

TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

**9th Social Sciences Scientists' Meet - 2021
(6-7, May 2021)**

Lead Centre

Centre for Agricultural and Rural Development Studies

Tamil Nadu Agricultural University
Coimbatore – 641 003

Directorate of Research

Tamil Nadu Agricultural University
Coimbatore 641 003

2021

PROCEEDINGS

9th Social Sciences Scientists' Meet" (6-7, May 2021)

The 9th Social Scientists Meet was held during May 6-7, 2021 at the Tamil Nadu Agricultural University, Coimbatore, through on-line connecting all scientists across the University College Campuses, Research Stations and KVKs besides main campus. **Dr. K.S. Subramanian**, Director of Research welcomed the gathering and flagged off issues relating social science. He emphasized the significance of social scientists in addressing current scenarios on agricultural production systems. The issues include impact of recently released landmark varieties (rice VGD 1 seeragasamba, rice TKM 13, blackgram VBN 8, Groundnut VRI 8, Cotton Co. 17, Castor YRCH 2 and Onion Co.6), crop boosters, precise area and production measurements especially for horticulture crops, GIS based crop insurance, artificial intelligence in price forecasting, supply chain management, block chain management, Alexa for touch and deliver technologies besides impact of virtual communication. The action taken reports on the 8th Social Scientists Meets were presented by Dr. K.R. Ashok, Director (CARDS). During the pre-review, the Director (CARDS) and HODs in the Directorate had reviewed the on-going university research projects (39), action plan projects (54), core project (8) besides externally funded projects (25).

The outcome of the review process was presented by **Dr. D. Sureshkumar**, Prof. & Head, Dept. Agricultural Economics, **Dr. P. Balasubramanian**, Prof. & Head, Agricultural Extension and Rural Sociology and **Dr. N. Venkatesa Palanichamy**, Prof. & Head, Dept. Agricultural Rural Management. In the closing remarks, the Director of Research said that there is a phenomenal change in the number of projects handled by the social scientists but it continues to grow to address the growing concerns in the present pandemic situation. A dedicated grantsmanship workshop will be organized to encourage young scientists to get externally funded projects. **Dr. D. Sureshkumar**, Prof. & Head (Agrl. Economics) proposed a formal vote of thanks.

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I. CENTRE FOR AGRICULTURAL AND RURAL DEVELOPMENT STUDIES (CARDS)

A. Key findings of completed projects

Externally funded projects

GoTN/CARDS/CBE/CAR/2020/R003: Feasibility Study for Improving the Performance of Regulated Markets in Tamil Nadu (Dr.K.R.Ashok, Dr.K.N.Selvaraj, Dr.K.R.Karunakaran, Dr.P.Balaji, Dr.S.VaradhaRaj)

Present study was undertaken in APMCs in the 8 districts of the state such as Dharmapuri, Kanyakumari, Krishnagiri, Pudukottai, Tenkasi, Theni, Thoothukudi and Tirunelveli. Nearly 88 to 99 per cent of revenue generated through market fee collection is from the sale of the produce outside the market yards due to notified area in the state. Maximum loss could be Rs. 198.49 lakhs in Thoothukudi district and minimum loss could be Rs. 49.47 lakhs in Tirunelveli district. There are 59 regulated markets presently functioning in the eight select districts, of which 18 regulated markets are presently functioning under rental premises constituting almost 30 per cent.

Produce e-traded both in terms of quantity and value are found sound in the Cumbum and Theni regulated markets in Theni districts and Harur regulated market in Dharmapuri district, increasing the participation rate of FPOs and unified license holders is imperative thereby a greater number of notified commodities can be e-traded for generating higher revenue.

Regulated markets in Tirunelveli district serve maximum area of 976.75 sq.km, while regulated markets in Kanyakumari district serves lowest area (278.67 sq.km).

Average area served by regulated market in the select districts (513.35 sq.km) is higher compared to the national average area of 487.40 sq.km per regulated market.

Number of villages served by each regulated market is found low compared to national average. Therefore, unless the measures are taken to revamp non arrivals regulated markets either to close or refurbishing, likely revenue loss could be magnified. Excess staffs working in Kanyakumari, Pudukkottai and Thoothukudi districts may be redeployed to regulated markets with PPC facilities wherein there are dearth of staff. Expansion of Primary Processing Centers (PPC) facilities to other regulated markets is warranted depending upon the capacity utilization of the existing facilities.

University Research Project

FMC/CARDS/CBE/CAR/2019/R001 : A Study on Evaluation of Social and Economic impacts of TNAU Varieties and Technologies (Dr.K.R.Ashok and team members)

Collected the details of technologies including different crop varieties, technologies and machinery released during the past 50 years. Thorough sensitization workshop, most successful technology and varieties were identified. Area of a crop varieties with >5000 ha and in case of vegetables >500 ha was considered for impact evaluation.

The study results revealed that about 45 % cropped area accounted for TNAU varieties and technologies. It is found that the gross value of outputs produced from the area covered under TNAU crop varieties, technologies and machineries were worked out to Rs.27542 crores during the year 2018-19. If TNAU technologies are not adopted by the farmers, the gross value of outputs would have been realized is Rs.17109 crores. Thus, the incremental benefits due to adoption of TNAU crop varieties, technologies and machineries is Rs.10433 crores per annum. Of which varieties contribute Rs.5029 crores, technologies contribute Rs. 4863 crores and machineries with Rs.541 crores. Thus, it is concluded that TNAU research and development has created significant impact in Tamil Nadu economy.

B. Action Plan (2021-2024)

| Project 1: Developing and Disseminating Market Advisories for TN - IAMP Basin crops | | | | |
|--|---|---|---|---|
| Name of the Scientists and Centre | 2021-22 | 2022-23 | 2023-24 | Deliverables/ expected output |
| Coimbatore Dr.K.M.Shivakumar Dr.S.Selvam Dr.A.Rohini Dr.M.Prahadeeswaran Dr.D.Murugananthi Dr.R.Parimalarangan | ARMA, ARIMA, ARCH, GARCH, ANN models for generating pre sowing and pre harvest market advisories. | ARMA, ARIMA, ARCH, GARCH, ANN models for generating pre sowing and pre harvest market advisories. | ARMA, ARIMA, ARCH, GARCH, ANN models for generating pre sowing and pre harvest market advisories. | Provide price forecasts and market intelligence for select six commodity to basin farmers |

| Project 2: Economics of Agricultural Production and Planning | | | | |
|---|---|---|---------|--|
| Name of the Scientists and Centre | 2021-22 | 2022-23 | 2023-24 | Deliverables/ expected output |
| Dr K.R. Ashok Dr.M.Pragadheeswaran | Collection of data from producers, consumers and creameries in Tamil Nadu, Kerala, Karnataka, Andhra Pradesh and Telanagana | Computerization and analysis of data Final Report Preparation and submission of report | | Marketable and marketed surplus of milk and milk products in different states Market channels and system of flow of milk and milk products to end consumers |

C. Details of research projects

A total of four numbers of projects were reviewed. Out of which, one externally funded project and one university research project were completed and two projects are ongoing.

Current Status of Research Projects

| Externally funded projects | | Core projects | | University sub projects | | Total | |
|----------------------------|---------|---------------|---------|-------------------------|---------|-----------|---------|
| Completed | Ongoing | Completed | Ongoing | Completed | Ongoing | Completed | Ongoing |
| 1 | 2 | .. | .. | 1 | .. | 2 | 2 |

D. Remarks of the ongoing projects

| S. No | Project No. | Project Title | Project Period | Project Leader (PI/Co-PI) | Remarks |
|-------|------------------------------|---|----------------------|--|--------------------------|
| a. | Externally Funded Projects | | | | |
| 1 | DPC 241501120 PF 0934 | Developing and Disseminating Market Advisories for TN - IAMP Basin crops | 2017-24 | Dr.K.M.Shivakumar Dr.S.Selvam Dr.A.Rohini Dr.M.Prahadeeswaran Dr.D.Murugananthi Dr.R.Parimalarangan | Project may be continued |
| 2 | NDRI/CARDS/CBE/CAR/2020/R002 | Estimation of Production and Utilization Pattern of Milk and Milk Products in India | May 2020 to Mar 2022 | Dr. K.R. Ashok Dr.M.Prahadeeswaran | Project may be continued |

II. DEPARTMENT OF AGRICULTURAL ECONOMICS

A. Key findings of completed projects

Externally Funded projects

A Study on Farm Level Productivity Assessment of Major Horticultural Crops in Tamil Nadu

(Dr. K.R.Ashok, Dr. D.Suresh Kumar, Dr.A.Vidhyavathi)

Tomato

Most of the farmers are cultivating tomato in less than one ha. Only very few farmers are cultivating tomato in more than one ha. The average area under tomato is more in case of Micro Irrigation System (MIS) and Protected Cultivation (PC) was 0.63 ha when compared to open cultivation (0.38 ha). Shivam tomato hybrid is the single most popular hybrid cultivated by most of the farmers in open field, MIS and PC. Under PC all farmers are cultivating Shivam. Varieties/hybrid cultivated in open cultivation are Shivam, Shreya, Namdhari and PKM1. Under MIS Shivam, Akshaya, Mehathu, Saaho, Shira and Ventura are cultivated. The average yield of tomato in open cultivation is 27154 kg/ha. Under MIS, the average tomato yield is 38200 kg/ha and it is 72345 kg/ha under protected cultivation. They are significantly different from open cultivation yield.

The total cost of cultivation of tomato under open method, MIS and PC are Rs. 203138/ha, 266478/ha and Rs.450603/ha, respectively. The total cost under MIS is 31.17 per cent and 122 Per cent higher in protected cultivation than the open cultivation. As expected the yield under MIS is 25 per cent higher than open cultivation and under PC, it is 166 per cent higher than open cultivation. Due to increased yield, the net income under MIS is 63 per cent higher than open cultivation. In case of protected cultivation, net income is 203 per cent higher than open cultivation. The net income earned from tomato cultivation under open method, MIS and PC was Rs.149864/ha, Rs.244484/ha and Rs.453710/ha, respectively.

Brinjal Cultivation

The average size of land holding of the farmers cultivating brinjal under open cultivation is 0.89 ha and in case of MIS, it is 1.45 ha, open cultivation of brinjal is 0.26 ha. Varieties/hybrids cultivated under open cultivation are Bhavani, GreenmParul, PLR2, Ujala and Disco. Under open cultivation, 30 per cent and 28 per cent of the farmers are cultivating Ulala and Parul variety, respectively. The average yield of brinjal under open cultivation is 23115 kg/ha. The varieties/hybrids cultivated under MIS are Dhuruva, Local and Shivam. More than 50 per cent of the farmers are cultivating Dhuruva variety under MIS and 33 per cent are cultivating local variety under MIS. The average yield under MIS cultivation of Brinjal was 32571 kg/ha. The yield increase was 41 percent when compared to open cultivation of brinjal.

The total cost of cultivation of brinjal was Rs.173254/ha and Rs215149/ha under open cultivation and MIS respectively. Total cost of brinjal cultivation under MIS was 23 per cent higher when compared to open cultivation. The net return earned in open cultivation was Rs.144577/h and it was Rs.304098/ha under MIS. Net return under MIS is 111 per cent higher than net return earned from open cultivation of brinjal. This is due to higher yield and good prices.

Bhendi Cultivation

The average size of holding of farmers cultivating bhendi in open cultivation was 0.86 ha and it was 1.31 ha in case of households cultivating bhendi under MIS. The average size of area under open cultivation is 0.26 and it is 0.458 under MIS. The bhendi variety /hybrids cultivated under open cultivation are rathika, slevam, saambroid, local NS7774, mahyco and jaani. Rathika variety is cultivated by 48 per cent of the farmers followed by slevam and jaani each by 18 per cent of the farmers under open cultivation. The varieties of bhendi cultivated under MIS are local, NS7774, sarathi, muna and jaani. More than fifty percent of the farmers are cultivating jaani variety under MIS followed by NS7774 by forty per cent of the farmers. The yield increase was 36 per cent under MIS when compared to open cultivation of Bhendi. The average yield of bhendi under open and MIS cultivation is 11543 kg/ha and under MIS it is 15746 kg /ha respectively.

The total cost of bhendi cultivation is Rs.86107/h and under MIS, it was Rs.127800/ha. Net return income from bhendi is 49 per cent higher under MIS than open cultivation. The net income earned from cultivating bhendi under open cultivation was Rs.75495/ha and under MIS is Rs.112326/ha.

Banana Cultivation

The average size of operational land holding of banana farms is 1.87 Ha whereas under MIS is 1.29 ha. The average area of banana under open field cultivation is 0.42 ha and under MIS, it is 0.81 ha. Majority of the farmers are cultivating nendran followed by quintal nendran and red banana. The average yield of banana under open cultivation is 23778 kg/ha. In case of MIS, the average yield is 32944 kg/ha which is 38 per cent more compared to open field cultivation.

The total cost under open cultivation of banana is Rs.326283/ha and in case of MIS it is Rs.377307/ha. The net return from MIS banana is 113 per cent more than banana cultivation under open cultivation. The net return of banana under open cultivation and MIS is Rs.256278/ha and Rs.545125/ha, respectively. This is mainly due to yield increase and higher price due to improved quality. Due to pre harvest contract harvesting and fifty percent of transport cost the farms is borne by buyers in banana cultivation. .

**NCAP/ CARDS/ CBE/AEC/ 2017/ R017 Resource Use Planning for Sustainable Agriculture in Tamil Nadu
(Dr. D.Suresh Kumar Dr.K.R.Karunakaran Dr.S.Muraligopal
Dr.M.Chinnadurai)**

The study results revealed that the net area sown reduced from 62.85 lha to 47.48 lha in last four decades. Land put to non-agricultural uses increased from 15 lha in TE1973 to 21.85 lha. The area sown more than once declined from 13.78 lha in TE1973 to 8.94 lha. 60 per cent of 47 lha of net sown area is supported with irrigation. Surface water supports 42.5 per cent and ground water supports 53.4 per cent of net irrigated area.

The production plans are drawn considering these changes. The cost and return estimation based on the market price, indicated net return of Paddy around Rs 19 to `Rs 21 thousand per hectare which reduced to around Rs 10-12 thousand by the other two methods. Pulses out beat cereals in terms of net return based on economic price and natural resource valuation

Under cash crops, banana, turmeric, sugarcane and vegetables were highly profitable both in market based and natural resource based method of valuation though these are resource exhaustive crops. Paddy area in summer season and irrigated sorghum area reduced, but area under all other cereals and pulses increased in the optimal plan. Maize area has doubled and area under oilseeds increases while area under banana and tobacco decreased.

Regional Crop Model (RCM) resulted in 11-13 per cent decrease In Gross annual Cropped Area (GCA) However, the net revenue realized from Rs218 billion in the existing crop plan to Rs 313.22 billion in water conserved plan and Rs 315.12 billion in technology intervention plans. The RUP analysis confirmed farm income increase even by 11% decline in cropped area by technology interventions increasing area under commercial and vegetable crops. Thus the state has crucial stage to intensify the adoption of yield boosting and income increasing technologies such as hybrids and location specific varieties, improvement production system through SRI, SSI, extend in adapting more area in tissue culture banana, BT cotton etc. besides increasing the drip irrigation system in water scared zones such as WZ in high water consuming crops turmeric, sugarcane, banana, tapioca, vegetables.

Policy implication of the study are; The existing land conversion act must be tightened to avoid further increase in the area under land put to non-agricultural use. Urban center development must incorporate the utilizing available uncultivable land area for future urban development plans. More subsidy support programmes may be designed particularly in safe and semi critical ground water zones to further increase the farm income. Optimal plans reported decline in food crops due to low profitability, Subsidy support programme to extend the area under SRI method with improved cultivation practices. Beside that value addition also to be explored on millet and other nutria-crops such as Thinai, samai, varagu, Panivaragu.

Further efforts have to be taken to increase the productivity of pulses and oilseed through yield enhancing technology with suitable sprinkler irrigation system. Concerted efforts to be made to utilize the highest productivity in sugarcane and its high profitability, through SSI and drip fertigation system to the one third of area. By implementing compulsory insurance and complete drip fertigation to banana to increase the farm profitability. Efforts also taken to convert one third of area with tissue culture plants for disease free high productivity. In all the optimal plans area under vegetables had increased and per ha net return also increased. Use of more hybrid vegetable seed production and necessary technology for protected vegetable cultivation may be promoted on the selected districts. Tailored made technology and credit support programmes may be formulated based on the present low per ha net return crops to further increase unit net return on land, water and labour inputs.

NIAM/ECK/TNJ/ECO/2020/R001 Poultry Business School - Income Enhancement through Critical Stages and Interventions during Production and Post Production (Dr.S.Angles)

The critical stages identified for enhancing the productivity of the poultry farmer is brooding, feed and maintenance of bedding (litter material). The total cost required for construction of an average size of shed (360 M²) and water facility is Rs. 7.00 lakh. The total cost of production of a live broiler bird is Rs. 79.53/kg. (fixed cost per kg of live broiler is Rs. 0.94 and variable cost is Rs. 78.35). Farmers share in consumer's price is 63.42 per cent and cost of production is Rs. 79.29/ Kg. In contract farming, the farmers receive an average price of Rs. 9.50 per kg.

The marketing channel followed by contract farmer is Farmer-Integrator – Wholesaler – Retailer – consumer and non-contract farmer is Farmer - Wholesaler – Retailer – consumer.

The major constraints identified were Price fluctuation, not using rakes for loosening the litter material, using charcoal for brooding and improper structure of sheds. When the scale of production increases the farmer can get more profit however they maintain on an average 3300 birds per batch. (Min. 800 & Max 12000 birds). In non-contract farming the major constraint was the availability of chick, feed and medicines. The interventions can be made in the areas of brooding, feed and maintenance of bedding (litter material) which can increase the net income to an extent of Rs 11655/per batch (19.70%).

Policy recommendations are: 1). Need to increase the awareness on azolla and production technologies and feeding it after 25 days along with other supplementary feeds which can reduce the feed cost considerably. 2). Farmers need to be trained on feed production themselves through which the major cost (57.45 %) in broiler production can be reduced. 3). As the initial investment is more (Rs. 7 lakh) subsidy can be provided to the marginal and small farmers to take up the commercial broiler production for additional income generation.

HIH/HCRI/PKM/DSS/2019/0007 Impact Evaluation of NABARD - CSR Partnered Nammiyampattu - Kovilur Watershed Projects in Thiruvannamalai District of Tamil Nadu (Dr.S.Varadha Raj Dr.S.Murali Gopal).

The study results reveal the following that

- NAS has increased by 2.55- 4.39 %
- Net irrigated area has increased by 42-81 %
- Surface water holding capacity- from 38000 M³ to 76000 M³
- Functional OW- increased by 27-43%
- Dysfunctional OW- reduced by 50%
- Functional bore well- increased by 18-20 %
- Cropping intensity – increased by 3-4 %
- Livestock population –increased by 2-25 %

Additional income due to the intervention

- Horticultural crops: Rs 9000-12000/acre/year
- Piggery units :Rs 0.80 -1.0 lakh/year
- Honey bee keeping :Rs 1800/box/year
- Back yard poultry :Rs 10000/year
- Bajibonda stall :Rs 500/day
- Organic farmers by 100 %

Additional revolving funds may be given for sustaining their livelihood activities and Funds for post project maintenance may be provided.

Core Projects

CARDS/CBE/AEC/2018/ CP085 Economic Evaluation of Solar Powered Pumping Systems in Tamil Nadu (Dr.M.Anjugam, Dr.R.Mahendiran)

Cost and returns: Operational cost of paddy cultivation using solar pumps is less expensive compared to oil engine pumps by Rs.9637. Gross margin (net income over operational cost) per ha under surface irrigation method was ₹.12083 higher in solar pumps over diesel engine whereas it was ₹.3097 lower than electric pumps. In sugarcane, solar pumps with drip irrigation is less expensive compared to solar pumps without drip irrigation. Gross margin under solar pumps was Rs.1.27 lakh per ha higher in using solar pumps with drip irrigation. Operational cost of sugarcane cultivation using solar pumps under without drip irrigation is very expensive compared to oil engine pumps. Gross margin was lower by Rs.9880 and Rs.24373 for solar pumps over oil engine and electric pumps, respectively.

Impact of solar pumps: Net benefit of using solar pumps for irrigation was Rs.21733 per ha in paddy over oil engine and Electric pumps was Rs.8314. In sugarcane, net benefit over oil engine and electric pumps were Rs.47713 and Rs.3874 per ha. Solar pumping system was found to be the most efficient system than diesel and electric pump system due to its low maintenance cost and zero energy cost.

Financial Feasibility: by replacing the diesel pumps with solar pumping system, net present value was positive, benefit cost ratio was greater than one at 10% and 12% discount rate and IRR was found to be 14% which is more than the opportunity cost and with the subsidy component, the solar pumping system was found to be financially feasible.

Benefits Sample farmers towards Solar pumps were continuous water supply throughout the year. In addition, low and nil maintenance of the system, no fuel requirement, long life for the system were the direct or private benefits whereas social benefits were saving of electricity to the government, no bad effects on the environment (pollution free).

Constraints: High capital cost as per small and marginal farmers; system working on only day time, no back up facility for storing electricity as well as water; no facility for repair of damaged parts and no service by company after installation even if it is under repair condition.

Policy Suggestions: are Installation of Quality panels with stand, provision of surface storage tank and poly ethylene sheet / aluminum sheet at the subsidized cost by the government, make necessary arrangement to service the system / follow up action at the end user level, periodical monitoring of the functioning of the solar pumping system, Training to beneficiaries by the SAUs on the servicing of the solar pumps, provision of higher motor efficiency (7.5 to 10hp) may be provided with subsidy, promotion of bank credit and Quadripartite arrangement model i.e. government - Agrl. Engineering department, Banking institutions and firms and farmer end users so as to promote the programme in a successful manner.

CARDS/CBE/AEC/2018/CP087 Documentation of Select Agricultural Goods for GI Registration in Tamil Nadu(Dr.N.Kiruthika)

RamnadMunduChilli Producer Company Limited was identified as registered organization for filing of GI. Cost benefit analysis revealed that farmers had received Rs.55, 450 as net return and the BCR is 1.65. The cost of production of RamandMunduChilli is Rs.48/kg and the net returns is Rs.32/kg. Value Chain Analysis of dry chilli was carried out and the analysis revealed that, the degree of value addition done by trader/wholesaler and retailer are 25% each, respectively. To prove the uniqueness of the Chilly, in collaboration with the Horticulture Department the biochemical analysis of RamandMunduChilli was found that the Capsaicin content is 0.1%, Oleoresin 14% and the colour value is 40.5. GI application for RamnadMundu Chilli was prepared and filed in collaboration with the HC&RI, TNAU, Coimbatore.

CARDS/TRY/ AEC/2018/CP096 A Study on Post Harvest Management and Prices of Small Onion in Tamil Nadu (Dr.Parimalarangan)

In India, the average annual growth of Onion was recorded as area (-13.88 per cent), production (11.25 per cent) and productivity (3.49 per cent). Productivity was shown increasing trend because of increase in production alone. In Tamil Nadu, for the same time period, average annual growth of Onion was recorded as Area (1.27 per cent), production (2.22 per cent) and productivity (1.01 per cent). In Tamil

Nadu, Productivity was shown increasing trend because of increase in area and production.

Seasonal Indices of monthly prices of small onion indicates that farmers will get higher price for their produce during January, July, September, October, November and December in Dindigul market. Small onion prices will be higher during the months of July, October, November and December in Trichy market. Likewise, small onion prices will be higher during the months of January, June, July, September, October, November and December in Coimbatore market.

Post-harvest losses have been found maximum at producer level (14.73 kg/q). And the same was to be 2.60 kg/q at wholesale level and it was 1.3 kg/q at retailer level. Overall, post harvest loss was reported as 18.63 kg/q. At farm level, loss to faulty storage was the highest (8.6 kg/q) followed by improper transportation, which resulted in a loss of 2.45 kg/q. The drying loss was 1.40kg/q. In small onion, 77 per cent of the producers and 62 per cent of traders faced postharvest losses during handling and marketing of their produce.

About 61 per cent of the farmers mainly sold onion immediately after harvest and around 86 per cent of the traders do not store it and they sold it as soon as they received it, since onion is highly perishable and as a means to reduce post-harvest loss and costs associated with storage and transportation. About 76 per cent of the traders used their own or rented storage to store onion. On an average, traders store onion from 3 to 5 days depending on conditions such as market prices. Farmers needs to be trained on processing and value addition of small onion.

CARDS / CBE / AEC / 2018/ CP086 A Study on Performances of Regulated Market in Tamil Nadu (Dr.S.Padma Rani)

Performance of regulated market is based on adequate infrastructural facilities, staff strength and awareness among farmers and traders about regulated market.

- The arrivals of crops in few markets has been drastically reduced due to, very high transportation and marketing cost, low production
- Location of the market and transportation facilities also determine the functioning of market.
- In Trichy and Thanjavur district majority of farmers use regulated markets for storing and drying their grains than for trading purpose.
- Farmers & traders stated that Warehouse capacity and drying yard facilities were not adequate during peak season. Farmers and traders demanded solar drier for drying paddy grains.
- In few of the markets (about 26 per cent) poor infrastructure marketing facilities were prevailed and none of the marketing functions was performed.
- Delay in sanctioning of pledge loan amount is the major problem and duration for storing of produce from six months to 8 months could be extended for selling their produce & for better realization of price.
- Non member farmers revealed that very high marketing cost viz. loading and unloading charges and high transportation cost are the main reasons for not trading through regulated markets.

Constraints faced by farmers in Regulated Markets

- Inadequacy of sufficient staff of markets made farmers to wait for long time for trading of their commodities
- Inadequate grading facilities
- Poor infrastructure facilities- lack of adequate storage and drying yard facilities was observed especially during peak seasons.
- Delay in sanctioning of pledge loan is one of the major constraints expressed by farmers
- Longer Distance between location of regulated markets and farmers field and lack of proper transportation facilities , Very high marketing cost viz. ,loading and unloading charges and transportation cost etc are the major reasons for not using the Regulated markets by the non-beneficiary farmers
- Advance payment from the private traders as cash and absence of risk of rejection of commodities are also the main reasons for trading through other private markets even though lesser prices are realized for their produce.

Benefits of e NAM linked Regulated Markets

- It was observed that majority (70. %) of the farmers and traders are aware of e Nam and trade practices. In all the e Nam linked markets cash transaction is limited.
- Farmers revealed that it has been safely and quickly transacted to their bank accounts through e payment.
- Majority of farmers and traders revealed that fair and competitive price was fixed due to participation of large no of traders from nearby districts and states
- It also saves time and found to be easy process. Farmers get better price information through their mobile App. for making better trading decisions.
- Price, income, and IT knowledge among farmers and traders would increase the willingness to participate in e Nam trading. Distance of the market from the farm has negative influence on accepting e Nam trading.
- Farmers are benefitted through e-trading, and there is a need to create awareness among farmers as well as traders and to be built their capacity in online trading
- Establishment of adequate assaying and grading facilities is important
- Uniform notification of commodities is needed.

CARDS/TRY/ AEC/2018/CP154 A Study of Collective Farming Scheme In Tamil Nadu(Dr.S.Selvam)

Every stake holders (Farmers, agricultural officers, input dealers, research institutes, credit institutions, traders etc) in the collective farming scheme should perceive collective farming scheme as important institutional innovation agriculture for overcoming the limitations of small holder farming for reaping the benefits of economies of scale in input purchase marketing of produce value addition etc.

- Strengthening district level unit of FPGs: Currently the District level unit meet only for purchase of corpus fund utilization. The district level unit involving, agriculture, horticulture, animal husbandry, fisheries. Forestry research stations / colleges of TNAU and KVKS, lead bank, NABARD may also provide need based

services required by FPOs. A meeting once in a month like bankers meet in every collectorate, would facilitate planning of activities every month.

- Flexibly schemes for farmer's collectives: Schemes specifically meant for FIG / FPCs/ FPOs should be designed along with dovetailing schemes into FIG / FPCs/ FPOs. The Nodal Agency (Headquarters collective farming unit) can consider some location specific needs of certain farmer collectives.
- It is extremely difficult to mobilize a share capital of Rs.1000 from small and marginal farmers in the initial years of collective farming project and alternative mode of mobilizing share capital can be devised.
- There is higher percent of relatives in the FIG membership as this study revealed. Through this type activity create higher bond with in FIG level and lead to better group activity for smaller business, it hampers linking of other groups in the formation FPG and FPC. Hence proper care should be devoted in selection of members in FIGs
- As per the focus group discussion, field visits and also discussion held with the state consultant it was felt that special manpower should be created for the mentoring, handholding and monitoring of FIGs in the scheme.
- IT applications for FPO– planning, implementing and coordination of operations of FPO could be effectively done through leveraging information technology without lag in time in implementation information flow and regulation.
- MSDA supported food processing unit and NMSA seed processing units linked with farmers collectives is a good initiative. Most of seed processing units are at establishment stage. Value addition units are at established but yet to start commercial operations. Many of the leaders of FPO/FPG lack business strategy to transform existing units into a sustainable business unit. Most of units are not market oriented, lacking in identifying target market, designing products to meet needs of target market and working backwards to develop value chain. The processing activity need to be done collectivity with sufficient volumes rather than with small quantity of individual farmers for better marketing, branding etc. Therefore, ultimately what is required is, "A valid mission for each FPG/FPO with business strategy, business model and a business plan that encompasses all the farmer members and based on market orientation. In this case FPOs can make use of services of eight agribusiness incubation centers in various parts of the State supported by EDII and Tamil Nadu Agricultural University.
- The study revealed that the role of women in agriculture under the scheme is limited. The rural women are very active in cultivation, dairy, fisheries, crop processing and other allied areas. Nearly 70% of Indian rural women are employed in agriculture and they are responsible for 60-80 percent of food production. In order to empower women special provision of membership in FIG and FPG, training and capacity building need to be created for the women.
- Farm mechanization in collective farming project has been helpful to bring about a significant improvement in agricultural productivity. On the basis of focus group discussion and field survey, it was found that farmers took highest interest in incentivized purchasing of farm equipments and food processing machineries. It was also observed that farmers need adequate training to operate machineries and equipments, especially for food processing machineries. Provision of formal training needs to be incorporated in the programme for leaders and members. In this case expertise of Agricultural

Engineering College and Research Institute at Coimbatore and Kumulur may be exploited.

- The study revealed that revenue generating activity for the farmer's collectives is only from leasing of farm machinery and the most of FPGs in collective farming project not resort to any other business related activity. Access to credit and capital are the common problem and also the biggest challenges that farmers collectives face at every stage of development. According to the chairpersons and BODs lack of working capital is the constraint to venture into business related activities. During the emerging period, which starts after the registration of the farmers collectives, should be linked with financial institutions for working capital.
- Consider FPO as a Start Up Company: FPO is a newly formed firm by farmers who have a no idea about forming and managing a private limited company. Few farmers under the guidance of officials of Department of Agril. Marketing and Agribusiness / Agriculture / Horticulture and other resource institutions initiate the process. It takes about two to four years for a FPO to move on. Considering the risk involved and innovative approaches to be developed (each FPO is unique in its own way), it is essential to consider it as a Start – company promoted by a firm / agribusiness incubator. The policy will enable FPOs for tax and fee concessions, similar to start – ups for 5 years.

CARDS/TRY/ AEC / 2018 / CP095 Analysis of Price Transmission along the Value Chain with Special Reference to Red Chillies Turmeric Black gram and Coconut(Dr.S.Selvam)

Coconut Value chain

About 3.8 percent of the price disequilibrium in the coconut value chain was corrected each month by change in price of coconut at Pollachi (Tamil Nadu) market and 11.50 percent disequilibrium system was corrected each month by change in DilPasand Copra price at Kozhikode (Kerala) market, 16.77 percent of disequilibrium system was corrected each by change in Milling Copra price at Kozhikode (Kerala) market, 16.23 percent of disequilibrium system was corrected each by change in Ball Copra price at Kozhikode (Kerala) market, 17.75 percent of disequilibrium system was corrected each by change in wholesale Coconut Oil price at Kozhikode (Kerala) market, 1.4 percent of disequilibrium system was corrected each by change in Coconut Oil price at International market and Coconut Oil retail price at Chennai market is 0.25 percent contributed for correction in the disequilibrium in coconut value chain

- Market Linkage between coconut markets
- Market linkage between coconut and processed coconut oil, mill copra, DP copra, ball copra , coconut cake
- Market linkage between Processed materials
- Market linkage between domestic markets and international markets

Black gram value chain

About 8.2 percent of the price disequilibrium in the Black gram value chain was corrected each month by change in Black gram price of Dahod (Gujarat) market and 7.9 percent disequilibrium was corrected each month by change in black gram dal price of Villupuram (Tamil Nadu) market, 6.2 percent of price disequilibrium was

corrected by change in price of black gram dal each in Gulbarga(Karnataka) and Kekri (Rajasthan) markets respectively. Similarly 0.29, 0.17, 0.17, 0.16 percent of price disequilibrium of Black gram value chain were corrected by change in price of black gram split (retail) at Salem, Chennai, Hyderabad, and Trivandrum respectively.

- Market Linkage between Blackgram dal markets
- Market linkage between Blackgram dal and processed form (spilt)
- Market linkage between Processed materials
- Market linkage established along the value chain

Greengram value chain

About 58 percent of the price disequilibrium in the greengram value chain was corrected each month by change in price of greengram dal at Tindivanam (Tamil Nadu) market and 17 percent disequilibrium system was corrected each month by change in green gram price of Akola (Maharashtra) market. Similarly 0.17 percent, 0.16 percent and 0.12 percent of the greengram value chain disequilibrium was corrected each month by change in price of greengram split (consumer) in Ernakulam (Kerala), Hyderabad (Telangana) and Salem (Tamil Nadu) markets respectively.

- Market Linkage between green gram dal markets
- Market linkage between green gram dal and processed form (spilt)
- Market linkage established along the value chain

Red chillies Value chain

About 12 percent of the price disequilibrium in Red chillies Value chain was corrected each month by change in red chillies price of Khammam. Similarly, seven percent of the disequilibrium system was corrected each month by change in red chillies price at Guntur markets. There is no red chilli powdered market was contributed to the correction in Red chillies Value chain

- Market Linkage between Red chillies markets
- Market linkage between Red chillies and processed form (powder)
- Market linkage established along the value chain

Turmeric value chain

About 20.65 percent of the price disequilibrium in the turmeric value chain was corrected each month by change in price of turmeric at Coimbatore (Tamil Nadu) market and 22.72 percent disequilibrium system was corrected each month by change in turmeric price at Duggirala (Andhra Pradesh) market, 0.04 percent of disequilibrium system was corrected each by change in turmeric powder price at Hyderabad (Telangana) market, 0.03 percent of disequilibrium system was corrected each by change in turmeric powder price at Salem (Tamil Nadu) market

- Market Linkage between Turmeric markets
- Market linkage between turmeric (bulb) and turmeric powder
- Market linkage between domestic markets and international markets
- Market linkage established along the value chain

Specific recommendations

These results show that if there is a disturbance occurred in the whole system, the change of efficiency of the selected markets in their respective value chains (table below) will have significant conservative force tending to bring the

model back into equilibrium whenever it moves too far. So Government policies should be formulated in such a way that ensures greater marketing efficiency in selected value chain through physical and institutional infrastructure at specific markets indicated below.

| Value Chain | Markets | Retail Markets |
|--------------------|---------------------------------------|-------------------------------|
| Coconut | Coconut at Pollachi (Tamil Nadu) | Coconut Oil retail at Chennai |
| | DilPasand Copra at Kozhikode (Kerala) | |
| | Milling Copra at Kozhikode | |
| | Ball Copra price at Kozhikode | |
| | Wholesale Coconut Oil at Kozhikode | |
| Black gram | Dahod (Gujarat) | Salem, |
| | Villupuram (Tamil Nadu) | Chennai |
| | Gulbarga(Karnataka) and | Hyderabad |
| | Kekri (Rajasthan) | Trivandrum |
| Greengram | Tindivanam (Tamil Nadu) | Ernakulam (Kerala) , |
| | Akola (Maharashtra) | Hyderabad (Telangana) |
| | | Salem (Tamil Nadu) |
| Red Chillies | Khammam | |
| | Guntur | |
| Turmeric | Coimbatore (Tamil Nadu) | Hyderabad (Telangana) |
| | Duggirala (Andhra Pradesh) | Salem (Tamil Nadu) |

CARDS/PKM/AEC/2018/CP162 Economic Impact of Climate Change on Hill Vegetable Farming in Tamil Nadu (Dr.S.Varadha Raj)

The results revealed the following

- Nearly 67 per cent of farmers in hill vegetable farming are rain-fed farmers.
- Positive trend in maximum temperature and minimum temperature during 1971-2018. This widening of temperature could create a detrimental effect on cropping pattern and productivity of hill vegetable crops.
- Highest seasonal index for maximum temperature was in April (110 %), May (109%) and March (108%). Lowest seasonal index for maximum temperature was in November (-0.90), October (-0.92) and December (-0.94).
- Nearly 8- 10 % of the higher variation of maximum temperature during March-May and 4-10 % of the lower variation during October- January than its seasonal average value during 1971-2018. Highest seasonal index for minimum temperature was found in May (1.14), followed by April (1.11) and June (1.08). Lowest seasonal index for minimum temperature was in January (-0.80), followed by December (-0.86) and February (-0.88).
- Average annual rainfall has a declining trend during 1971-2018. There is a possibility of reduction of rainfall by 0.58 mm from average annual rainfall of 135.92 mm in the upper Palani hills. Positive trend in rainy days during 1971-2018, but in the recent past, it has a declining trend. Highest seasonal index for rainfall was observed in October (239%), followed by November (183%) and September (170%).it indicates that September, October, and November months had a more annual average rainfall of 139 % 83% and 70%, respectively. Lowest

seasonal index for rainfall was found in January (-0.057), followed by February (-0.054) and March (-0.69). There is nearly 99 per cent reduction of rainfall in January and February when compared to the seasonal average annual rainfall. Negative trend of rainfall was noticed in southwest, Northeast, winter, hot weather monsoon during 1971-2018

- In SW- about 3.96 mm reduction of rainfall per year over the mean value of 595 mm. In NE, Nearly 2.22 mm rainfall reduction for every year from the mean value of 659.93 mm. In Winter, nearly 0.08 mm rainfall reduction for every year from the mean value of 58.52 mm. In hot-weather, nearly 0.74 mm rainfall from the mean value of 317.23 mm.
- Highest dry periods were found in the winter season (64.58%), followed by Northeast (60.42%), hot-weather (52.08%) and southwest (47.92%), whereas over all-seasons had nearly 54 % of dry period. This long period of dry spell affects the availability of water to the crops that change the crop composition, pattern and its productivity in hill areas. Highest critical variation was in the winter monsoon rainfall (136.90 %), followed by northeast monsoon rainfall (48.16%), hot-weather (43.53%) and southwest monsoon rainfall (32.31%). Nearly 28 per cent of critical variation found in all-seasons put together.
- CV of rainfall and rainy days are more during 1995 to 2018 than 1971-1994. 78 per cent of farmers opined about an overall increase in temperature. Nearly 90 per cent of farmers' perceived declining rainfall.
- Majority of respondent farmers also believed they had witnessed uneven distribution and unpredictable behaviour of the rainfall. Area of Potato has a negative trend. Irregular pattern of rainfall causes burning symptoms and quality of tuber also deteriorates.
- Hence, Farmers may be encouraged to construct water conservation structures through subsidies

University Research Projects

CARDS/CBE/AEC/2017/001 An Economic Inquiry into Farmers' Knowledge, Perception and Intensity of Pesticide Use in Major Vegetable Cultivation of Tamil Nadu(Dr.M.Thilagavathi)

Pesticide use pattern in sample farms

Onion: In sample Onion farms growers are selecting extremely toxic to highly toxic chemicals to control pest, disease and weeds and less toxic chemicals to control diseases. Onion growers are having the practice of using higher doses of pesticides per tank than the recommended level i.e. herbicide and insecticide @ +23 to 30ml/10 lit tank, fungicide @ 23 ml and 48 gms/ tank). On an average 22 to 57 percent of the farmers were using high toxic chemicals.

Brinjal: Sample growers are selecting moderately toxic to extremely toxic chemicals to control pest, disease and weeds and less toxic chemicals to control diseases. Brinjal farmers are having the practice of using higher doses of pesticides per tank than the recommended level i.e. herbicide and insecticide @ +20 to 25ml/10 lit tank, fungicide @ 18 ml and 15gms/ tank). On an average 73 to 100 percent of the farmers were using high toxic to extreme toxic chemicals

Bhendi: Farmers are selecting moderately toxic to extremely toxic chemicals to control pest, disease and weeds and less toxic chemicals to control diseases. Bhendi farmers are having the practice of using higher doses of pesticides per tank than the recommended level i.e. herbicide and insecticide @ +10 to 15 ml/10 lit tank, fungicide @ 10 gms/ tank). On an average 75 to 100 percent of the farmers were using high toxic to extreme toxic chemicals

Tomato: On an average 27 to 83.3 percent of the sample farmers were using moderately toxic to extreme toxic chemicals to control pest, disease and weeds and less toxic chemicals to control diseases. It was observed that the farmers are using prescribed level of chemicals per tank in most of the cases except few. This is due to their awareness on optimal usage of chemicals.

Farmer's Knowledge on Identification / awareness level on incidences in sample crops

Onion: Onion sample farmers (65 and 35 per cent) have possessed good to very good knowledge (RPI score 4.22 to 4.35) on identification of pest and diseases infestations and 50 to 23 percent possess average to poor knowledge in identifying the incidences due to nematode and nutritional deficiency.

Brinjal: On an average the sample farmers (43 and 55 per cent) have possessed good to very good knowledge (RPI score 4.30 to 4.53) on identification of pest and diseases infestations and 45 to 30 percent of them possess average to poor knowledge in identifying the incidences due to nematode and 52 to 27 per cent of the and 63 to 25 percent of the sample farmers have possessed good to average knowledge on identification of incidences due to nutritional deficiency and due to drought.

Bhendi: On an average 51.70 to 43.30 per cent of sample farmers have possessed good to very good knowledge (RPI score 4.4 to 4.48) on identification of pest and diseases infestations and 50 to 23 percent possess good to average knowledge (RPI score 3.7) in identifying the incidences due to nutritional deficiency and having average knowledge in identifying the incidences due to nematodes (RPI score 3.05)

Tomato: On an average 55.00 to 38.33 per cent of sample farmers have possessed very good to good knowledge (RPI score 4.48 to 4.4) on identification of pest and diseases infestations and loss due to drought. Fifty-five to 42 percent possess good to average knowledge (RPI score 3.52) in identifying the incidences due to nematodes. Sample farmers possess average knowledge in identifying the incidences due to nutritional deficiency (RPI score 3.17).

Farmer's knowledge on pest management practices in sample crops

Onion: 50 to 72 per cent of sample onion farmers have possessed good to very good knowledge on chemical methods i.e selection of chemicals, stages of application, doses of application (RPI score 4.2 to 4.3) and mode of application. Farmers possess average knowledge in following practices on environmentally safe methods (RPI score 2.5 to 2.8).

Brinjal: 42 to 53 per cent of sample farmers have possessed very good to good knowledge on chemical methods i.e selection of chemicals, stages of application, doses of application (RPI score 4.37 to 4.07) and mode of application than practices on environmentally safe methods (RPI score 2.67 to 2.6). Sixty five to 20 per cent of farmers possessed good to very good knowledge on safety measures to be followed.

Bhendi: 70 to 26.67 per cent of sample farmers have possessed good to very good knowledge on chemical methods i.e selection of chemicals, stages of application, doses of chemicals (RPI score 4.37 to 4.07) and method of application. Possess poor to average knowledge in practicing on environmentally safe methods (RPI score 2.58 to 3.1). Sixty five to 25 per cent of farmers possessed good to average knowledge on safety measures to be followed.

Tomato: 50 to 35.00 per cent of sample farmers have possessed good to very good knowledge on chemical methods i.e stages of application mode of application, selection of chemicals, stages of application, (RPI score 4.87 to 4.2) method of application. Possess good to average knowledge on doses of chemicals (RPI score 3.25) to be used. Possess average to poor knowledge in practicing on environmentally safe methods (RPI score 3.2 to 2.2). Thirty eight to 48.33 per cent of farmers possessed good to average knowledge on safety measures to be followed.

Factors responsible for pesticide Choice and pesticide application practices

Onion: On an average 74.24 per cent of farmers considering the efficacy of chemicals followed by cost of chemicals (16.67 per cent) in their choices of chemicals. Nearly 53.52 per cent of sample farmers are applying chemicals in the crucial stages of the pest and disease occurrences followed by based on the recommendation of input dealers (46.48 per cent). All the farmers were spraying during morning time. It was observed that 86.67 per cent of sample farmers are frequently (more than 10 times) spraying and 96.67 per cent of sample farmers were applying the chemicals based on their observation and stopped (78.33 per cent) the spraying of chemicals just two weeks before the harvesting.

Brinjal: On an average 67.61 per cent of farmers considering the efficacy of chemicals followed by ease of availability (19.72 per cent) in their choices of chemicals. Nearly 43.48 per cent of sample farmers are applying chemicals based on the recommendation of input dealers followed by observation in the crucial stages of the pest and disease occurrences (42.03 per cent). All the farmers were spraying during morning time. It was observed that 66.67 and 33.33 per cent of sample farmers are spraying at the frequencies of 4-6 times and 7 to 10 times. About 63.33 per cent of farmers are practicing the spraying at the interval of 2-3 days interval and it was noticed that 68.33 per cent of farmers were stopped the spraying of chemicals before 1 – 3 days of harvest and 31.67 per cent of farmers were applying chemicals even at the time of harvest.

Bhendi: On an average 66.67 per cent of farmers considering the cost of chemicals followed by efficacy of chemicals (31.67 per cent) in their choices of chemicals. Nearly 63.33 per cent of sample farmers are applying chemicals in the crucial stages

of pest and disease occurrences followed by the recommendation of input dealers (43.33 per cent). All the farmers were spraying during morning time. It was observed that 58.33 and 41.67 per cent of sample farmers are spraying at the frequencies of 4-6 times and 7 to 10 times. About 60.00 per cent of farmers are practicing the spraying at the interval of 2-3 days interval and it was noticed that 55.00 per cent of farmers were stopped the spraying of chemicals before 1 – 3 days of harvest and 25.00 per cent of farmers were applying chemicals even at the time of harvest.

Tomato: On an average 60.00 per cent of farmers considering efficacy of chemicals followed by (30.00 per cent) cost of chemicals in their choices of chemicals. Nearly 96.67 per cent of sample farmers are applying chemicals in the crucial stages of pest and disease occurrences. All the farmers were spraying during morning time. It was observed that 100.00 per cent of sample farmers are spraying at the frequencies of 7 to 10 times. About 58.33 per cent of farmers are practicing the spraying at weekly basis and 41.67 percent of them spraying chemicals based on their observation. It was noticed that 58.33 and 41.67 per cent of farmers were stopped the spraying of chemicals before 4-6 days and 7 – 10 days of harvest.

Sources of information

Onion: More than 90 per cent of onion sample farmers rely on input dealers for their information on pest management and five to eight percent of farmers received information from department officials.

Brinjal: On an average 64.56 per cent of sample farmers rely on input dealers for their information on pest management followed by 17.72 per cent of sample farmers received information from their fellow farmers and 15.19 per cent of farmers received information from technical sources.

Bhendi: Hundred per cent of sample farmers rely on input dealers for their information on pest management followed by 36.67 per cent of sample farmers received information from their fellow farmers and 4.60 per cent of farmers received information from technical sources.

Tomato: Around 55.83 per cent of sample farmers received information from technical sources for their pest and diseases management followed by media (32.5 per cent). Only 9.17 per cent of sample farmers rely on input dealers for their information on pest management followed by 2.5 per cent of sample farmers received information from their fellow farmers.

Farmer's Knowledge on Safety measures

Onion: Sample farmers possessed very good to good knowledge on taking bath, storage of chemicals, disposal of containers and application practices (RPI score 4.55 to 4.1) but possessed average to poor knowledge in its safety level to human and environment.

Brinjal: Farmers possessed very good to good knowledge (RPI score 4.32 to 4.0) on storage of chemicals, application practices, wearing protective cloth and taking bath.

Good to average knowledge on sprayer maintenance and disposal of containers (RPI score 3.88 to 3.65) but possessed average to poor knowledge (RPI score 3.58) in its safety level to human and environment.

Bhendi: Sample farmers possessed good to very good knowledge (RPI score 3.95 to 4.17) on storage of chemicals and taking bath. Good to average knowledge on application practices, sprayer maintenance, wearing protective cloth and on its safety level to human and environment.

Tomato : About 83.33 and 16.67 per cent of the sample farmers possessed very good to good knowledge (RPI score 4.83) in taking bath immediately after application of chemicals. Sample farmers possess good to average knowledge on storage of chemicals, application practices, sprayer maintenance, wearing protective clothing. Most of the farmers have possessed average to poor knowledge (RPI score 2.83) on its safety level to human and environment.

It is concluded that the vegetable growers in study districts, are selecting extremely toxic, highly toxic to moderately toxic chemicals to control pest and weeds in selected crops for the study. In most of the sample farms, the sample farmers are using less toxic chemicals to control diseases. In all crops, as control measures the farmers are following chemical method only. But the sample farmers possessed with average to poor knowledge in biological and environmentally safe method. On an average 60 to 74 per cent of farmers are considering the quality in terms of its efficacy followed by the cost of chemicals and its ease of availability. Farmers are spraying chemicals based on incidences. On an average six to ten no's of spraying per crop was done by the farmers. It was observed that pesticide spraying was taken at weekly interval in onion and three to five days interval in bhendi and brinjal crops. In brinjal crop, even at the time of harvest, farmers are having the practice of spraying the chemicals. Input dealers are the major sources of information on selection of chemicals for the onion, brinjal and bhendi sample farmers. But the tomato growers in Krishnagiri district are following the technical sources for their information. On an average, more than 70 per cent of farmers possess the good knowledge on selection and use of chemicals and on safety measures to be followed. But the sample vegetable growers are practicing only few safety measures.

Policy implications : Capacity building on selection of safe chemicals, its application methods and on safety measures to be followed may be given to the vegetable growers, Efforts may be taken to motivate the vegetable growers in adoption of the IPM practices and use of bio pesticides in vegetable crops which is safe to human and environment and the regulative measures on high toxic chemicals may be strengthened by the Government on its availability and its use on vegetable cultivation.

CARDS/CBE/AEC/2018/004 Crop Diversification for Nutritional Security in Tamil Nadu (Dr.K.R.Karunakaran)

Area under major crops (45 crops) of each crop group of cereals, pulses, oilseeds, vegetables, fruits and spices considered.

Cropping pattern revealed that the additional area has been brought in most of the cereals and pulses in the Cauvery delta zone. Pulses and vegetables were grown on more than 20 per cent area in TE 2012-13 over TE 2004-05 in this region. Western zone shows significant growth in the area cultivation of fruits, vegetables and pulses. Almost in all the regions, area under oilseeds and cereal (except CD) crops cultivation has fall down in TE 2012-13.

Consumption pattern change revealed that 10-13 per cent increase in the consumption of cereals, fruits and vegetables was observed in all the zones. In TE 2012-13, the quantity consumption of all food commodities except coarse grain and millets has increased in most of the zones.

The linkage between the crop diversity and dietary diversity analysis revealed that in TE 2012-13 dietary diversification coincided with crop diversification in north, north- eastern and Cauvery delta zones and over the last decades all the production zone exhibiting improvement in the dietary diversity through the market purchase.

Present level nutrient security was estimated from the current consumption pattern (2011-12 68th round NSSO) at different zone level and compare with the RDA. Except fat, calcium, vitamin B2 and vitamin C, the intake of all other nutrients still below the Recommended Dietary Allowance (RDA). Same pattern of nutrient intake was observed in all the agro-climatic zones of Tamil Nadu. The protein intake of Central zone (64.48 g) and High Rainfall zone (64.45 g) was more than the RDA in TE 2012-13.

Dietary diversity linkage to the different income group showed a positive relationship in all levels of income groups. As compared to the low - income households, there was a higher possibility of more diet diversity in middle and high income households.

Considering the study result of larger gap in energy, crude fiber, iron and vitamin A in the state and it has further widened in low-income non-farm groups, appropriate nutritional security programmes may be initiated particularly covering children, pregnant women and aged people. The dietary optimization model results revealed that pulses, fruits, vegetables and oilseeds predominant zone like northeastern, central and western zones achieved higher nutrient targets at minimum cost. The crop diversity plays a greater role in achieving the nutritional security among the farm consumer than non-farm consumer.

CARDS/MDU/AEC/2018/002 An Economic analysis of Production and Marketing of Barnyard millet (Kudiraivali) in Southern districts of Tamil Nadu (Dr.A.Sundar)

The value addition of barnyard millet enhanced from Rs. 30,770 to Rs. 41,832 per quintal which was 35.95 per cent over the existing channel. Scarcity in rainfall, non-availability of quality seed, pest and disease attack and labour shortage were the major production problems faced by barnyard millet growers. Price fluctuation followed by late payment from the traders and transportation cost were the major marketing problems faced by the farmers. It is suggested that introduction of new varieties suitable for all southern districts of Tamilnadu and Mechanization in

processing of millets (Small size miller) to improve the quality and to solve the labour scarcity problems may be done.

B. Action Plan (2021-2024)

| Theme No:1 | Title | Economics of Agricultural Production and Planning | | |
|--|---|---|---|---|
| Theme Leader | Dr.K.R.Karunakaran | | | |
| Name of the Scientists and Centre | 2021-22 | 2022-23 | 2023-24 | Deliverables/ expected output |
| Project 1: Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops in Tamil Nadu | | | | |
| Coimbatore: Dr.D.Suresh Kumar Dr. V.Karthick | Collection and compilation of cost data on major crops Collection of input and output price data for major crops | Collection and compilation of cost data on major crops Collection of input and output price data for major crops | Collection and compilation of cost data on major crops Collection of input and output price data for major crops | Data on inputs, output, costs, farm inventory and social dynamics Inputs for implementing price policies |
| Project 2: A Study on Varietal Adoption and Consumer's Preference of Rice Varieties in Cauvery Delta Region | | | | |
| Eachankottai Dr.V.Saravanakumar | Data collection Analysis of data Report submission | | | Varietal adoption in rice and consumer preferences of rice variety in CDZ |
| Project 3: Assessment of Impact of Mechanization on Rice fallow Pulses in Thanjavur District | | | | |
| Eachankottai Dr.S.Angles | Data collection Analysis of data Report submission | | | Impact of mechanisation on rice fallow pulses Alternate strategies for the revival of rice fallow pulses in the delta. |

| | | | | |
|--|--|--|--|--|
| Project 4: Socio economic assessment of High Density Planting in Mango and Guava | | | | |
| Trichy Dr.S.Senthilnathan | Data collection Analysis of data Report submission | | | Economics of High density planting |
| Project 5: Doubling Farmers Income : An Empirical Analysis on Relationship between Crop Diversification and Farm Income | | | | |
| Madurai Dr.A.Malaisamy | Data collection Analysis of data Report submission | | | Drivers of Crop diversification will be identified |

| | | | | |
|---|--|--|--|--|
| Theme No:2 | Title | Agricultural Marketing and Price Analysis | | |
| Theme Leader | Dr.K.N.Selvaraj | | | |
| Name of the Scientists and Centre | 2021-22 | 2022-23 | 2023-24 | Deliverables/ expected output |
| Project 1: Institution of Endowment Chair in Agricultural Marketing | | | | |
| Coimbatore Dr.K.N.Selvaraj Dr.R.Parimalarengan | Research on marketing issues and capacity building | Research on marketing issues and capacity building | Research on marketing issues and capacity building | Commodity reports on marketing of important Crops |
| Project 2: Causes and Consequences of e-NAM on the Economic Development of Indian Agriculture – A Case Study | | | | |
| Coimbatore Dr.K.M.Shivakumar Dr.M.Prahadeeswaran Dr.N.Kiruthika Dr.S.R.Padma | Bottlenecks in e-NAM, Formulation of strategies and develop case studies and success stories | | | Preparation of policy reports Policy implications for promotion of e-NAM |
| Project 3: Impact of COVID-19 on Vegetable marketing in Madurai District | | | | |
| Madurai Dr.R.Rajesh | Data Analysis Report preparation | | | Identification of challenges and alternate vegetable market linkages in response to COVID-19 |

| Project 4: Value Chain Analysis of Castor: A Study in Salem District | | | | |
|---|---|--|--|--|
| Yethapur Dr. T. Rajendran | Data collection Analysis Report preparation | | | Value chain in castor will be identified |

| Theme No:3 | Title | Natural Resources and Environmental Economics | | |
|-----------------------------------|-------------------|--|---------|-------------------------------|
| Theme Leader | Dr.D.Suresh Kumar | | | |
| Name of the Scientists and Centre | 2021-22 | 2022-23 | 2023-24 | Deliverables/ expected output |

| Project 1: Frontier Agricultural Technologies for Climate Change Adaptation and Mitigation: Policy Options for Innovations and Technology Diffusion | | | | |
|--|--|--|--|--|
| Eachangkottai Dr.V.Saravanakumar Dr.R.Balasubramanian Dr.K.Boomiraj | Data collection Analysis of data Report submission | | | Socio-economic impact of frontier technologies in rice and sugarcane production Determinants of farmer's preference in adoption |

| Project 2: Micro Irrigation in Tamil Nadu: An Analysis of Issues, Potentials and Strategies | | | | |
|--|--|--|--|--|
| Coimbatore Dr.D.Suresh Kumar Dr.K.R.Ashok Dr.P.Balasubramanian Dr.V.Karthick | Data collection Analysis of data Report submission | | | Extent of adoption, dis-adoption of micro irrigation and the factors influencing the adoption. Economic viability of adoption of micro irrigation |

| Project 3: An Inquiry into Rural Households Participation in Neem Seed Collection and Market Arrivals in the Light of Covid-19 Disaster | | | | |
|--|--|--|--|---|
| Coimbatore Dr.D.Suresh Kumar Dr.A.Vidhyavathi | Data collection Analysis of data Report submission | | | Participation of rural households in neem seed collection Market Arrivals of neem seed |

| | | | | |
|---|--|----|----|---|
| Project 4: An Assessment of Agricultural Vulnerability to Climate Variability in Tiruchirappalli District of Tamil Nadu. | | | | |
| Trichy Dr. R. Salvadi Easwaran | Analysis of data and Report Submission | .. | .. | Vulnerability index relating to the impact of climate variability |
| Project 5. An Economic Analysis of Vulnerability, Resilience and Adaptation to Climate Change on Livelihood Security and Crop Planning of Dry Land Farms of Madurai District | | | | |
| Madurai Dr.J.S. Amarnath Dr.B.Sivasankari | Analysis of data, Report Submission | | | Optimal plan for dryland farms |

| Theme No:4 | Title | Impact Evaluation of Development Projects | | |
|---|--|--|---------|--|
| Theme Leader | Dr.D.Suresh Kumar | | | |
| Name of the Scientists and Centre | 2021-22 | 2022-23 | 2023-24 | Deliverables/ expected output |
| Project 1 : Impact Evaluation of Watershed Development Projects implemented under Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) - (Earth while IWMP) during 2009-10 | | | | |
| Coimbatore Dr.D.Suresh Kumar Dr.K.R.Ashok Dr.S.Padma Rani Dr.S.Varadha Raj. | Data analysis and report preparation | | | Impacts of Watershed development programmes in the state |
| Project 2 : Impact Evaluation of Watershed Development Projects implemented under Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) - (Earth while IWMP) during 2011-12 | | | | |
| Coimbatore Dr.D.Sureshkumar, Dr.K.R.Ashok, Dr.S.Padma Rani Dr.S.Varadha Raj | Data analysis and report preparation | | | Impacts of Watershed development programmes in the state |
| Project 3: Impact Evaluation of Watershed Development Projects implemented under Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) – (Earth while IWMP) during 2014-15 | | | | |
| Coimbatore Dr.D.Sureshkumar, Dr.K.R.Ashok, Dr.S.Padma Rani Dr.S.Varadha Raj | Filed visits Collection Report preparation Submission of Final report | | - | Impacts of Watershed development programmes in the state |

| Theme No:5 | | Title | | Labour and Employment | |
|---|--|--|---------|------------------------------|--|
| Theme Leader | | Dr.C,Sekar | | | |
| Name of the Scientists and Centre | | 2021-22 | 2022-23 | 2023-24 | Deliverables/ expected output |
| Project 1: An Analysis of Higher Education, Placement, Employment and Earning Contours of TNAU Farm graduates during the Pre and Post COVID 19 Regimes | | | | | |
| Coimbatore | | Collection of data | | | Structural change in placement and employment of farm graduates in institutional and non-institutional domains during the pre and post Covid 19 regimes. |
| C. Sekar | | Report preparation | | | |
| Shibi Sebastian | | | | | |
| Project 2: Structural changes in Rural Employment and Its Implications for Agriculture | | | | | |
| Madurai | | Analysis of data and Report submission | | | Impact of rural employment in standard of living among rural households and agriculture |
| Dr.A.DanielViswasam Samuel | | | | | |

| Theme No. 6 | | Title: Artificial Intelligence & Big Data Analytics | | | |
|--|--|--|---------|---------|---|
| Project 1: Artificial Intelligence & Big Data Analytics in Food & Agriculture | | | | | |
| Theme Leader | | Dr.K.M.Shivakumar | | | |
| Name of the Scientists and Centre | | 2021-22 | 2022-23 | 2023-24 | Deliverables/ expected output |
| Coimbatore | | Design and conduct courses in artificial intelligence, machine learning and Big Data Analytics | | | Develop networks with agro industries, commodity exchanges, consultancy firms for improved networking of academia with industries |
| Dr.K.M.Shivakumar | | | | | |
| Dr.M.Kalpana | | | | | |
| Dr.C.S.Sumathi | | | | | |

C. Details of research projects

A total of 33 projects were reviewed. Out of which four externally funded projects, seven Core projects and three University Research projects were completed; Ten university research projects and nine external funded projects are ongoing in the department of Agricultural economics.

II.CURRENT STATUS OF RESARCH PROJECTS

| Campus | University sub projects | | Core projects | | Externally funded projects | | Total | |
|---------------|-------------------------|-----------|---------------|-----------|----------------------------|----------|-----------|-----------|
| | Completed | Ongoing | Completed | Ongoing | Completed | Ongoing | Completed | Ongoing |
| Coimbatore | 2 | 1 | 3 | .. | 2 | 8 | 7 | 9 |
| Madurai | 1 | 3 | .. | .. | .. | .. | .. | 4 |
| Trichy | .. | 2 | 3 | .. | .. | .. | 3 | 2 |
| Killikulam | .. | .. | .. | .. | .. | .. | .. | .. |
| Periyakulam | .. | .. | 1 | .. | 1 | .. | 2 | .. |
| Echangottai | .. | 2 | .. | .. | 1 | 1 | 1 | 3 |
| Mettupalayam | .. | .. | .. | .. | .. | .. | .. | .. |
| Vazhavachanur | .. | .. | .. | .. | .. | .. | .. | .. |
| Kudumiyamalai | .. | 1 | .. | .. | .. | .. | .. | 1 |
| Yethapur | .. | 1 | .. | .. | .. | .. | .. | 1 |
| TOTAL | 3 | 10 | 7 | .. | 4 | 9 | 13 | 20 |

New Projects Proposed During 2020-21

| Campus | University sub projects | | Externally funded projects | | Consultancy Projects/ Policy Studies | | Total | |
|---------------|-------------------------|----------|----------------------------|----------|--------------------------------------|----------|-----------|-----------|
| | Proposed | Obtained | Proposed | Obtained | Proposed | Obtained | Proposed | Obtained |
| Coimbatore | .. | .. | 25 | 7 | 6 | 1 | 31 | 8 |
| Madurai | .. | .. | 3 | .. | .. | .. | 3 | .. |
| Trichy | .. | .. | 1 | .. | .. | .. | 1 | .. |
| Killikulam | .. | .. | .. | .. | .. | .. | .. | .. |
| Periyakulam | .. | .. | 1 | .. | .. | .. | 1 | .. |
| Echangottai | 2 | 2 | .. | .. | .. | .. | 2 | 2 |
| Mettupalayam | .. | .. | .. | .. | .. | .. | .. | .. |
| Vazhavachanur | .. | .. | .. | .. | .. | .. | .. | .. |
| Kudumiyamalai | .. | .. | .. | .. | .. | .. | .. | .. |
| TOTAL | 2 | 2 | 30 | 7 | 6 | 1 | 38 | 10 |

D. Remarks of the ongoing projects

| Sl. No. | Project Number | Project Title | Project Period | Project Leader (PI/Co-PI) | Remarks |
|-----------|-----------------------------------|--|------------------------------|--|---|
| a. | Externally funded Projects | | | | |
| 1 | GOI/CARDS/CBE /AEC/1970/R001 | Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops in Tamil Nadu | Continuous Scheme Since 1970 | Dr.D.Suresh Kumar Dr.V.Karthick | Continuous Scheme Project activities may be carried out as per the plan |
| 2 | SDPC/CARDS/CBE /AEC/2021/R024 | Micro Irrigation in Tamil Nadu: An Analysis of Issues, Potentials and Strategies | Feb-2021 to June-2021 | Dr.D.Suresh Kumar Dr.K.R.Ashok Dr.P.Balasubramanian Dr.V.Karthick | The project may be completed in time |
| 3 | CIL/CARDS/CBE/AEC/2020/RO23 | An Inquiry into Rural Households Participation in Neem Seed Collection and | 01.01.2021 to 30.06.2021 | Dr.D.Suresh Kumar Dr.A.Vidhyavathi | The project may be completed in time |
| 4 | TAWDEVA/CARDS/CBE/AEC/2020 / R021 | Impact Evaluation of Watershed Development Projects implemented under Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) - (Earth while IWMP) during 2009-10 | Sep-2020 to Mar-2022 | Dr.D.Suresh Kumar Dr.K.R.Ashok Dr.S.Padma Rani Dr.S.Varadha Raj | The project may be completed in time |
| 5 | TAWDEVA/CARDS/CBE/AEC/2020 / R022 | Impact Evaluation of Watershed Development Projects implemented under Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) - (Earth while IWMP) during 2011-12 | Sep-2020 to Mar-2022 | Dr.D.Suresh Kumar Dr.K.R.Ashok Dr.S.Padma Rani Dr.S.Varadha Raj | The project may be completed in time |

| | | | | | |
|---------------------------------------|------------------------------------|--|----------------------|--|--|
| 6 | TAWDEVA/CARD S/CBE/AEC/2021 / R001 | Impact Evaluation of Watershed Development Projects implemented under Pradhan MantriKrishiSinchay eeYojana (PMKSY) - (Earth while IWMP) during 2014-15 | Apr-2021 to Mar-2022 | Dr.D.Sureshkumar, Dr.K.R.Ashok, Dr.S.Padma Rani Dr.S.Varadha Raj | The project may be done as per the plan |
| 7 | C31 AES | Causes and consequences of e-National Agriculture Market (e-NAM) on the Economic Development of Indian Agriculture – A Case Study | 2019 to 2022 | M.Shivakumar Dr M. Prahadeeswaran Dr. N. Kiruthika Dr.S.R.Padma | The project may be done as per the plan |
| 8 | NAHEP/CBE/ABD /2019/E001 | Artificial Intelligence and Big Data Analytics in Food & Agriculture | 2019 to 2022 | Dr.K.M.Shivakumar Dr.M.Kalpana Dr.C.S.Sumathi | The project may be done as per the plan |
| 9 | ICSSR/ACRI/ECK /DSS/ECO/2020/ R002 | "Frontier Agricultural Technologies for Climate Change Adaptation and Mitigation: Policy Options for Innovations and Technology Diffusion" | 2019 to 2021 | Dr.V.Saravana kumar Dr.R.Balasubra manian Dr.K.Boomiraj | The project may be done as per the plan |
| b. University Research Project | | | | | |
| 1 | CARDS/TRY/AEC /2019/001 | Socio Economic Assessment of High Density Planting Technology in Mango and Guava | Sep-2019 to Aug-21 | Dr.S.Senthilnathan | Complete the project as per the time schedule. Send the extension Proposal for approval. |

| | | | | | |
|---|----------------------------|---|-----------------------|--------------------------------------|--------------------------------------|
| 2 | CARDS/CBE/AEC/2020/001 | An Analysis of Higher Education, Placement, Employment and Earning Contours of TNAU Farm graduates during the Pre and Post COVID 19 Regimes | Aug-2020 to June 2022 | Dr.C. Sekar | The project may be completed in time |
| 3 | CARDS /MDU /AEC/2020/001 | Impact of COVID-19 on Vegetable marketing in Madurai District | Oct-2020 to Oct-2021 | Dr.R.Rajesh | The project may be completed in time |
| 4 | CARDS/ MDU/ AEC/2020/002 | An Economic Analysis of Vulnerability, Resilience and Adaptation to Climate Change on Livelihood Security and Crop Planning of Dry Land Farms of Madurai District | Oct-2020 to Sep-2022 | Dr.J.S. Amarnath Dr.B.Sivasankari | The project may be completed in time |
| 5 | CARDS/ECK/AEC/2021/001 | A Study on Varietal Adoption and Consumer's Preference of Rice Varieties in Cauvery Delta Region | 2021 to 2022 | Dr.V.Saravanakumar | The project may be completed in time |
| 6 | CARDS/ MDU /AEC/2018/001 | Structural Changes in Rural Employment and Its Implications for Agriculture | June 2018 to May 2021 | Dr.A.DanielViswasm Samuel | The project may be completed in time |
| 7 | CARDS/TRY/AEC/2018/001 | An Assessment of Agricultural Vulnerability to Climate Variability in Tiruchirappalli District of Tamil Nadu. | Jan 2018 to Dec 2021 | Dr.R.SalvadiEaswaran | The project may be completed in time |
| 8 | No.CARDS/ECK/ AEC/2020/001 | Assessment of Impact of Mechanization on Rice fallow Pulses in Thanjavur District | Apr-2020 to Mar-21 | Dr.S.Angles | The project may be completed in time |

| | | | | | |
|----|------------------------|---|----------------------|------------------|---|
| 9 | CARDS/MDU/AEC/2019 | Doubling Farmers Income: An Empirical Analysis on Relationship between Crop Diversification and Farm Income | Oct-2019 to Mar-2022 | Dr.A.Malaisamy | Complete the project as per the time schedule. Use only secondary data for analysis and |
| 10 | CARDS/YTP/AEC/2020/001 | Value Chain Analysis of Castor: A Study in Salem District | Sep-2020 to Aug 2022 | Dr. T. Rajendran | The project may be completed in time. |

III. DEPARTMENT OF AGRICULTURAL EXTENSION AND RURAL SOCIOLOGY

RPA I Monitoring of Adoption and Impact

Monitoring and evaluation of the adoption of varieties, technologies, machineries and other inputs on continuous basis is one of the important processes in the technology development and delivery system. This process will give concrete feedback on varieties and technologies to the research system. The level of adoption of technologies / varieties, adopter categories, diffusion of innovations will show the current status of technologies spread and status of production, productivity and income of the farmers. Accordingly, objectives with regard to monitoring of adoption and Impact are framed for implementation.

- Diffusion and adoption levels of new varieties / hybrids, crop management technologies and farm machinery / implements introduced by TNAU.
- Studies on adopter categories in the changing agricultural scenario.
- Study the impact of KVKs on farmers' prosperity.
- Conducting participatory monitoring and impact assessment of different schemes, interventions and special programmes implemented by TNAU, Agriculture department and other stakeholders.

RPA 2 Extension Research on ICT in Agriculture

ICT in agricultural extension is an emerging field focusing on the enhancement of agricultural and rural development in India. It involves application of innovative ways to use Information and Communication Technologies (ICT) in agricultural extension. The advancements in ICT can be utilized for providing accurate, timely, relevant information and services to the farmers, thereby facilitating an environment for more remunerative agriculture. However, all the ICT initiatives are not uniform with disparities between regions in the level and quality of telecommunications, information and the effort of individuals, public and private organizations and differentiated nature of demand of the farmers in different areas. As a result, there have been many successes, failures, lessons learned and experience gained, so far.

While these initiatives are intended to address the needs of the farmers through ICT, their actual usage and their ability to bring significant impact on the farm productivity and socio-economic development of the intended beneficiaries is to be studied.

- Use of Artificial Intelligence in technology delivery to farmers.
- Development and validation of the online contents for ICT projects.
- Organization of stakeholders meets for identification and development of ICT tools.
- Evaluation of ICT projects implemented in Agriculture by the Government, NGOs and Private Organization.
- Harnessing the different ICT tools and its effectiveness in ToT and empowerment of farmers.
- Development of new extension process for the content development suitable to different ICT tools including mobile, social media and portal.

RPA 3 Gender Studies and Livelihood of Tribal Farm Women

Women folk extensively involved in production of crops particularly, in land preparation, seed selection and seedling production, sowing, applying manure, fertilizer and pesticide, weeding, transplanting, threshing, winnowing and harvesting; in livestock production, fish processing, collection of non-timber forest produces (NTFPs) etc. In animal husbandry, women have multiple roles ranging from animal care, grazing, fodder collection and cleaning of animal sheds to processing of milk and livestock products. The majority of workers involved in collection of non-timber forest produces (NTFP) are women, particularly tribal women. Women also augment family resources through tasks such as collection of fuel, fodder, drinking water and water for family members and domestic animals. In the changing agrarian structure and economic relations, women's role in family farms is constantly increasing. The recent studies have indicated that men's role in family farms is declining rapidly and they shift to non-farm wage employment in urban and peri-urban areas. In this context, the following research areas are important for the empowerment of women folk.

Hence, the gender related studies would be focused to offer policy inputs, feedback to the research system and to develop new extension strategies for mainstreaming the gender in agriculture.

- Role of gender in agriculture and allied activities.
- Studies on constraints encountered by the farm women.
- Gender budgeting for different development departments and sectors.
- Strategies to overcome the drudgery of farm women.
- Livelihood opportunities of farm women through technological interventions.

RPA 4 Youth and Training

A large percentage of the population of India is under 18 years of age and the majority of the overall population lives in rural areas. It follows that young people make up a considerable portion of rural population. These young people represent the farm families of the future. Large number of rural youth is migrating to

urban areas for seeking white colour jobs in the wake of declining the profitability of agriculture. One of the strategies to retain youth in agriculture is providing skill training in selected agriculture based entrepreneurial ventures to rural youth and making them become an entrepreneur. Extension research will make efforts to retain young people in agriculture and allied activities.

- Shifting pattern among rural youth from agriculture and its impact.
- Factors responsible for the movement of youth from agriculture.
- Entrepreneurial need analysis of rural youth in Tamil Nadu.
- Skill training on agro-based entrepreneurial ventures to SC/ST rural youth.
- New extension strategies to retain the rural youth in agriculture.

RPA 5 Tank Irrigation Management and Farmer Organizations

Tank irrigation resource is very vital in sustaining agriculture and livelihood of rain-fed farmers. Studies on tank irrigation management, water users association and farmers' interest groups will give insight into the dynamics and sustainability of such groups and federations. Strong and willing participation of the farmers in such collective modes need to be encouraged as it guarantees not only better income but also societal outcome. Hence, it is very important to study the function of farmers' discussion groups, role of farmer interest groups, commodity groups and farmer producer organizations in terms of process, adoption of market-led extension approaches and dissemination of technologies.

- Institutional effectiveness of tank performance and its effect on agriculture.
- Group dynamics of farmers groups and farmers producers organizations.
- Documentation of the value chain system in commodity groups / farmers producer organizations.
- Skill gap assessment in the farmer producers' organizations and farmers groups.

A. Key findings of Completed Projects

Externally Funded Projects

DST/CARDS/MDU/EXT/2017/R006 - Empowerment of SC/ST Rural Youth through Skill Development and Entrepreneurship Programmes
Dr. P.P. Murugan, Professor (Agri.Extension),
Controllerate of Examinations, TNAU, Coimbatore -641 003.

The operational area of the project covers eight districts in Western Zone of Tamil Nadu namely Dharmapuri, Salem, Namakkal, Erode, Coimbatore, The Nilgiris, Tiruppur and Dindigul.

Key findings

- As per the mandate of the research projects, The preferred ventures required by the rural youth of all the eight districts were analysed through Participatory Rural Appraisal (PRA) technique and the top three

Entrepreneurial Ventures preferred by the rural youth of various districts was presented below

- For Salem District, Horticultural nursery production was preferred as first and foremost Potential Entrepreneurial Ventures. Vermicompost production were assigned second highest score followed by Honey Bee rearing was ranked third preferred ventures.
- For dharmapuri district, Millet based value added products were ranked first. Mushroom cultivation was ranked second highest score by the rural youth and Vermicompost production ranked third preferred ventures.
- Potential Entrepreneurial Ventures for Dindigul District was also studied, the rural youth expressed that Horticultural nurseries were ranked first preference followed by Honey Bee rearing as ranked second. Vermicompost production was assigned third preference by the rural youth.
- In Namakkal district, Cattle/Goat rearing and Management were ranked first Vermicompost production were ranked second. Composite carp cultivation and Seed production of high value crops were assigned third and fourth preference by the rural youth,
- Vegetable cultivation, vermicompost production and Mushroom cultivation were the most preferred ventures by the rural youth of Coimbatore districts.
- Rural Youth of Tiruppur district expressed that Cattle/Goat rearing and management, vermicompost production and Mushroom cultivation as first, second and third opted venture.
- In Erode, the respondents of rural youth opined that Millet Based Value added products, Cattle/Goat rearing and Management and Vermicompost production as their willing ventures.
- Similarly, the Youth from the Nilgiris suggested that Cattle/Goat rearing and Management, Vegetable cultivation and Honey Bee rearing as top three preferred entrepreneurial ventures.

Training Effectiveness

- In order to find out the effectiveness of training programme in terms of knowledge increase, pre and post training knowledge test was conducted for each and every training programme and the pooled results shows that Millet based trainings along with Value addition saw a whopping 64.16 per cent increase in knowledge among the youth. Though millets were widely cultivated earlier, it gradually declined due to many factors. Millet cultivation has transformed a lot with value addition practices in current scenario. Training content with value addition prospects immensely served the youth and improved their knowledge to a greater extent
- There was an increase in knowledge at the level of 44.50 per cent with respect to Cattle/ Goat rearing management..
- Horticultural Nursery related trainings witnessed an increase in knowledge up to 42.50 per cent. Nurseries are advantageous preferred to direct planting, which was commonly followed by the youth involved in horticulture. Nursery techniques along with transplanting practices serve as a wholesome package to expand the participation of youth in horticulture, improving their knowledge to a considerable extent.
- More than one-third (38.50 per cent) increase in knowledge was witnessed among the respondents who received training related to honey bee

production. A lot of youth are aware about the benefits of honey, yet they are not much aware about its production and marketing prospects. Beehives and whole package of practices to be followed made up the training content, improving the knowledge level of youth to some extent.

- Regarding Vermi-compost production, 36.70 per cent of increase in knowledge level was observed. Though the youth were aware about the benefits of earthworms in agriculture, they seldom knew stuffs related to vermi-compost production and maintenance. Hence the training was useful for the youth to learn the vermi composting practices practically and hence the increase in knowledge was obvious.
- Exactly one-third (33.33 per cent) increase in knowledge was observed among the respondents who attended trainings regarding Mushroom production and marketing. Mushroom and its cultivation practices were relatively unknown among the youth. They were provided with training regarding the cultivation aspects and environment required for better yield. Marketing prospects were also included in the training content, reporting an increase in knowledge among the youth.

Entrepreneurial Ventures Promoted / Guided

- In continuation to the training programme, inputs such as mushroom spawn, honey bee box with bee, vermicompost production poly bag were purchased and supplied to the rural youth to start entrepreneurial activities. Proper guidance and scientific approach were also given to the youth who is already having various entrepreneurial activities. Accordingly, 33 entrepreneurs i.e., Cattle and Goat Rearing and their management (14 Nos.), Honey Bee rearing (8 Nos.), Horticultural Nurseries (6 Nos.), Vermicompost Production (2 Nos.), Mushroom production (2 Nos.) and Millet based Value added products (1 No.)

Perceived impact of skill training programme

Social Dimension

Increased social recognition, increased social contacts and increased social participation emerged as major perceived impacts with respect to the social dimension.

Personal Dimension

The rural youth expressed that increased confidence, feeling of self empowerment, Development of self respect and increase in knowledge and skill emerged as major perceived impacts with respect to personal dimension.

Policy Implications

- Establishment of Centre for Youth Development
- Establishment of Community Computer Centers for getting agricultural and Entrepreneurial technologies
- Regular Entrepreneurship advisory services and Marketing Information
- Formation of Entrepreneurship clubs and capacity building for rural youth
- Promoting Youth in Horticultural Sector

1. CARDS/CBE/AEX/2020/001 - MGNREGA Implementation in Tamil Nadu: Problems, Prospects and Remedial Strategies

Dr.P.Balasubramaniam, Principal Investigator, Professor & Head, Department of Agriculture Extension & Rural Sociology, TNAU, Coimbatore.

Dr.N.Sriram- Co –Principal Investigator, Programme coordinator, KVK, Virudhachalam

Salient findings

I.Socio economic characteristics of beneficiaries: Socio-Economic Characteristics of MGNREGA beneficiaries

- Majority of the beneficiaries (43.50 per cent) was found to belong middle age group followed by 31.50 and 25.00 per cent in the old and young age groups respectively.
- Majority of the beneficiaries (84.00 per cent) were females while only 16.00 per cent of the beneficiaries were males.
- Almost all the (88.50 per cent) of beneficiaries were found to have nuclear family system while very few (11.50 per cent) per cent age of beneficiaries were reported to live in joint family system.
- About 83.5 percent of beneficiaries studied up to primary level and very meager level of beneficiaries were semi illiterate
- More than half of the beneficiaries (54.50 per cent) had MGNREGA as their occupation while more than one third of the beneficiaries (36.50 per cent) had MGNREGA + wage earning as their source of income. Few beneficiaries (9.00 per cent) had MGNREGA and farming as their occupation.
- More than two-third of the beneficiaries (68.50 per cent) had more favourable attitude towards MGNREGA followed by one-fifth of the beneficiaries (20.00 per cent) had favourable attitude and remaining 11.50 per cent of beneficiaries had less favourable attitude towards MGNREGA scheme..
- Household articles possession: More than half of the beneficiaries (51.50 %) found to have medium level of house hold article possession followed by low level of house hold possession among 35.50 per cent of the beneficiaries. Only 13.00 per cent of the beneficiaries found to have high level of house hold article possession.
- In MGNREGA period the beneficiary's savings behaviour had shown significant improvement with the number of households increasing to 31.7 percent

II. Extent of participation of beneficiaries in MGNREGA Participation of beneficiaries in village works

- In participation of beneficiaries in village works, cent per cent of beneficiaries participated in land development works followed by 87.00 per cent participated in water conservation works
- More than half of the beneficiaries (55%) participated in agriculture related work in panchayat and in private farms.

- About 65.00 per cent of beneficiaries participated in rural sanitation work. Every week end, they have work allocation on rural sanitation.
- Nearly half of the beneficiaries (48.50 per cent) had regular participation in Gramasabha meeting and 30 percent of beneficiaries were attending the work of work site selection, maintenance of attendance, verifying job cards, NMR register and participating in scrutiny of ongoing works, preparation of bills, closing week account and submitting it to block office

III. Socio-economic impact among beneficiaries due to the MGNREGA

- Majority of the MGNREGA beneficiaries (75%) expressed that there is regular employment and income
- The proportion of borrowers was marginally higher among the beneficiaries (58.3 percent) prior to joining MGNREGA scheme. Inadequacy of income coupled with lack of proper employment and indiscriminate spending may have caused the households to resort to increased borrowing. However the proportion of borrowers significantly declined after joining the MGNREGA scheme 34 percent
- Increased household purchase and payment of children's school fees in time (82.00 percent)
- Improved access to basic health, education, credit, reduced tensions between young and old, distress migration, improvement in women's decision making power, reduced social exclusion, improved participation in the community and betterment in village (50.00 percent)

IV. Suggestions –MGNREGA

- MGNREGA workers may be given farm works namely bund formation, establishment of live fencing, planting of trees, digging of pith for planting, harvesting and weeding with equal share of farming community and Govt.
- Government may share fifty percent and farmers may share fifty percent of the cost of MGNREGA workers.
- The works may be monitored jointly by the MGNREGA officials and farmers, which counter signed by the AAOs / any other competent authority of the village.
- Depending upon the skills, the works may be allotted to MGNREGA workers for improving the efficiency level.
- Skill training on Agriculture, Allied Sector and Non-agriculture sector related topics may be given to interested MGNREGA workers for starting new self employment activities for getting additional income.
- MGNREGA workers may be effectively utilized for raising of nursery and tree nursery at rural areas in collaboration with Forest Department for increasing the afforestation and area under forest.
- During peak hours of agricultural operation, the MGNREGA workers must be shifted to farming operations with MOU of farmers and village panchayat.
- Each MGNREGA workers should create a social forestry in every panchayat and should be maintained throughout years with minimum cost. Nominal cost may be fixed and given to workers for maintenance of the social forestry.

- Reduction in supply of farm labour alone with the support of a number of Government schemes, including MGNREGA, has led to an escalation in farm wages, which is adversely impacting the profitability of the farmers, claimed by the farming community.
- Due to minimum work load in MGNREGA, the efficiency of the labourers work have also reduced drastically which will also reflected in the farming operation while workers performing in the field, claimed by farming community.
- MGNREGA workers are not reporting the farm operation in early hours (normally agricultural labours start the work an early hours and complete the work an early, this is the trend usually practically in all farming operation) due to MGNREGA works, the labours tendency to come to farm works similar to MGNREGA work schedule which is not suitable for farming operation, claimed by farmers

3. CARDS/CBE/AEX/2019/002

Identification of Avenues to retain Youth in Rural Areas

(Dr. S. Kalaivani, Ph.D,Associate Professor)

Distribution of respondents according to push factors:

- More than 95.00 per cent (96.77 percent) of the respondents expressed lack of good price for agricultural commodities in the market followed by conversion of agricultural lands into plots (93.33 per cent). Ninety per cent of the respondents expressed that wages paid for the agricultural works like land preparation, sowing, planting, weeding and harvesting were less and insufficient to run their life and hence they were shifting from villages.
- The respondents (88.33 per cent) revealed that labour problem as the reason for migrating from villages followed by small land holdings and low production and burden of loan expressed each by 86.77 per cent of the respondents.
- Unemployment and under employment in rural areas and poverty (83.33 per cent), drought and scarcity of water (81.77 per cent), lack of non-agricultural jobs in rural settings (80.00 per cent), non availability of inputs at required time (75.00 per cent), population growth and lack of infrastructure facilities (70.00 per cent) and lack of institution for higher education (65.00 per cent) were the push factors expressed by the respondents.

Distribution of respondents according to pull factors:

- Availability of good infrastructure facilities such as hospitals, schools and marketing facilities attracted more than 90.00 per cent (991.77 per cent) of the rural youth. Each 85.00 per cent of the respondents said employment opportunities, high income and better social life and standard of living were the pull factors followed by higher level of educational facilities (81.00 per cent) and lower risk from natural hazards (50.00 per cent).

Constraints perceived by the respondents:

- More than 90.00 per cent (93.33 per cent) of the respondents expressed lack of remunerative prices for farm produce as major constraint to be active in

agriculture followed by lack of proper market intelligence (86.77 per cent), lack of proper market information (85.00 per cent), lack of finance (83.33 per cent), lack of proper storage facilities (81.77 per cent), lack of farm managerial skills (78.33 per cent), lack of technical guidance (76.77 per cent) and lack of quality inputs and lack of farm machineries each at 75.00 per cent.

Empowerment needs of rural youth:

- Cent of the respondents wanted to have training on contemporary agricultural technologies, entrepreneurial skill development and effective farm management. Each 98.33 per cent of the respondents expressed that they need training on farm mechanization and farm diversification followed by training on accessing information related to agricultural marketing (96.77 per cent).
- The respondents (100%) suggested to have access to productive agricultural resources and formation of farm youth self-help groups followed by agro - industrial modernization 99.77 per cent), creation of credit and loan scheme for youth in agriculture (91.77 per cent) and inclusion/participation in programme planning related to agriculture and rural development (88.33 per cent).

Avenues identified to retain youth in rural areas:

1. Creation of more number of non agricultural employment opportunities in the villages like establishment of jam, pickle and squash preparation units, handicraft shops, hotels, bakery, catering, tailoring, automobile workshops, agricultural implements electric motor, tractor, repair workshops, etc.
2. Set up of Skill Development Centres by the Government in each block.
3. Suitable training programmes on the following may be organized for the youth in rural areas.
 - i. Training on contemporary agricultural technologies
 - ii. Training on entrepreneurial skill development in farm and non-farm sector
 - iii. Training on effective farm management
 - iv. Training on farm diversification
 - v. Training on farm mechanization
 - vi. Training on post harvest technologies
 - vii. Training on accessing information related to agricultural marketing
4. Establishment of Village Knowledge Centres
5. Formation of farm youth self help groups
6. Agro - Industrial modernization
7. Awareness creation on credit and loan scheme for youth in agriculture

3. CARDS/CBE/AEX/2019/003

Impact of TNAU - Venture Capital Schemes (VCS) on various stake holders (PI) (Dr.M.Shanthasheela, Associate Professor)

- During the year 2019-20, the acreage coverage of Coconut Tonic is 18026.4 ac, Green Fodder (CN) stem cutting is 65.09 ac, Coconut Seedlings is 483.09 ac, Panchakavya is 1001.67 ac, Vermicompost is 36682.43 ac and Paddy seed is 17151.88 ac.
- 300 farmers surveyed and 98% of the farmers were satisfied about the quality of the VCS products.
- The entrepreneurial training was given in 65 areas like, Mushroom, Bee Keeping, Bakery Products, Vermicomposting, Organic farming, Kitchen Gardening, Roof top garden, Hydroponics etc., and 3177 participants benefitted
- Out of Rs.865.43 lakhs revenue generated, Rs.150.41 lakhs (17.38%) utilized for developing Infrastructure facilities like Machineries, Laboratory Equipment's, Civil works, Vehicle, Office automation facilities created for the stations.
- Identified Problems were labour shortage (70%), natural calamities (10%) and cost of the product was either very low or very high compared with current market price (25%).

4. CARDS /MDU /AEX/ 2019 / 001

Awareness, Knowledge and adoption of Sugarcane Technologies Popularization through AICRP scheme (Dr.R.Velusamy, Associate Professor)

Adoption of technologies by Sugarcane farmers popularized through AICRIP

Paired row system of planting

- All the AICRIP sugarcane farmers were adopted the technology continuously namely the spacing (75(25x25x25)/120cm), healthy setts, two budded setts (7 setts per meter), drip system of irrigation and placing the lateral between the row. Majority of AICRIP sugarcane farmers were adopted the technology namely preparation of setts just before planting and application of FYM with 93.33 and 73.33 per cent respectively. Half of the farmers were not adopted the technology namely planting either side of row.

Sustainable Sugarcane Initiative (SSI)

- AICRIP sugarcane farmers (100%) were adopted the component of SSI namely transplanting young seedlings, maintaining the wider space and drip irrigation. Majority of the farmers were adopted the fertigation through drip and intercropping with 86.66 and 80.00 per cent respectively. Farmers were not interested to raise the nursery using two budded chips in portray.

Pit method of Sugarcane Cultivation

- None of the AICRIP sugarcane farmers were adopted the pit method of sugarcane cultivation in the subsequent years after the demonstration conducted through AICRIP

Sub surface method of sugarcane cultivation

- Majority of AICRIP sugarcane farmers were continuing the adoption of placing the laterals below the 30 cm depth, inline drip laterals and planting eight two budded setts. Only half of the farmers were adopting the components namely lateral to lateral spacing and placing the dripper upwards with 63.33 and 56.66 per cent respectively.

Awareness, Knowledge and Adoption of technologies by Non - AICRIP Sugarcane farmers

Paired row system of planting

- All the Non AICRIP sugarcane farmers were aware and having knowledge on the technology namely planting healthy setts -7-8 months old, drip system of irrigation and preparation of setts just before planting. Cent per cent of farmers are aware about the number of two budded setts per meter and 88.33 per cent of non AICRIP farmers are having the knowledge about the number of two budded setts.
- Regarding adoption of sugarcane technology, cent per cent of non AICRIP farmers were followed the preparation of setts just before planting, number of setts per meter by 85.53 per cent, drip system of irrigation by 81.66 per cent, spacing by 73.33 per cent and lesser percentage of farmers were adopted the dual row planting in every row technology.

Sustainable Sugarcane Initiative (SSI)

- Non AICRIP sugarcane farmers (100%) were aware about the drip system, fertigation through drip and intercropping technology and 83.33 per cent of farmers were having knowledge. Regarding adoption of these components of technology, only 60.00 per cent of them were adopted.
- Half of the non AICRIP sugarcane farmers were adopted the spacing and planting of young seedlings. Very less number of farmers (11.66 percent) were adopted the raising of nursery using single budded chips in portray.

Pit method of cultivation

- Fifty per cent of Non AICRIP farmers were aware and having knowledge about the some components of pit method technology namely 7-8 months old cane for planting, carbendazim recommendation and soak the pit before planting. None of the farmers were adopted the pit method of sugarcane cultivation.

Sub Surface Method of Sugarcane cultivation

- Majority of the Non AICRIP farmers were aware about the some components of sub surface method of sugarcane cultivation namely planting two budded setts, planting either side of furrow and form drenches. None of the farmers were adopted the sub surface method of sugarcane cultivation.

Impact of adoption of popularized sugarcane Technology through AICRIP:

- Majority of the farmers were cleared the debts in the bank, relatives and money lenders from 50,000 to 2, 00,000 (81.67 per cent) due to increased yield and income through the adoption of popularized sugarcane technology.

- All the adopted farmers were got social respect among the sugarcane growers and with villagers due the appreciation from the sugar factory officials. Also they established good linkage with the extension personnel of the state department and sugar factory.
- Half of the AICRIP farmers were increased the sugarcane area in the next year due to the additional yield from the demonstration of sugarcane technologies. (56.66 per cent).
- Majority (81.67 per cent) of the AICRIP sugarcane farmers were spent more money for their social and cultural aspects due to adoption of sugarcane technologies. Fifty to sixty per cent of AICRIP farmers were purchased jewels, farm implements and house hold articles due to the higher income from the adopted sugarcane technologies.
- One third of the AICRIP sugarcane farmers were saved the money in the range of Rs. 50,000-2,00,000.

Policy Implications:

- Training and Demonstration may be conducted in the latest sugarcane technologies by the extension officials of the State Department of Agriculture. The sugar factory extension officer is contacting the farmers only those who registered their cane with sugar factory.
- Government interventions are needed to rectify the delayed payment to sugarcane farmers from the factory.
- Most of the farmers are not concentrating or adopting the recommended practices for ratoon crop. Training and demonstration may be conducted for ratoon crop to increase the yield

5. CARDS/MDU/AEX /2019/003

Impact Analysis of TN-IAMP in Periyar Vaigai Command Area of Madurai District (Dr.K.Ramakrishnan, Assistant Professor)

Technology Impact

Crop Production

- Farmers (79.00 per cent) adopted VBN 6 Blackgram variety on their own in the subsequent years and seed dibbling with a spacing of 45x10 cm adopted by 67.00 per cent of farmers in the study area.

Crop Protection

- Farmers (80.00 per cent) adopted the light trap in the study area after the scheme is over, 50.00 per cent of farmers adopted the seed treatment with *pseudomonas fluorescens* @ 10 g/kg or *trichoderma viride* @ 4 g/kg of seeds 24 hrs before sowing and after the demonstration 57.50 per cent of farmers adopted the pendimethalin and fluchloralin as pre-emergence herbicides in the subsequent years.
- Majority (91.66 per cent) of the black gram farmers were obtained 20.00 per cent higher income due to adoption of recommended technology, half of (45.00 per cent) the farmers were deepened their well for irrigation from the additional income and 60.00 per cent of farmers have repaid their loan due to additional income from black gram.

Constraints faced by beneficiaries of TN-IAMP

- Majority of the farmers (93.33 per cent) were faced constraint on damage of crop by wild animals and more than four-fifth of the beneficiaries (90.83 per cent) were faced non – availability of inputs on time during the season starts.

B. Action Plan (2021-24)

| Theme No. 1 | Monitoring of Adoption and Impact | | | |
|--|--|---|--------------------------------------|---|
| Title | CSEAS/ACRI/KDM/AEX/2019/R001 Agricultural Mechanization in the midst of Unemployment in India: Case of Land Poor and Landless Labour in Cauvery Delta in Tamil Nadu | | | |
| Theme Leader | Dr.M.Jegadeesan, Asst Professor (Agrl. Extension) Dr.M Ramasubramanian, Associate Prof (Agrl. Extension) | | | |
| Name of the Scientists and Centre | Dr.M.Jegadeesan, Asst Professor (Agrl. Extension) Dr.M Ramasubramanian, Associate Prof (Agrl. Extension) AC&RI,Kudimiyanmalai and KVK,Thiruvarur | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Discussion with members of village panchayat, farmer's association, Block development officials and agricultural and rural development officials to understand key issues related with farm and nonfarm employment | Wealth ranking exercise through PRA will be carried out to identify the factors, which the community defines as important in the categorization of the socio economic position of households. | Data analysis and report preparation | <ul style="list-style-type: none"> To assess the economic impact of mechanization Effect on employment generation or labour displacement due to adoption of combined harvester. Socio economic impact of migration on regional economy |
| Title | CARDS / CBE / AEX / 2020 / 006 Preparation of Strategic Research and Extension Plan (SREP) for Coimbatore District | | | |
| Theme Leader | Dr. Ravi Kumar Theodore, Professor & Head, Training Division, DoEE, TNAU,Coimbatore | | | |
| Name of the Scientists and Centre | Tmt. R. Sasikala, Asst. Professor (Journalism), DoEE, TNAU, Coimbatore -3 | | | |

| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
|--|--|--|----------------|---|
| | Data collection | Data tabulation and analysis Report writing | - | <ul style="list-style-type: none"> Analyze the performance of sub-systems and supra systems in different farming systems To examine the problems and issues faced by farmers in different farming systems To develop a Strategic Research and Extension Plan (SREP) for Coimbatore district. |
| Title | CARDS/CBE/AEX/2020/007 Study on the adopter Categories of coconut growers in Coimbatore District | | | |
| Theme Leader | Dr.M.Nirmala Devi DAE&RS,TNAU, Coimbatore -3 | | | |
| Name of the Scientists and Centre | Dr.M.Nirmala Devi DAE&RS,TNAU, Coimbatore -3 | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Identification of study area and selection of respondents | Collection of data, Interpretation of data and report preparation | - | <ul style="list-style-type: none"> To assess the adoption of latest technologies among coconut growers To find out the distribution of adopter categories among coconut growers |
| Title | CARDS/CBE/AEX/2020/004 Socio-economic impact of TNAU Millet varieties and technologies in Dharmapuri District | | | |
| Theme Leader | Dr. R.Premavathi, Assoc. Professor (Agricultural Extension) | | | |
| Name of the Scientists and Centre | Dr.M.A.Vennila, Asst. Professor (Agricultural Extension) | | | |

| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
|--|---|--|---------|---|
| | Collection of data, and analysis. | Interpretation of data and report preparation. | - | <ul style="list-style-type: none"> To assess extent of adoption of TNAU millet varieties and technologies by farmers To analyze the socio-economic impact of TNAU millet varieties and technologies of millet growers |
| Title | CARDS/CBE/AEX/2020/001 Footfall Analysis of farmers in ICAR Krishi Vigyan Kendras (KVKs) of TNAU through farmers' database for invigorating the technology delivery. | | | |
| Theme Leader | Dr.M.Senthil Kumar, Asst. Professor (Agrl. Extension),DOEE,TNAU, Coimbatore -3 | | | |
| Name of the Scientists and Centre | Dr.M.Senthil Kumar, Asst. Professor (Agrl. Extension),DOEE,TNAU, Coimbatore -3 | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Data collection and analysis and report preparation | - | - | <ul style="list-style-type: none"> To consolidate & digitize the database of farmers being maintained at 14 ICAR KVKs of TNAU To analyze the profile of farmers and to document the technological support availed by farmers from KVKs. |
| Title | CARDS/TKM /AEX/2021/001 A study on Farmer's livelihood Analysis due to pandemic covid-19 in Thiruvallur district | | | |
| Theme Leader | Dr. R. Agila, Professor, RRS, Tirur | | | |
| Name of the Scientists and Centre | Dr. R. Agila, Professor, RRS, Tirur | | | |

| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
|--|--|---------|---------|--|
| | Data collection and analysis and report preparation | - | - | <ul style="list-style-type: none"> To assess the social, economic and psychological consequences perceived by the farmers due to pandemic COVID-19. To identify the problem faced by the farmers in executing agricultural operations and marketing their produces. |
| Title | CARDS/MDU/AEX/2020/001 | | | |
| | A study on underutilized kodo and barnyard small millets cultivation and its post harvest Processing in Madurai District. | | | |
| Theme Leader | Dr. J. Pushpa, Professor, AC&RI, Madurai. | | | |
| Name of the Scientists and Centre | | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Data collection and analysis and report preparation | - | - | <ul style="list-style-type: none"> To know the present status of kodo and barnyard millet cultivation and to document diversity of the same. To assess the utilization behavior of post harvest millet processing units established with govt. support programme at millets growing areas. |
| Title | CARDS/KKM/ARM/2021/002 | | | |
| | Study on the Social and Economic Impact of Pandemic COVID-19 on the livelihood of farming in Thirunelveli District | | | |
| Theme Leader | Dr.R.Rajasekaran, Associate Professor (Agrl.Extn.),AC&RI,KIllikulam | | | |
| Name of the Scientists and Centre | Dr.T.Domodharan, Professor (Agrl.Extn.), AC&RI,KIllikulam | | | |

| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
|--|---|---------|---------|--|
| | data collection and analysis and report preparation | - | - | <ul style="list-style-type: none"> To identify the problems faced by the farmers in executing the regular agricultural operations and marketing of their produces with other stake holders of farming sector. To enumerate suggestive measures from the farmers and stakeholders perception to restore their livelihood. |
| Title | CARDS/TRY/AEX/2019/002 A study on awareness and adoption of technology and production and marketing constraints of jasmine growers of Trichy and Dindigul districts. | | | |
| Theme Leader | Dr. G. Anand, Assistant Professor (Agrl. Extension),HC&RI(W),Trichy | | | |
| Name of the Scientists and Centre | | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Data collection and analysis, interpretation of data and report preparation | - | - | <ul style="list-style-type: none"> To assess the determinants of awareness and adoption of technology among jasmine growers <ul style="list-style-type: none"> To identify the production and marketing constraints and suggest suitable policy implications |
| Title | AICRP / CARDS / TRY / AEX / 2021/001 Impact of KVK Interventions on Minimizing Yield Gap in Pulses under Rice Fallow and Sole crop cultivation in Tiruchirappalli district | | | |
| Theme Leader | Dr. Noorjehan A.K.A.Hanif, AP (Agrl.Extension),KVK, Sirugamani | | | |
| Name of the Scientists and Centre | Dr. V.Dhanushkodi, AP (Soil Science) Dr. N.Tamilselvan, Prof (Agron.) & PC, KVK, Sirugamani | | | |

| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
|--|---|--|---------|---|
| | Interview schedule preparation and collection of data | Data analysis, interpretation of data and report preparation | - | <ul style="list-style-type: none"> To study the impact of interventions of KVK, Tiruchirappalli on Pulse varieties and Management technologies among pulse growers. To study the yield gap in pulses among the selected respondents |
| Title | CARDS/KVK/TVM/AEX/2021/001 Impact of TN-IAMWARM project on Watermelon farmers in Villupuram District | | | |
| Theme Leader | Dr.S.Sangeetha, Asst. Professor (Agrl. Extension) | | | |
| Name of the Scientists and Centre | - | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Identification of study area, and sampling | data collection, Analysis and report preparation | - | <ul style="list-style-type: none"> Analyzing the socio economic impact of IAMWARM project among Watermelon farmers. To study the factors influencing adoption of ICM practices in Watermelon cultivation. |
| Title | CARDS/PKM/AEX/2020/001 A study on adoption of recommended banana production technologies among banana growers in Theni District. | | | |
| Name of the Scientists and Centre | Dr. K.P.Vanetha, Asst. Prof. (Agrl. Extn.),HC&RI,Periyakulam | | | |

| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
|--|--|---------|---------|---|
| | Collection of data and Data analysis, interpretation of results and report preparation | - | - | To know the knowledge and adoption level of banana growers on recommended banana production technologies To study the constraints faced by the banana growers towards adoption of TNAU recommended technologies. |
| Title | CARDS/ KVK/ PPT/ AEX/ PUL/ 2019/001 Impact of KVK Interventions on TNAU Released Varieties and Management Technologies of Pulses in Dharmapuri district | | | |
| Theme Leader | Dr. M.A.Vennila, Asst. Professor (Agricultural Extension),KVK,Dharmapuri | | | |
| Name of the Scientists and Centre | Dr. P.S Shanmugam Asst. Professor (Entomology) Dr. M.Sangeetha, Asst. Professor (Soil Science) | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Data analysis and report preparation and adoption index | - | - | • To study the impact of interventions of KVK, Dharmapuri on Pulse varieties and Management technologies among pulse growers. |
| Title | CARDS/TRY/AEX/2019/001 A study on the impact of vegetable farming on the livelihood status of small farmers in Trichy district | | | |
| Theme Leader | Dr.P.Sumathi, Professor (Agrl.Extension), HC&RI(W),Trichy | | | |
| Name of the Scientists and Centre | Dr.P.Sumathi, Professor (Agrl.Extension), HC&RI(W),Trichy | | | |

| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
|------|--|---------|---------|---|
| | Collection of data, data entry and analysis. Interpretation of data and report preparation | - | - | <ul style="list-style-type: none"> To find out the adoption behaviour of small farmers towards the recommended cultivation technologies in vegetable crops To assess the socio-economic impact of small farmers due to vegetable farming. |

| Theme II | ICT in Agriculture | | | |
|--|---|---|--|--|
| Title | F 36H "M-Velanmai" | | | |
| Theme Leader | Dr. C. Karthikeyan, Professor (Agrl. Extension)- PI | | | |
| Name of the Scientists and Centre | Dr. J.Venkata Pirabu, Dr. S. Nakkeeran, Dr. B. Vinothkumar, Dr. K.N. Selvaraj, Dr. P. Murali Arthanari, Dr. GA. Dheebakaran, Dr. P. Jeyakumar, Mr. M. Parthiban Dr. A. Sankari & Dr.Tirunavuka rasu | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | The 1st version of the M-Velanmai mobile application will be designed and planned to deploy in Google Play store for pilot testing | AI inference validation and Query redressal by TNAU scientists Conversational platform supported by text and voice input between farmers & TNAU scientists, Continuous flow of push notifications on daily/ weekly basis for crop monitoring, E- Governance system for project administrators to monitor the utility of app. | - Training the image datasets to detect the pests of paddy using the Convolution Neural Networks (CNN) | <p>To design and develop an artificial intelligence based Agricultural Extension Advisory System named 'M-Velanmai' which can facilitate farmers to access the needed decision support in agriculture.</p> <p>To pilot test, evaluate and upscale M-Velanmai in Tamil Nadu and study its impact</p> |

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|--|---|----------------|----------------|--|
| Title | CARDS/CBE/AEX/2021/001 Analysis of Utilization of mobile Apps by Farmers during Covid 19 Pandemic Situation | | | |
| Name of the Scientists and Centre | Dr.S.Kalaivani,Assoc.Professor (Agrl.Extension), DAE&RS,TNAU,Coimbatore -3 | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Collection of data, data entry and analysis. Interpretation of data and report preparation | - | - | <ul style="list-style-type: none"> To study the factors for accessibility and usage of 'Uzhavan' mobile app among the user farmers. To evaluate the performance of 'Uzhavan' app in ensuring useful, relevant, timely and localized information and other services rendered to the farmers |
| Title | CARDS/ TRY/ AEX/2020/001 Comprehensive analysis of Kisan Call Centre in Tiruchirappalli District | | | |
| Name of the Scientists and Centre | Dr.D.Periyar Ramasamy , Asst.Professor (Agrl.Extn.),ADAC&RI,Trichy | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Collection of data, data entry and analysis. Interpretation of data and report preparation | - | - | <ul style="list-style-type: none"> To measure the attitude of farmers towards the services of KCC To study the information sharing and utilization behavior of KCC users |
| Theme III | Gender, Livelihood and Tribal studies | | | |
| Title | SPC/CARDS/CBE/AEX/2020/R005 Enhancing the Livelihood Status of Tribal Women through Community /Village Based Bio-Enterprises –Kodaikanal Block , Dindigul District | | | |

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|--|--|-------------------|---------------------|---|
| Theme Leader | Dr. P.Balasubramaniam (PI),Professor &Head,DAE&RS,TNAU,Coimbatore - 3 | | | |
| Name of the Scientists and Centre | Dr. C.Gopalkrishanan, Professor (Pathology) (Co-PI), TNAU,Coimbatore -3 Dr.P.Balaji ,Asst.Professor (ARM), TNAU, Coimbatore -3 | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Conducting trainings and formation model centers | Impact Evaluation | Report presentation | <ul style="list-style-type: none"> To impart training on bio-fungicides production technologies To motivate tribal women to start community village based bio - enterprises for self- employment |
| Title | No. DEE- 1/KVK/ DPI/ ICAR- NBAIR/ Training Programme/ ASO/2021 Demonstration and training on bio intensive IPM and entrepreneurship development through bee keeping for the tribal farmers of Dharmapuri district, Tamil Nadu | | | |
| Name of the Scientists and Centre | Dr. C. Sivakumar, Dr. S. Srividhya, Dr. M.Sangeetha KVK,Dharmapuri | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Collection of data, data entry and analysis. Interpretation of data and report preparation | - | - | <ul style="list-style-type: none"> To demonstrate and train the tribal farmers on the use of bio control technologies in the field To develop entrepreneurship in bee keeping to sustain their family income. |
| Title | CARDS/CSCRI/MDU/AEX/2021/001 Analytical study on Multi-Dimensional Role of Women in vegetable cultivation and Marketing in Madurai District | | | |
| Name of the Scientists and Centre | Dr.A.Janaki Rani, Associate Professor (Agrl.Extension),CSC&RI, Madurai | | | |

| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
|--|---|--|---|--|
| | Selection of study area and respondents | Collection of data, data entry and analysis. | Interpretation of data and report preparation | To identify the gaps in the participation and limiting factors for their involvement in vegetable cultivation and Marketing. To assess the social networking among the women vegetable growers. |
| Title | No. DEE- 1/KVK/ Dharmapuri/ SCSP Project/ASO/ 2021 Enhancing the Livelihood of Scheduled Caste farmers through Entrepreneurships development in bee keeping and Capacity building on Bio-intensive IPM of Major crops in Dharmapuri district of Tamil Nadu | | | |
| Name of the Scientists and Centre | Dr. C. Sivakumar, Dr. S. Srividhya, Dr. M.Sangeetha KVK,Dharmapuri | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Training and demonstration will be conducted | Collection of data, data entry and analysis. Interpretation of data and report preparation | - | To develop entrepreneurship in honey bee rearing among the scheduled caste farmers To measure the training effectiveness on bio control technologies |
| Title | CARDS/MTP/AEX/2020/001 A study on the role of Non-Wood Forest Products (NWFPs) on Tribal livelihood development | | | |
| Name of the Scientists and Centre | Dr. C.Cinthia Fernandez,Asst.Professor ,FC&RI, Mettupalayam | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Collection of data, data entry and analysis. | Interpretation of data and report preparation | - | Mapping the profile of the Tribal People involved in NWFP Collection Assessing the Socio-economic impact of NWFP collection and marketing in terms of |

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|--|--|--|--|--|
| | | | | income, employment generation, savings, asset creation, social status and empowerment on the tribal livelihood |
|--|--|--|--|--|

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|--|---|----------------|----------------|---|
| Theme IV | Youth and Training | | | |
| Title | CARDS/KUM/AEX/2019/001 Sensitization Training on Recently Developed Technologies and Modern Machineries in Agriculture | | | |
| Theme Leader | Dr.A.Sakunthalai, Professor(Agrl.Extn),AEC&RI,Kumulur . | | | |
| Name of the Scientists and Centre | Dr.V.Alex Albert, Assistant Professor(SST),AEC&RI,Kumulur Dr.A.Aruna Devi, Assistant Professor, SWCE, AEC&RI,Kumulur | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Collection of data, data entry and analysis. Interpretation of data and report preparation | - | - | To assess the attitude of trainees (farmers) towards the mechanization. To impart hands on training on various Agricultural technologies and mechanization. |

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|--|---|--|----------------|--|
| Title | CARDS/CBE/AEX/2020/003 Sustainability of Urban vegetable gardening | | | |
| Name of the Scientists and Centre | Dr. Shibi Sebastian, Assistant Professor(Agrl. Extn.),DSW,TNAU, Coimbatore -3 | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Selection of study area and respondents | Collection of data, data entry and analysis. Interpretation of data and report preparation | - | To develop strategy for sustainability of urban vegetable gardening. |

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|--|---|----------------|----------------|---|
| Title | CARDS/MDU/AEX/2020/R002 Drought mitigation strategies of farmers in irrigated cropping system in Madurai district | | | |
| Name of the Scientists and Centre | Dr. K. Mahandrakumar, Ph.D. Professor and Head (Agrl. Extn) | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Collection of data, data entry and analysis. Interpretation of data and report preparation | - | - | To identify and document the coping strategies followed by the farmers to overcome the adverse effects of drought |
| Title | DEE-1/ SBGF Project/ SDPC/Nutri-garden/ ASO/ 2020-21 dt.01.12.2020 Empowering School Students on Establishment of Nutritional Garden in their backyard through Virtual training by ICAR KVKs of TNAU in Villupuram, Cuddalore and Tiruppur districts of Tamil Nadu during COVID-19 Pandemic" | | | |
| Name of the Scientists and Centre | Dr. M. Senthil Kumar, Asst. Prof. (Ag. Extension), DoEE, TNAU, Coimbatore | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Training will be conducted. Collection of data, data entry and analysis. Interpretation of data and report preparation | - | - | To sensitize students and general public on the importance of nutritional garden in improving the nutritional intake in the diet of the family. |

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|---------------------|---|
| Theme V | Farmers organizations & Natural Resource Management |
| Title | JSPS/ACRI/KDM/ DSS/2020/R002 Long Term Tank Performance and Institutional Effect of Irrigation Tank Management in Tamil Nadu |
| Theme Leader | Dr.M.Jegadeesan, Asst Professor (Agrl. Extension) |

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|--|---|----------------|----------------|---|
| Name of the Scientists and Centre | Dr.T.Rajendran, Dr.S.R.Padma | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Collection of data, and analysis. Interpretation of data and report preparation | - | - | To analyze long term historical changes in the tank management practices among the Ryotwari and Zamindari system in Tamil Nadu To compare the institutional effectiveness of tank performance and its effect on agricultural production under the PWD, Ex-Zamin and Panchayat Union (PU) management. |
| Title | CARDS/KKM/AEX/2021/001 Farmers Perception and Constraints on Integrated Farming Approaches in Thoothukudi district | | | |
| Name of the Scientists and Centre | Dr.G.Kumar, Ph.D, Assistant Professor (Veterinary &Animal Sciences | | | |
| Year | 2021-22 | 2022-23 | 2023-24 | Deliverables/Expected Output |
| | Collection of data, and analysis. Interpretation of data and report preparation | - | - | <ul style="list-style-type: none"> • Ascertain the different integrated farming methods adopted by the farmers in Thoothukudi district. • Advantages of integrated farming methods in Thoothukudi district. |

Current status of the projects

A total of thirty six projects being implemented in the Department of Agricultural Extension and Rural Sociology were reviewed. Out of which, one externally funded project, five university research projects were completed; twenty four university sub-projects and seven externally funded projects are ongoing in the department.

CURRENT STATUS OF RESEARCH PROJECT

| Campus | University sub projects | | Core projects | | Externally funded projects | | Total |
|---------------------|-------------------------|---------|---------------|---------|----------------------------|---------|-------|
| | Completed | Ongoing | Completed | Ongoing | Completed | Ongoing | |
| Coimbatore | 3 | 7 | - | - | 1 | 3 | 14 |
| Madurai | 2 | 4 | - | - | - | - | 5 |
| Killikulam | - | 2 | - | - | - | - | 2 |
| Trichy | - | 4 | - | - | - | - | 4 |
| Kudumiyamalai | -- | - | - | - | - | 2 | 2 |
| Echangottai | - | - | - | - | - | - | 0 |
| Mettupalayam | - | 1 | - | - | - | - | 1 |
| Periyakulam | - | 1 | - | - | - | - | 1 |
| Vzhavachanur | - | 1 | - | - | - | - | 1 |
| KVK, Dharumapuri | - | 1 | - | - | - | 2 | 3 |
| KVK,Trichy | - | 1 | - | - | - | - | 1 |
| KVK,tidivanam | - | 1 | - | - | - | - | 1 |
| RRS,Tirur | - | 1 | - | - | - | - | 1 |
| TOTAL | 4 | 24 | - | - | 1 | 7 | 36 |

NEW PROJECTS PROPOSED DURING 2020-21

| Campus | University sub projects | | Externally funded projects | |
|-------------------|-------------------------|----------|----------------------------|----------|
| | Proposed | Obtained | Proposed | Obtained |
| Coimbatore | 4 | 4 | 12 | 3 |
| Madurai | 1 | 1 | 10 | - |
| Killikulam | - | - | - | - |
| Trichy | - | - | 1 | - |
| Kudumiyamalai | - | - | - | - |
| Echangottai | 1 | 1 | 1 | - |
| Mettupalayam | - | - | 3 | - |
| Periyakulam | - | - | - | - |
| Vzhavachanur | 1 | - | 2 | - |
| KVK, Dharumapuri | 1 | - | 2 | - |
| KVK,Tirupur | 2 | - | 1 | - |
| KVK, Virudhunagar | 1 | - | - | - |
| KVK, Kaniyakumari | 1 | - | 2 | 1 |
| KVK, Tirur | 1 | - | - | - |
| KVK, Vridhachalam | - | - | 3 | - |
| RRS,Tirur | 1 | - | - | - |
| TOTAL | 14 | 6 | 36 | 3 |

C. Remarks on ongoing research projects

| S. No. | Project Number & Title | Project Period | Project Leaders | Remarks |
|---------------|---|-------------------------|---|------------------------------------|
| a. | Externally Funded Projects | | | |
| 1 | DST/CARDS/MDU/EXT/2017/R006 Empowerment of SC/ST Rural Youth through Skill Development and Entrepreneurship Programmes | 20.02.2017-19.02.2021 | Dr.P.P.Murugan | Completion report may be submitted |
| b. | Externally Funded Projects-Ongoing | | | |
| 1 | SPC/CARDS/CBE/AEX/2020/R005 Enhancing the Livelihood Status of Tribal Women through Community /Village Based Bio-Enterprises – KODAIKANAL BLOCK , DINDIGUL DISTRICT | June 20 to June 2022 | Dr. P.Balasubramaniam (PI) Dr.C.Gopalkrishanan, Professor (Pathology) (CoPI), Dr.P.Balaji, Asst.Professor (ARM) | Project may be continued |
| 2 | Proc. No.DR/P2/ASO/TN IAMP/WTC/2020 dt. 06.01.2020 of the DR, TNAU. F 36H M-Velanmai” | 2019-2024 | Dr.C.Karthikeyan, Dr.J.Venkata Pirabu, Dr.S.Nakkeeran, Dr.B.Vinothkumar, Dr.K.N.Selvaraj, Dr.P.Murali Arthanari, Dr.GA.Dheebakaran, Dr.P.Jeyakumar, Mr.M.Parthiban, Dr.A.Sankari, Dr.M. Thirunavukkarasu | Project may be continued |
| 3. | JSPS/ACRI/KDM/DSS/2020/R002 Long Term Tank Performance and Institutional Effect of Irrigation Tank Management in Tamil Nadu | 1.3.2020 to 30.10.2021 | Dr.M.Jegadeesan, Dr.T.Rajendran Dr.S.R.Padma, | Project may be continued |
| 4 | CSEAS/ACRI/KDM/AEX/2019/R001 Agricultural Mechanisation in the midst of unemployment in India: Case of land poor and landless labour in Cauvery Delta in Tamil Nadu | 1.12.2019 to 30.06.2021 | Dr.M.Jegadeesan, Dr.M. Ramasubramanian | Project may be continued |

| | | | | |
|---|---|--------------------------------|---|--|
| 5 | No. DEE- 1/KVK/ DPI/ ICAR-NBAIR/ Training Programme/ ASO/ 2021 dated.29.3.2021 Demonstration and training on bio intensive IPM and entrepreneurship development through bee keeping for the tribal farmers of Dharmapuri district, Tamil Nadu | 2021-2022 | Dr.M.A.Vennila Dr.C.Sivakumar | Project may be continued |
| 6. | No. DEE- 1/KVK/ Dharmapuri/ SCSP Project/ASO/ 2021 dated.29.3.2021 Enhancing the Livelihood of Scheduled Caste farmers through Entrepreneurships development in bee keeping and Capacity building on Bio-intensive IPM of Major crops in Dharmapuri district of Tamil Nadu | 2021-2022 | Dr.M.A.Vennila Dr.C.Sivakumar Dr.S.Srividhya, Dr.M.Sangeetha, | Project may be continued |
| 7. | No. DEE-1/ SBGF Project/ SDPC/Nutri-garden/ ASO/ 2020-21, dt.01.12.2020 Empowering School Students on Establishment of Nutritional Garden in their backyard through Virtual training by ICAR KVKs of TNAU in Villupuram, Cuddalore and Tiruppur districts of Tamil Nadu during COVID-19 Pandemic” | 2019-20 | Dr.M.Senthil Kumar, Dr.N.Sriram, Dr.S.Anbumani Dr.N.Anandaraja, Dr.K.Sundharaiya,Dr. R.Neelavathy,Dr.G.G. Kavitha Shree | Extension for continuing project may be obtained |
| c. University Research Projects- Completed | | | | |
| | CARDS/CBE/AEX/2020/001 MGNREGA Implementation in Tamil Nadu : Problems, Prospects and Remedial Strategies | March 2020 – Feb 2021 | Dr.P. Balasubramaniam Dr.N.Sriram | Completion report may be submitted |
| 2 | CARDS/CBE/AEX/2019/002 Identification of Avenues to retain Youth in Rural Areas | October 2019 to September 2020 | Dr.S.Kalaivani | Completion report may be submitted |
| 3 | CARDS/CBE/AEX/2019/003 Impact of TNAU - Venture Capital Schemes (VCS) on various stake holders (PI) | December, 2019 to March, 2021 | Dr.M. Shanthasheela, | Completion report may be submitted |
| 4 | CARDS /MDU /AEX/ 2019 / 001 Awareness, Knowledge and adoption of Sugarcane Technologies Popularization through AICRP scheme | October 2019 to March 2021 | Dr.R.Velusamy | Completion report may be submitted |

| | | | | |
|----------|--|---------------------------------|----------------------------------|---|
| 5 | CARDS/MDU/AEX /2019/003 Impact Analysis of TN-IAMP in Periyar Vaigai Command Area of Madurai District | November 2019 to March 2021 | Dr.K.Ramakrishnan | Completion report may be submitted |
| C | University Research Projects-Ongoing | | | |
| 1 | CARDS / CBE / AEX / 2020 / 006 Preparation of Strategic Research and Extension Plan (SREP) for Coimbatore District | Feb. 2020 to Jan. 2021 | Dr. Ravi Kumar Theodore, | Project may be continued with stated objectives |
| 2 | CARDS /CBE / AEX / 2020/002 Developing a climate led transfer technology model for the rice eco system | July 2020 – June 2021 | Dr.R.Arunachalam | Project may be continued with stated objectives |
| 3 | CARDS/CBE/AEX/2021/001 Analysis of Utilization of mobile Apps by Farmers during Covid 19 Pandemic Situation | March 2021 to February 2022 | Dr.S.Kalaivani | Project may be continued with stated objectives |
| 4 | CARDS/CBE/AEX/2020/007 Study on the adopter Categories of Coconut growers in Coimbatore District | December 2020- November 2022 | Dr.M.Nirmala Devi | Project may be continued with stated objectives |
| 5 | CARDS/CBE/AEX/2020/004 Socio-economic impact of TNAU Millet varieties and technologies in Dharmapuri District | From July 2020 to December 2022 | Dr.R.Premavathi | Project may be continued with stated objectives |
| 6 | CARDS/MTP/AEX/2020/001 A study on the role of Non-Wood Forest Products (NWFPs) on Tribal livelihood development. | December 2020- June 2022 | Dr.C.CinthiaFernandaz | Project may be continued with stated objectives |
| 7 | CARDS/CBE/AEX/2020/001 Footfall Analysis of farmers in ICAR KrishiVigyanKendras (KVKs) of TNAU through farmers' database for invigorating the technology delivery | August 2020- December - 2021 | Dr.M.Senthil Kumar, | Project may be continued |
| 8 | CARDS/CBE/AEX/2020/003 Sustainability of Urban vegetable gardening | June 2020 to May 2022 | Dr. Shibi Sebastian | Project may be continued |
| 9 | CARDS / CBE / AEX / 2020/ 006 Performance Evaluation of Mobile " Uzhavan" farmer app in information dissemination and services rendered among Farmers | October 2020 to September 2022 | Dr.S. Srivara Buddhi Bhuvanewari | Project may be continued |

| | | | | |
|----|---|--------------------------------|--------------------------|--------------------------|
| 10 | CARDS/ TKM / AEX/ RIC/2021/001 A study on Farmer's livelihood Analysis due to pandemic COVID-19 in Thiruvallur district | Nov 2020 – Oct 2022 | Dr.R.Agila | Project may be continued |
| 11 | CARDS/MDU/AEX/2020/001 A study on underutilized kodo and barnyard small millets cultivation and its post harvest processing in Madurai District. | June 2020 to July 2022 | Dr.J.Pushpa., Ph.D | Project may be continued |
| 12 | CARDS/MDU/AEX/2020/R002 Drought mitigation strategies of farmers in irrigated cropping system in Madurai district | September 2020 to August 2021 | Dr. K. Mahandrakumar | Project may be continued |
| 13 | CARDS /KUM /AEX/ 2019 / 001 Sensitization Training on Recently developed Technologies and Modern Machineries in Agriculture. | 01.09.2019 – 01.09.2021 | Dr.A.Sakunthalai, | Project may be continued |
| 14 | CARDS/TRY/AEX/2019/001 A study on the impact of vegetable farming on the livelihood status of small farmers in Trichy district | Sept,2019 to August,2021 | Dr.P.Sumathi | Project may be continued |
| 15 | CARDS/CSCRI/MDU/AEX/2021/001 Analytical study on Multi-Dimensional Role of Women in vegetable cultivation and Marketing in Madurai District | Feb 2021 – Jan 2023 | Dr.A.Janaki Rani, | Project may be continued |
| 16 | CARDS/KKM/ARM/2021/002 Study on the Social and Economic Impact of Pandemic COVID-19 on the livelihood of farming in Thirunelveli District | January' 2021 – December' 2022 | Dr.R.Rajasekaran | Project may be continued |
| 17 | CARDS/TRY/AEX/2019/002 A study on awareness and adoption of technology and production and marketing constraints of jasmine growers in Trichy and Dindigul districts | August 2019 to July 2021 | Dr,G.Anand | Project may be continued |
| 18 | AICRP/CARDS/TRY/AEX/2021 /001 Impact of KVK Interventions on Minimising Yield Gap in Pulses under Rice Fallow and Sole crop cultivation in Tiruchirappalli district" | December 2020 – November 2022 | Dr. NoorjehanA.K.A.Hanif | Project may be continued |
| 19 | CARDS/ TRY/ AEX/2020/001 Comprehensive analysis of Kisan Call Centre in Trichirappalli District | January 2020 to December 2021 | Dr.D.PeriyarRamasa my | Project may be continued |

| | | | | |
|----|---|--------------------------------|-------------------|--------------------------|
| 20 | CARDS/KVK/TVM/AEX/2021/001 Impact of TN-IAMWARM project on Watermelon farmers in Villupuram District | January 2021 to December 2022 | Dr.S.Sangeetha | Project may be continued |
| 21 | CARDS/PKM/AEX/2020/001 A study on adoption of recommended banana production technologies among banana growers in Theni District | Oct , 2020 to Sep, 2022 | Dr.K.P.Vanetha | Project may be continued |
| 22 | CARDS/ KVK/ PPT/ AEX/ PUL/ 2019/001 Impact of KVK Interventions on TNAU Released Varieties and Management Technologies of Pulses in Dharmapuri district | December 2019 to November 2021 | Dr. M.A. Vennila | Project may be continued |
| 23 | CARDS/KKM/AEX/2021/001 Farmers Perception and Constraints on Integrated Farming Approaches in Thoothukudi district | November 2020 – October 2022 | Dr. T.Dhamodaran, | Project may be continued |

IV. AGRICULTURAL AND RURAL MANAGEMENT

A. Key Findings of the Completed Projects

Externally Funded Projects

1. NFSM/CARDS/CBE/ARM/2019/D001

Development of National Database on millets and establishing benchmarks for production, consumption and utilization of millets
(Dr.N.VenkatesaPalanichamy, Dr.A.Rohini, Dr.M.Shanthasheela, Dr.D.Murugananthi, Dr.M.Chandrakumar, and Dr.V.M.Indumathi)

- Indian millet markets are integrated in the long run. In majority of the selected markets bidirectional flow of information was found.
- Nepal remained as the most and first stable market among the major importers of Indian ragi as the higher probability of retention.
- India's export of bajra, Yamen Arab Republic remained as the most and first stable market among the major importers of Indian bajra with the higher probability of retention.
- Kenya remained as the most and first stable market among the major importers of Indian sorghum with probability of retention at 0.29 i.e., the probability that Kenya retains its export share over the study period was 29 per cent.
- None of the major importers retained the share in import. There was no stability among the importing countries in sorghum import from India.
- In all the markets Sorghum price is showing increasing trend. Since May to September is lean arrival season there are chances for price increase across the

major Indian markets. Sorghum price across major Indian markets showed increasing trend. In June 2021 in all the major markets Sorghum price will be ruling higher.

- In case of Bajra marginal increase in price is seen across major Indian markets. Ragi prices showed mixed trend across Indian markets.
- In all the States millets are marketed through Village merchant and Wholesaler
- Marketed surplus was lesser for small millets compared to Sorghum, Ragi and Cumbu.
- In Tamil Nadu, small millets are marketed through Farmer Producer Organization where in further value addition is done and farmers are getting higher price when selling through FPOs
- In other States, millet farmers were involved in primary processing like cleaning and drying and not involved in further value addition.
- Majority of the Indian millet farmers are not taking up the processing activity which limits the opportunities for additional income.
- In all the States, consumption of rice was higher in urban household than in rural.
- Wheat consumption is also higher among the urban household
- In all the States, Sorghum, Bajra and Finger Millet was consumed more by the rural compared to urban household.

Suggestions

- Farmers may be encouraged to cultivate millet Hybrids & HYV to get better yields.
- Marketed surplus of millets can be increased.
- Direct marketing may be encouraged to get remunerative price for the millet farmers.
- Consumption of millets may be increased by making available through PDS & outlets of FPOs
- Processing [or] value addition in millets has vast scope & suitable machineries may be provided at subsidized cost at local area
- To stabilize the export of millets more of value added millet products may be encouraged.

Core Projects

1. CARDS/CBE/ARM/2018/CP150

A study on turmeric market system as a means to increase the income of small and marginal farmers of Tamil Nadu

(Dr.D.Muruganathi)

- Increasing trend in turmeric price was observed over the years across three markets. Erode and Sangli market showed similar seasonality, whereas Nizamabad price showed a different seasonality. Analysis on cycles through BB algorithm revealed that, there existed three, two and four cycles in Erode, Nizamabad and Sangli turmeric price from 1997-2019.
- In the triennium ending 2013-16, Tamil Nadu ranked first in Indian turmeric production by contributing 23.5 per cent, where as in 2017-19 contribution has reduced to 10.8 per cent. Due to high cost of production and reduction in price farmers reduced the area under turmeric in Tamil Nadu.

- Among the sampled farmers in Erode, 77 per cent of the farmers reduced the area under turmeric from 4.25 acres in 2014 to 1.74 acres in 2018. The remaining 23 percent has switched over to other crops like banana and tapioca. The productivity per acre as well as the price offered per quintal has reduced over the years.
- Graded produce fetches more price compared to non-graded ones. Among the alternative marketing channels available for turmeric selling through FPO increased the income of the turmeric farmers and this channel found to be efficient. Farmers could able get 16 per cent additional income compared to traditional marketing channels.
- GI tag has not induced any additional market demand and price for the Erode local variety
- In all the trading centres in Erode, selling of turmeric is done through e-auction which reduced the timing of the tendering process and unbiased. Only seven percent of the farmers were aware of e-NAM.
- The cost incurred by the farmers in cultivation of turmeric is Rs.1.18 lakhs per acre in Erode. Among this 35 per cent was spent on harvesting and in postharvest processing practices.
- On an average, by cultivating turmeric in one acre a net profit of around Rs.38854 is obtained.
- Among the alternative marketing channels available, selling through FPO increased the income of the turmeric farmers and this channel found to be efficient. Farmers selling through FPO gained 16 per cent additional income compared to traditional marketing channels.
- High labour cost, reduction in price of turmeric, low productivity and water scarcity was the major problems faced by turmeric farmers in Erode.
- All the traders opined that trading of turmeric through e-NAM will increase the income of the farmers and awareness to be created among the farmers about e-NAM.
- About 93 percent of the farmers suggested that the government should come forward to fix a minimum support price to turmeric and this should be above Rs. 10,000/quintal considering the cost of cultivation.
- Standardizing the quality parameters governing the price fixation and to avoid stocking for a longer period will fetch better price for the produce.

Suggestions

- Predicting the occurrence of cycles will help the farmers to make their sowing and selling decisions which could reduce the risk in cultivation of the crop.
- To encourage the farmers to cultivate turmeric, Minimum Support Price could be used as a measure to compensate the increase in labour cost and reduction in price.
- Consumer awareness could be created about GI turmeric.
- Educating the farmers about the importance of grading at farm level could reduce the transaction cost and also increases the marketing efficiency.
- Farmers may be encouraged to sell through FPOs for increasing their income.
- Curcumin content based pricing may be done to get better price for Tamil Nadu turmeric.

- Practical difficulties in trading of turmeric through e-NAM may be considered and procedures may be simplified to increase the trading of turmeric through eNAM in Tamil Nadu.

2. CARDS/MTP/ARM/2018/CP168An Economic analysis of *Meliadubia* across multiple use benefits in Western Tamil Nadu (TNAU-Core-Project-Phase IV)(Dr.K.Divya)

- For Ply wood purpose, the total cost of cultivation of Melia (5X5m) was Rs.4,06,940per ha,total returns from yield was Rs.11,00,000per ha and net income was Rs.6,93,060 per ha. The benefit cost ratio@10% was 7.64.
- In pulp wood, the trees can be harvested from 2nd, 4th and 6th year of cultivation. The total cost of cultivation of Melia (2X2m) was Rs.7,35,800 per ha,total returns from yield was Rs.17,00,000 per ha and net income was Rs.9,64,200 per ha. The benefit cost ratio@10% was 5.74.
- When the trees were used for both ply wood and pulp wood purposes the cost of cultivation of Melia (2X2m) was Rs.6,83,300 per ha, total returns was Rs.13,00,000 per ha and net income was Rs.11,29,200 per ha. The benefit cost ratio@10% was 6.80.
- The major channels for ply wood were channel I. Farmer →Village trader→ Traders→ Ply wood /Timber industries which has Producer share 57.33 and of Price spread Rs.3250/-. Channel II. Farmer → Traders→ Ply wood /Timber industries having Producer share 70.25 and Price spread 2150. Channel III. Farmer → Ply wood /Timber industries has Producer share 90.12 and Price spread 715.
- The major channels for Pulp wood were Channel I.Farmer→Local traders→Traders→ Paper industries which has producer share 89.41 and price spread 450. Channel II. Farmer →Paper industries has Producer share of 96.29 and price spread 150.
- The main reasons for the farmers to prefer *Melia* as an alternative crop is less maintenance and low labour cost.
- The main problem in growing *Meliadubia* was less suitability to soil and climatic conditions.

Suggestions

- Government can support for drip irrigation for Malaivembu farmers
- Tree Insurance can be provided to the *Melia* farmers
- An price stabilization system is needed for tree crops

University Research Projects

1. CARDS/TRY/ARM/2018/001Business Practices and Performance of Edible Oil Processing (Traditional) Firms in Tamil Nadu(Dr.C.Velavan)

- Majority of edible oil processing units (83 percent) sourced the raw materials from the local traders.
- All the sample units purchased raw materials on cash basis from the traders
- Nearly 55 per cent of units had demand driven production plan

- Nearly 78 per cent of the units used less than 40 per cent of capacity of oil production and 14 per cent of units used 40-59 percent of capacity
- Nearly 68 per cent of unit used Settling method and 20 per cent of units used bag filtering method for oil filtration to maintain purity
- Nearly 82 per cent of units had used food grade bottles and 18 per cent of units had used non-food grade bottle for packing of oils
- Nealy 38 per cent of units had not been registered under FSSAI
- Nearly 50 percent of units used family labour and 12 per cent of units used permanent labour
- Nearly 93 per cent of units sold the produce at the processing centre
- Nearly 78 per cent of units sold the produce without branding
- Three oils Viz., Groundnut oil, Gingelly oil and Coconut oil were traded through traditional method of processing
- Value Chains
 - Farmers – Oil seed Wholesale – Processors- Consumers
 - Farmers – FPOs - Retailers -Consumers
 - Nearly 97 per cent of traditionally processed oils were sold through the first models
- Average sale price of Gingelly oil, Coconut oil and Groundnut oil were Rs.365/lit, Rs.270/lit and 225/lit respectively
- 35 per cent of units had IRR of 18-24 per cent and 34 per cent of units had 12-18 per cent
- Nearly 54 per cent of units had BCR of 1.4-1.6 and 37 per cent of units had BCR of 1.4-1.6
- No. of year of operation, No. oil produced by the unit and location of unit had positively influence the rate of return of the oil processing units
 - If the unit is present in urban/peri-urban area increased the rate of return by 0.27 per cent
 - If one more variety of oil produced by the unit increased the rate of return by 0.19 per cent
 - If the year of operation increased one year the rate of return increased 0.01 per cent
 - Fixed investment was not significantly influence the profitability of the units

Policy Recommendation

- Entrepreneurs may be trained in the areas of quality management and certification to improve their operation
- Standards may be established for the traditionally processed oils for certification which would be helpful to expand the market
- FPOs may be motivated to produce traditionally processed oil which would help the member farmers could benefit
- Marketing tie-up to oil processing units may be supported by the Department of Agrl. Marketing & Agribusiness
- Processing Units may be suggested to establish peri-urban areas with all the three oils for profitability

2.CARDS/CBE/ARM/2020/001Impact of technology business incubator (TBI) on the clients performance(Dr.M.Malarkodi)

- Most of the TBI incubatees entrepreneurs were postgraduates
- About 86 per cent of the sample respondents were having manufacturing firms followed by 14 per cent were in service providers
- About 56 per cent of the incubatees were made an initial investment upto rupees one lakh.
- Observing (4.45), experimenting/ exploring (4.38) and idea networking (4.13) behaviour of the TBI incubatees were found to be higher which could be encouraged to be continued among the incubatees
- Risk taking (3.97) and questioning (3.60) behaviour of the TBI incubatees were found to be less which has to be improved for enhancing the entrepreneurial behaviour.
- Among the services provided by the TBI, the Technical Consultancy services was ranked first followed by Market linkages / Intra-Incubatee linkages/ Interface Meets, In-house facility provided, Capacity building programmes for business promotion were ranked second, third and fourth place respectively.
- Among the various services proved by the TBI, Business Assistance Services and Enabling Environment Services of TBI were perceived more than the expectation of TBI clients. The perception and expectation on Management Guidance and Consulting Services were found to be satisfied. There was a significant difference in perception and expectation of TBI clients on the Physical Infrastructure Services like Communication facilities, laboratory and library facilities.

Suggestions

1. EDP / training programs must be conducted to impart sufficient knowledge on assessing the viability & feasibility of innovative business ideas
2. Improve the services viz., Licensing of TNAU Technologies, Helps in obtaining awards for the business service, Patent Services for innovative process and products, Access to Sem. / Con. / Workshops
3. Steps must be taken to improve the physical infrastructure Service

B. Action Plan (2021-2024)

| Theme No : 1 | Title | Management of Agribusiness and Entrepreneurship | | |
|-----------------------------------|---------|---|---------|-------------------------------|
| Name of the scientists and centre | 2021-22 | 2022-23 | 2023-24 | Deliverables/ expected output |

| | | | | |
|--|---|--|--------------------------|--|
| Project 1. Assessment of Demand and Supply of Industry Human Capital in Agribusiness Sectors | | | | |
| Dr. S.Hemalatha Dr. K. Mahendran Dr. S. Moghana Lavanya Dr. R. Balaji Dr. D. Murugananthi Dr. S. Anandhi | Selection of agribusiness sectors – Seed, Plant protection and Banking sectors and Study the organizational structure of the agribusiness sectors | Designing forecasting model and Simulating the model | Final report preparation | Prediction of human capital requirement in different agribusiness sectors for ten years from 2020 to 2030. |
| Project 2. Unlocking the Potential of Internet of Things – A Case Study on Agritech Start-up Model | | | | |
| Dr.C.Muralidaran | The potential of agritech startups could be done by FGD and report writing | | | Agri startups could benefit from the study |
| Project 3. An Evaluation of MUDRA Scheme in Coimbatore District | | | | |
| Dr. N.Deepa | Selection of beneficiaries, data collection and report writing | | | Impact of MUDRA scheme in Coimbatore district will be known |
| Project 4. Performance analysis of Packing Case Industries in Coimbatore District, Tamil Nadu | | | | |
| Dr.S.Selvanayaki | Assessing performance of the packing case industries through data collection, analysis and report writing. | | | Packing case industries and farmers could be benefitted from the study |
| Project 5. Analysis of Export Trend and Performance of Non Basmati Rice from Tamil Nadu | | | | |
| Dr.R.Balaji | Collection of data from samples, analysis and report writing | | | Trend and export performance of non basmati rice is known |
| Theme No : 2 | Title | Institutions for Agribusiness | | |
| Project 1. Preparation of study on Groups (Part II) and State Level Up Gradation Plan (Part III) | | | | |
| Dr.N.VenkatesaPalan ichamy Dr.D.Suresh Kumar Dr. C.Karthikeyan Dr. A.Rohini | Collecting data from FPOs, SHGs, Producer cooperatives. Conducting | | | State level Up Gradation Plan with regard to micro food enterprises in |

| | | | | |
|--|---|---|--|---|
| Dr.M.Chandrakumar Dr. D. Murugananthi | baseline assessment studies and detailed study on ODOP product cluster in the districts | | | TN |
| Theme No : 2 | Title | Supply Chain Management and Value Chain Analysis | | |
| Project 1. A Study on Increasing Production of Moringa Value Added Products from Farmers and Entrepreneurs through Value Chain Approach in Southern District of Tamil Nadu | | | | |
| Dr.T.Samsai | Data collection, analysis and report writing | | | Moringa value chain model could be made |

C. Details of Research Projects

| Departments | University sub projects | | Core projects | | Externally funded projects | | Total | |
|--------------|-------------------------|----------|---------------|-----------|----------------------------|----------|-----------|----------|
| | Completed | Ongoing | Completed | Ongoing | Completed | Ongoing | Completed | Ongoing |
| Coimbatore | 2 | 2 | 1 | .. | 1 | 2 | 4 | 4 |
| Madurai | .. | 1 | .. | .. | .. | .. | .. | 1 |
| Killikulam | .. | 1 | .. | .. | .. | .. | .. | 1 |
| KVK, Vamban | .. | .. | .. | .. | .. | .. | .. | .. |
| Mettupalayam | .. | 1 | 1 | .. | .. | .. | 1 | 1 |
| TOTAL | 2 | 5 | 2 | .. | 1 | 2 | 5 | 7 |

A total of 12 projects are operated in the department of ARM, in which one externally funded project is completed; two core projects has been completed; two university research projects are completed; two externally funded projects and five university research projects are ongoing projects in the department.

New Projects Proposed

| Campus | University sub projects | | Externally funded projects | | Consultancy Projects | | Total | |
|--------------|-------------------------|----------|----------------------------|----------|----------------------|----------|-----------|----------|
| | Proposed | Obtained | Proposed | Obtained | Proposed | Obtained | Proposed | Obtained |
| Coimbatore | 2 | 2 | 4 | 2 | 2 | 1 | 8 | 5 |
| Madurai | 1 | 1 | .. | .. | .. | .. | 1 | 1 |
| Killikulam | 1 | 1 | 1 | .. | .. | .. | 2 | 1 |
| Mettupalayam | 1 | 1 | 1 | .. | .. | .. | 2 | 1 |
| Total | 5 | 5 | 6 | 2 | 2 | 1 | 13 | 8 |

D. Remarks of the Ongoing Project

| S. No | Project Number and Title | Project Period | Project Leader (PI/Co-PI) | Remarks |
|--|--|-----------------------|--|--|
| 1. Externally Funded Projects | | | | |
| | DST/CARDS/CBE/ARM/2020/R003 Assessment of Demand and Supply of Industry Human Capital in Agribusiness Sectors | 2020-2023 | Dr. S. Hemalatha Dr. K. Mahendran Dr. S. Moghana Lavanya Dr. R. Balaji Dr. D. Muruganandhi Dr. S. Anandhi | The project may be continued |
| 2. | GoTN/CARDS/CBE/ARM/2021/R004 Preparation of study on Groups (Part II) and State Level Up Gradation Plan (Part III) | 2021 | Dr.N.Venkatesa Palanichamy Dr.D.Suresh Kumar Dr. C.Karthikeyan Dr. A.Rohini Dr.M.Chandrakumar Dr. D. Murugananthi | The project may be continued |
| 2. University Research Projects | | | | |
| 1. | CARDS/KKM/ARM/2020/001 Unlocking the Potential of Internet of Things (IoT) – A Case Study on AgritechStartup Model | 2020-2022 | Dr.C.Muralidharan | The project may be continued |
| 2 | CARDS/MDU/ARM/2021/001 A Study on Increasing Production of Moringa Value Added Products from Farmers and Entrepreneurs through Value Chain Approach in Southern Districts of Tamil Nadu | Dec 2020- Nov 2022 | Dr.T.Samsai | The project may be completed by 2021 |
| 3 | CARDS/CBE/ARM/2020/002 An Evaluation of MUDRA Scheme in Coimbatore District | Oct 2020- Sep 2022 | Dr.N.Deepa | The project may be continued |
| 4 | CARDS/MTP/ARM/2021/001 Performance analysis of Packing Case Industries in Coimbatore District, Tamil Nadu | Jan 2021- Dec 2022 | Dr.S.Selvanayaki | The project may be continued |
| 5 | CARDS/CBE/ARM/2021/001 Analysis of Export Trend and Performance of Non Basmati Rice from Tamil Nadu | 2021-2022 | Dr.R.Balaji | Export potential for VGD-1 Rice variety may be studied. The project may be continued |

V. CLOSING REMARKS AND THE WAY FORWARD

Director of Research

- All the Scientists are encouraged to obtain more number of externally funded projects.
- Scientists who have no projects should propose new projects with issues of current relevance.
- Crop monetization for Agricultural and Horticultural crops including TNAU technologies needs to be updated annually to report to the Government
- Outreach TNAU Technologies may be assessed and suitable recommendations may be given for interventions.
- All the staff members are requested to propose consultancy projects.
- All the ongoing university research projects may be reviewed by the Director, CARDS and interim corrections have to be made for revision of projects.(Agricultural Extension)
- Multi-disciplinary projects may be proposed

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