

Proceedings of the XII Annual Review Meeting of Niche Area of Excellence (NAE) Programme

The XII Annual Review Meeting of Niche Area of Excellence Programme was held on 28th September, 2018 at Conference Facility, NAS Complex, New Delhi from 9.00 AM onwards under the chairmanship of Dr. T. Mohapatra, Secy. DARE & DG, ICAR. The following experts and ICAR Officials participated:

- Dr N. S. Rathore, DDG (Agril. Education)
- Dr. A.K. Singh, DDG (Horticultural/Crop Science)
- Dr J.K. Jena, DDG (Animal Science)
- Dr S. Rajan, Director, CISH, Lucknow
- Dr. (Col.) A.K.Gahlot, Former VC, RAJUVAS, Bikaner
- Dr Kuldeep Singh, Dir, NBPGR, New Delhi
- Dr. V. Ravindra Babu, Former Dir, DRR, Hyderabad
- Dr. P.S Pandey, ADG (EP & HS)
- Dr. R. K. Singh, ADG(CC), ICAR
- Dr. WS Dhillon, ADG(Hort.), ICAR
- Dr. B. K. Pandey, Pri. Sci.(Hort.Sci.), ICAR
- Dr. Vikramaditya Pandey, Pri.Sci.(Hort.Sci.), ICAR
- Dr Vanita Jain, Pri. Sci., Education Division, ICAR

Dr P S Pandey, ADG (EP&HS) briefed the house about the achievements made under the programme by the various centres till date and raised the issues pertaining to Niche Area of Excellence. He underlined the continuing importance of agricultural research, education and extension for sustaining agricultural production against the odds of reducing profitability, increasing global competition, and adverse impact of biotic and abiotic stresses. He stressed that the purpose of the review meeting will not be based only for asking the deliverables but also to get feedback where we faltered and why. The subject matter experts may look into these issues and clearly suggest action points for continuing, strengthening or changes in the NAE programme. He reiterated the criticality of capacity building as the core mandate for this programme.

At the outset, Dr. N S Rathore, DDG (Agricultural Edn), ICAR, welcomed Dr. T. Mohapatra, DG, ICAR & Secy. DARE, invited experts, DDGs, officials from ICAR, PIs and Co-PIs of all the NAE centres. He elaborated the concept and genesis of Niche Area of Excellence. He informed that aim was to achieve educational excellence in teaching, research and capacity building. He emphasized that this was the programme with a mission. By the time the programme is concluded the centre should be in a position to give a technology/product etc. for the stakeholders. He advised that a separate website of NAE should be developed and must be updated on regular basis.

Dr. T. Mohapatra, Secretary, DARE and DG, ICAR appreciated the important accomplishments and excellent achievements of some of the centres. He appreciated the fact that some centres have managed to attain visibility globally, attracting due recognition and collaboration, resulting in important linkages. He emphasized the importance of capacity building and technology generation through this programme. He was of the view that NAE is a brand name for the

institute signifying recognition of the host institution in the identified areas and emphasized the need for more scientific publications from the NAE. He hoped that institutions will form core group of committed and competent faculty in the area. This programme is approved through highly competitive process and is reviewed thoroughly. It is expected the research will be high class and students will be engaged and impact in terms of quality research publications and technology is expected. Hence, there is need for the quantifiable yardsticks to measure the visibility attained by the centre. Patents and technology commercialized is one of the important indicators of success and all these technologies which are commercialized must be quantified in term of product sales and economic returns.

The inaugural session was followed by presentations of ongoing programmes wherein the programme-wise salient achievements for the year 2017-18 and technical programme for the year 2018-19 were presented. Invited experts as resource persons, offered valuable suggestions and inputs and discussed the way forward.

Plant Sciences, Horticulture Science & Agricultural Education

Four programmes were presented and discussed.

- 1. Genetic improvement of Kinnow mandarin for fruit quality, biotic and abiotic stress tolerance (PAU, Ludhiana), duration (2016- 2020).** The achievements were presented by Dr. P.K. Arora, PI

Salient Achievements:

- 291 hybrids between ‘Kinnow’ and ‘Mukaku Kishu’ were developed and identified using polymorphic SSR markers
- A total of 7, 14 and 502 hybrids were developed from the crosses- ‘Jattikhatti’ x ‘X-639’, ‘Jattikhatti’ x ‘Sour orange’ and ‘Volkamer lemon’ x ‘Cleopatra mandarin’, respectively and verified with SSR markers
- Two virulent isolates of *Phytophthora* were selected based on the earliest and sever symptoms expression.
- Four thousand plants of the PAU Kinnow-1 were multiplied and distributed.

Specific Comments:

- i. A concern was expressed about the progress of the project and it was categorically mentioned that the progress of the programme needs to be accelerated.
- ii. The experts commented that the number of plants produced and distributed is not satisfactory and results were below expectation. Even the plants developed in 2016 were not taken to field. Screening must be done in the field along with polyhouse.
- iii. Since the major objective is to produce seedless Kinnow. Centre should concentrate on micro propagation programme of the induced mutant and its commercialization in PPP mode through production of sufficient raw material.
- iv. The centre must explore the ways to cater to the stakeholders in other states, like Rajasthan.
- v. Experts were also not happy with the absence of Capacity building component in the programme, and number of students benefitting in the programme as this is one of most significant mandate of the NAE.

- vi. The centre must indicate the sustainability plan beyond the support period of ICAR.
- vii. Outcomes must be presented and defined in measurable terms.
- viii. There is need to review the project further at centre along with representative from ICAR and site committee.

2. Crop regulation for increasing productivity of Alphonso mango under climatic condition in Konkan region (Dr. BSKVV, Dapoli), duration (2015- 2020). The achievements were presented by Dr. M.M. Burondkar, PI.

Salient Achievements:

- Foliar application of Potassium nitrate @1% and GA @ 100 ppm resulted in maximum induction of post harvest vegetative flush, maximum flowering intensity and recorded highest yield per tree.
- Foliar application of (2-Chloroethyl) trimethyl (ammonium chloride) ('CCC) @ 2500 ppm, Paclobarazol (PBZ) @ 1000 ppm and cultural practices i.e.. Basin exposure twice in last week of September and last week of October recorded maximum suppression of post monsoon vegetative flush with maximum induction of flowering and highest fruit yield per tree.
- Foliar application of orthophosphoric acid @ 1% and PBZ @ 1000 ppm were most effective in respect of days required for induction of flowering, flowering intensity and also recorded highest fruit yield per tree.
- Foliar application of triconanol @ 15 ppm was most effective for improvement in pollination and spraving of Jaggary @, 5 % recorded maximum fruit set at Pea, Marble, Egg and Harvest stage.
- Dipping and spraying of fruits in Arka Saka Niwarka @ 2ml/lit at egg stage significantly reduced the occurrence of spongy tissue as compared to control.

Specific Comments:

- i. The centre must clearly indicate new developments and measurable outcomes as per objectives of the project which is lacking presently.
- ii. The use of PBZ may be restricted and centre was advised to explore the available safe chemicals.
- iii. Centre was advised to check how the concentrations of Gibberellic Acid and Cytokinins are affected by PBZ. The centre was also advised to check if CCC was banned in vegetative or flowering stage.
- iv. Leads for future work to be specified.
- v. The committee was not satisfied with the presentation and stressed on the need for statistical analysis to check variability.
- vi. Economics for use of Arka Saka /KNO₃ needs to be worked out thoroughly by the centre.

3. Development and validation of markers for novel alleles of candidate genes enhancing yield and low accumulation of arsenic from native rice germplasm (BCKV, Mohanpur), duration (2017- 2019). PI, Dr Somnath Bhattacharya presented the salient achievements.

Salient Achievements:

- (i) Relatedness between high yielding varieties and land races was deciphered based on yield attributing parameters and Simple Sequence Repeats (40 SSRs).
- (ii) SNP based codominant primers of *SPIKE* gene (Os04g52479) were designed and validated in a mapping population. They are now in use for MAS in rice.
- (iii) Based on relative abundance of transcript of the gene Gnl1a (Depletes cytokinin in young panicle by oxidation) in young panicle ten contrasting genotypes were selected. SNPs identified based on sequencing of Gnl1a gene in 10 contrasting genotypes.
- (iv) One primer pair was designed from the flanking sequence of 12nt repeat unit of the promoter sequence of NOG gene (LOC_Os01g54860), related also to improve grain number by suppressing the JA production.
- (v) SNP of ABCC1 gene between high and low arsenic rice genotype identified.

Specific comments

- The expert committee appreciated the progress of the programme.
- The experts suggested that the centre should incorporate trait of arsenic tolerance in high yielding genotype.
- The centre must conduct meeting of internal review committee along with one experts of domain area and ADG(EP&HS).

Agricultural Education**4. Technology enhanced learning in agricultural education (NAARM, Hyderabad), duration (2014-2020).** The achievements were presented by PI, Dr G R K Murthy.**Salient Achievements:**

- Digital courses (meant for UG students of agriculture and veterinary streams) were developed using the standardized TEL protocols for offline access.
- E-learning site revised in accordance with web standards, integrating all kinds of educational interactions courses viz., distance education, MOOCs, vocational, open access, regular courses under single place, thereby managing and showcasing the E-learning easier and effective
- TELAgE lab was used to develop digital video content for various purposes like MOOC and other in-house academic activities.
- Comprehensive and updated MOOC management process is standardized with Course planning, Pre-course preparation, Course management, Learner Evaluation and certification
- Revenue of Rs. 11.00 lakh was generated by the centre in 2017-18.

Specific Comments:

- i. Progress of the programme was appreciated.
- ii. The centre was asked to develop a business model wherever possible.
- iii. NAARM may develop a proposal for developing at least 10 MOOC programme using the resources developed under the project.
- iv. A sustainability mode may be worked out beyond the project period.

Animal Sciences

Four programmes were reviewed under Animal sciences.

5. Spore based sensor for monitoring pesticide residues in milk (NDRI, Karnal), duration (2014-2019). The programme achievements were presented by PI, Dr Naresh Kumar

Salient Achievements:

- i. Scope of spore-enzyme based sensor on paper strip was enhanced by establishing the limit of detection (LODs) for 31 more pesticides belonging to different groups in pure solvent system as well as spiked milk system using developed strip based assay.
- ii. A total of 1000 kits were supplied to M/s. VIMTA Labs Hyderabad with the recommendations of FSSAI to conduct the surveillance work on pesticide residues in India resulting in revenue of Rs. 1,18,000/- under this program.
- iii. 100 kits were supplied to M/s. FRAC labs, Dwarka, New Delhi as a part of validation work with strip based sensor with different commodities like grains, chilly, water, milk, tea and revenue of Rs. 11,800/- was generated under this program.
- iv. 100 kits were supplied to M/s. Arrowline Organic Products Private Limited, Chennai, for testing pesticide residues in concentrate feeds, fodder and milk as part of organic farming approach and revenue of Rs. 11800/- was generated under this program.
- v. Apart from distribution of pesticide kits for field application, samples of milk from various sources, Sirsa, Ajmer and Paonta Sahib were also analyzed using paper strip based sensor with a consultancy charges of Rs. 26,175.00 in 2017-18.
- vi. The developed strip based sensor was also validated through inter laboratory testing from various NABL accredited labs like FRAC Labs, VIMTA Labs, Duke Thomson's India Pvt. Ltd. Indore, and Arrowline organic products private limited, Chennai.

Specific Comments

- Progress of the programme was appreciated by the experts
- The experts suggested commercialization of product through at least one entrepreneur
- Refinement of developed strip to identify fluoride, lead, cadmium etc. in milk.
- The centre must get a scientific report from third party assessment, and may develop a format for the same.
- The centre was advised to conduct capacity building programmes at different locations as well as in various Dairy Technology Colleges and train the students. The centre must also take steps to train stakeholders in supply chain and milk testing laboratories in country.
- The centre may map pesticide residues and validate the data.

6. Centre for Zoonoses (MAFSU, Nagpur), duration (2014-2019). The presentation was made by PI, Dr. Sandeep P. Chaudhary

Salient Achievements:

- i. New vectors namely, tick and fly were found for propagation of *Listeria monocytogenes* have been identified.
- ii. Proteins (PepA, DapE and PepQ) for rapid, sensitive and simple serological assay (on-field) for diagnosis of tuberculosis in animals have been identified. Attempts are going on for standardization of test.

- iii. Karp strain of *Orientiatsutsugamushi* as a major circulating genotype among rodents of the region has been identified for the first time.
- iv. The outbreaks suspected of leptospirosis at Mumbai, Raigarh, Chiplun and Ashti, Wardha in Maharashtra have been attended and confirmed and reported accordingly for further treatment of the cases.
- v. Molecular epidemiological study and distribution of *Listeria monocytogenes* isolates was studied by PFGE confirming the 4b as major circulating serotype among animals, vectors and environment.

Specific Comments:

- Experts were concerned about the output and were of the view that impact of work was not visible.
- The centre was advised to create linkages and do mapping and provide roadmap to improve condition.
- The centre should take care to present the data in line with the objectives.
- The centre was advised that sampling should represent the population in general & should not be from the suspected population only.
- The major equipment MALDI-ToF must be maintained with the help of dedicated manpower and through outsourcing of the facility for generation of revenue.
- The centre must submit a sustainability plan after completion of programme

7. Study of *Clostridium perfringens* and *Dichelobacter nodosus* (SKUAST, Kashmir), duration (2015-2020). The presentation was by PI, Dr. S.A. Wani.

Salient Achievements:

- i. *Clostridium perfringens* was isolated from 65 samples (46.10%) of adult sheep and 96 samples (78.68 %) from lambs.
- ii. A total of 287 faecal samples from poultry (Broiler) were tested and 60 isolates of *C. perfringens* Type A and 9 isolates of *C. difficile* were obtained.
- iii. Whole genome sequencing of *D. nodosus* completed successfully and submitted in NCBI database (**SRX3594754**). Genome announcement from American Society of Microbiology in progress.
- iv. Serogroup B of *D. nodosus* was detected 88.68% (47/53) samples while serogroups E was detected in 11.32% (6/53) samples from footrot positive for *D. nodosus*. *F. necrophorum* was detected in 20.40% (20/98) samples from footrot lesions.
- v. Of the many immunogenic proteins, genes for two of them namely Pil-T and U32 have been have been cloned in *E. coli* and expression studies are in progress. Besides epsilon toxin of *C. Perfringens* has also been cloned for exploitation as vaccine candidate.
- vi. Outer membrane proteins of *C. perfringens* have been isolated along with the internal proteins. Hyperimmune sera is being raised to identify immunogenic proteins.

Specific Comments:

- Experts were not satisfied with the progress of the programme and its outcomes and again advised the centre to work towards developing the vaccine.
- It was recommended that a midterm review along with the expert Dr A. K. Gahlot and internal review team at the centre may be organised.

8. **Nutrition and gut health; probiotics, prebiotics and phytochemicals as functional foods to augment gut health of dogs (IVRI, Izzatnagar), duration (2014-2019).** The achievements were presented by Co- PI, Dr. Sunil E. Jadhav

Salient Achievements:

1. Successful development of 03 products based on probiotic and polyphenols (PPE and JAE)
2. Out of the three approaches used for development of the products, alginate-based encapsulation was found the most effective in terms of shelf-life and maintenance of *in vitro* viability of the probiotic bacteria
3. Feeding trial in healthy rats evaluating the 03 products revealed that the '**Probiotic-PPE**' and '**Probiotic-PPE-JAE**' products were comparable, but had an edge over the '**Probiotic-JAE**' product in promoting gut health
4. Feeding trial to evaluate the 03 products in rats with chemotherapy-induced mucositis also revealed that the above two products were more effective in alleviating the inflammatory response vis-à-vis '**Probiotic-JAE**'
5. Feeding trial using the '**Probiotic-PPE**' and '**Probiotic-PPE-JAE**' products in healthy dogs is underway
6. While exploring the possibility of developing a fourth product consisting of probiotic along with prebiotic (inulin) and/or polyphenols (from Jerusalem artichoke), the formulation containing '**Probiotic-inulin**' shown the potential for gut health promotion
7. A product has successfully been developed using the same formulation (**Probiotic-inulin**) followed by its *in vitro* evaluation.
8. Further evaluation of the product in rats with chemotherapy-induced mucositis is underway, following which it would be tested in health dogs
9. The centre requested some additional extension so that they could come up with the stable product.

Specific Comments:

- The progress of the programme was appreciated.
- Since the products out of the project are in the final stage of the products or, it was recommended to extend the project for next six months. So that, final product may be obtained out of the project.

Concluding Session

The following were the major suggestions/recommendations:

- Every centre especially, the concluding centres may submit a write up of conclusions, knowledge generation, basic /applied research conducted and technologies generated, benefit to the stakeholders along with success story if any.
- The monitorable indicators to be defined with base line in quantifiable terms.

- Way forward and sustainability of the centre after the conclusion of the programme to be indicated. The centres must ensure to further the mandate of NAE in terms of capacity building
- It was decided that date for the internal review may be communicated to the Council well in advance so that official from Education Division may also be deputed for the same.
- No deviation from objectives and technical programme be allowed by the Internal Review Committee.
- Every centre must do SWOT analysis.
- The facilities under Niche area be used for capacity building in the NARES system.
- All the centres must develop a website for increased visibility.
- The funding from the Council must be acknowledged in all publications, technologies, products and patents arising out of these programmes.
- The products registration and patenting need to be taken up through IP&TM Unit of the ICAR.
- The centre must publish at least one publication in NAAS rated journal above 7.5 for further award of NAE/ or must have the patents granted.
- The Principal Investigator must state action taken, if any, or his comments on observations of Review Meeting. As well as action taken on the recommendations/suggestions of Internal Review committee suggestion in annual as well as final reports.
- All the centres where NAE has been concluded may submit the printed final report as per the format immediately. Changes /modifications if any, as suggested by experts may be incorporated along with ATR.
- Final report to be presented objective wise and must specify the way forward.
- First slide during each review must always be of the suggestions/ATR of the last review meeting as well as comments /ATR of the Internal Review Committee.
- The PIs were advised to keep the Nodal Officer identified by the university in loop regarding progress under NAE.
- It is expected that university should not shift or transfer the PI without the prior permission/information to Agricultural Education Division, ICAR.
- To assess the impact of the programme vis a vis support provided every centre require to submit the following:
 - ✓ NAAS rating of the research publications
 - ✓ Citation of these publication
 - ✓ Viewership of the publications, if recently published
 - ✓ Technologies commercialized, its economic worked out
 - ✓ Revenue generated
 - ✓ Total number of faculty and other stakeholders trained
 - ✓ Data on how they are presently engaged including students
- All the centres must ensure that any major equipments supported under the programme needs to be shared within the institute/ university and among other institutes as well, thereby generating revenue.
- License for any technology generated under NAE should be non exclusive.

The meeting ended with the vote of thanks.