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# CTCRI NEWS

Central Tuber Crops Research Institute  
Sreekariyam, Thiruvananthapuram 695 017  
Kerala, India

## HH Sree Visakham Thirunal Endowment organized

The inauguration of the HH Sree Visakham Thirunal Endowment was organized jointly by Indian Society for Root Crops (ISRC) and Central Tuber Crops Research Institute (CTCRI). The Indian Society for Root Crops has instituted an endowment in the honour of His Highness Sree Visakham Thirunal, the late Maharaja of erstwhile princely state of Travancore, who introduced and popularised cassava in India. The endowment was inaugurated at CTCRI by Sree Padmanabha Dasa His Highness Marthanda Varma, the Maharaja of Travancore. Dr.S.K.Naskar, Director, CTCRI, presided over the function and Dr.M.Anantharaman, President, ISRC, welcomed the gathering. In his inaugural address, the Maharaja commemorated the contributions made by Sree Visakham Thirunal in the field of judiciary,



## CTCRI Congratulates new Director General



Dr. Subbana Ayyappan, has taken over as new Secretary, Department of Agriculture Research and Education (DARE), Ministry of Agriculture, Govt. of India and Director General (DG), Indian Council of Agricultural Research (ICAR) on 1<sup>st</sup> January, 2010.

He was born at Alakere in the state of Karnataka, India on 10<sup>th</sup> December, 1955. He is a well-accomplished scientist in the area of fish microbiology who rose through the ranks in ICAR to the top position. Prior to the present assignment, He has served as the Deputy Director General (Fisheries) during 2002-09; Director, Central Institute of Fisheries Education, Mumbai (Deemed University) during 2000-02; Director, Central Institute of Freshwater Aquaculture, Bhubaneswar during 1996-2000; Senior Scientist and Principal Scientist in the ICAR system

(1984-95) and as Scientist, Central Inland Fisheries Research Institute, Barrackpore (1978-84).

His specific areas of research are fisheries, freshwater aquaculture and aquatic microbiology. He has over 200 publications in reputed journals/proceedings and books, two patents and one design to his credit. He has a number of prestigious awards and honours to his credit. Under his leadership CIFA received the 'Best ICAR Institution Award, 1996. He was Founder Chief Executive, National Fisheries Development Board, Hyderabad and virtually established the Board.

Dr. Ayyappan has served in different capacities in several important committees. He has represented the country in several important International fora. He has served on the Boards of several international institutions/ organisations such as Network of Aquaculture Centres in Asia-Pacific (NACA), Bangkok, Thailand; World Fish Centre, Penang, Malaysia.

The CTCRI family extends hearty welcome and congratulations on his new assignments.

police reforms, literature, etc. He reiterated the late Maharaja's vision regarding the need for a secondary staple food to save his subjects from the impending shortage of rice and the steps taken by him for introducing cassava from South America through the then Ceylon and promotion of cultivation of cassava. Padasree Prof (Dr). P. Pushpangadan, Director General and Senior Vice President, RBEF, New Delhi delivered the first endowment lecture on the topic "The Conservation of Biodiversity/Agro-biodiversity in the 21st Century

and the Importance of Intercultural Exchange of Edible Crops". In his lecture he described the rich biodiversity of Kerala and its potential for benefiting the people. He explained the ways for utilizing this biodiversity through the new IPR regulations and the thrust areas and future strategies for R and D work on plant biodiversity. He concluded by stating a thought provoking message that the untapped bio wealth should be converted into economic wealth. Dr.M.S.Sajeev, Secretary, ISRC, proposed the vote of thanks.

## 36<sup>th</sup> Institute Research Committee meeting

The 36<sup>th</sup> Institute Research Committee Meeting of Central Tuber Crops Research Institute was held during 26-29, April 2010 in the Millennium hall, CTCRI, Thiruvananthapuram. All the 39 scientists including seven scientists from Regional centre, Bhubaneswar participated in the meeting. Dr. S. K. Naskar Director, CTCRI and Chairman of IRC in his initial remarks mentioned that research programs are to be discussed in depth keeping in mind the effect of climate change on tuber crops production, the recommendations of QRT and RAC and stressed the need for quality planting material production in tuber crops. It was told that in spite of little bit difficulty in shortage of funds, the progress made in most of the projects are satisfactory but still lot needs to be done. He also congratulated the scientists who obtained Ph. D during 2010 and all those who got various awards for their research paper/poster presentations in various symposia, conferences, etc.

There were seven technical sessions viz. Extension and Social Sciences, Regional Centre, Crop Protection, Crop



*Plenary session in progress during 36<sup>th</sup> IRC*

Improvement, Crop Production, Crop Utilization and Plenary session. A total of 68 ongoing and nine new project proposals were discussed in the meeting. Apart from these Institute projects, salient findings under 26 externally aided projects were also presented.

### New Projects Approved

Three externally aided projects were approved during this period. CTCRI NEWS congratulates the scientists for getting the project approved.

- a. "Mining and characterization of therapeutically significant-bioactive molecules from unique bacteria associated with novel EPN". (PI Dr. C. Mohandas. Funded by DST, Govt. of India.)
- b. "Development and characterizations of super absorbent polymers from Cassava starch." (PI Dr. A.N.Jyothi and Dr.M.S.Sajeev. Funded by DST, Govt. of India.)
- c. "Fly ash zeolites." (PI Dr.V.Ramesh and Dr.James George, Funded by DST, Govt. of India)

### Appointment

Dr. R.S. Misra has assumed charge of Head, Regional Centre w.e.f the afternoon of 26<sup>th</sup> February 2010. Prior to his new assignment, he was serving as Head, Division of Crop Protection, CTCRI, Thiruvananthapuram, Kerala. CTCRI NEWS congratulates and wishes him success in this endeavour.

## **Pachamalai hills - A major tapioca growing area in Tamil Nadu**

Pachamalai hills are hypsographic type of hills situated in Eastern Ghats of Tamil Nadu. A tropical climate prevails with a maximum temperature ranging from 23 to 31 oC and the minimum temperature of 14oC. Maximum amount of rainfall is received only during north east monsoon. The major crops in this hill are tapioca, paddy var. ponni, mango, grapes, etc.

Tapioca is extensively cultivated in a total area of 11,188 ha and is considered as profitable crop by the farmers of the hills despite of price disparity (low price) as compared to the plains. The main planting season is July. H-165 is the popular variety. Better performance of the crop was noticed at top elevations and medium performance at middle/ lower middle hill ranges. Considerable variation in soil physical and chemical properties at different elevations was noticed due to

lack of soil conservation measures that resulted in the movement and deposition of soil particles from top towards bottom portion of the hill and farmers have been realizing a decline in yield over time.

The soil is reddish and clay loam in texture with surface and sub surface hardening due to low organic carbon content. Generally low management practice is followed in terms of organic and inorganic/micronutrient application, soil conservation measures, crop residue incorporation, legume cropping etc. and the yield varied from 20-25 t ha<sup>-1</sup>. Lack of adoption of soil conservation measures that result in soil physical degradation along with imbalanced fertilization (quantity and time application) leading to decline of soil fertility are considered as serious challenges in the sustainable management of soil in tapioca cultivation in the Pachamalai hills.

- **Dr. V. Ramesh**

## **Use of Vine Cuttings as Planting Material for Seed-Tuber Production in *Dioscorea***

Seed yams (small or mini tubers) of 250 - 500 g size used as planting material for production of ware yams, constitute the major cost item in the production of ware yams. This note reports the possibility of production of seed tubers using vine cuttings as the planting material in three cultivated species of yams. Vine cuttings of single, two and three nodes obtained from the top 1 to 1.5 m length of vines from 3 - 4 months old plants in three species of *Dioscorea* were planted in polythene bags. More than 90% vine cuttings developed roots and shoot within 30 days after planting in *D. alata*, whereas in *D. rotundata* and *D. esculenta*, it took 45 days. These plantlets were maintained in polythene bags for four months under shade net house. Under such conditions, these plants produced 5 to 15 g mini tubers. In the present observation, interestingly, the vine cuttings of all the three *Dioscorea* sp. did not require any growth regulator treatment for root and

shoot production or tuber development. The size of mini-tubers produced from vine-raised plants can be increased to the desired size through manipulation of agronomic practices, trailing of plants, fertilizer application and increasing crop duration to eight months. The tubers developed from the vine cuttings have the potential to bulk and develop into normal size tubers. Furthermore, mini-tubers which are whole tubers of the same weight as the "minisetts" (cut pieces of large tubers) (25 g) have been shown to have higher percentage of sprouting than the "minisetts". Plenty of vines available from a *Dioscorea* field can be used for the purpose while optimum amount of vines can be pruned from the plant without significantly affecting the tuber yield. Alternately, yam plants can be grown specifically for production of more vines for planting material (seed tuber) production.

- **V. Ravi, S. K. Naskar and C. S. Ravindran**

## Research Advisory Committee meeting

Second meeting of RAC V of CTCRI was held on 24<sup>th</sup> February 2010 under the Chairmanship of Dr S.M.Paul Khurana. The Committee discussed the action taken on the recommendations of the previous meeting and new directions were made for the future programmes. Recommendations of the second meeting of Research Advisory Committee are,

1. It is essential that programs may be taken up to develop carotene rich cassava varieties.
2. Cassava being a rainfed crop, studies may be conducted to identify drought resistant varieties.
3. As genes for CMD resistance are presently available in India, CMD resistance may be taken as one of the essential traits in improved varieties.
4. In order to diversify product development from cassava and sweet potato, breeding programs may be taken up for the development of varieties for specific uses such as fried chips, parboiled cassava/sweet potato, starch etc.
5. The quantum of Magnesium and Zinc used in cassava experiments may be reviewed as it appears to be on the higher side. Environmental pollution related to excess or prolonged application of Mg and Zn may also be studied.
6. Economics of organic cultivation of elephant foot yam need to be worked out.
7. Fertigation studies in elephant foot yam as well as cassava may continue.
8. Soil mapping based on GPS (Global Positioning System) and GIS (Geographical Information System) may be continued and verified as well.
9. SSNM studies for important varieties in different locations to be continued.
10. Production and multiplication of disease free planting material may be vigorously pursued.
11. The chemistry of the pesticide made from cassava and yam bean seed also may be studied. The efficacy of biopesticides from cassava and yam bean may be augmented by appropriate formulation.
12. Indexing is required to be intensified for producing virus free planting material in cassava.
13. Detailed studies may be undertaken on ICMV and ACMV, especially with regard to immunodiagnostics as these are molecular variants.
14. Detailed studies on sweet potato viruses and development of HR varieties for taro leaf blight may be pursued.
15. Work on low calorie sago and sweeteners as well as low Glycaemic noodles with low Glycaemic index should be intensified and awareness on such products should be created among the public.
16. While developing minimally processed tubers to increase shelf life and expand the export prospects, care should be taken to minimize energy use.
17. Technical knowhow on harvesting and processing machinery developed for tuber crops at CTCRI may be transferred to private parties/ Governmental/ Cooperative organizations. RAIDCO can be contacted for this.
18. While perfecting the indigenous technology to produce Bioethanol from cassava, availability of imported enzyme in India should not become a bottleneck in the commercialization. Relevant research for alternatives on this aspect also may be carried out.
19. Aggressive efforts have to be made for the commercialization of technologies and Press conference/Business meet may be held periodically for this.
20. The technologies generated at CTCRI should reach large number of farmers, farm women, entrepreneurs etc. In this regard, the print and electronic media should be effectively utilized. In addition, holding of periodic Press meet, Stakeholders' interface etc. may also be thought of.
21. The location specific research undertaken at the centre namely, breeding for leaf blight resistance, salinity etc. in taro and production of Ethanol from sweet potato may continue.

## Participation in Exhibitions

### CTCRI participated in eight exhibitions

1. Jeeva 2010 organised by Department of Animal Husbandry, Kottiyam, Kollam during 8-11, January 2010.
2. Exhibition organised during 28<sup>th</sup> Group meeting of All India Co-ordinated Research Project (Vegetable Crops) IHR, Bangalore during 16-19, January 2010.
3. Agriculture Exhibition and Kisan Mela organised by IISR, Peruvannamuzhi, Kozhikode during 8-12, February 2010.
4. Rashtriya Kisan Mela 2010 organised by NRC Citrus, Nagpur during 21-22, February 2010.
5. ATMA Programme, Department of Agriculture, Kerala during 20-22, February 2010.
6. Technology Expo & Farmers Mela 2010 organised by CIFT, Kochi during 11-12, March 2010.
7. Exhibition during National Conference on production of quality seeds and planting material health management in horticultural crops. Society for promotion of Horticulture, IHR, Bangalore Venue NASC New Delhi during 11-14, March 2010.
8. Exhibition during “Swadesh Prem Jagriti Sangosthi 2010” organized by the Lt. Amit Singh Memorial Foundation and University of Horticultural Sciences, Bagalkot, Karnataka in collaboration with Bio-diversity International with the support from ICAR, National Horticulture Board, National



CTCRI Exhibition Stall at Swadesh Prem Jagriti Sangosthi 2010 in Bengaluru

Horticulture Mission, TMNE, Ministry of Agriculture and NHRD at the campus of Horticultural Science, Doddabettahalli, Vidyanarayapura, Bengaluru during 29-31, May 2010.

### Regional Centre of CTCRI participated in three exhibitions.

9. Annual Adivasi Mela 2010 organized by Directorate of Horticulture, Govt. of Orissa during January - February 2010 at Adivasi ground, Bhubaneswar.
10. Rashtriya Sabji Kisan Mela organized at Indian Institute of Vegetable Research, Varanasi during 30-31, January 2010.



Dr. H.P. Singh, DDG (Hort.), ICAR visiting CTCRI stall during Rashtriya Sabji Mela organized at IIVR, Varanasi, Uttar Pradesh.

11. National level AGMARK exhibition organized by Directorate of Marketing & Inspection, Ministry of Agriculture, Govt. of India during 23-26, March 2010.

## Training Programmes Organized

Three trainings on ‘ Value added products from Tuber Crops’ to SHG Members, farmers, NGOs etc was organised by Dr. G. Padmaja during 05-06, January; 23-24, February and 22-23, March 2010.

During January-June 2010, 33 batches of farmers were given training on tuber crops production and processing technologies and various activities of CTCRI wherein 1585 farmers and 28 officials from Kerala, Tamil Nadu and Himachal Pradesh participated. Seventeen batches of 739 students from Karnataka, Kerala, Tamil Nadu, Uttar Pradesh, Andhra Pradesh and Gujarat also attended, students awareness programmes on tropical tuber

crops and training programmes conducted at CTCRI, Thiruvananthapuram.

One day Research Orientation training programme to seven new recruiters of ARS Scientists from CPCRI, Kasargod was organised at CTCRI, Thiruvananthapuram on 13 May 2010. A brief exposure to various CTCRI research programmes and laboratories/experimental fields was given.

### Short course on multivariate data analysis

The Regional Centre of CTCRI, Bhubaneswar has organized a short course on “Applied Multivariate Data Analysis for Biological and Social Sciences” during 28 June 2010 to 2 July 2010. Fourteen participants sponsored by IIT-Bhubaneswar, GBPUAT (Pantnagar), TNAU (Madurai), NIRJAFT (Kolkata), CET (Bhubaneswar) and OUAT (Bhubaneswar) participated in the programme. The short course was inaugurated by Dr. Md. K. Khan, Dean, College of Agricultural Engineering & Technology, Orissa University of Agriculture & Technology, Bhubaneswar, Orissa on 28 June 2010. The trainees were imparted need-oriented hands-on training on state-of-art multivariate techniques. Dr. C. Satapathy, Director, AMITY Global Business School, Bhubaneswar distributed



*Inauguration of short course on multivariate data analysis in Bhubaneswar*

certificates to the participants during the valedictory function on 2 July 2010. Dr. P. Sethuraman Sivakumar, Scientist (Senior Scale) coordinated the programme.

### CTCRI-OTELP training programme organized

The Regional Centre of CTCRI, Bhubaneswar in collaboration with Orissa Tribal Empowerment and Livelihoods Programme (OTELP) has organized two training programmes on “Improved agro-techniques of

tropical tuber crops” during 11-23, May 2010 and 24-26, May 2010. A total of 40 staff and stakeholders of OTELP from Orissa participated in the programme. During the programme, the trainees were imparted need oriented



*Dr. B. Behera, CPI, NAIP (Comp-3), OUAT distributing certificates to the participants of CTCRI-OTELP programme on 26 June 2010.*

practical training on production and processing of various tropical tuber crops. Dr. M. Nedunchezhiyan, Senior Scientist coordinated these programmes.

Six batches of 260 farmers from Orissa and Jharkhand; three groups of 60 students from Andhra Pradesh, West Bengal and Orissa visited Regional Centre of CTCRI, Bhubaneswar and were imparted training on various tuber crops technologies. Seven ARS trainees under field experience programme also visited Regional Centre of CTCRI on 3 March 2010.

Ten farmers from Baripada, Orissa under the scheme under Rice Development programme (2009-10) of Directorate of Agriculture, Govt. of Orissa attended the training programme on “Production and processing of tropical tuber crops” on 22 June 2010 at RCCTCRI, Bhubaneswar.

### Participation in Seminar/ Symposium/ Workshop

1. **Dr. M.S.Palaniswami**  
Attended National conference on Horticultural Biodiversity on 29 May, 2010 at Bengaluru.
2. **Dr. K .Abraham**  
Participated in the meeting cum Workshop on Zonal Technology Management & Business Planning and Development (South Zone ) at CIFT, Cochin during 12-13, March 2010.

**3. Dr. G. Padmaja**

Attended in the workshop on 'Implementation of venture capital assistance and PDF Schemes of small farmers' Agribusiness Consortium' held in Thiruvananthapuram on 29 January, 2010.

**4. Dr. C.S Ravindran**

Participated in the National Conference on production of quality seeds and planting material health management in horticultural crops held at New Delhi during 11-14, March 2010 and presented a paper on 'Planting material production in tropical tuber crops: problems and prospects'.

**5. Dr. C.S Ravindran and Dr. M. Anantharaman**

Participated in the brain storming session- cum Launching Workshop on 'Integrated Farming Systems' programme held on 06-07, March 2010 in Thiruvananthapuram. Dr. M. Anantharaman gave a presentation on 'Extension Success/ Failure'.

**6. Dr. M. Anantharaman and Dr. C. Mohandas**

Participated in the meeting cum Workshop on Zonal Technology Management & Business Planning and Development (South Zone) at CIFT, Cochin 12-13, March 2010.

**7. Dr.S.Ramanathan and Dr.C.S.Ravindran**

Participated in the workshop on "Formulation of an action plan to face the natural calamities during ensuing monsoon period." in Thiruvananthapuram on 13 April 2010.

**8. Dr.C.Mohandas, Dr.Bala Nambisan, Mr. J.V. Siji, Mr. S.Nishanth Kumar and Ms. J. Deepa**

Participated in the seminar on "Talented bacteria associated with *Rhabditis* sp. having insecticidal, nematicidal antimicrobial and antineoplastic properties." at Bangalore Bio in Bengaluru during 2-4, June 2010.

**9. Dr. R.S. Misra**

Participated in the workshop on "The Role of Education in Agrifood-Based Approaches to Nutrition Improvement" at Xavier Institute of Management, Bhubaneswar, Orissa on 10 June 2010.

**10. Shri.M.Unnikrishnan**

a. Attended national workshop of FAO sponsored project

on 'Establishment of National Information sharing Mechanism on Implementation and monitoring of the Global plan of Action (GPA) for the conservation and sustainable utilization of plant genetic resources for food and agriculture (PGRFA) on 17 April, 2010 at National Bureau of Plant Genetic Resources, New Delhi.

b. Participated in the regional workshop of FAO sponsored project on 'Establishment of National Information sharing Mechanism on Implementation and monitoring of the Global plan of Action (GPA) for the conservation and sustainable utilization of plant genetic resources for food and agriculture (PGRFA) on 19 May 2010 at National Bureau of Plant Genetic Resources regional station, Thrissur.

**11. Dr. James George, Dr. Vinayaka Hegde, Dr. T.Makeshkumar and Dr. V.Ramesh**

Participated and presented a poster in National conference on production of quality seeds and planting material health management in horticultural crops during 11-14, March 2010 in New Delhi. Dr. Makeshkumar presented a poster entitled "Role of diagnosis in plant health management". Dr. James George presented a poster on "Standards for quality planting material production in tropical tuber crops." Which was selected for best poster award. Dr. V. Ramesh presented a paper on AICRPTC titled 'Inclusive production of healthy planting material in tropical tuber crops under participatory mode and seed tuber village concept involving AICRP Tuber Crops Centres at different regions of India'.

**12. Dr. C A Jayaprakas**

Participated in the National Seminar on 'Sustainable agriculture' and gave a lead talk on 'Integrated approach for the pest management in agriculture' at CMS College, Kottayam.

**13. Dr. M.N.Sheela**

Took part in the national consultation on "Agro biodiversity management" at NAS complex, New Delhi during 26-27, May 2010.

**14. Dr. Vinayaka Hegde and Dr. T.Makeshkumar**

Participated in the Indian Virological Society

National conference on Recent trends in viral disease problems and management (VIROCON 2010) held at Sri Venkateswara University, Tirupati during 18-20, March 2010 and presented a paper entitled 'Evaluating Virus resistance constructs against RNA and DNA viruses infecting Cassava'.

**15. Dr G.Suja**

Attended a workshop on "Organic farming: Changing mindset" on 9 April 2010 at World Agriculture Market, Vengeri, Kozhikode.

**16. Dr. K.Susan John**

a. Participated in the one day workshop on "Soil fertility mapping and nutrient advisory service of state planning board." at Central soil fertility Laboratory, Thiruvananthapuram on 21 April, 2010.

b. Took part in the one day workshop on "Soil tests based plant nutrient management plan for agro ecosystems of Kerala." at Central Soil Fertility laboratory, Thiruvananthapuram on 28 June 2010.

**17. Dr. M. Nedunchezhiyan**

Participated in the Regional Review Workshop on NAIP held at Ranchi during 4-5, March 2010.

**18. Dr. T. Makesh Kumar, Dr. K.Rajasekhara Rao and Dr. A.N. Jyothi**

Participated in the Brain storming session on Nanotechnology in Agriculture held at CIFE, Mumbai during 27-28, March 2010. Dr. T. Makesh Kumar presented a concept note on 'Nanotechnology in the study of diagnostics and host virus interaction of Cassava mosaic disease in Cassava'. Dr. Rajasekhara Rao presented a concept paper on "Reverse engineering of biologically active sweet potato nano-fragrances for mitigation of weevil *Cylas formicarius*."

**19. Dr T.Srinivas**

a. Attended Group Monitoring Workshop of Kerala State Council for Science, Technology and Environment (KSCSTE) and presented the progress of the work done on the project "An Economic analysis of yield gaps and constraints in tuber crops production in Kerala." on 18 January 2010 held at Sastra Bhavan,

Thiruvananthapuram, Kerala.

b. Participated in one day National workshop on "Sources of growth in Indian Agriculture-Trends, Challenges and Prospects" organized by National Centre for Agricultural Economics and Policy Research on 27 March 2010 in New Delhi.

**20. Dr. K. Rajasekhara Rao**

Participated in the Workshop on "Sensitisation Workshop on the quarantine pest, the coconut leaf beetle *Brontispa longissirra* organized by NBAII, Bangalore at OUAT, Bhubaneswar on 28<sup>th</sup> January 2010.

**21. Dr. C.Mohan**

Participated in the Bioinformatics Indica, an International symposium on computerizational Biology, Structural Bioinformatics & System Biology in centre for bioinformatics from 11-13, January 2010.

**22. Dr. V. S. Santhosh Mithra**

Participated in the National Workshop on ICT initiations of NAIP with special reference to uniformity guidelines for the ICAR at NBPGR New Delhi on 19 March 2010.

**23. Dr.V. Ramesh**

a. Participated in Workshop on use of fly ash in agriculture, organized by CFARM at New Delhi on 9 March 2010.

b. Participated in the workshop on "Recombinant DNA Technology" at CFBTR, Madurai during 20-31, May 2010.

## Lectures / Media talks/ Meetings attended

**1. Dr. S.K.Naskar**

a. Participated in the meeting of the Director General, ICAR with Horticulture Division in New Delhi during 2-3, February 2010.

b. Participated in the Director's Conference held at ICAR, New Delhi during 15-17, February 2010.

c. Participated in the Divisional meeting of Directors of Horticulture Division under the Chairmanship of Dy. Director General (Hort.) at ICAR, New Delhi on 4 February, 2010.

2. **Dr. S.K.Naskar and Dr. M.S.Palaniswami**  
Participated in XXII meeting of the ICAR Regional Committee No. VIII held in Bengaluru during 13-15, May 2010.
3. **Dr. S.K.Naskar, Dr. M. Anantharaman and Dr. S. Ramanathan**  
Attended Grand Kerala Festival meeting on 19 June 2010 at Secretariat, Thiruvananthapuram.
4. **Dr. M.S.Palaniswami**  
Attended meeting of Central sub - committee on crop standards notification and release of variety for horticultural crops held in New Delhi on 4 May, 2010.
5. **Dr. K. Abraham and Shri. M. Unnikrishnan**  
Participated in the 'Meeting of the Scientists from Research Institutions of Western Ghats on 04-02-2010 organized by the Chief Conservator of Forests (Biodiversity Cell) at Forest Head Quarters, Vanalakshmi, Vazhuthacaud, Thiruvananthapuram and Shri. M. Unnikrishnan presented 'CTCRI's achievements in the conservation and utilization of biodiversity of tuber crops'.
6. **Dr. G. Padmaja**  
Organized the Project Review Committee (PRC) meeting of the DSIR funded project entitled 'Primary processing and value addition of sweet potato and yams for self employment generation by Women' at CTCRI on 14 March 2010.
7. **Dr. C.S Ravindran**
  - a. Participated in the discussion on present problems of coconut cultivation held at the World market complex, Anayara on 3 January 2010 and gave a presentation on 'Role of tuber crops as intercrops in coconut gardens'.
  - b. Took a class on 'Cultivation practices of tuber crops' to a group of five trainees from Mithranikethan on 12 January 2010.
  - c. Took a class on 'Seed production techniques of quality planting material in tuber crops' to 25 agricultural Assistants at RATTTC Kazhakkuttam on 18 January 2010.
  - d. Handled a class to 61 farmers from Neyyattinkara on 28 January 2010 on 'Agro techniques and planting material production in tuber crops'.
  - e. Took a class to 30 farmers from Thrissur on 'Cultivation practices and also on rapid multiplication of planting materials of tuber crops' on 15 March 2010.
  - f. Attended the World Environment Day celebrations held at Kanakakunnu Palace, Thiruvananthapuram on 5 June 2010.
  - g. Attended the National Technology Day (2010) Celebrations held at Centre for Earth Sciences Studies, Thiruvananthapuram on 8 June 2010.
8. **Dr. S. Ramanathan**
  - a. Annual review meeting of the ICAR Network project on 'Assessment of gender issues and identification and refinement of selected women specific technologies in horticultural crops' at DRWA Bhubaneswar on 12 March 2010.
  - b. Handled a class on "Project monitoring and evaluation techniques." to the trainees at SAMETI, Thiruvananthapuram on 23 June 2010.
9. **Dr. R.S. Misra, Dr. R.C. Ray, Dr. A. Mukherjee, Dr. M. Nedunchezhiyan, Dr. K. Laxminarayana, Dr. K. Rajasekhara Rao and Dr. P. Sethuraman Sivakumar**  
Participated in the 'Knowledge Fair on sweet potato utilization and cultivation for tribal women' organized by CIP Liaison Office, Bhubaneswar during 17-18, March 2010 at Directorate of Women in Agriculture, Bhubaneswar and RCCTCRI, Bhubaneswar.
10. **Dr. R.S. Misra and Dr. M. Nedunchezhiyan**  
Participated in the RECARD meeting held at NABARD Orissa Regional Office, Bhubaneswar on 26 March 2010. In the meeting, Dr. R.S. Misra presented a paper on 'Measures to improve the productivity of horticultural crops in Orissa'.
11. **Sri M. Unnikrishnan**
  - a. Participated in the sixth Institute Management Committee meeting of Indian Institute of Spices Research (IISR) on 8 June 2010 at IISR, Kozhikode in the capacity of IMC member of IISR.

- b. Department Promotion Committee meeting (DPC) for Assessment of Technical personnel category III (ASRB) Field/Farm Techniques at Indian Institute of Spices Research (IISR), Kozhikode on 17 May 2010
- 12. Dr. J. T. Sheriff**  
Attended the committee meeting of Ministry of Food Processing Industries on “Bench marking technologies.” on 19 April 2010 in New Delhi.
- 13. Dr. James George**  
a. Gave a talk on tuber crops in the “Vayalum Veedum” program on 24 April 2010 arranged by All India Radio at Cheriyanad Panchayat, Alappuzha.  
b. Delivered a talk on “Prospects of tuber crops for food security.” at Shantigram Bhavan, Neyyattinkara on 14 June 2010.
- 14. Dr. C A Jayaprakas**  
a. Demonstrated the efficiency of bio pesticide extracted from Cassava against the pseudo stem weevils in banana at farmers’ field in Badiyadukka, Kasaragod under KVK Kasaragod.  
b. Gave a talk on ‘Some Nobel Thoughts’ on National Science day celebrations at CTCRI.  
c. Attended the Group meeting on Sucking Pest (ORP) at IIHR Bengaluru on 26 June 2010.  
d. Visited Indian Cardamom Research Institute (ICRI) Mailadumpara (Idukki) and demonstrated the effect of cassava bio pesticide on insect pests.
- 15. Dr. V. Ravi**  
Delivered a talk on “Drought tolerance of cassava and sweet potato” at RCCTCRI, Bhubaneswar in a training programme organized by RCCTCRI and OTELP (Orissa Tribal Empowerment Programme on 25 June 2010.
- 16. Dr. (Mrs.) A. Mukherjee**  
a. Delivered lectures on ‘Salt tolerant orange and purple flesh sweet potato: sustainable food and nutrition security’ and ‘Biotic and abiotic stress tolerance in taro’ on 12<sup>th</sup> January 2010 as resource person at the Academic Staff College for UGC-sponsored Refresher Course in Agricultural Sciences.  
b. Delivered lectures on ‘Application of Biotechnology in Horticulture: Tuber crops’ and ‘Practice of Plant Tissue Culture: Agrobiotechnology’ on 4 March 2010 in the Dept. of Biotechnology & Zoology, Utkal University for UGC-sponsored Refresher Course in biotechnology.
- c. Participated in IMC meeting of DRWA on 25 March 2010.
- 17. Dr. M. N. Sheela**  
Attended meeting of “Task Force on plantation crops” and presented the project reports of the project funded by PPV&FRA at CPCRI during 28-29, June 2010.
- 18. Dr. M. L. Jeeva**  
a. Participated in the half yearly review meeting of AMAAS at Mau, Uttar Pradesh 9 January 2010.  
b. Participated in the consultative meeting on Diagnosis at Trichy 21-24, January 2010.  
c. Attended the ‘Empowered Committee (EC) meeting of NFBSRA project” in New Delhi on 28 June 2010 and presented the progress in the project entitled “Molecular Diagnosis of Fungal Diseases of Cassava, Taro, *Amorphophallus* & Yams.”
- 19. Dr. Vinayaka Hegde**  
Participated in the review meeting of outreach project on *Phytophthora*, *Fusarium* and *Ralstonia* diseases of horticultural and field crops ‘ held at New Delhi from 15-16, March 2010.
- 20. Dr. M. Nedunchezhiyan**  
a. Delivered a lecture on ‘Seed production and certification in tuber crops’ in the officers training on ‘Seed production’ organized by Orissa State Seed and Organic Productions Certification Agency, Bhubaneswar on 4<sup>th</sup> January 2010.  
b. Participated as resource person in the ‘Scaling up of water productivity in agriculture for livelihoods through teaching-cum-demonstration, training of trainers and farmers’ organized by Directorate of Water Management, Bhubaneswar on 10<sup>th</sup> January 2010 at Sakhigopal, Puri district, Orissa.
- 21. Dr. Susan John**  
a. Attended the 97<sup>th</sup> Indian Science Congress held at Trivandrum during 3-7, January 2010.

- b. Took a class on 'Soil fertility management on tropical tuber crops' to 50 farmers each from Perumpuzha Krishi Bhavan on 29-01-2010, Trivandrum block on 08-03-2010, Kottayam on 11-03-2010; 75 farmers of Muthukulam block on 06-03-2010, 25 farmers of Haripad block on 22-03-2010 and to 50 students of Loyola School on 04-03-2010.
- c. Attended package of practices state level workshop - 'Crops 2010' on 24-02-2010 at KAU, Vellanikkara Thrissur.
- d. Participated in the first meeting of Kerala Soil scientists in Thiruvananthapuram on 25 May 2010.
- e. Attended meeting of State Planning Board on Agricultural technical expert committee on 26 May 2010 in Thiruvananthapuram.
- f. Handled a Class on "NM Strategy for tropical tuber crops" to 25 farmers of Peruvanthanam panchayat, Idukki on 5 June 2010.

#### 22. Dr. G. Suja

- a. Attended the 97<sup>th</sup> Indian Science Congress held at Trivandrum during 3-7, January 2010.
- b. Handled a class on 'Agro techniques and organic farming of tuber crops' to 50 farmers each from Perumpuzha, Kollam on 29 January 2010, Kottayam on 11 March 2010 and Kannur on 23 March 2010.
- c. Handled a class on 'Organic farming of tuber crops' on 9 February 2010 at RATTTC, Kazhakkuttam and to 25 farmers of Kollam on 9 March 2010.
- d. Handled a class on 'Propagation of tuber crops' to 50 Students of Loyola School on 4 March 2010.
- e. Attended package of practices state level workshop - 'Crops 2010' on 24 February 2010 at KAU, Vellanikkara Thrissur.
- f. Attended the meeting convened by Director of Agriculture, Kerala to formulate POP for organic farming on 23 April 2010 at Anayara, Thiruvananthapuram.
- g. Handled a class on "Agrotechniques of tuber crops." to 50 farmers from Kottayam district (Under ATMA Programme) on 30 April 2010.

- h. Took a class to 35 farmers from Kollam on "Eco-friendly farming in tropical tuber crops." at RATTTC, Kazhakkuttam on 4 June 2010.

#### 23. Dr. T. Makesh Kumar

- a. Participated in the National Consultative meeting on diseases diagnostics in horticultural crops during 22-24, January 2010 and presented status of diagnostics in tuber crops disease and future needs.
- b. Attended as an external expert in the selection of bioinformatics trainees at IISR, Kozhikode on 3 March 2010.
- c. Attended 6<sup>th</sup> review meeting of "ICAR Network projects on Transgenic in crops." held at NRCPB, New Delhi during 19-20, May 2010.

#### 24. Dr. A.N Jyothi

Attended the project Advisory Committee meeting of DST on 25-01-2010 at IISR, Jammu and presented a project proposal.

### Trainings Attended

1. **Dr. K. Rajasekhara Rao** participated in training on GC-MS and EAG during 18-24, January 2010 at the National Bureau of Agriculturally Important Insects, Bangalore under NAIP on Sustainable Livelihoods operating at the Regional Centre.
2. **Dr. V. Ravi** attended training on "Biotechnology" Rajiv Gandhi Centre for Biotechnology Poojappura, Trivandrum. during 05-24, March 2010.
3. **Dr.J.Sreekumar**  
Installation and configuration of SAS at UAS, Bangalore during 21-22, June 2010 organized by GKVK, UAS, Bengaluru under the NAIP project on strengthening of statistical computing for NARS.
4. **Dr. C.S.Ravindran**  
Attended the Orientation programme on "Familiarization and Interpretation of weather products and technologies." at Indian Meteorological Department, Thiruvananthapuram on 23 June 2010.

## Visit Abroad

### 1. Dr. T. Srinivas

After successfully completing consultancy assignment in International Centre for Agricultural Research in the Dry Areas (ICARDA), Syria from 27 November 2009 to 10 January 2010, joined CTCRI on 11 January 2010.

### 2. Dr. J. Sreekumar

Attended NAIP sponsored three months training program in Bioinformatics from 1<sup>st</sup> March to 28 May 2010 at Plant Research International, Wageningen University, Wageningen, The Netherlands and joined back CTCRI. He got exposure to latest computational techniques in protein structure modelling and protein - protein interaction site prediction. He also got experience in working with LINUX and handling software packages R statistical computing and Modeller.

### 3. Dr.G.Byju

- a. Participated in the International conference on “Balanced fertilizer application in tropical agriculture” during 12-16, April 2010, Kuantan, Pahang, Malaysia.
- b. Attended International conference on “Soil classification and Reclamation of Degraded Lands in Arid environment” during 17-19 May, 2010, Abu Dhabi, UAE.

### 4. Dr.M.Anantharaman

Participated in the CIP-IFAD Consultation workshop on R&D investments in Roots and Tubers in the Asia Pacific Region in Bangkok during 17-19, May 2010.

## Recognition & Awards

### 1. Dr.C.S.Ravindran

Selected as one of the 15 member committee constituted by the Dept. of Agriculture to mitigate natural calamities in Kerala on 13 April 2010.

### 2. Dr. K. Susan John

- a. Resource person for capacity building on soil sample collection for the State Planning Board

- b. Member Technical Expert Committee of State Planning Board on Agriculture projects.

### 3. Dr.James George

James George, C.S. Ravindran, and S. K. Naskar received the award for the Best Poster presentation for the paper “Standards for quality planting material production in tropical tuber crops” presented in the National Conference on Production of Quality Seeds and Planting Material-Health Management in Horticultural Crops held at New Delhi during 11-14 March 2010.

### 4. Dr.J.T.Sheriff

Member - Bench Marking Technologies Committee of Ministry of Food processing Industries, Govt. of India, New Delhi.

5. Mr. Nishanth Kumar, S., SRF received the young scientist award in the 22<sup>nd</sup> Kerala Science Congress held at Kerala Forest Research Institute, Peechi during 28-31 January 2010.

## Patent

Provisional patent application on ‘A novel cyclic dipeptide from bacterial symbiont of *Rhizoctonia* sp, process of inoculation and its antimicrobial properties’ was cleared for filing by C. Mohandas, Bala Nambisan, Prem Dureja, Nishant Kumar and Siji.

## Happenings in Brief

### Germplasm Exploration

**Sri. M. Unnikrishnan** conducted germplasm exploration and collection from 15-25, March, 2010 in five Islands (Kadanat, Amini, Kavarathi, Suheli-Cheriyakavu and Andros) in the Lakshadweep Islands along with Dr. Joseph John, Scientist from National Bureau of Plant Genetic Resources (NBPGR) regional station, Thrissur. Seventeen tuber crop accessions were collected including the unique collection of *Taccoloides leontopeta* growing in the uninhabited island of Suheli. Indigenous Technological Knowledge (ITK) was collected on the utilization of *Tacca* in the production of ‘country starch’ having medicinal cure.

### CTCRI Celebrated World Environment Day

World Environment Day was celebrated at CTCRI

on 5 June 2010. Dr.S.K.Naskar, Director planted the mango sapling in memory of the day in the Institute and mentioned the impact of climate change and the importance of environment protection by growing trees and reducing pollution.



*Director planting mango sapling on the World Environment Day*

The software package SAS Educational Analytics software along with SAS Enterprise guide, SAS Enterprise Miner, SAS Gentotics/ JMP Genomics has been installed in ARIS Cell.

## Sports

A 27 member sports contingent from CTCRI participated in the ICAR Zonal Sports meet organised at Central Institute of Fisheries Technology (CIFT), Cochin during 23-27, February 2010. Shri R.Bharatan and Shri V.R.Sasankan bagged II and III prizes respectively in the Long Jump event. Shri Swaminathan got II prize in the



1500 m race and III prize in the 800 m race. CTCRI NEWS congratulates the prize winners.

## Science Forum Corner

Science Forum meet was arranged for four lectures and three research papers by research scholars of Division of Crop Utilization.

1. The details of guest lectures are:
  - a. Dr. B. S. Murthy, Scientist, IITM, Pune on 'Effect of solar eclipse on surface energy budget and carbon dioxide flux'.
  - b. Dr. P. M. Govinda krishnan, Principal Scientist, CPRI, Simla on 'IT applications in potato'.
  - c. Dr.Bhuwan Sthapit, Expert in Biodiversity from UNEP - GEF programme gave a lecture on "On-farm conservation of biodiversity".
  - d. Mr. Abdul Rahman Ilyas, Chief Operating officer, Agri, Science Park, ICRIASAT, Hyderabad gave an exposure talk on Agri-Science Parks.



*Dr. C.A. Jayaprakas giving a talk on the occasion of National Science Day 2010*

2. National Science Day-2010 was organized on 27<sup>th</sup> February. The focal theme of this year was 'Gender Equity for prosperity with peace: A National Science Day (NSD) talk on "Some Nobel Thoughts" was delivered by Dr. C. A. Jayaprakas, Principal Scientist, CTCRI.

## Recreation Club Corner

A new executive committee of CTCRI Recreation Club for the year 2010-11 has taken over and inauguration

of club activities and cultural evening was held on 28 June 2010.



*Dr. S.K. Naskar, Director inaugurating CTCRI recreation club*

## Any other Information

- i). Peer Committee meeting of NFBSRA project established “Molecular Diagnosis of Fungal Diseases of Cassava, Taro, Amorphophallus and Yam” was held at CTCRI on 5<sup>th</sup> March to review the project. Dr. Muthusamy, Ex Dean, AC&RI Killikulam, Tamil Nadu Agricultural University (TNAU) chaired. Dr. M. Anandharaj, Project Coordinator, (Spices), Indian Institute of Spices Research (IISR), Kozhikode, Dr. K. Shanmughasundaram, Prof. and Head, Microbial Technology, Madurai Kamraj University and Dr. S. K. Naskar, Director, CTCRI attended as members. The meeting was organized by the PI, Dr. M. L. Jeeva, Member Secretary of the peer committee. Dr. Vinayaka Hegde, Dr. T. Makesh Kumar & Dr. Veena S.S were the special invitees.
- ii). A memorandum of understanding for the conduct of M.Sc Biotechnology (integrated course) was executed between Kerala Agricultural University and Central Tuber Crops Research Institute on 24<sup>th</sup> March 2010.
- iii) Pasta developed from the orange fleshed sweet potato variety ST 14, with high protein and carotene content was formally launched at the XXII meeting of the ICAR Regional Committee No. VIII held in Bengaluru during 13-15, May 2010. The product is having low starch digestibility could serve as a low glycaemic food for diabetics
- iv) Dr.V.V.Singh, Head Farm, CIAE visited CTCRI on . He

held discussion with Dr.S.K.Naskar, Dr.James George, Dr.J.T.Sheriff and Dr.C.S.Ravindran in connection with the farm mechanization. He visited the field and identified the requirements for weeding and harvest machineries. He also gave a presentation on Farm Mechanisation programs undertaken by CIAE, Bhopal in the Science Forum.

## Commercialization

### Dr. J.T.Sheriff

- a. Consultancy- Evaluated arrow root machine at Kottayam District
- b. Field evaluation of rasper at Shri. Jyothi Sago Industries, Rasipuram

## Publications

1. Agro-techniques of tropical tuber crops
2. Agro-techniques and value addition in tropical tuber crops
3. Tuber crops recipes for household utilization and small-scale industries (Under NAIP)



*CTCRI team evaluating arrowroot machine at Kottayam district*

## Retirement

1. Shri. K.Ramakrishan, Technical Officer (T5) retired on 30-04-2010.
2. Shri. B.Gopalakrishan Nair, skilled supportive staff retired on 31-05-2010.
3. Dr.M.S.Palaniswami, Project Co-ordinator AICRPTC retired on 30-06-2010.

CTCRINEWS wishes them a happy and peaceful retirement life.

## Promotions

Smt. L.Rajalekshmy and Smt. K.S.Sudhadevi were promoted as T7-8 technical officer from T6 Technical Officer. Shri V.R.Sasankan, Shri V.Ganesh, Shri B.Renjith Kishor and Shri K.Ramakrishnan were promoted as T5 Technical Officer from T4 Technical Assistant.

The following 48 officials have been granted financial upgradation under the Modified Assured Career Progression (MACP) scheme.

Sri P. J.Davis, Sri Kalakar Malik, Smt. K. Presanna, Smt. R.Bhagavathy, Smt. K.V.P.Sarada, Sri P.S.Sureshkumar, Sri J.Unni, Sri P.K.Acharya, Smt. K.Padmini Nair, Sri M.Padmakumar, Sri Sukra Singh, Sri A.R.Bhaskaran, Smt. S.Thankamani Amma, Sri G. Ravindran, Smt.

S.Ushakumari, Sri V.G.Sankaran, Sri Ramachandra Das, Sri Bijoykumar Nayak, Sri K.Manikantan, Sri P.Arjunan, Sri K.Mani, Sri N.B.Sasidharan, Sri K.Sivanandan, Sri K.P.Somasekharan, Sri K.K.Pramod, Sri M.Krishnan, Sri C.K.Bhaskaran, Sri Akshyakumar Nayak, Sri Ramesh Nayak, Sri K.C.Jena, Sri Raula Nayak, Smt. P.Sarojini, Sri Bhajaman Malik, Sri Purna Samal, Sri P.Udayakumar, Sri Sauri Pradhan, Sri B.Gopalakrishnan Nair, Sri K.Sarachandrakumar, Sri G. Madhu, Smt. Paluni Begua, Sri Babuli Sethi, Smt. C.T.Chellamma, Smt. M.Syamala, Sri S.Radhrishnan Nair, Sri A.Chandran, Sri K.Velayudhan, Sri P.Ramankutty, and Sri T.Lawrence.

CTCRI NEWS congratulates all.

## Distinguished Visitors

S.No.	Visitor	Date
1.	Dr. S.M. Paul Khurana, Vice Chancellor, Rani Durgavati Vishwavidyalaya, Jabalpur, Madhya Pradesh-482 001	24-02-2010
2.	Dr. D.C. Joshi, Dean, Food Processing & Technology, Gujarat Agril. University, Anand, Gujarat.	24-02-2010
3.	Dr. H.C. Pathak, Dean (Agri) & Director of Research Navasari Agricultural University, Navasari- 396 450, Gujarat.	24-02-2010
4.	Dr. S.J. Singh, (Former Head, IARI Regional Station), Flat No. 23, 5th Floor, Prachi Residency, Baner Road, Pune, Maharashtra	24-02-2010
5.	Dr. N. Mohanakumaran, Director Research (Retd.) Chirakkara Palace, Pappanamcode, Thiruvananthapuram - 695 018	24-02-2010
6.	Dr. Umesh Srivasthava, Asst. Director General (Hort - II), Indian Council of Agril. research, Krishi Anusandham Bhavan- II, Pusa, New Delhi-110012.	24-02-2010
7.	Shri. K. Chandrasekharan, Vettikkathu House, P.O Koothattukulam - 686 62, Ernakulam, Kerala	24-02-2010
8.	Shri. Salim P. Mathew, S 1-407 MS Apartment, Kasthurba Gandhi Marg, New Delhi-110001	24-02-2010
9.	Dr. Wolfgang Gruneberg, Sweet Potato Crop Leader, International Potato Center (CIP)	8-9, March 2010
10.	Sri. Suresh Pattnaik, NRM Consultant, OTELP, Govt. of Orissa, Bhubaneswar	11-5-2010
11.	Dr. Vishal Nath, Head, Central Horticulture Experiment Station, Bhubaneswar, Orissa, India	13-5-2010
12.	Dr. Basudev Behera, Professor (Agronomy) & CPI, NAIP (Comp-3), Orissa University of Agriculture & Technology, Bhubaneswar, Orissa, India	26-5-2010
13.	Dr. Md Khalid Khan, Dean, College of Agricultural Engineering and Technology, Orissa University of Agriculture & Technology, Bhubaneswar, Orissa, India	28-6-2010
14.	Dr. C. Satapathy, Director, AMITY Global Business School, Bhubaneswar	2-7-2010

## हिंदी कार्यशाला - 2010

संघ सरकार की राजभाषा नीति के अनुपालन में इस संस्थान के सभी कर्मचारियों के लिए 25/06/2010 को हिन्दी अनुवाद पर एक दिन की कार्यशाला आयोजित किया गया। डॉ. एस.के. नसकर निदेशक और अध्यक्ष (राजभाषा), हिन्दी के महत्व पर पकाश डालते हुए समारोह के उद्घाटन किया।

डॉ. वी.एस. संतोष मित्र, वैज्ञानिक (एस.जी) और संपर्क अधिकारी (राजभाषा) सभा का स्वागत किया, विशेष रूप से श्री.एन. सामराज, हिंदी अधिकारी, मंडल रेल कार्यालय, तिरुवनंतपुरम का स्वागत किया और कार्यशाला में अच्छी उपस्थिति पस संतोष प्रकट

किया। श्री.एन. सामराज, हिंदी अधिकारी, मंडल रेल कार्यालय, तिरुवनंतपुरम अनुवाद और द्विभाषी कंप्यूटर पर वर्ग लिया। 42 प्रतिभागियों ने कार्यशाला में उत्साहपूर्व भाग लिया। प्रतिभागियों की राय थे कि इस तरह के कार्यशालाओं की बारंबारी बढ़ाई जानी चाहिए क्योंकि उन्हें यह बहुत फायदेमंद लगा।

श्रीमती टी.के सुधालता, तकनीकी अधिकारी (हिंदी) ने धन्यवाद प्रस्ताव पेश किया और श्री एन. सामराज के वर्ग की सराहना की और सभी प्रतिभागियों को कार्यशाला से प्राप्त ज्ञान उपयोग करने के लिए अनुरोध किया। कार्यशाला 1.00 पर संपन्न हुआ।



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**TUBERS FOR HUNGER ALLEVIATION**