

## **Proceedings of the XI Annual Review Meeting of Niche Area of Excellence (NAE) Programme**

The XI Annual Review Meeting of Niche Area of Excellence Programme was held on 22<sup>nd</sup> August, 2017 at Conference Facility, NAS Complex, New Delhi from 9.30 AM onwards under the chairmanship of Dr. N.S. Rathor, DDG (Agricultural Education). The following experts and ICAR Officials participated:

- Dr. A.K. Singh, DDG (Horticultural Science)
- Dr. K. Alagusundaram (DDG NRM)
- Dr J.K. Jena, DDG (Fishery Science)
- Dr S. Rajan, Director, CISH, Lucknow
- Dr. Gaya Prasad VC, SVBPUAT, Meerut
- Dr. K. K. Vass, Former Director, CIFRI, Kolkata
- Dr B. Gangwar, Former PD, FFSR, Modipuram
- Dr G. Mohan, Professor, IT, ASCI, Hyderabad
- Dr P. Ananda Kumar, Dir, IIRR, Hyderabad
- Dr. V. Ramamurthy, Ex principal Scientist, Division of Entomology, IARI, New Delhi
- Dr S.K. Chaudhary, ADG (SWM), NRM
- Dr P.K Chakrabarty, ADG (PP&B), Crop Science
- Dr. M.B Chetti, ADG (HRD)
- Dr. P.S Pandey, ADG (EP & HS)
- Dr B. S. Prakash, ADG (A&P), Animal Sciences
- Dr W. S. Dhillon, ADG (Hort II), Hort. Sci.
- Dr K.L Khurana, Pri. Sci., Education Division
- Dr Jyoti Misri, Pri Sci. Animal Sciences Division
- Dr Vanita Jain, Pri. Sci., Education Division

At the outset, Dr. N S Rathore, DDG (Agricultural Edn), ICAR, welcomed the 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 elaborated 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 appreciated the programmes encouraging entrepreneurship. He emphasized the need for documentation and need to incorporate extension tools for creating awareness, sustainability and further expansion in focussed area.

Dr PS 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 and underlined the continuing importance of agricultural research, education and extension for sustaining and improving agricultural production with emphasis on strengthening higher education and capacity building. He reiterated the criticality of capacity building as the core mandate for this programme. The subject matter experts may look into these issues and clearly suggest action points for continuing, strengthening or changes in the NAE programme.

The inaugural session was followed by two technical sessions spread over entire day wherein the programme-wise salient achievements for the year 2016-17 were presented. Invited experts as resource persons, offered valuable suggestions and inputs and discussed the way forward.

### **Technical Session I**

#### **Plant Sciences, Plant Protection & Horticulture Science, NRM& Agricultural Education**

Seven programmes were presented and discussed.

- 1. Integrated centre for drought research: Genetic enhancement of crops by molecular approaches and phenotyping (UAS, Bangalore).** The PI, Dr M. Udaya kumar presented the salient achievements.

#### **Salient Achievements:**

1. Promising Groundnut transgenic to improve productivity.  
Multiplied seeds of specific events are available. Proposed to deposit promising events from different backgrounds to DRG, Junagadh.
2. KMP175 released for cultivation in the name of DHAKSHA.
3. Trait introgressed lines of IR-64 with specific drought adaptive QTLs are available for multi location testing.
4. Rice transgenic with improved tolerance and productivity are developed. Stable transgenic with different gene backgrounds are now available for future exploitation.
5. Trait donor lines for specific adaptive mechanisms are available for the scientific community working in the area of drought.
6. Validated genes regulating several cellular level mechanisms are deposited with the plant molecular biology laboratory of the department of crop physiology and are available for the scientific community.
7. A comprehensive phenomics platform which is established provides an option for scientific community to carry out phenotyping promising material to assess stress response and map adaptive traits.

#### **Specific comments**

- i. The expert committee appreciated the progress of the programme.
- ii. The centre must share developed resources in groundnut and rice among the other expert groups. Since the programme is concluded, the centre may submit the impact and economics of the varieties developed under the programme.
- iii. Patents submitted for technologies generated from the programme must acknowledge the Council support along with benefit sharing.
- iv. The final report must include a write up on the benefits of the research and capacity building under NAE to the society and how the concerns regarding transgenics be addressed.

**2. Capacity building in taxonomy of insects and mites (UAS, Bangalore).** The achievements of the programme were presented by the Dr. B.M. Mallik

**Salient Achievements:**

- 11 training programmes were organized (two long duration (21 days) training programmes, seven short duration (<7 days) training programmes and two 12 days programmes.
- The 21 days training programmes were on “Taxonomy of insects and mites” to enable teachers/research personnel, PG students in developing skills to identify the insects and mites up to the family level.
- The short duration training programmes were on “Taxonomy of bees and other pollinators” and “Taxonomy of fruit flies”,
- Two medium duration training programmes on “Taxonomy of Phytophagous and Phytoseiid mites”
- Five one to two days programmes for school children and amateurs were organised with the intention of increasing appreciation for insects among the common people.
- For all the training programmes manuals containing pictorial keys for identification of insects and mites and introduction to groups of insects and mites were prepared.

**Specific comments**

- i. The importance of the work in area was appreciated, and since the programme has been concluded the centre was advised to submit the overall impact of the programme along with the final report.
- ii. Printed final report to be submitted after completion of digitization of the Keys.
- iii. The committee was of the opinion that university may be directed to attach curator for maintenance of the infrastructure and collections created under the programme.

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

**Salient Achievements:**

- Twenty polymorphic SSR markers were identified after testing 138 SSR markers while four markers (TTA15, CMS04, Ci06A05b and CiBE1500) were found to be ideal for differentiation of hybrids.
- Using these four SSR markers, 106 true hybrids were identified.
- Crossing was performed between JattiKhatti x Sour orange; JattiKhatti x X-639
- A total of 19, 29, 33 and 35 polymorphic SSR markers, respectively were identified for differentiation of hybrids from nucellar types in the crosses: Jattikhatti x X639, Jattikhatti x Sour orange, Volkamer lemon x Cleopatra and Rangpur lime x Sour orange.
- In the JattiKhatti x Sour orange cross, 15 true hybrids have been identified with the use of 5 SSR markers.

- The *Phytophthora* has been isolated and is being multiplied for screening of hybrid rootstocks in sick plots.
- The PAU Kinnow 1 is differentiable from seeded Kinnow with SSR markers: CiBE3298, CiBE3397, CiBE3936, CCSM156 and AG14.
- Nine hundred plants of the PAU Kinnow-1 have been multiplied and distributed

**Specific Comments:**

- i. 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.
- ii. University must establish stability of mutation/ genotype and uniqueness of the material.
- iii. The potential of Alemow should also be explored as breeding parent and has to be included.
- iv. The centre must explore the ways to cater to the stakeholders in other states, like Rajasthan.

**4. Crop regulation for increasing productivity of alphonso mango under climatic condition in Konkan region (Dr. BSKVV, Dapoli).** The achievements were presented by Dr. P.M. Haldankar.

**Salient Achievements:**

- The programme was sanctioned recently, hence achievements were not given
- No trainings have been conducted during last one year.

**Specific Comments:**

- i. The slow pace of the work was noticed by the expert committee.
- ii. The centre was asked to give due justification for changing the time for vegetative flush and reasons for deviations from standard package of practices.
- iii. The committee was not satisfied with the presentation and it was proposed that project report may be forwarded to SMD for review.

**Agricultural Education & Natural Resource Management**

**5. Technology enhanced learning in agricultural education (NAARM, Hyderabad).** The achievements were presented by PI, Dr G R Murthy.

**Salient Achievements:**

- Execution of Distance Education Programme in online mode **for the first time** for the course on Teaching Excellence
- Digital content development in Consultancy Mode for Certified Farm Advisor course to MANAGE institute with **revenue generation (Rs 3.4 lakhs)**

- Strengthening academy's activities like modules on oral communication, video development, and micro teaching in various capacity building programmes
- Complete course management (administration, development, management, evaluation and certification) of Massive Open Online Course (MOOC) on "Competency Enhancement for Effective Teaching" using open source technologies with a very high completion rate of 53%
- Development of vocational education courseware on Integrated Pest Management
- Digital courses in veterinary science (Veterinary Anatomy and Parasitology) were developed and other courses are in progress

#### **New enrichments to the TEL lab**

- Enhancement in pedagogical style by integrating whiteboard with touch sensitive computer
- Character Generation titling to facilitate screen titling during the recording process
- Better lighting scheme for recording
- Mini editing lab with editing software like creative cloud and Camtasia
- Chroma-key green matte for chroma-key effects in digital video development

#### **Specific Comments:**

- i. Progress of the programme was appreciated.
- ii. The centre was asked to develop a business model wherever possible.
- iii. The experts were of opinion that activities may be allowed to continue till March 2018, without additional funding.
- iv. Facility should be available for use in multiple formats.
- v. Interactive teaching may be incorporated during the current financial year.

- 6. Management of soil health and productivity in ravinous land (RSKVV Gwalior).** The achievements were presented by the PI, Dr S. K. Verma.

#### **Salient Achievements:**

- Prepared maps on extent of ravine area in different district of Gird Zone i.e. Morena, Bhind, Gwalior, Sheopur and Datia and observed that ravine area in gird region is decreasing due to the shallow and medium ravines used for agriculture purpose.
- The Chambal ravine developed in following four stages pothole stage, tunneling stage, collapsing stage and recession stage.
- The modified gabion structure was found most suitable to check soil erosion. The total soil stored against the improved gabion was 1204 tons/ ha.
- The five modules i.e. Diversified cropping, Agri-horti, Horti-Medicinal, silvi-medicinal and silvi-pastoral modules was studied for soil conservation carbon sequestration, biomass carbon.
- The most suitable module was agri-horti followed by silvi-pastoral for soil conservation.
- Total 17 types of plants were planted in the experiment area under different modules.

- The organic carbon which was just 0.11- 0.12 % at start of experiment is at 0.30 to 0.35% under various modules in surface soil.

#### **Specific Comments:**

- i. It is observed that impact is not included and economics are also not worked out.
- ii. System packages to be prepared for farmers use, and same may be reflected in the Final draft report to be submitted.

#### **7. Production & protection technologies for potential vegetables and pulses under organic farming (CSKHPKV, Palampur).** The report was presented by Dr. J P Saini, PI

#### **Salient Achievements:**

- i. Comparative performance of different cropping sequences of the selected targeted crops under organic and inorganic management practices revealed significant effect of organic management practice on soil health and productivity of the system on the whole.
- ii. Soil health was quantified in terms of organic carbon (15-20%), dehydrogenase activity (21-59.6%), soil microbial biomass carbon (12.7-26.7%) and physical parameters like water holding capacity (10.74-13.04%) *etc.* which were significantly increased under organic management practices as compared to inorganic over a period of five years.
- iii. Organic nutrient management practices resulted in significantly higher yields (10.6-30.9%), higher net returns (Rs. 20600/- to 76250/-) ultimately resulted in higher benefit: cost ratio (0.11-1.42) in comparison to integrated and organic management practices.
- iv. Quality produce analysis was done in a comparative manner of both organically and inorganically grown crops-soybean, okra, gram, pea, mash, potato and wheat. In all the crops under study, important quality parameters specific to a crop like dry matter, crude protein, crude fat, crude fibre, sugar, carbohydrates, ash, vitamin C *etc.* were on the higher side in the organically grown crop samples.
- v. Effective organic technologies were demonstrated on the farmer's fields at different villages in district Bilaspur and Hamirpur of H.P

#### **Specific Comments:**

- i. Since the programme has been concluded the centre was advised to explore other sources of funding to sustain the facilities created.
- ii. The centre was also asked to submit a detailed report on success story, including names of one or two good farmers who have adopted organic farming practices.
- iii. The detailed writeup may be submitted on the changes in produce quality under organic farming vis a vis control.

## Technical session II

### Animal & Fishery Sciences

Five programmes under Animal sciences and one under Fishery Sciences were presented and discussed. One programme PI could not attend due to Health Issue and it was decided to have the presentation later.

- 8. Fish safety and quality assurance (TNFU, Thoothukudi).** The presentation was by the PI, Dr G. Jeyasekaran.

#### Salient Achievements:

- A single enzyme PCR-RFLP technique was developed for authentication of four commercial important shrimp species.
- Endosulfan, Aldrin and Endrin occurred in higher than permissible levels in shrimps, fish and water
- One of the shrimp samples collected from Bhimavaram region of Andhra Pradesh had higher than permissible level of chloramphenicol residue
- Toxic Polyaromatic hydrocarbon residues were found in the fish collected from Oil spill area in Chennai coast; Samples (212 Nos.) obtained from 31 seafood processing industries located in Tamil Nadu, Andhra Pradesh and Odisha

#### Specific Comments:

- Programme progress was found satisfactory.
- Parameters for Fish safety should be kept in mind while exporting to same state or other states and export guidelines of OIE should be properly followed.
- Quality and amount of fish export should be recorded properly.
- The committee did not agree to extend the programme and the centre may submit the draft final report.

- 9. Development of bio-sensors for diagnosis of *Peste des petits ruminants* (PPR) and Brucellosis (IVRI, Izatnagar).** The achievements under the programme were presented by the PI, Dr Sameer Srivastava

#### Salient Achievements:

1. PI could not attend due to sudden Health problems and it was decided to make the presentation later.

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

### Salient Achievements:

- i. Different groups of pesticides have been traced in milk having potential public health concern.
- ii. Shelf stability of lyophilized spores and paper strip in vacuum packaging conditions established upto 7-8 months at 4oC.
- iii. Third party validation, Licensing and commercialization of spore, enzyme sensor on paper strip for its application in food industry was done.
- iv. The technology was transferred successfully to M/s.Hatsun Agro Product Limited, Chennai through MOU Dated 17<sup>th</sup> Dec, 2016 and was exchanged during NDRI industry meet and subsequently Know-How details were transferred through one week training program w.e.f.17-23Dec, 2016. A non-exclusive license with an amount of Rs.5.75 lakh was granted for ten years without royalty.
- v. Started new course in FSQA at PG level (M.Tech/Ph.D.) to help industry/regulators in the country to ensure safe food to the consumers.

### Specific Comments

- Progress was appreciated by the experts and committee considered it quite innovative.
- It was suggested to develop strips for detection of pesticides in vegetables, cereal crops and other food grains.
- Refinement of developed strip to identify pesticides residues in milk on individual basis.
- Sensitivity of stakeholders of the programme outcomes should be done.
- The experts suggested for the safety guidelines and permissible levels of pesticides residues in the context of Indian standards.

**11. Centre for Zoonoses (MAFSU, Nagpur).** The presentation was by PI, Dr. Sandeep P. Chaudhary

### Salient Achievements:

- i. A **duplex PCR** has been standardized for simultaneous detection of Brucellosis and tuberculosis in animals. The technique is under validation with collaborators. Has a potential of patenting.
- ii. Cases of **reverse zoonoses** with respect to tuberculosis in animals and human have been detected in collaboration with medical collaborator; Central India Institute of Medical Sciences (CIIMS), Nagpur.
- iii. Proteins 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.
- iv. **New vectors** for propagation of *Listeria monocytogenes* have been identified.
- v. Mite species "**Ornithonyssus bacotii**" (**tropical rat mite**) has been detected with potentials to transmit *Orientia tsutsugamushi*; an etiological agent for Scrub typhus in the region.
- vi. **Karp strain of Orientia tsutsugamushi** as a major circulating genotype among rodents of the region has been identified first time.

- vii. **An outbreak** was attended at Mumbai in collaboration with Bombay Municipal Corporation which was confirmed as **Leptospirosis** among animals (cattle, buffaloes, dogs and rodents) as well as human. The major common serovars in **human and animals were Tarassovi, Djasiman and Pomona** .The work has been done in collaboration with NIVEDI, Bengaluru.
- viii. The collaboration/**Linkages** with the National and International Institutes have been developed.
- ix. **Three articles in esteemed journal** 'Tropical Animal Health and Production' and 'Vector borne and zoonotic diseases' have been submitted/under submission.
- x. Manuscript titled "Prevalence and Phylogenetic Analysis of *Orientiatsutsugamushi* in rodents and mites from Central India" submitted in **Vector borne and zoonotic diseases** have been accepted with a reference no. **VBZ-2017-2159.R1**.
- xi. Under the '**Capacity building**', a training on 'Surveillance and Outbreak Investigations for Veterinarians' was organized in collaboration with National Institute of Epidemiology, Chennai

#### **Specific Comments:**

- The progress of the programme was appreciated.
- The experts suggested to extend the programme till March 2018, to complete the objectives as this was sanctioned on 30<sup>th</sup> March, 2015 and effectively only two years were completed.

**12. Study of *Clostridium perfringens* and *Dichelobacter nodosus* (SKUAST, Kashmir).** The presentation was by PI, Dr. S.A. Wani.

#### **Salient Achievements:**

- i. Molecular characterization of *C. perfringens*, *F. necrophorum* and *D. nodosus* and toxinotyping of *C. perfringens*
- ii. Whole genome sequencing of representative strains
- iii. Investigation of recombinant immunogenic proteins for cross protection
- iv. Two immunogenic proteins namely Pil-T and U32 have been identified. The genes for both the proteins 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.
- v. Pulse field gel electrophoresis analysis of isolated from revealed IV Pulsotypes from three different poultry farms.

#### **Specific Comments:**

- (i) Experts appreciated the project outcomes and suggested the need for developing the vaccines which are in high demand.

- (ii) Manpower strength and demand forecast for the particular field should be analyzed and projected.
- (iii) Project outcomes and implementation should be as per guidelines and other researchable areas should be explored.

**13. Wild life forensics and health (NDVSU, Jabalpur).** The presentation was by PI, Dr. AB Srivastava.

**Salient Achievements:**

- i. Sequenced and submitted whole genome of domestic pig using NGS to the NCBI database.
- ii. Techniques were developed for species identification from biological samples such as dried blood stained materials like clothes and weapons used for poaching..
- iii. Validated Bio-technological tools and detected EEHV in Asiatic elephants.
- iv. Diagnosis of Leptospirosis, Canine distemper, Infectious canine hepatitis and Canine parvo viral infection in wild carnivores and feral dogs.
- v. Screening of wild carnivores and feral dogs around Panna Tiger Reserve for diagnosis of Leptospirosis, Canine distemper, Infectious canine hepatitis and Canine Parvo viral infections.

**Specific Comments:**

- Committee members were of the view that approach should be focused.

**14. Nutrition and gut health; probiotics, prebiotics and phytoenic as functional foods to augment gut health of dogs (IVRI, Izatnagar).** The achievements were presented by PI, Dr. A.K. Patnaik.

**Salient Achievements:**

- 1. Isolated, characterized and validated the potential use of a probiotic bacteria of canine-origin, *Lactobacillus johnsonii* CPN23 (GenBank Accession No. KP065494) through a series of in vitro and in vivo trials.
- 2. Successful development of procedure for laboratory-scale extraction of purified inulin from Jerusalem artichoke and its characterization as a prebiotic.
- 3. Successful evaluation of gut health promoting potential of the above probiotic (*Lactobacillus johnsonii* CPN23) and prebiotic (Jerusalem artichoke-derived inulin) in combination with polyphenolic extracts sourced from Pomegranate peel and Jerusalem artichoke tuber in a series of experiments using healthy and colitis-affected rat model followed by healthy dogs.
- 4. Through a series of feedings experiments, **short-listed two compounds** having proven potential for augmenting gut health of dogs in terms of improvements in hindgut microbial metabolites, antioxidant status, immune response and expression of antioxidant- and mucin-genes.

5. Seven students have worked for their Doctoral and Masters degree under the program. Besides, two advanced short-courses of 10-days duration each were carried out benefiting 23 participants from various research institutes and SAUs, etc.
6. Information generated in the form of 07 research papers published in international and national journals, 12 presentations in conferences/symposia including two international symposium, and 02 Gen Bank submissions for canine-origin probiotics

### **Successful development of two nutraceutical products**

1. Prebiotic–polyphenols (Jerusalem artichoke inulin + Jerusalem artichoke extract)
2. Probiotic–polyphenols (*Lactobacillus johnsonii*CPN23 + Pomegranate peel extract)

### **Specific Comments:**

- The progress of the programme was appreciated.
- Committee recommended extension of the programme for two more years to bring it to a logical conclusion.

### **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 after the conclusion of the programme to be indicated.
- 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.
- The facilities under Niche area be used for capacity building in the NARES system.
- Web-page should be developed by each centre.
- 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 atleast 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.

The meeting ended with the vote of thanks.