

Farming Beyond Extremes: Crops and Varieties for changing climatic conditions

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Variation in monsoon rainfall due to climate change and phenomena such as El Niño often results in drought conditions, adversely affecting crop production, livestock, water resources, and rural livelihoods. In Tamil Nadu, nearly half of net cultivated area is under rainfed which is vulnerable to rainfall deficits and prolonged dry spells. A Super El Niño can bring higher temperatures, prolonged dry spells, erratic rainfall, and increased water stress in many parts of Tamil Nadu which can reduce yield unless crops and management practices are adjusted. The best adaptation strategy is to shift toward short-duration, drought-tolerant, heat-tolerant, and climate-resilient crop varieties, while improving water-use efficiency. Cultivating climate resilient crops and varieties could reduce the impact of El Niño.

Crops and Varieties to tackle the impact of Super El Nino
Short duration drought tolerant rice varieties suitable for direct seeded conditions

TKM 15

- Drought tolerant, short duration rice variety released during 2022 for direct sown rainfed and semidry areas of Tamil Nadu from Rice Research Station, Tirur
- Matures in 118 days and has the ability to withstand early-stage water stress, good germination percentage under direct sowing, early vigour and high drought recovery.
- Yield: 3995 kg/ha and 4217 kg/ha under rainfed and semidry conditions respectively.
- Erect, high tillering and non-lodging plant habit.
- Moderately resistant to major diseases such as blast, sheath rot, sheath blight, brown spot and RTD
- Field tolerant to major pests like leaf folder, stem borer and gall midge
- White, medium slender grain with 1000 grain weight of 15.0 g with good hulling (80%), milling (68%) and HRR (62.9 %).
- High proline content (2.15 mg/g), Chlorophyll Stability Index (80.23 %) and total chlorophyll content (1.51 mg/g) under water stress.

Rice CO 53

- Parentage: PMK (R) 3 x Norungan

- Duration : 115-120 days
- Season : Rabi
- Yield : 3720 kg/ha (under rainfed)
- White, short bold rice variety
- Suitable for cultivation in water limited conditions of Tamil Nadu

Improved CO 51 HT

- Duration - 105-110 days.
- Season: Kuruvai/Navarai/Sornavari/Summer.
- Grain yield – 4327 kg / ha
- Medium slender grain with milling – 70 % and HRR – 65 %
- Suitable for direct seeded rice cultivation
- Tolerant to broad spectrum herbicide Imazethapyr
- Moderately resistant to blast, false smut, sheath rot, RTD, brown spot and grain discolouration.

CR Dhan 807

- Developed from mega variety Sahbhagi Dhan at NRRI, Cuttack.
- Ideal for Direct Seeded condition.
- Climate resilient and drought tolerant.

Short duration drought tolerant millet varieties

Millets are climate resilient crops which can be grown under water-scarce conditions in marginal lands, making them future-ready crops for ensuring food security under the current climate crisis. Area under millet cultivation, production and productivity of millet crops have to be increased and high yielding millet varieties have to be adopted in order to ensure food and nutrition security of our country.

Maize Hybrid COH (M) 11

- Released from the Department of Maize, TNAU, Coimbatore
- Parentage : UMI 1240 / UMI 1210
- Duration : 105-110 days
- Season : June- July; Sep-Oct; Jan- Feb
- Yield : 6590 kg/ha (Rainfed)
- Drought tolerant

- Orange yellow semi-dent kernels with high test weight
- Better fodder qualities
- Moderately resistant to Fall Army Worm and Charcoal Rot

Maize VGI H (M) 2

- Released from Maize Research Station, Vagarai
- Parentage : UMI 1200 / UMI VIM -419
- Duration : 95-100 days
- Season : Sep-Oct
- Yield : 6352 kg/ha
- Drought tolerant and suitable for rainfed conditions
- Stay green; Orange yellow dent kernels
- Moderately resistant to Fall army worm and Stem borer

Sorghum K 13

- Parentage : ICSB 518 x SPV 1489
- Duration : 95-100 days
- Season : June- July; Sep-Oct

- Yield : Grain 2575 kg/ha; Stover 11.4 t/ha
- Dual purpose suited for grain and fodder
- Resistant to shoot fly, stem borer, downy mildew

Sorghum CO 32

- Parentage : APK 1 x M35 1
- Duration : 105-110 days
- Season : June- July; Sep-Oct
- Yield : Rainfed - Grain - 2445 kg/ha; Stover - 6960 kg/ha
- High protein (11.31-14.66 %) and fiber content (5.8 %)
- Moderately resistant to shoot fly and stem borer, downy mildew and grain mould

Pearl Millet Hybrid COH 10

- Parentage : ICMA 10444A x PT 6679
- Duration : 80-95 days
- Season : Sep-Oct sowing
- Yield : Grain 2050 kg/ha (Rainfed)
- Bold grain with semi compact long ear head

Minor millets

S. No	Crop	Variety	Duration (days)	Season	Yield (kg/ha)	Special Features
1.	Barnyard Millet	ATL 1	90	June-July Sep-Oct	Grain: 2123 kg/ha Dry fodder: 3057 kg/ha	• Drought tolerant • Non lodging • Iron 5.85 mg/100g • Resistant to stem and borer shoot fly • Moderately resistant to grain smut
2.	Barnyard Millet	MDU 1	95-100	<i>kharif</i> , <i>rabi</i> and summer	Grain Rainfed: 1500-1700 kg/ha Irrigated: 2200-2500 kg/ha Fodder: 3000-3300 kg/ha	• Early maturing and high yielding • High iron content (16 mg/100g of grain) • Resistant to shoot fly, stem borer and smut
3.	Proso millet	ATL 2	65-70	June-July Sep-Oct	Grain: 2140 kg/ha Dry fodder: 2793 kg/ha	• Short duration • Protein content: 12.0% • Non lodging and suitable for mechanical harvesting • Moderately resistant to shoot fly incidence and • Resistant to brown spot diseases

						• Moderately resistant to leaf blight
4.	Finger Millet	ATL 1	110	Kharif (June-July) Rabi (Sep-Oct) ummer (Jan-Feb)	Grain yield: 3130 kg/ha	• Drought tolerant • Moderately Resistant of leaf, neck and finger blasts • No serious pest incidence • Sturdy culm and suitable for mechanized harvesting • Bold grains with high bulk density
5.	Kodo Millet	ATL 1	110	Rabi (Sep-Oct)	Grain yield: 2510 kg/ha	• Drought tolerant, • Panicles, long and open with bold seeds • No serious pest and diseases incidence • uniform maturity traits suited for mechanized harvesting
6.	Small Millet	ATL 1	85-90	Kharif (June-July) Rabi (Sep-Oct)	Grain - 1587 kg/ha Straw yield - 3109 kg/ha	• Strong and sturdy culm • Long, semi- compact panicles with non- shattering grains • Drought tolerant • Easy threshability, synchronous maturity and non-lodging • Bold grains • Palatable and highly suitable for cattle feeding

Pulses

Green gram CO 9

- Parentage : CO 6 x COGG 912
- Duration : 65 -70 days
- Season : June- July

Sep-Oct

- Seed yield : 825 kg/ha
- Determinate plant type with synchronized maturity
- Suitable for single / mechanical harvest
- Moderately resistant to YMD
- Shiny and medium bold seeds: 4.0 to 4.5 g/100 seeds
- Protein content: 23.2%

Black gram VBN 8

- Parentage : VBN 3 x VBN 04-008
- Duration : 65 -70 days
- Season : Kharif, Rabi, Summer
- Seed yield : 990 kg/ha

- Resistance to Mungbean Yellow Mosaic Virus, powdery mildew and leaf curl virus

Black gram VBN 10

- Parentage : Vamban 1 x UH04-04
- Duration : 70 -75 days
- Season : Sep-Oct
- Seed yield : 1130 kg/ha (rainfed)
- Resistant to Mungbean Yellow Mosaic Virus, leaf crinkle, leaf curl virus diseases

Black gram VBN 11

- Parentage : PU 31 x CO 6
- Duration : 70 -75 days
- Season : June-July; Sep-Oct
- Seed yield : 865 kg/ha (rainfed)
- Resistance to Mungbean Yellow Mosaic virus and leaf curl virus
- Suitable for all seasons of Tamil Nadu

Black gram CO 7

- Parentage : VBN (Bg) 5 x *V.mungo var sylvestris*
- Duration : 60 -65 days
- Season : June-July; Sep-Oct
- Yield : Grain - 880 kg/ha (rainfed)
- Resistance to Mungbean Yellow Mosaic virus
- Suitable for single / mechanical harvest
- Bold seeded type (5.5 -6.0 g /100 seeds)

Oilseeds

Groundnut

VRI 10

- Parentage : VRI 2 x NRCG CS 349
- Duration : 90-95 days
- Season : Rainfed: Chithirai(Apr-May), Adi(June-July), Ayppasi(October)
- Average yield : Kharif: 2535 kg/ha; Rabi: 2448 kg/ha
- Bold kernels (48-55g/100kernel), shelling out turn (70-75%),
- oil content (46-48%) & resistant to stem rot

- Moderate resistance to late leaf spot & rust diseases

TMV 14

- Parentage : VR 12 x TVG 0004
- Duration : 105-110 days
- Season : Rainfed: Chithirai(Apr-May), Adi(June-July), Ayppasi(October)
- Average yield : Rainfed: 2222 kg/ha
- oil content (45.01%) & medium sized pods
- Moderate resistance to leaf spot & rust diseases

Sesamum

VRI 4

- Parentage ; VRI (Sv) 2 x GT 10
- Duration : 85-90 days
- Seed Yield 957 kg/ha
- Oil yield : 380kg/ha
- Suitable for Rabi/summer
- Recommended for cultivation in all over India (CVRC)

Green manures and Fodder crops

S.No	Crop	Variety	Duration (days)	Season	Yield (t/ha)	Special Features
1.	Green manure Sunnhemp	ADT 1	120 (for seed production)	Seed production Dec. - Jan., March - April	Biomass - 20.8	High biomass - 20.8 Less infestation by pests and diseases Enhances soil organic carbon, fixes atmospheric nitrogen
2.	Green manure Daincha	TRY 1	120 (for seed production)	Seed production: Dec. - Jan., March - April	Biomass - 17.9	Low CN ratio Higher nodulation efficiency No incidence of major pests and diseases
3.	Fodder Sorghum	CO FS 31	Perennial	-	115t/ha	Perennial fodder 6-7 cut / year
4.	Fodder Sorghum	CSV 33MF	Perennial	-	103 t/ha	Multicut fodder Low HCN content (63.07ppm) National Check variety
5.	Fodder Hedge Lucerne	CO 3	Perennial	-	Green fodder yield : 115t/ha Seed yield : 200-230kg/ha	Perennial fodder

6.	Cumbu Napier	CO(BN) 5	Perennial	-	Green fodder yield : 115t/ha Seed yield : 200-230kg/ha	Perennial fodder
7.	Cumbu Napier Hybrid	CO-6	Perennial	-	347 t/ha/year	High green fodder yield with good ratooning ability multi-cut fodder grass
8.	Cumbu Napier Hybrid	CO-7	Perennial	-	368 t/ha/year	Perennial with high green fodder yield with good ratooning ability, resistant to fall army worm, sucking pests.

Awareness on drought-resilient technologies, including drought-tolerant and short duration crop varieties, moisture conservation practices, seed priming, dry sowing, and life-saving irrigation techniques to improve farm

resilience under water-stress conditions has to be created to tackle the impact of changing climatic conditions.

Climate Resilient Crops and Varieties

Rice varieties		
		
TKM 15	CO 53	Improved CO 51 HT
Millet varieties		
		
Maize Hybrid COH (M) 11	Maize VGI H(M) 2	Sorghum K 13
		
Pearl Millet variety CO 10	Barnyard Millet ATL 1	Finger Millet ATL 1

 Varagu TNPsc 176 as ATL 1	 Panivaragu TNPM 238 as ATL 2	
Kodo millet ATL 1	Prosomillet ATL 1	Small Millet ATL 1
	 BLACKGRAM VBG 12.062	
Green gram Co 9	Black gram VBN 11	Black gram Co 7
 BLACKGRAM VBG 12.34	 VBG 09-003	
Black gram VBN 10	Black gram VBN 8	Ground nut TMV 14
		
Ground nut VRI 10	Sesamum VRI 4	Sunnhemp ADT 1
		

Fodder Sorghum CO 31	Hedge Lucerne CO 3	Cumbu Napier CO(BN) 5
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