AICRP Sorghum Progress Report 2018-19

Centre: TNAU, Coimbatore

Dr. B. Selvi,
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Department of Millets,
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Coimbatore

Centre: Coimbatore

1. Name of the officer in charge (AICSIP):	Dr. B. Selvi, Professor (PBG)
2. Associated Scientists (AICSIP) and their discipline	1. Dr. N. Vadivel Assoc. Professor (Agronomy) 2. Dr. A. Sudha Asst. Professor (Pl. Pathology) 3. Dr. D. Kavithamani Asst.Professor (PBG)
2. Associated scientists from state project	Nil
3. Annual budget	Pay and allowances : 54.21 lakhs Recurring : 3.885 lakhs TA : 1.125 lakhs
4. Any other financial support	TNAU, Main

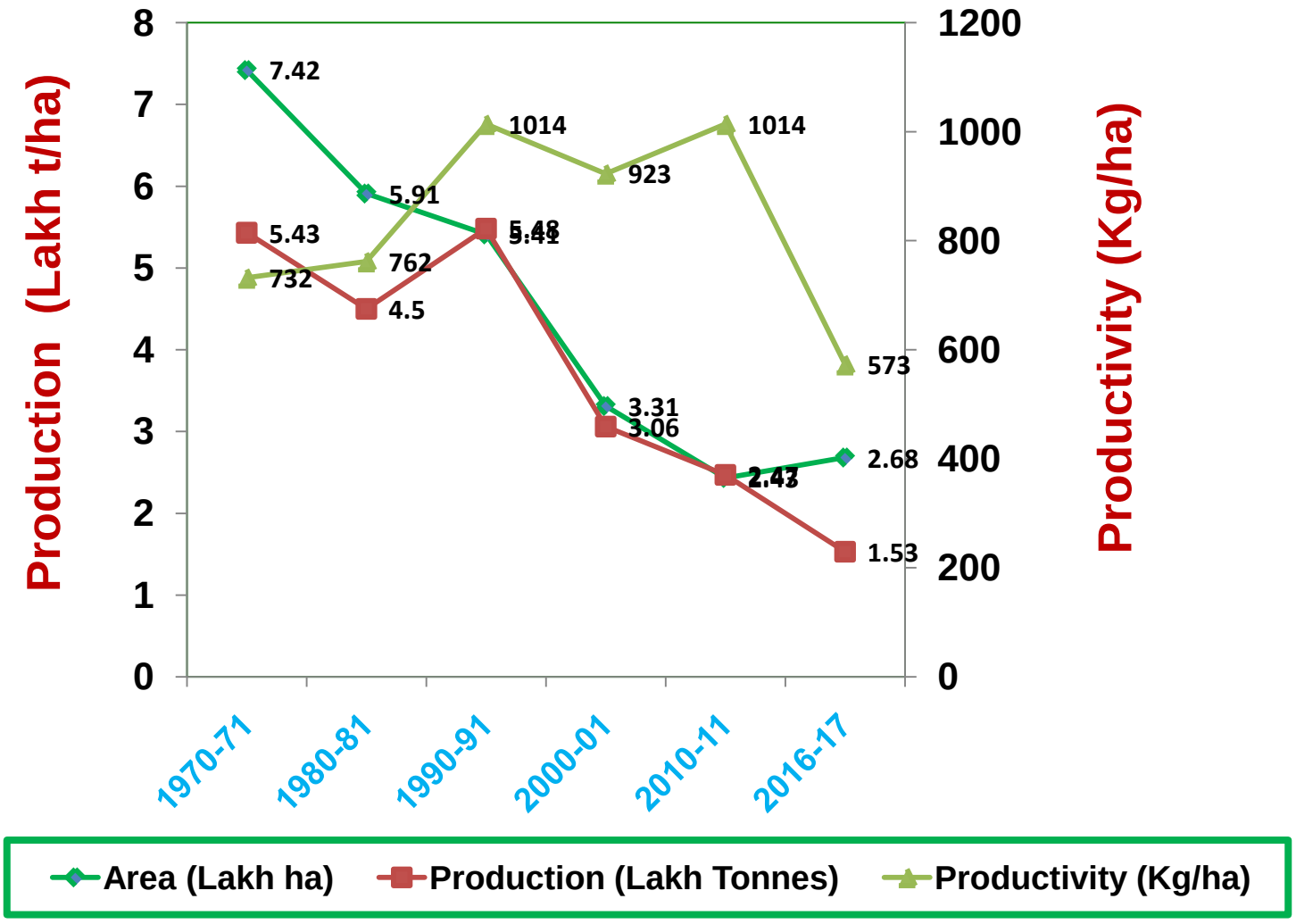
Staff changes during the year

Retired	**Nil**
Transferred	**Mr. D . Krishnamurthy** **Agrl. Supervisor**
New recruits	**Dr. A. Sudha** **Asst. Professor (Pl. Pathology)** **Mr. P. Maduraiveeran** **Junior Agrl. Officer**
Sanctioned Strength	**7 (Scientist: 4 ; Supporting:3)**
In position	**7**

Seasonal information

Particulars	Kharif	Rabi
Rainfall	304.7	220.7
Area covered	1.28 L.ha	1.40 L.ha
Total production	1.06 L.ha	0.47 L.ha
Productivity	829 Kg/ha	338 Kg/ha
Major genotypes in the farmers' fields	GS - CO 26, CO 28, CO 30, PY2, K8, K12 FS : CO 27, CO(FS) 29, CO(FS) 31, CSV33MF Local land races: Periyamanjal, Thalaivrichan cholam, Red cholam & irungu cholam Private: Mahalakhsmi, Pioneer 501	
Area under each of the released cultivars	CO26 (2.9%), CO 28 (1.9%), CO 30 (8.7%), K12 (5%) & Local	
Farmers' requirement in cultivar	Grain Sorghum - Dual purpose Forage Sorghum - Single cut - FS	

Decadal trend in production and productivity of sorghum in Tamil Nadu



Action taken on important recommendation during AGM 2018

Sl.No.	Recommendations	Action taken
1.	Timely supply of Check seeds of CSV33MF for constitution of multicut trials	Seed has been sent in time (March' 2019)
2.	The centre should take up serious efforts in Entomology and Pathology discipline	• Pathologist posted • Entomology & pathology trials conducted
3.	Centre has not made any progress in research of Midge and downy mildew resistance. Sincere efforts are to be made.	**Midge:** CO 26 x SPV 2362 COS 28 xx SPV 2362 COS 28 x SPV 2366 **Downy mildew:** Co 30 X TNS 648 Co 28 X TNS 648 Co 26 X TNS 648

Trials conducted

Discipline	No. of AICSIP trials allocated	No. of station trials	No. of trials successfully conducted	Shortfall
Plant Breeding : Grain sorghum	4	5	9	Nil
Plant Breeding : Forage sorghum	5	4	9	Nil
Agronomy	3	-	3	Nil
Pathology	4	-	4	Nil
Entomology	8	-	8	Nil
Total	**24**	**9**	**33**	**Nil**

Priority areas of research for the centre

Centre	Insect	Disease	Abiotic	Product type
Coimbatore	Shoot fly, Midge, Stem borer	Downy mildew, Grain mold	-	Dual purpose, forage Sorghum, Colored sorghums

Priority areas of research for the centre

Target	Generation	No. of cross Evldt.	No. of families/SPS	Target	Generation	No. of crosses evaluated	No. of families/ SPS
Grain sorghum Shoot pests	F_0	3	Crop raised	Shoot pests	F_3	7	14 (F_4)
	F_1	5	5 (F_2)		F_4	3 (11families)	18(F_5)
	F_2	7	11 (F_3)				
Midge	F_0	3	Crop raised	Grain mould	F_1	7	7 (F_2)
Red grain	F_0	2	Crop raised	Downy Mildew	F_1	3	3 (F_2)
				Total		**40**	**58**
Forage Sorghum improvement							
High GFY	F_1	3	10	High GFY	F_2	12	52
	F_5	12	8	**Total**		27	70

Drought (Kovilpatti & Aruppukottai)

KPT - Drought tolerant TKSV 1126, TKSV 1143, SPV 2123 & SPV 2109 crossed with K 12 & K 8

APK - 5 F_2 + 15 F_3 families were evaluated for drought

Coloured grain (Paiyur & Madurai)

PYR- 27 red grain types evaluated and 16-05 (RS), 2457, 16-01 (RS), 2657 and 4269 were found to be early in maturity

Madurai - Red grain sorghum land races 7 numbers were collected from Madurai, Ramnad and Virudhunagar districts

Major achievements and efforts under each priority area during 2018-19

Discipline: Plant Breeding

Entries contributed to AICRP trials during last 3 years

Sl. No.	Name of the entry	Year of Nomination	Trial Name
1.	TNS 664 TNS 667	2017-18	IVT-GS
2.	TNS 649 TNS 661 TNFS 0952	2016-17	IVT-GS IAVHT-MC
Total		**5 entries**	

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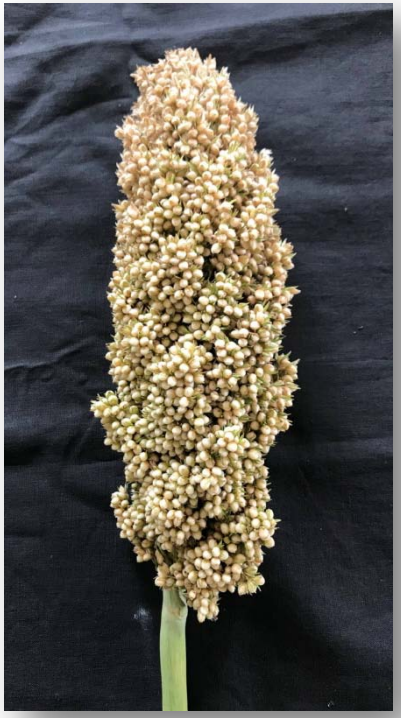
Sorghum

TNS 648

- **Parentage:** APK1 x M35-1
- **Duration :** 105-110 days
- **Yield potential:** 3051 kg/ha (Irrigated)
  2231 kg/ha (Rainfed)
- **Fodder yield:** 10795 kg/ha (Irrigated)
  6700 kg/ha (Rainfed)



Special features

- Dual purpose
- High Protein content (12.59%)
- Resistant to shoot fly (19.7%) & Stem borer (8.14%)
- Resistant to grain mould (3%) & downy mildew (5.6%)

Major achievements and efforts under each priorit area during 2018-19

Discipline: Plant Breeding : Grain sorghum

Sl. No	Target	Achievement
1.	ART	**TNS 661 (TNS 603 x IS 18551) : 1st year of ART** Grain yield (kg/ha) : 3016 kg/ha (13 % inc. over CO 30) Fodder yield : 8 t/ha (10 % inc. over CO 30)
2.	MLT S'2018	No. of entries tested : 4: Promising entries : 2 TNS 663 / TNS 667 Grain yield (kg/ha : 2170 / 2209 % inc.(CO30) : - / 1.29 Fodder yield (kg/ha) : 9497 / 9429 % inc.(CO30) : 3.15 / 2.41
3.	UV-S'2018	No. of entries tested : 5: Promising entries : 2 TNS 676 / TNS 677 Grain yield (kg/ha : 3487 kg/ha / 3509 kg/ha Fodder yield (kg/ha) : 8086 kg ha / 8371 kg ha. % inc. (Co30 - Both) : >20 / >20

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Major achievements and efforts under each priority area during 2018-19

Discipline: Plant Breeding : Grain sorghum

Sl. No	Target	Achievement
4.	NRRYT Summer'18	No. of entries tested : 12 : Promising entries : 3 TNS 630 x TNS 636-2-3-1-3-1 TNS 630 x TNS 634-3-2-2-3-1 TNS 627 x TNS 640-2-3-2-3-2 Grain yield (kg/ha) : 3100-3800 DFY (Kg/ha) : 8500-9500
5.	MLT Kharif'18	No. of entries tested : 3 Check : 2 Promising entry: 1 TNS 667 Grain yield (kg/ha : 3413 kg/ha % inc.(Co30) : >28 % inc. (K12) : >33 Fodder yield (kg/ha) : 8214 kg/ha % inc.(Co30) : > 25 % inc. (K12) : >11

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Major achievements and efforts under each priority area during 2018-19

Discipline: Plant Breeding : Grain sorghum

Sl. No	Target	Achievement
5	Screenings for shoot fly & midge-K18	**No. of entries screened: 103** **Promising entries for Shoot fly: 22 (Resistant – No incidence)** KO 57, SPV 759, CO 28, SPV 749, IS 88, HC 308, IS 18459, SO3 251, SPV 168, SOR 6931, KO514, IS 753, SPV 195, SPV 459, IS 200, R 2317, IS 29528, IS 4136, SPV 740 and SPV 541 **No. of entries screened: 15 (From IIMR)** **Promising entries for Midge resistance:** **Lowest incidence recorded** : SOR 6942 (25%) **Remaining entries recorded : > 40%**
6	**Screening for disease resistance**	**No. of advanced cultures screened: 6 during K,18** Best culture - TNS 648 - 2.4 % - Grain mould Downy mildew TNS 648 - 5.56 % ***Grain mould & downy mildew - <10%***

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Major achievements and efforts under each priority area during 2018-19

Discipline: Plant Breeding – Forage Sorghum

Sl. No	Trial	No. of entries tested	Achievement
1.	UVT I – Summer'18	9	None of them performed > 10 % GFY increase over check variety CO 27.(Trial was dropped)
2.	UVT I – Kharif'18	10	**GFY Heterosis: 3-38 % .** **Superior entries are** 1. RSSV 9 x TNS 599-1-1-3-1 2. BMR 211 x CSV 24SS-1-1-1-1 3. TNS 623 x ICSV 700-2-2-2-1 4. TNS 623 x ICSV 700-2-3-1-1
3.	UVT-II (R'2018-19)	8	

Culture	Parentage	DFF (days)	GFY (t/ha)	% inc. over CO 27	Special attributes
TNFS 220	BMR 211 X CSV 24SS	60	31.97	17.39	Plant Height -270 cm; Brix-12 %; TSS-9.74%
TNFS 222	TNS 623 X ICSV 700	57	34.75	27.60	Plant Height -210 cm; Brix-10 %; TSS-7.54%

TNFS 220

TNFS 222

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Major achievements and efforts under each priority area during 2018-19

Discipline: Plant Breeding – Forage Sorghum

Sl. No	Trial	No. of entries tested	Achievement
4.	RRYT Summer'18		**GFY heterosis: 2-35 %.** SS 303 x SS 253-2-3-1-2-2; SS 303 x SS 253-1-3-1-2-3; SS 303 x SS 253-6-4-1-2-2; SPSSV 6 x SS 253-4-2-1-1-1 SS 179 x SS 172-2-3-2-3-2; SSV 84 x SS 253-4-2-1-3-2
5.	**EC crosses**	-	**Crosses synthesized - 16 nos.**

Segregating materials evaluated

Sl. No.	Generation	No. of crosses evaluated	No. of families/single plant selected
1.	F_1	3	10
2.	F_2	12	52
3.	F_5	12	8
	Total	27	70

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Breeder Seed Production during 2018-19

Sl. No	Variety	Class	Target	Achievement
1	CSV 33 MF	Breeder Seed	825	600 kg
2	CO 30	Breeder Seed	125	150 kg
3	CSV 33 MF	TFL	-	65 kg
4	CO 30	TFL	-	300 kg

Multicut Forage Sorghum CSV 33 MF (SPV 2242 F): National Check

Major achievements and efforts under each priority area during 2018-19

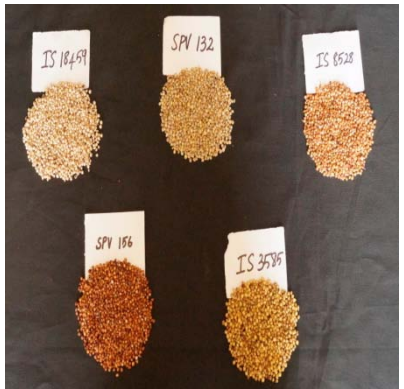
Discipline: Germplasm

RGB- PGR - 400
local collections - 20
IIMR Hyderabad - 43
ICRISAT - 77

Total - 540

Characterization completed – 407

- The promising GS lines – IS 6312, IS 8120, AS 3479, AS 4153, AS 4242 and AS 5476
- The promising FS lines – SOR1891, SO3 256, IS 2688, SOR 6942, IS4124, SPV86 and SPV587



Major achievements and efforts under each priority area during 2018-19

Discipline: Entomology

Screening for shootfly and stem borer				
Sl. No.	**Name of the Trial**	**Target**	**Achievement**	**Shortfall**
1.	AHT-GS	14	14	Nil
2.	AVT-GS	19	19	Nil
3.	IHT -GS	18	18	Nil
4.	IVT-GS	24	24	Nil
5.	IAVHT -MC	18	18	Nil
6.	AVHT -SC	13	13	Nil
7.	IVHT -SC	27	27	Nil
8.	IAVHT-SS	23	23	Nil
	Total Entries	156	156	

Major achievements and efforts under each priority area during 2018-19

Discipline: Plant Pathology

Screening for downy mildew, grain mould, sugary disease, Rust and Anthracnose				
Sl. No.	**Name of the Trial**	**Target**	**Achievement**	**Shortfall**
1.	AHT-GS	11	11	Nil
2.	AVT-GS	21	21	Nil
3.	IAVHT -MC	16	16	Nil
4.	AVHT -SC	11	11	Nil
	Total Entries	59	59	

Major achievements and efforts under each priority area during 2018-19

Discipline: Agronomy				
Sl. No.	**Name of the Trial**	**Target**	**Achievement**	**Shortfall**
1.	Trial No. 1 KA	10	10	Nil
2.	Trial No. 2 KF	3	3	Nil
3.	Trial No. 5 K	1	1	Nil
	Total Entries	14		

Findings:

Trial 1 KA - Grain yield was significantly higher with 100% RDF

Best entries - SPV 2437 & SPV 2423

Trial 2 KF - CSV 33 MF recorded tillers & GFY

Trial 5 K - Best treatment - T_5 (Mechanical sowing + weeding + harvesting)

Constraints

Sl No	Constraint	Suggestions to overcome them
1.	Less recurring contingency	Recurring contingency may be increased

Publications from AICRP centre

Formal	Number
Journal Papers (International)	2
Journal Papers (National)	-
Manual	3
Posters	-
Popular	-
Popular articles	-
Field days organized/attended	1

Other activities rendered by all scientists

Sl. No	Activities	Number	% time spent
1	Trainings organized by centre	-	-
2	Trainings attended by scientists	7	5
3	Guiding students	4 (Chairman) 4 (Member)	10
4	Institutional activities	10	10
5	Recognitions	2	2

Major findings from Student theses on sorghum

Sl. No.	Student Name	Title	Findings
M.Sc.,			
1.	Sri Subalakhshmi. V	Phenotypic characterization and diversity studies in sorghum germplasm for morphological traits associated with grain yield and yield components.	Associated traits- Panicle length & 100 seed weight Best entry – SOR 6942, KO5 75, SPV 168, KO5 44 & IS 2688
2.	S. Subhashini	Genetic studies in F_2 population of grain Sorghum (*Sorghum bicolor L.Moench*) for yield and yield component traits	Best population COS 28 x SPV 2307 CO 30 x SPV 2307
Ph.D.,			
1.	P.Vinoth	Genetic analysis for grain yield and its component traits in Sorghum (*Sorghum bicolor L.Moench*)	Too early to report

Major activities for 2019-20: Priority research area wise

Discipline	Major activities envisaged
Grain sorghum	Evolving dual purpose shoot fly, midge resistance grain mould and downy mildew resistance varieties & Breeder seed production of C0 30
Forage sorghum	Development of single cut forages with improved nutritional qualities & Breeder seed production of CSV 33MF
Germplasm	Broadening the genetics base of sorghum germplasm for end user preference
Agronomy	Developing cost effective and labour saving technologies for sorghum
Pathology	Basic and management studies on major sorghum diseases

THANK YOU