Rice CO 56: A high yielding Non-lodging medium duration rice variety

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In Tamil Nadu rice is cultivated in an area of 20 lakh hectare, out of which 13 lakh hectare area is covered with medium duration rice varieties during *samba / thaladi* season. For this segment, a new variety; CO 56 was identified and released during 2023 with high yield potential, tolerance to major pest and diseases and non-lodging. CO 56 (CB 12132) isa cross derivative of CO (R) 50 / CB 05501 matures in 135 - 140 days is highly suitable for cultivation during *Samba* / *Thaladi* seasons in all rice growing districts of Tamil Nadu. CO 56 was tested in 216 trials from 2012 to 2022 and in overall basis it recorded a meangrain yield of 6372 kg/ha with 11.85, 13.14, 10.01, 23.78 and 10.36 per cent improvement over TNAU RiceADT 49, TKM 13, CO 52, BPT 5204 and ADT 54 respectively. At Cumbum, Theni district, the culture has recorded the highest yield of 9990 kg/ha. In station trials, it recorded a mean grain yield of 6930 kg/ha with 10.26 and 14.30 per cent increase over TNAU Rice ADT (R) 49 and BPT 5204 respectively. In Multi Location Trials (MLT) conducted during 2015-16, its mean grain yield was 5180 kg/ha which was 33.50 and 18.70 per cent higher than TKM 13 and BPT 5204 respectively. CO 56 was evaluated as IET 25531 under All India Coordinated Rice Improvement Programme during *Kharif,* 2016 in which, it recorded a mean grain yield of 5578 kg/ha with 7.52 and 39.51 per cent increase over national checks Jaya and NDR 359 respectively.Adaptive Research Trials (ART) were conducted at 122 locations with CB 12132 during 2018-19 and 2019-20 in 18 districtsit recorded more than 7000 kg/ha in 29 locations. CO 56 is moderately resistant against multiple diseases *viz.,* blast, BLB, sheath rot, sheath blight, brown spot, rice tungro and glume discolouration and pests stem borer and gall midge. It possesses medium slender white rice with intermediate amylose, soft gel consistency and moderate gelatinization temperature. It has got good milling percentage, head rice recovery, linear elongation ratio and high volume expansion ratio. CO 56 is a non-lodging variety with higher yield, better pest and disease resistance and good grain quality is recommended for cultivation during *samba / thaladi* seasons of Tamil Nadu as alternate to the existing varieties *viz*., ADT 38, ADT 46, CO 43, CO (R) 50 and TRY (R) 3 in all rice growing tracts of Tamil Nadu.

Rice CO 57: A diabetic friendly biofortified rice variety

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Malnutrition hinders overall health status of rural population, pregnant women and young children and can cause permanent problems with physical and mental development. Biofortification of staple food crops such as rice with enriched nutrients through genetic improvement ensure the nutritional requirements of vulnerable sections. Breeding efforts at TNAU have led to the development of CO 57 (CK 145-3: improved *Kavuni*) with high yield and major nutritional and therapeutic properties equivalent to traditional *Kavuni*. CO 57 is a cross derivative of CO (R) 50/ *Kavuni*, which matures in 130-135 days with photo insensitivity.It recorded a mean grain yield of 4078 kg/ha over three years of station trials with 33.9% yield increase over traditional *Kavuni*. In special multilocation trials (MLT) conducted during 2019-21, its mean grain yield was 5663 kg/ha which was 86.5% higher yield over *Kavuni*. Under ART, CO 57 was tested under four districts during 2020-2021, which registered a grain yield of 3760 kg/ ha which is 26.84% higher than *Kavuni* (2964 kg/ha).In overall analysis, the culture CO 57 registered 4638 kg/ha which is 55.74 % higher than its parent *Kavuni* (2978 kg/ha). CO 57 is resistant against bacterial leaf blight, sheath blight, false smut and moderately resistant against sheath rot, brown spot and grain discoloration, yellow stem borer and leaf folder. It possesses medium slender blackish purple rice with intermediate amylose, soft gel consistency and low gelatinization temperature. It got good milling (70.5%), high head rice recovery (59%), linear elongation ratio and high-volume expansion ratio. CO 57 has the therapeutic properties as that of traditional *Kavuni*. It possess comparatively low carbohydrate (65-70%) than popularly eaten white rice varieties (White Ponni and IR 64 contain 80 - 85%), high dietary fibre (3 - 3.5%) and medium glycemic index (67%), higher levels of leutein (205µg/100g), anthocyanins (148 mg/100g), antioxidants, flavonoids (6.54 mg/100g) and resistant starch. Most importantly, Improved *Kavuni* exhibits significant inhibitory activity against α-amylase and α-glucosidases which can be considered as a major contributor for low glycemic index. This high yielding variety with nutritional and therapeutic is highly suitable for cultivation during *samba / thaladi* seasons in Tamil Nadu.

Rice ADT 58: High yielding medium slender grain paddy variety released for *Thaladi* / Late sown seasons of Rice growing regions of Tamil Nadu

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The necessary adaptive features prerequisite for growth and development of *thaladi* paddy varieties grown in Cauvery Delta zone are as follows, viz., higher levels of seedling establishment, Zinc deficiency tolerance, Zinc use efficiency, higher levels of pollen fertility, spikelet fertility, complete exertion of panicles under cold temperature (<18 ° C) and grain filling ability with duration of 120-135 days. ADT39 is the highly suited variety for *thaladi* conditions for more than 3 decades in CDZ. ADT39 has the following negative features: higher levels of chaffy grains, grain shattering and susceptibility to leaf folder. The culture AD12132 was developed at TRRI, Aduthurai from the cross ADT39 X Konark, having adaptive features combined with higher percentages of filled grains, non-shattering ability and tolerance to leaf folder. The overall yield increase was more than 19.0 % than the check ADT39 by consolidating station trials, MLT, ART, OFT, AICRIP and large scale demonstrations. The average yield recorded was 6376 kg/ha and has the yield potential of 9500 kg/ ha under optimum conditions. The culture AD12132 was approved for the variety release during 2023 by UVTRC and subsequently by SVRC based on its yield performance, cooking, taste qualities and *thaladi* season's adaptive features. It was released as ADT58 during January2023 by TN Government. The paddy variety ADT58 has the following salient features; medium tall plants (120 cm), non-lodging tendencies, low input responses, suitable to mechanical harvesting, higher levels of spikelet fertility (95%), less chaffy grains, well exerted panicles, pale green and turgid leaves with synchronous flowering and maturity, Resistant to leaf folder, tolerant to stem borer, BPH, gall midge, BLB and blast. Grain quality parameters: 72.0% milling, 65.0 HRR, with medium slender grains LB ratio of 2.92 and having 1000 g weight of 16.5 g. Cooking taste qualities are on par with IW Ponni and better than ADT39. Intermediate amylose content (23.5%) with non-sticky rice. Linear elongation after cooking 9.2 mm and breath wise elongation2.9 mm. Suited to Idly making as well. Over all acceptance score is 8.5 for cooking and taste quality. Zinc deficiency tolerance score: 5.0. Germplasm registration: NBPGR: IC647769. Notification by S.O. 4222(E) dt 25.09.2023 by the Central Sub Committee on Crop Standard Notification and Release of Varieties for Agricultural Crops, Govt of India for the cultivation in Tamil Nadu under *thalad*i and late sown conditions. ADT58 is becoming highly popular among the farmers of CDZ and also the adjoining districts owing to its adaptive features and grain quality.

Rice ASD 21 : An ideal replacement for ASD 16 and TPS 5 rice varieties.

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ASD 21 (AS 15024) is a derivative of the cross ASD 16 x Manjal Saradai, effected during Pishanam (Rabi) 2010 and stabilized in F7 generation during Pishanam 2014 The short duration rice variety ASD 21 (AS 15024) with 120 days duration has recorded 14.1 and 13.9 per cent yield increase over the check varieties TPS 5 and ASD 16 respectively in the research station trials. ASD 21 (AS 15024) has recorded an average yield of 6515 kg/ha with 8.2 and 18.6 per cent yield increase over the checks TPS 5 and CO 51 from 20 locations of MLT 1-Early trial conducted during 2018 and 2019. Adaptive Research Trials (ART) were conducted through Tamil Nadu State Agriculture Department in farmer's holdings, during 2020 and 2021 wherein the mean yield of ASD 21 (AS 15024) was 6130 kg/ha from 88 locations and it was 8.1 and 7.8 per cent higher than the checks TPS 5 and TKM 13 respectively. In National trials, ASD 21 (AS 15024) was tested in AICRIP as IET 29799 in 20 locations of Eastern, Central, Western and Southern Zone during *Kharif,* 2021. It recorded a mean grain yield of 5770 kg/ha in 120 days surpassing the regional check varieties Lalat and MTU 1010 by 18.8 and 5.9 percent respectively. It was on-par with the national check Gontra Bidhan 3 (5881 kg/ha). The performance of ASD 21 (AS 15024) was tested in 22 farmers' holdings during 2021-22 along with the checks, TPS 5 and ASD 16 in Tirunelveli district (One acre plot Large Scale Demonstration) and reported an average grain yield of 6845 kg/ha with 13.6 and 12.6 per cent increase over TPS 5 (6025 kg / ha) and ASD 16 (6079 kg / ha) respectively. Considering all trials, ASD 21 (AS 15024) has recorded a mean grain yield of 6330 kg / ha at 137 locations. Its grain yield advantage was 12.4, 9.2, 18.6 and 7.8 per cent over ASD 16, TPS 5, CO 51 and TKM 13 respectively. The yield increase was at 29 locations against ASD 16, at 137 locations against TPS 5, at 20 locations against CO 51 and at 88 locations against TKM 13. The variety has moderate tolerance to pests viz., stem borer, leaf folder and diseases *viz*., blast and sheath blight. The rice culture ASD 21 (AS15024) has white short bold grain type with good shelling percentage (85%) and head rice recovery (59.3%). It has intermediate amylose content (21.45%) and gelatinization temperature (Score 5) and soft gel consistency (82 mm). It has desirable cooking and battering quality traits. In organoleptic tests, this culture had good scores for texture, tenderness, cohesiveness and taste. Rice ASD 21 (AS 15024) variety is suitable for Early *Kar*/ Late *Pishanam* seasons of Tamil Nadu and highly suitable for southern districts of Tamil Nadu

Pearl Millet Hybrid COH 10

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Pearl millet (*Pennisetum glaucum* (L.) R. Br.) is an indispensable arid and semi-arid crop of India cultivated as dual purpose (food and feed) crop. It is highly nutritious and having industrial importance. In the present climate scenario, pearl millet cultivation is the heart of dry land agriculture. Being a C_4 plant it can utilize sunlight and water efficiently and has tremendous potential for biomass production. A high yielding hybrid COH 10 (TNBH 1619) was released during 2023 through SVRC for Tamil Nadu and Notified as per S.O. 4222(E). dt. 25.09.2023. The high yielding and medium maturing pearl millet hybrid, developed from a cross between ICMA 10444A (MS line from ICRISAT) and PT 6679 (Pollinator developed from germplasm lines) at Department of Millets, Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore-3. A total of 221 trials had been conducted from 2017 onwards through various trials for evaluation. It has been tested extensively under MLT (11), ART (117), OFT (51) in Tamil Nadu and in other states through All India Coordinated programme (27) for A & B zone. It performed well both under rainfed and irrigated situations in Tamil Nadu. This hybrid is medium in stature (170 -190 cm) and medium duration (85-90 days). It produces 2-3 productive tillers with spindle to cylindrical shaped earhead. The size of the grain is bold and grey in colour. The hybrid, TNBH 1619 is resistant to downy mildew under both normal and sick plot condition. This new hybrid recorded a mean grain yield of 3030 kg / ha under irrigated conditions, which are about 12.5 and 7.0 per cent increase over the checks pearl millet hybrid CO 9 and 86 M 38 respectively. The mean grain yield under rainfed conditions is 2060 kg /ha which is 13.5 per cent increase over pearl millet hybrid CO 9. It has the higher yield potential of 3760 kg/ha under well managed conditions. The pearl millet hybrid COH10 (TNBH 1619) was screened during 2021 and 2022 for three seasons. The mean per cent shoot fly infestation in TNBH 1619 was 8.3 per cent infestation (T) while the checks CO9 and 86M38 registered 10.6 (S) and 6.1 (T) per cent infestation, respectively. Stem borer infestation was not noticed during the study period.

The hybrid COH 10 (TNBH 1619) is medium duration, high yielding and bio fortified with Fe (70 ppm) and Zn (43 ppm), possessing high protein (15.6 %), resistant to downy mildew, bold grain, semi compact ear head, non-lodging and fertilizer responsive. It engrossed with high mineral composition, acceptable cooking quality and suited for consumption.

Based on amplification pattern for the genotypes, the SSR markers PSMP 2013, CTM 21, PSMP 2227, IPES 0219 and PSMP 2078 were identified as polymorphic markers and utilized for molecular basis of hybrid confirmation.

Sorghum K 13 : A high yielding dual purpose sorghum variety suitable for rainfed vertisol tracts of southern districts of Tamil Nadu

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Sorghum is one of the most significant dryland crops grown in *kharif* and *rabi* seasons as a dual purpose crop in Tamil Nadu. It is cultivated over an area of 4.05 lakh hectares with an annual production of 4.27 lakh tonnes and a productivity of 1054 kg/ha of grain (Season and Crop report -2020-21). Sorghum is cultivated as a rainfed crop by the marginal farmers in 85 per cent of the area to meet out the requirement of grain for consumption and dry fodder as a animal feed. Sorghum is also prone to some of the pests like shoot fly and stem borer and diseases like grain mould and downy mildew. This necessitates the development of an early duration sorghum variety with high commercial value for the present day rainfed scenario. Crop breeding is the continuous endeavor to develop better crop varieties with wider adaptation, increased productivity and enhanced resistance to benefit the farming community. The latest rainfed sorghum variety released was K 12 during the year 2015. With the objective of developing more productive varieties than K 12, the sorghum culture TKSV 1036 was developed by crossing ICSB 518 x SPV 1489 and tested for its superiority in various yield trials. Sorghum Culture TKSV 1036 is a hybrid derivative of the cross (ICSB 518 x SPV 1489) developed at the Agricultural Research Station, TNAU, Kovilpatti. This culture was evolved with an objective to develop high yielding dual purpose sorghum variety with enhanced tolerance to shoot fly and stem borer and with improved fodder quality. It has been tested for its adaptability under multilocation trials and on-farm trials in the southern districts of Tamil Nadu. This culture has also been tested across the country under All India Coordinated Sorghum Improvement Project as SPV 2304 for its potential grain and fodder yields. The culture, TKSV 1036 recorded an average grain yield of 2575 kg/ha over 118 locations which is 10.7 per cent and 3.5 per cent increase over K 12 (Local check) and CO 30 (check) respectively. Sorghum K 13 (TKSV 1036) is found to be highly suitable for cultivation under rainfed condition during winter season. The sorghum culture TKSV 1036 is photo-insensitive and hence suitable for cultivation throughout the year. TKSV 1036 is a dual purpose sorghum culture which can give an average dry fodder yield of 11.4 tonnes /ha. The dry fodder yield increase is 26.6% over local check K 12. Sorghum K 13 is shorter in duration which matures in 95-100 days. The crop is of tall plant type, tolerant to drought and non-lodging. Grains are highly acceptable, creamy white colour, borne on medium cylindrical semi-compact ear heads. It is also resistant to pests *viz.*, shoot fly and stem borer and moderately resistant to midge. This newly released sorghum K 13 variety is found to be highly resistant to ergot (0.0% incidence), downy mildew (4.60% incidence), grain mould (9.90% incidence) and rust and showed moderate resistance to leaf blight and anthracnose. Hence, the sorghum culture TKSV 1036 is released as K 13 sorghum for general cultivation in Southern districts of Tamil Nadu.

Maize COH(M) 11 : A high yielding single cross maize hybrid suitable for irrigated and rainfed ecosystem of Tamil Nadu

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COH(M) 11 is a high yielding single cross (UMI 1240× UMI 1210) hybrid suitable for cultivation in irrigated and rainfed ecosystems of Tamil Nadu. The hybrid is suitable for cultivation in all the seasons of Tamil Nadu *viz*., June-July (Adi pattam), Sep-Oct (Puratasi pattam) and Nov-Dec (Margazhi pattam) with a duration of 100-110 days. The kernels are semi dent yellowish orange in color and has high test weight (390g/1000 grains). The hybrid recorded the overall yield performance of 8108 kg/ha under Irrigated condition with 10.0% and 16.1% yield superiority over the respective checks COH(M) 8 and NK 6240. Under rainfed condition, the hybrid recorded the grain yield of 6593 kg/ha with 14.2% and 13.9% yield increase over the respective checks COH(M) 8 and Bio 9682. Under University Station trials, the hybrid recorded an average grain yield of 11,182 kg/ha with 12.74% yield superiority over COH(M)6 under irrigated condition. The hybrid was also tested at Veppanthattai under rainfed condition which recorded 7401 kg/ha with 9.0% yield superiority over COH(M) 6 and 12.8% over COH(M) 8.

Under Adaptive Research Trial and large scale demonstration, the hybrid recorded the respective grain yield of 8,087 kg/ha and 8,700 kg/ha. Under On Farm Trials (83 locations) conducted during 2018-2020, the hybrid recorded the average grain yield of 7,950 kg/ha which is 11.06 % increase over COH(M)6, 12.5 % over COH(M) 8 and 14.6% increase over NK 6240 and 11.33% over P 3401. Under Front line demonstration (10 ha.) the hybrid recorded 7080 kg/ha and 6386 kg/ha under irrigated and rainfed condition respectively at Cuddalore which showed 14.7% and 18.3% respective yield increase over farmers practice. Under Agronomy trials the potential yield of the hybrid was found to be 10825kg/ha. The hybrid is moderately tolerant to water stress conditions by its higher relative water content and by regaining photosynthetic activity after stress.

Under National forage maize trial the hybrid was evaluated during 2021-2023 and ranked 1st under All India trials which recorded the Green forage yield of 386.5 (q/ha), Dry matter yield of 88.4q/ha, Crude protein yield of 7.5q/ha and found to be superior over the National and qualifying checks over three years. The hybrid CMH 12-686 was also identified to be best performing in Hill zone (368.6 q/ha), North West zone (367.8 q/ha), Central zone (384.6 q/ha) and South zone (457.0 q/ha) for Green Forage yield. The hybrid also recorded superior forage quality traits of 43.2% ADF, 64.2% NDF and 57.4% IVDMD which was found to be superior over the check COH(M)8. The hybrid ranked 2nd for NDF% and 1st for IVDMD% when compared to the checks over three years. The hybrid recorded resistant reaction for the diseases *Maydis* and *Turcicum* leaf blight and also showed resistant reaction for *Chilo partellus* and Fall Army Worm infestation

Kudiraivali ATL 1: A high yielding Nutri-cereal variety

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Kudiraivali variety ATL 1 (culture TNEf 317) is a cross derivative between DHBM 99-6 x RBM 36 evolved by Centre of Excellence in Millets, Athiyandal. It is an early duration culture and matures in 90 days. This culture has recorded 2123 and 3057 kg/ha of grain and straw yield respectively in a total of 328 trials under rainfed condition with a duration of 90 days. Its yield superiority has been observed as 14.94 and 14.45 percent increase in terms of grain and straw yield over the check variety, CO(KV) 2 and 12.92 and 13.09 percent over the check variety, MDU 1 respectively. The grain and straw yield of the kudiraivali culture TNEf 317 in station trials is 3415 and 4787 kg/ha; in Mother trials is 2349 and 3118 kg/ha; Baby Trials is 2301 and 2990 kg/ha; in ART is 1468; in OFT is 2244 and 3011 and in Large Scale Demonstration is 2819 and 3668 kg/ha respectively.

Kudiraivali variety ATL 1 has strong and sturdy culm with long, cylindrical and semi compact panicles. and 5–8 productive tillers per plant. It is highly drought tolerant. It is endowed with special attributes like easy threshability, synchronized maturity and non-lodging growth habit. Regarding the seed quality, it is rich in (Iron 5.85 mg/100g) with preferred grain qualities for cooking and value addition. Based on colour, appearance, flavour texture and taste. Kudiraivali ATL 1 displayed favourable overall acceptability. Though there is no major incidence of pests and disease in kudiraivali. However, It is highly resistant to shoot fly and stem borer and moderately resistant to grain smut diseases.

In light of its good stability in yield across seasons and locations, high seed iron content and overall acceptability, Kudiraivali ATL 1 is released as medium duration, non-lodging, drought tolerant, resistant to grain smut and high iron strain for cultivation during *kharif* season as rainfed crop in Aruppukottai, Virudhunagar, Ramanathapuram, Madurai, Thoothukudi, Dharmapuri and Thiruvannamalai districts of Tamil Nadu.

Panivaragu ATL 2: A high yielding short duration variety

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Panivaragu variety ATL 2 (culture TNPm 238) is a pure line selection from IPM 19 evolved by Centre of Excellence in Millets, Athiyandal. This variety has recorded 2140 and 2793 kg/ha of grain and straw yield respectively in a total of 253 trials under rainfed condition during the past eleven years of evaluation with a duration of 70 days. The yield superiority has been observed as 16.24 and 16.68 per cent increase in terms of grain and 18.80 and 19.35 per cent increase in terms of straw yield over the check varieties, CO(PV) 5 and ATL 1 respectively. The grain and straw yield of the Panivaragu culture TNPm238 in Adaptive Research trials is 2078 and 2716 kg/ha; in On Farm Trials is 2302 and 2936 kg/ha and Large Scale Demonstration is 2296 and 2966 kg/ha respectively.

Panivaragu ATL 2 has strong and sturdy culm with large, semi-compact and branched panicles. The plant stature is medium tall and tufty. It is drought tolerant. The plant has 8 productive tillers and non-shattering grains. It is endured with special attributes like easy threshability, synchronized maturity and non-lodging growth habit. The grains are nutritious (Protein 12.9 %) with preferred grain qualities for cooking and value addition. The nutrient rich straw is palatable and highly suitable for cattle feeding. With high milling out turn (72%). There is no serious pest and disease problem in Panivaragu. However, this variety is moderately resistant to leaf blight and resistant to brown spot diseases and moderately tolerant to shoot fly incidence.

In light of its good stability in yield across seasons and locations, high seed protein content and overall acceptability, Panivaragu ATL 2 is released as early duration, non-lodging, resistant to leaf blight and tolerant to shoot fly and high protein strain for cultivation during *kharif* season as rainfed crop in Coimbatore, Erode, Namakal, Salem, Dharmapuri, Krishnagiri, Thiruvannamalai, Theni, Thoothukudi and Tirunelveli districts of Tamil Nadu

A high yielding greengram variety: CO 9

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Greengram CO9 is a cross derivative of CO 6 x COGG912. It matures in 65-70 days and suitable for *kharif, rabi* and summer seasons. The overall yield obtained was 825 kg/ha which is 12.70, 12.85 and 10.44 per cent increase yield over CO 8 (732 kg/ha), VBN 3 (731 kg/ha) and VBN 4 (747 kg/ha), respectively. In station trials, it registered 999 kg/ha which is 17.36 (851 kg/ha) per cent increased yield over the check variety CO 8. In multilocation trial conducted during *kharif* season, it recorded 18.32 per cent yield increase over (841 kg/ha) over VBN 3, whereas, it recorded the yield of 842 kg/ha during *rabi* season and registered 11.96 and 3.06 per cent increased yield over CO 8 (752 kg/ha) and VBN 3 (817 kg/ha), respectively. This variety was tested in Adaptive Research Trial (ART) in 98 locations of Tamil Nadu and it recorded 807 kg/ha during two *kharif* seasons. During *rabi* season also, this variety was tested in 72 locations in ART and it recorded 789 kg/ha. In the On Farm Trials (10 locations), it recorded seed yield of 794 kg/ha which is 29.60 per cent increase over the check variety *viz*., CO 8 (613 kg/ha) and in eight locations 18.43 per cent increase over VBN 4 (678 kg/ha). This variety recorded seed yield of 911 kg/ha in large scale demonstration trial. In All India Coordinated Research Project on pulses conducted across the country, it recorded a mean seed yield of 960 kg/ha in Initial Varietal Trial with 26.15 per cent increase yield over the national check OUM11-5. It was promoted to AVT1 and it recorded an average yield of 933 kg/ha which is 15.76 per cent over national check COGG 912 in south zone. The variety was screened for yellow mosaic disease in all the three seasons and in two locations *viz.*, Coimbatore and in Vamban (hotspot) and showed resistant – moderate resistance. In agro-inoculation screening, it showed score one and found to be resistant to yellow mosaic disease. Apart from this, it is also tolerant to major pests. It has a protein content of 23. 20 per cent with acceptable organoleptic traits. This variety has synchronized maturity, green, shiny and medium bold seeds. This variety was released and notified (S.O 4222E dt 25.9.2023) for commercial cultivation in the year 2023 for Tamil Nadu.

Greengram VBN 6: A high yielding greengram variety suitable for rice fallow cultivation

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Pulses are the common options for the majority of the Indian house hold. Pulses are major sources of proteins among the vegetarians in India. Among the pulses, Greengram is mostly preferred for food preparations, snack, savouries and values additions. In India Greengram is grown in 47.5 lakh ha with production of 25.5 lakh tonnes and average productivity of 516 kg/ha (Indiastat, 2022). In Tamil Nadu, the area, production and productivity of Greengram is 1.61 lakh ha, 0.59 lakh tonnes and 367 kg/ha, respectively (Season and Crop Report (2021 - 22). Among rice fallow pulses Greengram occupies an area of 0.50 lakh ha and average yield under rice fallow system is 268 kg/ha (Dept. of Agriculture, TN 2021-22) It is extensively cultivated in Cauvery Delta Zones *viz.,* Thanjavur, Tiruvarur, Nagapattinam, Mayiladuthurai and parts of Trichy and Cuddalore Districts. The Greengram variety ADT 3 released in 1988 only available for cultivation under rice fallow system. Focusing the availability new variety and improving pulses productivity NPRC, Vamban was released the Greengram culture VGG 15 - 030 as Greengram VBN 6 in 2023. It is a derivative of VBN (Gg) 2 x IPM 409 - 4 maturing in 70 - 75 days and suitable for rice fallow season. The average yield of VBN 6 is 760 kg/ha which is 17.47 % increased yield over check variety ADT 3 (648 kg/ha). The unique characteristic of Greengram VBN 6 includes early duration, synchronized maturity, amenable for single harvest and non-shattering of pods. It is moderately resistance to Mungbean Yellow Mosaic Virus, Powdery mildew and Urdbean Leaf Crinkle diseases. It has shiny & small seeds with 100 seed weight of 3.0 to 3.5 g and possesses high protein (20.63%), starch (57.31%) and crude fibre (5.2 %). This variety is recommended for cultivation during *rice fallow* seasons of Tamil Nadu.

Cowpea VBN 4: A high yielding Cowpea variety

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Cowpea is most widely grown pulse-cum-vegetable crop. It plays an important role in maintaining the soil fertility. Area under cowpea in India is 3.9 lakh ha with a production of 22.1 lakh tonnes with the productivity of 683 kg/ha (Indiastat, 2021-22). In Tamil Nadu, it is cultivated in an area of 0.61 lakh ha with a production of 0.45 lakh tonnes and productivity of 741 kg/ha (Season and Crop Report 2022 - 22). Focusing the importance of improving pulses productivity, Cowpea culture VCP 14 - 001 was released as Cowpea VBN 4 in 2023 at NPRC, Vamban. It is a derivative of VBN 1 x VCP 10 - 001 maturing in 70 - 75 days. The average yield of Cowpea VBN 4 is 1072 kg/ha which is 15.9 % increased yield over check variety VBN 3 (925 kg/ha). In station trials, it recorded a mean yield of 826 kg/ha in *Kharif* season which is 4.6 *per cent* increased yield over CO (CP) 7 and in *Rabi* season, it recorded 2582 kg/ha which is 69.1 and 46.78 *per cent* increased yield over VBN 3 (1527 kg/ha) and CO(CP) 7 (1759 kg/ha) respectively. In multi location trials (MLTs), it recorded the average yield of 791 and 1141 kg/ha during *kharif* and *rabi* seasons respectively. In Adaptive Research Trials during *kharif* season (63 locations), it recorded an average yield of 998 kg/ha with 10.8 *per cent* increased yield over the check variety VBN 3 (901 kg/ha). In *rabi* season (39 locations), this variety recorded an average yield of 1114 kg/ha which is 13.10 *per cent* increased yield over check VBN 3 (985 kg/ha). The maximum yield of 2160 kg/ha was recorded in Vadamadurai in Dindigal dist. The characteristic of Cowpea VBN 4 includes early duration, synchronized maturity, resistance to Bean Common Mosaic Virus, and pod borer. It has 100 seed weight of 9.5 to 11.0 g and protein content is 18.61 % and crude fibre (5.6 %). This variety is recommended for cultivation during *kharif and rabi* seasons of Tamil Nadu.

Sunflower COH 4: A high yielding and high oil sunflower hybrid

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The sunflower hybrid COH 4 is developed from a cross between a male sterile line COSF12A and multi head restorer line IR 6. High yielding hybrid has high oil content of 42% and it matures in 90-95 days.

The overall mean performance of sunflower hybrid COH 4 under various trials (Station trials, MLT, ART and OFT) showed that hybrid recorded seed yield of 2490 kg/ha during *Kharif.* The yield represented an increase of 22.5 and 6.0 *per cent* over GK 2002 and COH 3 Hybrids respectively. During *Rabi*, sunflower COH 4 recorded seed yield of 2182 kg/ha which was 33.8 and 13.1 *per cent* over GK 2002 and COH 3 respectively.

Sunflower COH 4 has high oil content of 41-42% as compared to check hybrids *viz.,* GK 2002 (38.5%) and COH 3 (42 %) on seed basis. Sunflower hybrid COH 4 has high oil yielding potential, hybrid recorded oil yield of 895 kg/ha during *Kharif* and oil yield represented an increase of 30.5 and 3.5 *per cent* over GK 2002 and COH 3 Hybrids respectively. During *Rabi*, COH4 recorded oil yield of 761 kg/ha which was 42.2 and 10.1 *per cent* over GK 2002 and COH 3 respectively.

Sunflower hybrid COH 4 had registered potential seed yield of 3276 kg/ha under on-farm trial at Kallur village of Trichy Dt. during *Kharif* season. And also this hybrid recorded highest seed yield of 2800 kg/ha during *Rabi* season at Thuraiyur block of Trichy Dt. Hence it has high seed yield and oil yield potential during *Kharif* and *Rabi* season.

Volume weight is important trait which will determine the market price in sunflower. Sunflower COH 4 hybrid recorded high volume weight of 46g/100ml and having potential to tap high market value to farmers produce. This hybrid showed moderate resistant to diseases *viz.,* necrosis, powdery mildew and *Alternaria* and found less incidence to sucking pests and leaf feeders

Sunflower hybrid COH 4 meets the requirement of farmers and released for cultivation under *Kharif* and *Rabi* season in major sunflower growing districts of Tamil Nadu. *viz.,*Namakkal, Erode, Karur, Trichy, Virudhunagar, Dindugul and Perambalur.

Sesame VRI 5: High yielding mono-stem sesame variety with high oil content suitable for high density planting

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The white seeded and monostem sesame variety VRI 5 is a cross derivative between VRI 3 x EC 370840. It matures in 75-80 days and suitable for *Rabi* and Summer season cultivation in Tamil Nadu. The average seed yield of sesame VRI 5 is 795 kg/ha which is 10.3 (721 kg/ha) and 11.5 (713 kg/ha) *per cent* superior over the check varieties VRI 3 and TMV 7 respectively. The mean seed yield of VRI 5 is 795 kg/ha and 806 kg/ha during *Rabi* and Summer season which is 9.1 (729 kg/ha) and 11.9 (720 kg/ha) *per cent* increase over the best check variety VRI 3 respectively.

In station trials, VRI 5 registered a mean seed yield of 835 kg/ha, 920 kg/ha and 773 kg/ha respectively during *Kharif, Rabi* and rice follow seasons with 9.4 (763 kg/ha), 9.0 (844 kg/ha), and 10.6 (699 kg/ha) *per cent* increased yield over the best check varieties VRI 3, TMV 7 and VRI 1 respectively. In Multi locational trials, VRI 5 produced a mean seed yield of 656 kg/ha which is 4.1 and 7.9 *per cent* superior than the check varieties VRI 3 (630 kg/ha) and TMV 7 (608 kg/ha) respectively. Under Adaptive Research Trials, sesame VRI 5 produced a mean seed yield of 804 kg/ha which is 10.0 and 11.5 *per cent* superior than the check varieties VRI 3 (731 kg/ha) and TMV 7 (721 kg/ha) respectively. Under On Farm Trials (OFT) during *Rabi,* Summer and Rice follow seasons, it recorded a mean seed yield of 754 kg/ha with 11.5 (676 kg/ha), and 13.6 (664 kg/ha) *per cent* increased yield over the check varieties TMV 7 and VRI 3 respectively.

The mean oil content of sesame VRI 5 is 52.0% and protein content is 23.8%. Among the fatty acids, VRI 5 is having high Linoleic acid (44.5%) followed by Oleic acid (39.5%). In addition, the monostem sesame VRI 5 is moderately resistant to stem and root rot, phyllody and powdery mildew diseases as well as sucking pests.

Sunn hemp ADT 1: High biomass producing variety suited for green manure purposes

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Sunnhemp is well adapted to irrigated garden land and rainfed upland conditions of Tamil Nadu. The sunnhemp variety CO1 was released during 1983 from TNAU and it did not enter into seed chain. Due to changes in climatic and cropping patterns, soil fertility is getting reduced due to poor microbial activity and depletion of nutrients from the soil. Thus, the cultivation of sunnhemp will improve soil fertility and boost up crop yields. However, there is no notified variety available in Tamil Nadu which is a hindrance to entering into the seed production chain to be scaled up on a larger scale for the supply of larger quantities of seeds to the farmers of the state. The Dept of Agriculture and Farmers Welfare, Tamil Nadu expressed its need for the release of sunnhemp to be notified as a distinct variety of TN to enter into the seed production chain. Keeping these necessary requirements in view, the variety Sunnhemp ADT 1 was developed at Tamil Nadu Rice Research Institute, Aduthurai to fulfil the requirement of a stable high biomass yielder which will be an excellent green manure crop to enrich the soil nutrient status. It is a selection from the derivatives of the intercrosses of SH4, CO1, SUIN 53 and JRJ610 during 2016-17 and the culture was named as ADSH17001. In preliminary yield evaluation trials at TRRI, Aduthurai between 2019 to 2020, the culture ADSH 17001 registered an average biomass yield of 23.1 t/ha which is 26.9 and 49.5 per cent higher than the local check CO1 (18.2 t/ha) and national check SH4 (15.45 t/ha) respectively. Based on its superior performance in station trials and observed fast decomposition ratio, ADT 1 was nominated to a Multi-location trial (MLT). Over three years from 2019 to 2022, a total of 107 trials were conducted to assess the yield potential of ADSH 17001 in comparison with check varieties CO1 and SH 4 in the Multi-location trial, Adaptive Research trial, and On Farm trial. On an overall basis, ADSH 17001 registered a mean biomass yield of 20.8 t/ha which is 31.9 per cent higher than the CO1 local check. Field days were conducted to popularize the culture among farmers. Based on the SVRC recommendations 2023, it was released as ADT 1 sunnhemp as a green manure variety suitable for irrigated and rainfed ecosystems of Tamil Nadu. The variety ADT 1 was registered in NBPGR as germplasm (IC647768) and notified by the Central Sub-committee on Crop Standard, Notification and Release of Varieties in the Gazette of India vide notification no. S.O. 4222(E), dated 25th September 2023. Sunnhemp ADT 1 matures in 120 days as a seed crop and is highly suitable for Kharif and Rabi as a green manure crop with a duration of 45-60 days. ADT 1 is a tall and robust variety with a plant height of 210-220 cm, Lanceolate leaf, and cylindrical stem with ribbed surface. Yellow colour flowers, light hairy black colour pods with dark grey coloured seeds. Suitable to irrigated and rainfed ecosystem of Tamil Nadu with an average biomass yield of 20.79 t/ha. The green manure crop can be ploughed in the soil for 45-60 days (flowering stages) and is recommended for Kharif and Rabi seasons as green manure crop under irrigated and rainfed conditions. Seed production of this variety is recommended between January to April months.