Constraint | Suggestions |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> ➤ Financial crunch due to increased cost of field supplies, fertilizers/ laboratory chemicals, field labourer etc. ➤ 33% cut in recurring contingency grant | <p>Recurring contingency budget need to be increased</p> |
| <ul style="list-style-type: none"> ➤ Lack of equipments and man power for forage nutritional quality analysis | <p>Forage nutritional quality analysis equipments and position of Biochemist sought in XII Plan need to be provided</p> |
| <ul style="list-style-type: none"> ➤ Non release of funds sanctioned under NR contingency | <p>Funds need to be released for purchase of equipments required for nutritional analysis and pathological work</p> |
| <ul style="list-style-type: none"> ➤ Lack of facility for disease screening under controlled conditions | <p>Funds for development of Glass house facility need to be provided</p> |

Publications from AICRP-Sorghum centre

| Formal | Number |
|---------------------------------------|-----------------------------------------------------|
| Journal Papers (International) | As 1st author: Nil |
| | As co-author: Two (1 Pathology + 1 Agronomy) |
| Journal Papers (National) | As 1st author: Nil |
| | As co-author: 6 (2 Breeding + 4 Pathology) |
| Review papers | As 1st author: Nil |
| | As co-author: Nil |
| Poster Presentation | Nil |
| Popular | |
| Popular articles | Two (1 Breeding + 1 Pathology) |
| Field days organized/attended | Nil |

Other activities rendered by all scientists

| Sl. No | Activities | Number | % time spent |
|--------|----------------------------------|---------------------------------------------------------------------------------------------------|--------------|
| 1 | Trainings organized by centre | 1 (Breeding- 21 days Summer School, September 08-28, 2016) 2 (Pathology- 21 days CAS Training) | 5 |
| 2 | Trainings attended by scientists | - | - |
| 3 | Guiding students | 4 (2 Ph. D. & two M. Sc. by two Breeders) 3 (3 Ph.D. by Pathologist) | 10 |
| 4 | Institutional activities | Teaching / Extension & other administrative activities assigned time to time | 15 |
| 5 | Recognitions | - | - |

Major activities/objectives for 2017-18

| Discipline | Major activities envisaged |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;">Breeding</p> | <ul style="list-style-type: none"> ✓ AICSIP/State/ Station Trials for yield and quality evaluation ✓ Resistance breeding (foliar diseases) ✓ Hybrid breeding (single cross, three way cross) ✓ Red grain CMS development / identification for use in multi cut hybrid development/ use of alternate cytoplasm ✓ Basic genetic studies through student research ✓ Genetic stock management/evaluation/registration ✓ Organization of FLDs with promising varieties and hybrids of forage sorghum |
| <p style="text-align: center;">Agronomy</p> | <ul style="list-style-type: none"> ✓ Evaluation of improved agronomic management practices for cost effective fodder production under different cropping systems ✓ Evaluation of forage crops for bio energy potential under intercropping system |
| <p style="text-align: center;">Pathology</p> | <ul style="list-style-type: none"> ▪ AICSIP/Station trials for foliar disease screening/management ▪ Management of anthracnose, zonate leaf spot, leaf blight and stalk rot through Bio-control agents, organic methods ▪ Studies on variability in <i>C. graminicola</i>, <i>Gloeocercospora sorghi</i> and <i>Erwinia chrysanthemi</i> |



Thank You