

**PROCEEDINGS OF THE ICAR-CTRI RESEARCH ADVISORY
COMMITTEE (RAC) MEETING – 2018**

7-8th June, 2018

Venue: Seminar Hall, ICAR-CTRI, Rajahmundry

The Research Advisory Committee of ICAR-Central Tobacco Research Institute as constituted afresh by the Indian Council of Agricultural Research, New Delhi *vide* F.No.Cs.1/4/2008-1A-III dated 9th March, 2018 met for two days during 7-8 June, 2018 at ICAR-CTRI, Rajahmundry to critically review research progress of the institute and to make advisories in the form of recommendations for improving ongoing research programmes and to initiate new ones in emerging areas of critical importance in the Indian tobacco sector. The RAC meeting was attended by its Chairman, Dr. H. Shivanna, Former Vice-Chancellor, UAS (GKVK), Bangaluru and all distinguished members (RAC composition appended as ANNEXURE-I). The Heads of Divisions, Heads of Research Stations, Scientists, and Heads of Administration/ Accounts of ICAR-CTRI participated in the meeting.

Dr. M. Anuradha, Member-Secretary of RAC, formally welcomed the Hon'ble Chairman and Members of RAC and all participants to the 1st meeting of the current RAC. The meeting started with ICAR song followed by lighting the lamp by the dignitaries. All the participants introduced themselves briefly.

Dr. D. Damodar Reddy, Director, ICAR-CTRI made a presentation on myriad aspects of tobacco sector and the research backup by CTRI. He highlighted the global scenario of tobacco production, productivity and export trends and presented the Indian tobacco dynamics and emerging challenges and researchable issues. Some critical issues included: need for development of tobacco varieties/hybrids with less harmful constituents, efficient management of resources for production, enhancing farm returns, effective use of alternative energy sources for tobacco curing, exploring possibilities for crop diversification in tobacco areas, value addition and diversified uses for tobacco etc. Dr. Reddy also highlighted Institutes' broad research framework along with on-going research programmes and achievements, the institute's performance in terms of research publications, awards and recognitions, and attracting research grants through the externally funded projects.

The Chairman and Members of RAC individually expressed their introductory views on tobacco sector and deliberated their expectations on the tobacco research front. Dr. R. K. Singh, ADG (ICAR) emphasized the need for diversification of crop and releasing varieties with low tar content. He reminded the general need to find alternative cropping systems that can be promoted in those tobacco areas where tobacco productivity is low and returns are not very

attractive. Dr. K.S. Varaprasad, Ex Director, IIOR enquired about NAAS rating of publications of the Institute. He opined that there should be increased focus on technology dissemination and commercialization of technologies. Dr V. R. Rao expressed the concern about the uncertainty surrounding the tobacco and stressed the need to recognize the positive aspects of the tobacco sector in terms of income and employment generation, pharmaceuticals and alternative uses and export earnings. While narrating recent research relating to tobacco, Dr. M. Krishna Reddy expressed the view that the options available for research are many and varied in tobacco crop. Dr. S.K. Pattanayak drew attention of the house to the emerging challenges and issues involved from the natural resource management perspective. He emphasized the need for soil health maintenance and soil test based balanced fertilization with due importance to secondary, micro nutrients and use of biofertilizers for cost effectiveness. While complementing interesting views of Members, the RAC Chairman, Dr. H. Shivanna, called for exploring the ways and means to remove criticism on tobacco crop. He stressed the need for collaborative research on alternative uses and value addition of tobacco while continuing the efforts to enhance productivity and leaf quality to meet market and export needs. He further, highlighted the importance of speeding up the research on use of solar/green energy as substitute/supplement for wood fuel in FCV tobacco curing so that negative environmental issues associated with tobacco are addressed in the right earnest.

Dr. M. Anuradha, Member-Secretary presented a brief Action Taken Report (ATR) on the RAC recommendations made in its previous meeting (2017). Following the presentation of ATR by Member-Secretary, there was a discussion on registration of germplasm with NBPGR, management of *orabanche*, pesticide residues and possible use of solar energy for curing FCV tobacco.

After the introductory remarks by the RAC and member secretary's presentation, the Heads of Divisions and Heads of Research Stations presented the action taken report, salient research achievements and thrust area of their respective Division/ Station as briefed below.

Dr. K. Sarala, Head, Division of Crop Improvement presented the Action Taken Report (ATR) of the previous RAC meeting and research highlights, thrust areas and future plan of action pertaining to the Division of Crop Improvement. She informed about the six different thrust areas viz., higher yield and quality along with flavor, breeding for biotic and abiotic resistance, Hybrid development, breeding for low levels of harmful substances, alternate uses of tobacco and genetic resource management. Dr. K. Sarala informed about the steps that were initiated for registration of germplasm after the relaxation of rules by NBPGR. She also informed that the release proposal of FCV entry, TBST-2 was prepared and submitted to AP State Seed Sub-Committee for Varietal Release. She gave a brief note on the germplasm activities going on at the division. For a query related to the seed system. Dr. Sarala informed that the 90% of seed requirement of the farmers is met by ICAR-CTRI. She gave a note on the

two FCV hybrids released for AP and Karnataka and two *Bidi* tobacco hybrids. Chairman suggested to strengthen the maintenance breeding programme.

Dr. S. Kasturi Krishna, Head, Division of Crop Production presented the Action Taken Report (ATR) of the previous RAC, different projects conducted at ICAR-CTRI and its regional stations, salient findings of research activities carried out in the institute under different core areas viz., *Orobanche* management, false maturity mitigation strategies and also the research carried out in agricultural extension, computer applications and externally funded projects. She has also presented the activities of BTRC, Kalavacharla.

Citing the increasing importance of Integrated Farming System (IFS) models, Chairman, RAC, Dr. H. Shivanna, Former Vice Chancellor, UAS, GKVK, Bengaluru stressed the need to try out different models and economics of IFS. To this query, Dr. S. Ramakrishnan explained the existing working models of farming system.

The quantum of infestation and threat of *orobanche* in different tobacco growing areas was discussed in the house. At this juncture, the Chairman enquired about different field experiments conducted so far for control of *orobanche*. Dr. S. V. Krishna reddy, Principal Scientist, Division of Crop Production explained the results of the ongoing experiments and their attempts in trying different treatment combinations. The chairman expressed concern over the limited effectiveness of the treatments and suggested to work out on alternate combinations. Dr. K. S. Varaprasad, Former Director, IIOR, suggested rethinking for alternative options as this parasitic weed has become a menace to Indian tobacco. He further added to integrate all the available methods and then try out new methods. Dr. D. Damodar Reddy, Director, ICAR-CTRI made a mention of solarization technique that can be a potential option to reduce parasite's seed load in the soil. The chairman advised the Head of Division to reorient the studies on *orobanche* management for enhancing practicality and effectiveness..

Dr. R. K. Singh, ADG (Crop Sciences) raised discussion on the need of socio-economic impact of tobacco studies as it is already remunerative to the farmers. Dr. S. Kasturi Krishna replied that if tobacco area is to be reduced or alternative crops have to be cultivated, then this study results give the quantitative terms of the profit in tobacco growing areas. Adding to the discussion, Sri Nagapuri Rajamouli, Farmer, Member-IMC expressed that farmers are interested in tobacco cultivation as it is financially supported by the banks and profitable, therefore, research work should be on value addition to tobacco rather than alternative crops. Adding to this, Director explained the progress of research on tobacco seed oil. RAC opined that focus should be on alternative uses as tobacco is bio-factory for various molecules.

Dr G.Raghupathi Rao, Head (i/c), Div of Crop Protection presented the action taken report, sanctioned scientific cadre strength and scientists in position. The details of the ongoing research programmes, salient research findings emanated from various research projects undertaken and

future thrust areas of the division were presented. The research results are mainly on integrated management of biotic stress which includes monitoring of insect and disease resistance, development of IPM technology, screening for host plant resistance to insect pests and diseases and evaluation of new molecules/formulations of pesticides against insect pests and diseases. The Chairman and members showed concern on pesticide usage and advised to give emphasis on non-chemical approaches for management of pest and diseases in tobacco crop. Dr K. S. Varaprasad suggested to determine MRL/GRLs of pesticides before recommending for tobacco crop.

Dr. C. Chandrasekhara Rao, Head, Division of Crop Chemistry and Soil Science presented the salient research findings of the work done in the division. The major research efforts are on management of resource constraints for production efficiency and product quality, use of poly carbonate roof and agri-biomass briquettes for fuel saving in the process of curing and exploiting tobacco for alternative uses with special reference to seed oil. The members appreciated the work done by the division, which is as per the present day requirements. They suggested to work on isolation of native P solubilisers and N₂ fixers from the tobacco growing areas, developing microbial consortia for enhancing the nutrient use efficiency, Soil Health management for sustainable tobacco, STCR based fertilizer application through targeted yield equations, preparation of balance sheet of major and micro nutrients in different FCV tobacco growing zones, and commercialization of technologies developed.

Later, Dr. S. Kasturi Krishna, Head i/c, CTRI Research Station, Jeelugumilli, Dr. M. Anuradha, Head, CTRI Research Station, Kandukur, Dr. S. Ramakrishnan, Head, CTRI Research Station, Hunsur, Dr. P. Venkateswarlu, Head i/c, CTRI Research Station, Guntur, Dr. M. Kumaresan, Head i/c, CTRI Research Station, Vendasandur and Dr. A. Sreenivas, Head i/c, CTRI Research Station, Dinhat, have presented the Action Taken Reports and salient research findings of the experiments carried out at their respective stations. To a query raised by the chairman on selection of treatments for the permanent manurial trial, Dr. A. Sreenivas clarified about different treatments and control plot. The House felt that, as it is a long term permanent manurial trial, the results can be utilized best in tobacco crop production practices.

After critically analyzing the achievements of the research activities, RAC members offered appropriate suggestions and recommendations for further improvement. The RAC members appreciated the research stations for their contribution. They suggested to develop situation specific IFS models at different tobacco growing zones. The RAC advised to add microbial interventions particularly in the preparation of tray media for seedling production and compare with the available consortia with other institutes.

Critical observations by the RAC

After completing all the presentations the Chairman and members of the Research Advisory Committee gave their critical observations/points for consideration in formulating the projects which include

- Application of marker assisted selection in breeding for trait specific cultivar/hybrid development.
- Utilisation of germplasm repository and development of Pre breeding lines for quality, biotic and abiotic stress
- Registration and depositing germplasm with NBPGR
- Identification of varieties for higher seed yield
- Studies on seed structure with scanning electron microscope facility available in other institutes
- Further intensive exploration of tobacco for ornamental purposes
- Reorientation of crop production programmes with special reference to *orabanche*
- Development of forewarning system for *orabanche* occurrence
- Non Pesticidal approaches for management of pest and diseases in tobacco crop.
- Determination of MRL/GRLs of pesticides before recommendation on tobacco crop.
- Use of biointensive approaches in the management of nematodes.
- Microbial interventions particularly in the nursery and media for portray seedling production
- Isolation of native P solubilisers and N₂ fixers from the tobacco growing ecosystem and development of microbial consortia for enhancing the nutrient use efficiency.
- Soil Health management by using biofertilisers for sustainable tobacco production
- STCR based fertilizer application through targeted yield equations
- Preparation of balance sheet of major nutrients in different FCV tobacco growing zones
- Secondary and micronutrient requirements of tobacco crop their removal and external supplementation
- Development of Integrated crop management strategies
- Commercialization of technologies developed.

- Alternative farming systems for tobacco in all agro ecological zones
- Precision agriculture need to be given importance in all types of tobacco
- Secondary agriculture needs prioritization with special emphasis on seed oil and other value added products
- More emphasis on tapping solar energy for flue-curing in place of wood fuel in view of environmental concerns with the use of wood as fuel

After critical review and thorough discussion, Research Advisory Committee made the following recommendations in identified priority research areas for implementation in coming years.

RECOMMENDATIONS OF RAC - 2018

S. No	RAC Recommendations	Timeline for initiation of action
1	Recognizing the huge size of tobacco germplasm repository at the institute (3370 accessions) and its potential use in crop improvement, the RAC advises to continue efforts to register germplasm lines with NBPGR, New Delhi and to focus special attention to pre-breeding programme. The trait specific marker assisted selection should receive priority in developing <i>varieties</i> with superior eco-agronomic and economic traits.	2018-19
2	Reorient research projects/programmes in crop production domain and concentrate on developing Integrated Crop Management (ICM) modules by integrating nutrient, pest and <i>Orobanche</i> management. As no single crop is as remunerative as FCV tobacco, it is advised to look at the possibilities for developing alternative farming systems options suitable for different FCV tobacco growing regions.	2018-19
3	Recognizing the importance of national initiatives on soil health maintenance and rationalize fertilizer use in different agricultural production systems, the RAC recommends to prioritize soil fertility assessment including micronutrient status in tobacco producing soils and develop soil test crop response (STCR) equations based fertilizer prescription for targeted yields	2018-19
4	As the presence of pesticide residues in the tobacco leaf is a serious concern both for domestic industry and for exports, the RAC advocates for concerted research efforts to minimize pesticide residue levels in the tobacco produce by developing non-chemical approaches/residue free approaches and/or IPM modules for pest and disease management.	2018-19
5	While appreciating the efforts on use of barn roof-top polycarbonate chamber and agri-biomass briquettes for substitution/supplementing wood fuel in tobacco curing,	Initiated and ongoing

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	the RAC recommends to concentrate on use of solar energy for curing and work with a larger goal of developing environment friendly system of curing, so as to check negative environmental impacts of tobacco curing	
6	Since value addition/secondary agriculture in tobacco assumes significance in the wake of anti-tobacco campaigns and the WHO-FCTC regime, the RAC suggests to document potential applications of tobacco as an aid in molecular farming. Efforts on evaluation of tobacco seed oil for human consumption may be continued in collaboration with ICMR-NIN, Hyderabad, by seeking special support from ICAR.	2018-19
7	Expressing concern on very low in-position scientific staff strength (31) against sanctioned strength of 54, the RAC recommends to ensure that all vacancies of scientific positions are filled at the earliest. Top priority may be given to the disciplines of Organic Chemistry, Agricultural Chemicals Plant Pathology and Agricultural Statistics in which vacancies remained unfilled for a long period. RAC suggested to outsource the organic chemist on adhoc basis for time being.	2018-19

The Chairman and Members of RAC thanked Dr. T. Mohapatra, Secretary, DARE & DG, ICAR and Dr. A.K. Singh, DDG (CS), ICAR, New Delhi for giving the opportunity to serve as Research Advisory Committee of the institute. Finally, the meeting concluded with the formal vote of thanks proposed by Dr. A.V.S.R.Swamy, Principal Scientist, Division of Crop Improvement, ICAR-CTRI, Rajahmundry.

ANNEXURE-I

Composition of Research Advisory Committee of ICAR-CTRI, Rajahmundry

1	Dr. H. Shivanna, Former Vice-Chancellor, UAS, GKVK, Bengaluru	Chairman
2	Dr. K.S. Varaprasad, Former Director, IIOR, Hyderabad	Member
3	Dr. V.R. Rao, Former Principal Scientist & Head Crop Production Division, CRRI, Cuttack	Member
4	Dr. M. Krishna Reddy Principal Scientist & I/c Head Division of Plant Pathology, IIHR, Bengaluru	Member
5	Dr. S. K. Pattanayak, Professor and Head, Dept. of Soil Science and Agricultural Chemistry, OUAT, Bhubaneswar	Member
6	Dr. D. Damodar Reddy, Director, ICAR-CTRI, Rajahmundry	Member
7	Dr. R. K. Singh, ADG (CC), ICAR, Krishi Bhavan, New Delhi	Member
8	Sri, Nagapuri Rajamouli, Farmer, Member –IMC	Member
9	Dr. M. Anuradha, Principal Scientist & Head, ICAR-CTRI RS, Kandukur	Member-Secretary