

spices with rearing of cattle for better earnings.

In the Mela, various technologies and products were showcased through exhibition stalls arranged by different ICAR Institutes, State Govt. Department, KVKs and NGOs. Different Technical Sessions based on production technology management, farm women empowerment, post harvest management was organized during four days of

the event. About 5500 farmers, farm women, students and other stake holders from Rajasthan, Gujarat, Maharashtra, M.P., Haryana, Delhi, and U.P. participated in the mela. A souvenir of Western Zone Krishi Vigyan Mela-2014 entitled “*Bijiya Masale: Kisanon Ke Liye Vardan*” released and distributed to all the participants.



Inaugural of Western Zone Krishi Vigyan Mela-2014



Women participation in western Zone Krishi Vigyan Mela-2014



Release of Smarika-2014



Speech of Chief Guest





Director, NRCSS delivering lecture in Western Zone Krishi Vigyan Mela-2014



Valedictory function of western Zone Krishi Vigyan Mela-2014



Visit of delegates at NRCSS Stall



Farmers visit at research farm of NRCSS

6.6 Visit of farmers at centre's farm

A number of groups of farmers, students, researchers and traders have visited NRCSS research farm. During 2013-14 more than 10000 famers and students from different parts of Rajasthan, Gujarat, Punjab, Haryana, U.P.,

Uttarakhand, M.P., Himachal Pradesh, Jharkhand and Maharashtra visited the centre under various training and visit programme. The lectures were delivered by scientists to acquaint them with the new technologies laid in the field.



6.7 Television talks

Name of Scientists	Topic	Date of broadcast
Dr Balraj Singh and Dr Gopal Lal	पश्चिम क्षेत्रीय कृषि विज्ञान मेले पर रिपोर्ट	19.2.14 , DD Jaipur
Dr Balraj Singh, Dr Gopal Lal, Dr R. K. Kakani and Dr Ravindra Singh	बीजीय मसालों की खेती में ध्यान रखे जाने वाली जरूरी बातें	18.2.14, DD Jaipur.
Dr. Gopal Lal	Post-harvest handling and processing of seed spices.	14.03.2014, DD Jaipur
Dr Balraj Singh, Dr Gopal Lal, Dr R. K. Kakani and Dr Ravindra Singh	राजस्थान में बीजीय मसाला फसलों की खेती में सम्भावनाएँ – एन.आर.सी.एस.एस (राष्ट्रीय बीजीय मसाला अनुसंधान केन्द्र) की भूमिका	21.2.14, DD Jaipur.
Dr. Gopal Lal	Present scenario of seed spices in India, their importance and how to handle them after harvesting and in storage	10.04.2014, ETV Rajasthan.
Dr. Ravindra Singh	बीजीय मसाला फसलों में बूंद-बूंद सिचाई प्रणाली	ETV Rajasthan in Annadata programme at 6.30 AM on 15 March, 2014
Dr. Ravindra Singh	बीजीय मसाला फसलों में ओलावृष्टि का प्रभाव एवं बचने के उपाय	ETV Rajasthan in Annadata programme at 6.30 AM on 16 March, 2014

6.8 Exhibition conducted/Participated

NRCSS is actively involved in showcasing the technologies to seed spice stakeholders including farmers through various extension programmes. A team of scientists and technical staff of NRCSS participated in the the Kisan

Melas organized by different agriculture institutions and exhibited seed spice technologies. Thousands of the farmers visited NRCSS stall and their queries were solved by the representatives. The literature in the form of pamphlet and booklet was also given to the interested farmers. During the year 2013-14 NRCSS has participated in following events:



Event	Organizer and Venue	
Kisan Mela 6 January, 2014	State Agril. Dept. Pushkar, Jat Dharamshala, Ajmer	
Western Zone Krishi Vigyan Mela 4-7 February, 2014	NRC on Seed Spices, Ajmer	
Krishi Pusa Vigyan Mela 26-28 February, 2014	IARI, Pusa Campus, New Delhi	
Krishi Mela 1 March, 2014	Krishi Vigyan Kendra (MPUAT), Bhilwara	
Fasal Vichar Ghoshthi 5 March, 2014	KRIBHCO, Village Baghera, Kekri	



7. Education and Training

7.1 Education

7.1.1 Student guided

Name	Degree	Title of thesis	Guide
Anubha Jain	M.Sc. (Ag.)	Genetic variability and character association in fenugreek (<i>Trigonella foenum-graecum</i> L.)	Dr. Balraj Singh
Preeti Singh Panwar	M.Sc. (Ag.)	Identification of critical Stage for weed competition in ajwain (<i>Trachyspermum ammi</i> L.)	Dr. Balraj Singh
Anita Ahari	M.Sc. (Ag.)	Genetic variability and correlation study for yield and yield contributing traits in fennel (<i>Foeniculum vulgare</i> Mill)	Dr. Balraj Singh
Ruchi Yadav	M.Sc. (Ag.)	Effect of different organic modules and varieties on growth and yield of fenugreek (<i>Trigonella foenum graecum</i> L.)	Dr. Gopal Lal
Brij Mohan Barolia	M.Sc. (Ag.)	Effect of different packaging materials on shelf life and quality of fennel (<i>Foeniculum vulgare</i> L.)	Dr. Gopal Lal
Yogendra Singh	M.Sc. (Ag.)	Effect of different protected structures and nutrient levels on growth and yield of coriander (<i>Coriandrum sativum</i> L.)	Dr. Gopal Lal
Bhoopendra Singh	M.Sc. (Ag.)	Estimation of variability in M ₅ generation of fenugreek (<i>Trigonella foenum graecum</i> L)	Dr. R.K. Kakani
Devendra Kumar Sharma	M.Sc. (Ag.)	Effect of weed management practices on growth, yield and quality of nigella (<i>Nigella sativa</i> L.)	Dr. S.S. Meena
Rohit Kumar Meena	M.Sc. (Ag.)	Effect of spacing and fertilizer levels on different genotypes of fenugreek (<i>Trigonella foenum-graecum</i> L.)	Dr. S.S. Meena
Prakash Chandra	M.Sc. (Ag.)	Stability analysis for yield and yield attributes in fenugreek (<i>Trigonella foenum-graecum</i> L.)	Dr. S.S. Meena
Mamta Sharma	Ph.D.	Genetic diversity analysis through molecular markers and genetic studies on oil content and harvest index in released varieties of fennel (<i>Foeniculum vulgare</i> Mill.)	Dr. R.S. Meena



7.1.2 Students visited NRCSS

To create awareness among the students regarding agriculture research in general and seed spices in particular, NRCSS always encourages their visit to NRCSS. Students were allowed to see the experiments in fields and interact

with the scientists of the institute. Seed Spice Knowledge Area is developed by ITMU, NRCSS for demonstrating the technologies generated by NRCSS. During the reporting year 300 students from schools and colleges visited the centre and learned about seed spices research.



7.2 Training Programme organized at NRCSS for farmers

Title	Duration	No of Participants	Coordinators	Sponsored by
Improved production technologies for seed spices	16-17 Sep, 2013	30 farmers	Dr. S.N. Saxena & Dr. S.S. Rathore	ATMA, Ajmer
Improved production technologies for seed spices	18-19 Sep, 2013	30 farmers	Dr. S.N. Saxena & Dr. N.K. Meena	ATMA, Ajmer
Improved production technologies for seed spices	20-21 Sep, 2013	30 farmers	Dr. S.S. Meena & Dr. S.S. Rathore	ATMA, Ajmer
Improved production technologies for seed spices	28-29 Sep, 2013	30 farmers	Dr. Ravindra Singh & Dr. B.K. Mishra	ATMA, Ajmer
<i>Navintam Bijya Masala Utapadan Takinikia</i>	24-28 Sep, 2013	30 farmers	Dr. Ravindra Singh & Mr. M. K. Vishal	ATMA, Bhilwara
बीजीय मसाला फसलों के उत्पादन की नवीनतम तकनीकियाँ	24-28, Sep, 2013	30 Farmers	Dr Ravindra Singh & Mr M. K. Vishal	PD, ATMA Bhilwara
<i>Navintam Bijya Masala Utapadan Takinikia</i>	28 Sep to 2 Oct, 2013	30 farmers	Dr. R.S. Mehta & Dr. R.D. Meena	ATMA, Bhilwara
Awareness Programme under DUS Project	30 Sep, 2013	101 farmers	Dr. R.S. Meena, Dr. R.K. Kakani, Dr. Sharda Choudary & Dr.R.k. Solanki	PPV & FRA at NRCSS
<i>Janjatiya Sah Yojna ke Antragarh Bijiya Masalo Ki Unnat Kheti</i> organized by at KVK, Dungarpur (Rajasthan), under TSP	17 Oct, 2013	27 farmers	Dr. G.Lal & Dr. R.S. Mehta	NRCSS, Ajmer
<i>Janjatiya Sah Yojna ke Antragarh Bijiya Masalo Ki Unnat Kheti</i> organized by at KVK, Banswara (Rajasthan), under TSP	18 Oct, 2013	29 farmers	Dr. R.S. Mehta & Dr. G.Lal	NRCSS, Ajmer
<i>Janjatiya Sah Yojna ke Antragarh Bijiya Masalo Ki Unnat Kheti</i> organized by at KVK, Pratapgarh (Rajasthan), under TSP	19 Oct, 2013	50 farmers	Dr. R.S. Meena, Dr. G.Lal & Dr. R.S. Mehta	NRCSS, Ajmer
Advance seed spices production technologies	28 Oct- 1 Nov., 2013	35 farmers	Dr. S.S. Rathore & Dr. Sharda Choudhary	ATMA, Chandrapur (MH)



Title	Duration	No of Participants	Coordinators	Sponsored by
Enhancing production, productivity and quality of seeds spices in sekhawati region at KVK, Jhunjhunu (Rajasthan)	7-8 Nov, 2013	60 farmers	Dr. G.Lal, Dr. R.S. Meena & Dr. N.K. Meena	NHM
Promotion of seed spices production in Arunachal Pradesh held at College of Horticulture and Forestry (CAU), Pasighat, Arunachal Pradesh	18-19 Nov, 2013	60 farmers	Dr. G. Lal & Dr. R.S. Mehta	NRCSS, Ajmer
Promotion of seed spices production in Assam held at Regional Station of Central Plantation Crop Research Institute, Kahikuchi, Guwahati	18-19 Nov, 2013	60 farmers	Dr. R.S. Mehta & Dr. N.K. Meena	NRCSS, Ajmer
Improved production technologies for seed spice cultivation	1-5, Feb, 2014	30 farmers	Dr. Y.K. Sharma & Dr. K. Kant	ATMA, Bhilwara
Modern technologies of seed spices production	4-8, Feb, 2014	30 farmers	Dr. B.K. Mishra & Dr. N.K. Meena	ATMA, Dungarpur
Modern technologies of seed spices production	4-8, Feb, 2014	30 farmers	Dr. R.D. Meena & Mr. M.K. Vishal	ATMA, Dungarpur
Improved production technologies for seed spice cultivation	4-8, Feb, 2014	30 farmers	Dr. R.K. Kakani & Dr. B.K. Mishra	ATMA, Bhilwara
Improved production technologies and processing for seed spice cultivation	4-5 Feb, 2014	50 farmers	Dr. N.K. Meena & Mr. M.A. Khan	ADG (Hort.), Ladnu, Nagaure
Improved production technologies for seed spice cultivation	6-7 Feb, 2014	50 farmers	Dr. K. Kant & Sh. S.P. Maheria	ADG (Hort.), Ladnu, Nagaure
Crop diversification through seed spices	7-11 Feb, 2014	30 farmers	Dr.O.P.Aishwath & Dr.R.K. Solanki	ATMA, Tonk
Improved production technologies for seed spices cultivation	3-4 Mar, 2014	50 farmers	Dr. S.S. Meena & Dr. R.S. Meena	NHM



8. Awards and Recognition

8.1 Awards

Name of Personnel	Name of Award	Awarded by
Dr. R.K. Solanki (Scientist)	Best Scientist of NRCSS (2012-13)	Director, NRCSS on Republic Day function, 2014
Dr. S.S. Rathore (Senior Scientist)	Most Industrious Scientist of NRCSS (2012-13)	Director, NRCSS on Republic Day function, 2014
Sh. Sanjeev Sharma (Assistant)	Best Administrative staff of NRCSS (2012-13)	Director, NRCSS on Republic Day function, 2014

Name of Scientists	Particulars
Dr. Balraj Singh	<p>Nominated as a member of Executive Council for the Indian Society for Spices (ISS), Calicut for the year 2013-15</p> <p>Life member of the Indian Society for Spices (ISS), Calicut (Kerala)</p> <p>Life member of the Society for Horticultural Research and Development, Ghaziabad (UP)</p> <p>Nominated as Patron of the Journal of Current Horticulture, published by the Society for Horticultural Research and Development, Ghaziabad (UP)</p> <p>Acted as Chief Technical Advisor for Establishment of a Centre of Excellence on Hi-tech Horticulture in Odisha</p>
Dr. Gopal Lal	Member, Rajasthan Kisan Aayog, from November 2011 to February 2014
Dr. S. N. Saxena	Chief Editor of International Journal of Seed Spices, published by Indian Society of Seed Spices, Ajmer
Dr. R. K. Kakani	Joint Secretary, Indian Society of Seed Spices, Ajmer
Dr. Krishnkant	<p>Best poster award on "Screening of coriander germplasm against seed wasp (<i>Systole albipennis</i>) infestation" presented in National Seminar on Non Timber Forest Produce, Aromatic Plants and Spices, organized by Indira Gandhi Krishi Vishwavidyalaya, Raipur on December 23-24, 2013</p> <p>Joint Secretary, Indian Society of Seed Spices, Ajmer</p>



Name of Scientists	Particulars
Dr. O.P.Aishwath	<p>Elected as a 'Councilor' of 'Indian Society of Soil Science (ISSS)' for the year 2014-15</p> <p>Nominated as Member in 'Standing committee on Policy and Bye- Laws' for 2014 in council of ISSS</p> <p>Invited as Chief Guest during valedictory session in an UGC sponsored conference organized by the PG Department of Zoology and Biotechnology, Dyananad Collage, Ajmer during 22-23 November, 2013</p>
Dr. Ravindra Singh	<p>Received the Fellow of the Hi-Tech Horticulture Society, SVPUA & T, Modipuram, Meerut during International Seminar on " Impact of Technological Tools on Food Security under Global Warming Scenario" held on 11-13, May 2013 at Sobhit Institute, Modipuram, Meerut</p> <p>Nominated as Councilor of Indian Journal of Agricultural Research, Karnal</p>
Dr. S. S. Meena	Tresurer, Indian Society of Seed Spices, Ajmer
Dr. B.K.Mishra	Admitted as visiting fellow in the Department of International Program at CALS, Cornell University, Ithaca, USA towards completion of training in the area of Biosecurity during Oct 1, 2013 to Dec 29, 2013
Dr. Sharda Choudhary	Received appreciation letter from Prof. Andy Pereira, University of Arkansas, Arkansas, USA for working very hard and applying good skills during three months NAIP training
Dr. R. D. Meena	Fellow of Indian Society of Seed Spices
Sh. M.K.Vishal	Editor of International Journal of Seed Spices Annual member Horticultural Society of India



9. Linkages and Collaborations

Linkages and collaboration is the key of success in modern era. Output of research programmes may be manifold by effective linkages and collaboration. NRCSS is always encouraging collaborative research work with Parallel institutes or Universities. Presently NRCSS have linkages with following research organizations in the country.

- Indian Agricultural Research Institute, New Delhi and its regional stations
- Indian Institute of Spices Research (IISR), Calicut (Kerala)
- Central Plantation Crops Research Institute, Regional Station, Guwahati (Assam)
- Directorate of Medicinal and Aromatic Plants Research, Anand, Gujarat
- National Bureau of Plant Genetic Resources (NBPGR), New Delhi
- All India Coordinated Research Project on Spices, (AICRP) Calicut (Kerala)
- All India Coordinated Research Project on Vegetables, (AICRP), Varanasi (UP)
- Central Arid Zone Research Institute (CAZRI), Jodhpur, (Rajasthan)
- Central Institute of Arid Horticulture (CIAH), Bikaner, (Rajasthan)
- SAU's such as RAU, Bikaner, MPUAT, Udaipur, SDAU, Dantiwara, CCSHAU, Hisar, SKUAT, Sri Nagar, APHU, Hyderabad, UAS, Dharwar and NDUAT, Faizabad.
- Central Agricultural University, campus Pasighat (Arunachal Pradesh)
- Spices Board, Cochin (Kerala)
- Directorate of Arecanut and Spices Development (DASD), Calicut (Kerala)
- State Agriculture Department of Rajasthan and Gujarat
- State Horticulture Department of Rajasthan and Gujarat
- Central Sheep and Wool Research Institute, Avikanagar (Rajasthan)
- Central Research Institute for Dryland Agriculture, Hyderabad (AP)
- Central Institute of Post Harvest Engineering and Technol (CIPHET), Ludhiana (Punjab)
- Protection of Plant Varieties and Farmer Rights Authority (PPVFRA), Govt of India, New Delhi
- Zonal Project Coordinators, Jodhpur, Rajasthan and Barapani (Meghalaya)
- Farmers, NGOs and KVKs



10. Publications

10.1 Research Papers

10.1.1 International Journals

1. Kumar, M., Prasanna, R., Bidyarani S.N., Mishra, B. K., Kumar, A., Adak, A., Jauhari, S., Yadav, K., Singh, R., Saxena, A. K. (2013). Evaluating the plant growth promoting ability of thermotolerant bacteria and cyanobacteria and their interactions with seed spice crops. *Scientia Horticulturae*, 164: 94–101
2. Saxena, S. N., Rathore, S. S., Saxena, R., Barnwal, P., Sharma, L. K. and Singh B. (2014). Effect of cryogenic grinding on essential oil constituents of coriander (*Coriandrum sativum* L.) genotypes. *J. Essential Oil Bearing Plants*. DOI: 10.1080/0972060x.2014.895197
3. Saxena, S. N., Sharma Y. K., Rathore, S. S., Singh, K. K., Barnwal, P., Saxena, R., Upadhyaya, P. and Anwer, M. M. (2013). Effect of cryogenic grinding on volatile oil, oleoresin content and anti-oxidant properties of coriander (*Coriandrum sativum* L.) genotypes. *J. Food Sci. and Tech*. DOI 10.1007/s13197-013-1004-0
4. Tomar R. S., Kulkarni G. U, Parakhia M. V, Thakkar J. R, Rathod V. M, Solanki R. K and Golakiya B. A (2014). Genetic diversity analysis in coriander (*Coriandrum sativum*) genotypes through morphological and molecular characterization. *Res. J. Biotech*. Vol. 9 (3): 1-11
5. Barnwal, P., Singh, K. K., Sharma, A., Choudhary, A. K., Saxena, S. N. (2014). Effect of grinding conditions on physicochemical, thermal and antioxidant properties of coriander powder. *Int. J. Seed Spices* 4(1): 25-32
6. Choudhary, S., Meena, R.S. Singh, R. Vishal, M. K., Choudhary V. and Panwar, A. (2013). Assesment of genetic diversity among Indian fenugreek (*Trigonella foenum-graecum* L.) varieties using morphological and RAPD markers *Legume Research*, 36, (4). 289-298
7. Godara, A. S., Gupta, U. S., Singh, R. and Lal, G. (2013). Effect of bio-regulators on productivity and profitability of fenugreek (*Trigonella foenum graecum* L.). *Int. J. Seed Spices*, 3(2):42-45
8. Godara, A. S., Kapade, S., Lal, G. and Singh, R. (2013). Effect of phosphorus and sulphur level on the performance of Nagauri Methi (*Trigonella corniculata* L.). *Int. J. Seed Spices*, 3(2):70-73
9. Jain, A., Singh, B, Solanki, R. K., Saxena, S. N. and Kakani, R.K.(2013). Genetic variability and character association in fenugreek (*Trigonella foenum- graecum* L.). *Int. J. Seed Spices* 3(2): 22-28
10. Kant K., Ramanujam, B., Tyagi, S. K., Sharma, Y. K., Meena, S. S., Mishra, B. K., Vishal, M. K. and Meena, S. R. (2013). Management of fennel aphids (*Hyadaphis coriandri* Das) through biorational approaches. *Ann. Plant Protection Sci.* 21(1):21-23
11. Kant, K., Ranjan, J. K., Mishra, B. K., Meena, S. R., Lal, G. and Vishal, M. K., (2013). Post harvest losses by cigarette beetle (*Lasioderma serricorne* Fab.) in seed spice crops. *Ind. J. Horti.* 70(3): 392-396
12. Kant, K., Sharma, Y. K., Mishra, B. K., Vishal, M. K. and Meena, S. R. (2013). Management of chalcid wasp (*Systole albipennis*) (Eurytomidae: Hymenoptera) in coriander: a pest of field and quarantine significance. *Ind. J. Agri. Sci.* 83 (10): 1043–1045
13. Kant, K., Sharma, Y. K., Ramanujam, B., Tyagi, S. K., Ranjan, J. K., Mishra, B. K., Meena, S. S., Vishal, M. K. and Meena, S.R.(2013). Biorational approaches for management of aphids (*Hyadaphis coriandri* Das) on fennel. *Ind. J. Horti.* 70(2): 300-303



14. Kant, K., Singh, B., Meena, S. R., Ranjan, J. K., Mishra, B. K., Solanki, R. K., Kumar Mukesh (2013). Relative abundance and foraging behaviour of honey bee species on minor seed spice crops. *Int. J. Seed Spices* 3(2):51-54
15. Khare, M. N., Tiwari, S. P. and Sharma, Y. K. (2014). Disease problems in the cultivation of I. Cumin (*Cuminum cyminum* L.) II. Caraway (*Carum carvi* L.) and their management leading to the production of high quality pathogen free seed. *Int. J. Seed Spices* 4(1): 1-8
16. Lal, G, Saini, I. P., Mehta, R. S., Maheria, S. P. and Sharma, Y. (2013). Effect of irrigation and different seed treatments methods on growth and yield of fenugreek (*Trigonella foenum graecum* L.). *Int. J. Seed Spices*, 3(2):29-33
17. Lal, G., Mehta, R. S., Singh, D. and Choudhary, M. K. (2013). Effect of technological interventions on cumin yield at farmers' field. *Int. J. Seed Spices*, 3(2):65-69
18. Lal, G., Mehta, R. S., Godara, A. S., Mahala, H. R., Maheria, S. P. and Singh, B. (2014). Performance of cumin varieties and technological interventions at farmers fields in Jaisalmer district of Rajasthan. *Int. J. Seed Spices*, 4(1):9-13
19. Meena, R. D., Meena, R.S., Singh, Balraj, Meena, S. S., Sharma, Y. K. and Meena, N. L. (2014). Characterization of fennel (*Foeniculum vulgare* Mill.) germplasm for *Ramularia* blight disease resistance and yield attributes. *Inter. J. Seed Spice*, 4(1). pp 36-38
20. Meena, S.S., Mehta, R. S., Lal, G. and Anwer, M. M. (2013). Economic feasibility of weed management practices in fenugreek (*Trigonella foenum-graecum* L.) *Ind. J. Hort.*, 70(1): 150-153
21. Meena, S.S., R.S. Mehta, R.D. Meena, N.K. Meena and B. Singh (2013). Effect of sowing time and crop geometry on growth and seed yield of dill (*Anethum sowa* L.). *Int. J. Seed Spice*, 3(2)81-84
22. Mehta, R. S., Lal, G. and Vishal, M. K. (2013). Growth and yield of coriander (*Coriandrum sativum* L.) as influenced by irrigation and nutrient levels with varying crop geometry. *Ann. Agric. Res. New Series*, 34(3):205-209
23. Mishra, B. K., Sharma, A., Aishwath, O.P., Sharma, Y. K., Krishna Kant, Vishal, M. K., Saxena, S. N. and Ranjan, J. K. (2013). Microbiological profile of coriander (*Coriandrum sativum* L.) crop rhizosphere in Rajasthan and screening for auxin producing rhizobacteria. *Int. J. Seed Spices*, 3(2):59-64
24. Nagpure, K., Naruka, I. S., Rathore, S. S. and Verma, K. S. (2014). Response of Dill (*Anethum graveolens* L.) cultivars to different date of sowing. *Int. J. Seed Spices* 4(1): 71-75
25. Naimuddin, Aishwath, O. P., Lal, G., Kant, K., Sharma, Y. K., and Ali, S. F. (2014). Response of *Trigonella foenum-graecum* to organic manures and Rhizobium inoculation in a Typic Haplustept. *J. Spices and Arom. Crops*, 23(1): 111-115
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27. Panwar, A., Choudhary, S., Sharma, M., Sharma, Y. K., Meena, R. S., Malhotra, S. K., Mehta, R. S. and Aishwath, O.P. (2012). Morphological and biochemical characterization of Rhizobium isolates obtained from fenugreek (*Trigonella foenum graecum* L.) *Seed Research*. 40(2): 171-177
28. Rathore, S. S., Saxena, S. N. and Singh, B. (2013). Potential health benefits of major seed spices. *Int. J. Seed Spices* 3(2):1-12
29. Rathore, S. S., Saxena, S. N., Kakani, R. K. and Singh, B. (2013). Rapid and mass screening method for galactomannan content in fenugreek seeds. *Int. J. Seed Spices* 3(2):91-93
30. Rathore, S. S., Saxena, S. N., Kakani, R. K., Sharma, L. K. and Singh, B. (2014). Rapid and mass screening methods for 4-hydroxyisoleucine in fenugreek seeds. *Int. J. Seed Spices* 4(1):93-94
31. Saxena R., Saxena, S. N. and Soni, A. (2014). Cryogenic grinding enhances analgesic and antipyretic activities of coriander (*Coriandrum sativum* L.). *Int. J. Seed Spices* 4(1):14-18
32. Saxena, R, Soni, A., Saxena, S. N., Rathore, S. S. and Barnwal, P. (2013). Cryogenic grinding: a physical technique to retain volatile content in natural products. *Int. J. Modern Physics: Conference Series* 22: 589-592



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 20. Saxena, S. N. (2013). Cryogenic grinding technology for value addition in seed spices In: Food Processing & Post Harvest Technology Industry Meet, organized by ZTMU, IARI, New Delhi on 15 May , 2013.
 21. Saxena, S. N. (2013). Value addition in seed spices using cryogenic grinding technology In: New Vistas in Food Processing with Quality Assurance for Augmenting Rural Prosperity at Department of Processing and Food Engineering College of Technology and Engineering MP University of Agriculture and Technology, Udaipur 01 during 21-22, June, 2013.
 22. Saxena, S. N. (2014). Cryogenic grinding technology: An effective approach for retention of flavour and enhancing medicinal properties of spices. In: International Conference on “Emerging Food Safety Risks: Challenges for Developing Countries” at National Institute of Food Technology Engineering and Management, Kundli, Sonipat, Haryana during January 09-10, 2014
 23. Saxena, S. N., Rathore, S. S., Sharma, L. and Singh, B. (2013). Fenugreek: As an emerging source of industrial galactommanan. In: New Vistas in Food Processing with Quality Assurance for Augmenting Rural Prosperity” at Department of Processing and Food Engineering College of Technology and Engineering MP University of Agriculture and Technology, Udaipur during 21-22, June, 2013
 24. Sharma, L. K., Agrawal, D., Rathore S. S. and Saxena, S. N. (2013). Effect of cryogenic grinding on essential oil constituents of cumin (*Cuminum cyminum* L.). In: Souvenir of National Seminar on Effect of Biotechnological Advancements on environment, 2013 at Dayanand College Ajmer during 22-23 November
 25. Singh, B., Mishra B. K. and Rathore, S. S. (2013). Role of Good Agricultural Practices in Vegetables and seed spices production, processing and value addition. In: Souvenir of National seminar on New Vistas in Food Processing with Quality Assurance for Augmenting Rural Prosperity at Department of PFE, CTAE, MPUAT, Udaipur. Pp 25-32



10.7 Publications Other than seed spices

10.7.1 Research papers (International)

1. Singh, R., Mishra, B. K., Shukla, K. B., Jain, N. K., Sharma, K. C., Kumar, S., Krishna Kant and Ranjan, J. K. (2013). Fermentation process for alcoholic beverage production from mahua (*Madhuca indica* J. F. Mel.) flowers. *African J. of Biotech.*, 12(39): 5771-5777
2. Lal G. and Har Dayal. (2014). Effect of modified atmosphere and $KMnO_4$ on the post-harvest behaviour of date palm (*Phoenix dactylifera* L.) fruits cv. Shamran under different storage conditions. *Scholarly J. Agri. Sci.*, Vol. 4(3):133-137
3. Meena, N. K. Ram Pal, Barman, D. and Medhi, R.P. (2013). Biology and seasonal abundance of two spotted spider mite, *Tetranychus urticae* Koch on orchids and rose. *Phytoparasitica*, 41 (5): 597-609

10.7.2 Research Paper (National)

1. Das Biswajit, Hare Krishna, Ahmed, N., Attri, B. L., Ranjan, J. K. and Pragya (2013). Protected strawberry culture at high altitude temperate climate as influenced by planting time, mulching and soil moisture. *Ind J Horti.* 70(4): 506-511
2. Godara, A.S. Gupta U.S. and Singh, R. (2013). Effect of integrated nutrient management on herbage, dry fodder yield and quality of oat (*Avena sativa* L.) *Forage Research*, (38): 59-61.
3. Malik, J. K. Singh, R. O.V.S. Thenua and Kumar, A. (2013). Response of pigeonpea (*Cajanus cajan*) + mungbean (*Phaseolus radiatus*) inter cropping system to phosphorus and biofertilizers. *Legume Res.*, 36 (4) : 323-330
4. Mishra, B. K. Yadav, V. Vishal M. K. and Kant, K. (2013). Physiological and molecular characterization of clusterbean [*Cyamopsis tetragonoloba* (L.) Taub] rhizobia isolated from different areas of Rajasthan, India. *Legume Res.*, 36 (4): 299–305
5. Mishra, B.K., Jain, N.K., Sharma, K.C. and Kumar, S. (2013). Storage stability of ready-to-serve beverage from Mahua (*Madhuca indica*) flowers. *Ind. J. Horti.* , 70(3):459-462

6. Rajkumar, Kaul, M. K., Saxena, S.N., Bhargava, S. and Singh A. K. (2013). *In vitro* propagation of virus tolerant root stock of *Carrizo ctranze*. *Ind. J. Horti.* , 70 (2): 179-184
7. Singh, A. K, Singh, D. K., Singh, B., Punetha, S. and Rai, D. (2013) Evaluation of carnation varieties under naturally ventilated greenhouse in mid hill of Kumaon Himalaya. *African J. Agri. Res.* 8(29):4111-4114

10.7.3 Book

1. Choudhary, S., Gupta, N. and Jethra, G.(2013) Single Nucleotide Polymorphism and PRNP Genotyping for Scrapie. *Lambert Academy Publishing*, Germany ISBN : 978-3-659-43271-2 pp:155
2. Mishra, B. K., Kumar, S. and Tiwari, J. K. (2013). Food and Nutritional Security by Sustainable Agriculture: Methods to Attain and Sustain. New India Publishing Agency, New Delhi. (ISBN: 978-93-81450-04-9) Pp 460
3. Singh, B. , Singh, Balraj, Sabir, N. and Hasan, M. (2013). Advances in protected cultivation. Published by New India Publishing Agency, New Delhi, India. Pp: 103-118
4. Singh, R , Malik, J.K. and Thenua, O. V. S. (2013). Nutrient management in Pigeon pea+ green gram Inter cropping system. *Lambert Academy Publishing, Germany.* ISBN: 978-3-659-44206-3 pp 184

10.7.4 Book Chapters

1. Kumar, S., Verma, R. K. Mishra, B. K. and Chopra D.S. (2013). Role of enzymes in food processing In: B. K. Mishra, Sunil Kumar and Jagesh K. Tiwari (Eds.). Food and Nutritional Security by Sustainable Agriculture: Methods to Attain and Sustain. New India Publishing Agency, New Delhi, (ISBN: 978-93-81450-04-9), Pp:453-460
2. Mishra, B. K., Kumar, S. and Sharma, A. (2013). Composting Process: Physiology and Microbiology. In: B. K. Mishra, Sunil Kumar and Jagesh K. Tiwari (Eds.) Food and Nutritional Security by Sustainable Agriculture: Methods to Attain and Sustain. New India Publishing Agency, New Delhi. (ISBN: 978-93-81450-04-9) Pp:119-132
3. Singh, B. (2013). Production Technology for Vegetables



under Protected Conditions. In: "Advances in Protected Cultivation" A book (Eds. Brahma Singh, Balraj Singh, Naved Sabir and M. Hasan) Published by New India Publishing Agency, New Delhi, India. Pp: 103-118

4. Singh, B. (2013). Progress, Challenges and Strategies to scale up Protected Cultivation in India. Agriculture Year Book-2013. Published by CARD, New Delhi. Pp: 130-33
5. Singh, B., Singh, B., Sabir, N. and Hasan, M. Advances in protected cultivation (2013). Published by New India Publishing Agency, New Delhi, India. Pp: 103-118

10.7.5 Popular articles

2. Kalyanrao, Tomar, B. S. and Singh, B. (2013). Hybrid seed production of bottle gourd on vertical trailing system. ICAR News 19(1): 15
3. Kalyanrao, Tomar, B. S., Singh, B. and Bhushan M. Aher (2013). Seed production of bottle gourd is remunerative. *Indian Horticulture*. 58(4): 26-29

10.7.6 Research papers/ Abstracts presentation in conferences/ Symposia/ Seminar/ workshop/ other forum

1. Meena, R. D., Meena, S. S., Sharma, Y. K., and Meena, N. L. (2013). Effect of intercropping with fruits on the

disease severity of powdery mildew in urad and mung. In souvenir of "National seminar on new vistas in food processing with quality assurance for augmenting rural prosperity" held during 21-22 June, 2013 at Department of PFE, CTAE, MPUAT, Udaipur. Pp: 96

2. Mishra, B K, Kumar, S., Jain, N. K. and Sharma, K.C. (2013). Value Added Products From Mahua Flowers For Rural Prosperity" In: Souvenir of National seminar on "New Vistas In Food Processing With Quality Assurance For Augmenting Rural Prosperity" held during 21-22 June, 2013 at Department of PFE, CTAE, MPUAT, Udaipur. Pp:69-70
1. Singh, B., Meena, R. D., Sharma, Y. K., Meena N.K. and Solanki. R.K. (2013). Production technologies for management of viral diseases in horticultural crops. Abstract Book, Virocon 2013, Asia-Pacific Congress of Virology, December 17-20, 2013, Amity University, Noida: Pp: 216
2. Solanki, R. K. and Fougat, R. S. (2013). Constitutive Karyotyping of *Plantago* spp. for constitutive heterochromatic banding patterns. Paper presented as oral in the "Non Timber Forest Produce, Medicinal, Aromatic Plants and Spices: Innovation for livelihood security" held from 23-24th Dec, 2013 at IGKV, Raipur



11. RAC/IMC/IRC Meetings

11.1 RAC Meetings

The XII Research Advisory Committee (RAC) Meeting of NRCSS was held at Ajmer during 1-2 April, 2014 under the chairmanship of Dr. V.A. Parthasarathy, Former Director, IISR, Calicut. The other members of RAC, Dr. M.N. Khare, Dr. S.R. Bhat, Dr. A.K. Srivastava and Dr. Balraj Singh, Director, NRCSS, Dr. R.K. Kakani, Member Secretary besides the scientists and officers of NRCSS were present. During welcome address, Director NRCSS briefed about the activities carried out and progress made by the centre during last one year. He detailed about the infrastructural progress of the administrative building, labs, farm stores, farm roads with street lights, insect proof net houses, drip irrigation units, procurement of tractor and farm machinery and development of additional 1.0 ha land for cultivation. He further informed about the strengthening of scientific staff, recruitment of AF&AO and LDC and clearance of probation and promotion of technical staff of the centre. Chairman and all the members appreciated the progress of NRCSS and congratulate the Director and scientists for their efforts. Dr. R.K. Kakani presented the action taken report of last RAC. He informed that the proceedings of last RAC have been approved by ICAR without any comment, which was appreciated by the committee. The ATR has been approved by RAC with minor suggestions.

After approval of ATR, the programme leaders presented their research achievements. Critical comments and recommendations made by RAC were as under:

1. The germplasm may be evaluated over a specified period of time for targeted traits for which, a calendar may be prepared.
2. Attempt may be made to develop cores in coriander based on available data.
3. Scientists may submit additional new projects to develop genetic stocks/ techniques for hybridization in different spice crops.
4. Quality parameters/ standards for various seed spices may be developed by fixing a minimum level of standards for different parameters of seed spice crops and varieties. It should be defined taking into account quality parameters of the released varieties.

5. Economics of the experiments including precision resource management should be highlighted.

Chairman and members of RAC visited the Research Farm of NRCSS and interacted with all the scientists on their research experimental fields and gave valuable suggestions for betterment of the research. They also planted trees in the NRCSS campus.

The XII RAC meeting ended on 2nd April 2014 with the vote of thanks to Chairman, all the members and Director NRCSS by Member Secretary Dr. R.K. Kakani.



RAC members

S.No.	Name	Position
1	Dr. V. A. Parthasarathy	Chairman
2	Dr. S. B. S. Tikka	Member
3	Dr. A. K. Srivastava	Member
4	Dr. S. R. Bhatt	Member
5	Dr. M. N. Khare	Member
6	Dr. Umesh Srivastava	Ex Officio Member
7	Dr. Balraj Singh	Ex Officio-Member
8	Dr. Rajesh Kumar Kakani	Member Secretary



11.2 IMC Meeting

X IMC meeting was held on March 22, 2014. The meeting was chaired by Dr Balraj Singh, Director, NRCSS and other members. A brief introduction of ongoing research activities were made for the committee. Sh Ravindra Singh, Member Secretary presented the report as per the agenda items. Six agenda items were discussed and recommended by IMC. The recommendations of IMC have sent to council for approval.



IMC Members

S.No.	Name	Position
1	Dr. Balraj Singh, Director, NRCSS	Chairman
2	Dr. A.K.Srivastava	Member
3	Dr. Neelima Garg	Member
4	Dr. P. Chowdappa	Member
5	Dr. K. Nirmal Babu	Ex Officio Member
6	ADH (HII), New Delhi	Ex Officio Member
7	Director of Horticulture, Govt of Gujrat	Ex Officio-Member
8	Director, Research, SKRAU, Bikaner	Ex Officio-Member
9	FAO, Directorate of Mustard Research, Bhartpur (Raj.)	Ex Officio-Member
10.	Sh. Ravindra Singh, AO, NRCSS	Member Secretary

projects were presented and discussed by the individual scientists and the programmes were strengthened as per QRT and RAC recommendations. Dr. S.R. Bhatt, Principal Scientist, NRCPB, New Delhi, Dr R.P. Mahrishi, Ex. Professor, SKRAU, Bikaner and Dr. Dharendra Singh, Professor, SKN CoA, Jobner were among the invited experts from relevant field. In the opening remark Dr Balraj Singh emphasized and urged to the project leaders to publish the research findings in reputed journals. He also suggested to develop a close collaboration with SKRAU, Jobner and Mandore for seed spice research. During these sessions, ongoing institutional projects, externally funded projects, coordinated trails and new projects proposals were presented and thoroughly discussed.



11.3 13th IRC Meeting

The 13th Institute Research Council (IRC) meeting was held on 21-23 August, 2013 and 09 September, 2013 to review the progress of ongoing research projects at NRCSS including externally funded projects. The meeting was chaired by Dr. Balraj Singh, Director, NRCSS. All the ongoing



List of Programmes and sub- projects:

Programme	Programme Leader	Name of sub-project
Crop Improvement		
Collection, evaluation and documentation of plant genetic resources of seed spices	Dr. R. K.Solanki	CI-1. Management of plant genetic resources of seed spices (Year of start 2008)
		CI 19 : Enhancing genetic variability in cumin (Year of Start 2012)
		CI 20: Cytogenetical and biochemical characterization of cumin (Year of Start 2012)
Breeding for improvement in major seed spices	Dr. R.K. Kakani	CI-2. Breeding for high yield, quality & resistance to biotic & abiotic stress in fenugreek. (Year of start 2007)
		CI-3. Breeding for high yield and quality in coriander. (Year of start 2007)
		CI-4. Breeding for high yield, quality & resistance to biotic & a biotic stress in fennel (Year of start 2009)
		CI-5 Breeding for high yield, quality & resistance to biotic & abiotic stress in cumin (Year of start 2009)
		CI-6 Breeding for high yield, quality & resistance to biotic & abiotic stress in caraway (Year of start 2009)
Breeding for improvement in minor seed spices	Dr. R.S. Meena	CI-7 Breeding for high yield, quality & resistance to biotic & abiotic stress in celery (Year of Start 2009)
		CI-8 Breeding for high yield and quality in dill (<i>Anethum graveolens</i> L & <i>Anethum sowa</i> Kurz.). (Year of start 2009)
		CI-9 Breeding for high yield & improved quality in ajwain for Rabi and Kharif season (Year of start 2009)
		CI-10 Breeding for high yielding and improved quality in nigella (Year of start 2009)
		CI-15 Genetic enhancement of anise for yield and yield contributing traits (Year of start 2011)



Programme	Programme Leader	Name of sub-project
Deciphering molecular diversity and molecular characterization in seed spices	Dr. S Choudhary	CI-12 Genetic diversity analysis through biotechnological tools in fenugreek (Year of start 2010)
		CI-13 Molecular characterization of cumin (Year of start 2010)
		CI-18 Genomic study of seed spices (Fennel and Coriander) (Year of start 2012)
Basic and applied studies on artificial hybridization in major seed spices	Dr. J.K. Ranjan	CI-16 Standardization of Technologies for crossing in coriander (<i>Coriandrum sativum</i> L.) (Year of start 2011)
Crop Production		
Precision resource management in seed spices production	Dr. R. Singh	CPd-15 Scaling up water productivity in seed spices cultivation (cumin, nigella) (Year of start 2010)
		CPd-16 Effect of land configuration and water management techniques on yield of seed spices in maize (babycorn) based cropping system (Year of start 2010)
		CPd-23 Standardization of NPK levels for coriander and cumin under protected environment in the scenario of climate change (Year of start 2011)
		CPd-24 Fertigation scheduling for efficient nutrient and water management in major and minor seed spices. (Year of start 2012)
Cropping system and weed management in seed spices	Dr. R.S. Mehta	CPd-12 Evaluation and identification of efficient cropping sequences for semi arid region of seed spice growing area (Year of start 2010)
		CPd-11 Standardization of package of practices for organic seed spices production (coriander & cumin) (Year of start 2009)
		CPd-18 Standardization of sustainable and profitable cropping system with fruit crops (Year of start 2012)
		CPd-17: Identification of critical stage for weed management in seed spices (coriander, ajwain and fennel) (Year of Start 2010)



Programme	Programme Leader	Name of sub-project
Post Harvest management and value addition in seed spices	Dr. G. Lal	CPd-9 Development of integrated system for processing with MAP of seed spices (cumin, fennel) (Year of start 2010)
Microbiological approaches in integrated nutrient management in seed spices	Dr. B.K. Mishra	CPd-19 Screening of plant growth promoting rhizobacteria for coriander (<i>Coriandrum sativum</i> L.) (Year of start 2011) CPd-20 Isolation and evaluation of phosphate solubilising microorganisms for fennel (<i>Foeniculum vulgare</i> L.) (Year of start 2011)
Assessment of edaphic stresses and nutrient management for sustainable seed spices production	Dr. O. P. Aishwath	Cpd 25 Nutrient management for sustainable seed spices production (coriander and fennel) (Year of start 2012) Cpd 26 Evaluation of seed spices for edaphic stresses. (Year of start 2012)
Crop Protection		
Survey & surveillance of existing and emerging diseases and insect pests in seed spices	Dr. R. D. Meena	CPT-1 Survey and surveillance of existing and emerging diseases of seed spices (year of start 2012) CPT-3 Survey & surveillance of insect pests in seed spices. (year of start 2012)
Management of diseases in seed spices	Dr. Y.K. Sharma	Project CPT 10 Evaluation of <i>Trichoderma</i> isolates for the management of cumin wilt (<i>Fusarium oxysporum</i> f.sp. <i>cumini</i>) (Year of start 2011) CPT-12 Management of wilt disease in cumin through soil solarisation. (Year of start 2011)
Management of insect pests in seed spices	Dr. KrishnaKant	CPT-8 Management of seed Insect-pest of seed spices through modified atmospheric packaging and other non chemical methods (year of start 2012) CPT-9 : Management of Fennel Seed Wasp (<i>Systole albipennis</i> Walker) (year of start 2011)



Programme	Programme Leader	Name of sub-project
Basic Science		
Biochemical basis of defence mechanism and quality traits in seed spices	Dr. S. S. Rathore	BS-6 Quality profiling of coriander and fenugreek germplasm. (Year of start 2011)
		BS-7 Biochemical basis of defense mechanism in cumin (<i>Cuminum cyminum</i> L.) (Year of start 2011)
Physiological approaches for enhancing yield and quality in seed spices under abiotic stresses	Dr. S. N. Saxena	BS-8 Physiological approaches for enhancing yield and quality in seed spices under abiotic stresses (Year of start 2012)
Social Science		
Seed spices knowledge management and technology transfer	Sh. M.K. Vishal	CPd-21 Design and development of database for seed spices. (Year of start 2011)
		CPd-22 Development of seed spices atlas of India using GIS approach. (Year of start 2011)
		SS-1. Awareness and adaptation of seed spices production technology. (Year of Start 2008)

New Projects:

Programme/ project	Sub projects	Investigators
Breeding for improvement in major seed spices Prog.Leader : Dr. R.K. Kakani	Breeding for high yield, powdery mildew resistance and suitability to limited moisture condition in fenugreek	R.K. Kakani, R.K. Solanki, S.N. Saxena, S.S. Rathore and Y.K. Sharma
	Breeding for high yield, small seed size and stem gall resistance in coriander	R.K. Kakani, S.N. Saxena, Y.K. Sharma and R.S. Meena
Cropping systems in seed spices Prog.Leader : R.S. Mehta	Standardization of economical intercropping system of seed spices with vegetables	R.S. Mehta, S.S. Meena Ravindra Singh, N.K. Meena and S.P. Maheria
Post harvest management and value addition in seed spices Prog. Leader : Dr. G. Lal	Development of Value added product from fennel & dill	G.Lal, B.K. Mishra, S.N. Saxena, Neelima Garg (CISH, Lucknow), P.C. Kumar (CISH, Lucknow)



Programme/ project	Sub projects	Investigators
Precision resource management in seed spices production Prog. Leader : Dr. Ravindra Singh	Off season production of coriander and fenugreek for green leaf	G.Lal, R.K. Kakani, R.S. Mehta, Ravindra singh, N.K. Meena and S.P. Maheria
Assessment of edaphic stresses and nutrient management for sustainable seed spices production Prog. Leader : Dr. O. P. Aishwath	Effect of non-edible oil cakes on coriander and cumin growth and yield	R.S. Mehta, G.Lal, Ravindra singh, O.P. Aiswath, B.K. Mishra S.S.Rathore , S.S. Meena and R.D. Meena
Pollination mangement in seed spices Prog. Leader: Dr. N.K. Meena	Impact of pollinators on yield and quality of coriander, fennel, ajwain & dill	N. K. Meena, K. Kant, R. K. Solanki and R. D. Meena
Management of insect pests in seed spices Prog. Leader : Dr. Krishna Kant	Sustainable management of insect pests in coriander and cumin	N.K. Meena, K.Kant, G.Lal, S.N. Saxena, Sharda Choudhary and M.A. Khan
Management of diseases in seed spices Prog. Leader : Dr. Y.K. Sharma	Management studies on emerging problems in cumin and fenugreek	Y.K. Sharma, R.D. Meena, R.K. Kakani and R.K. Solanki
Seed spices knowledge management and technology transfer Prog. Leader: Sh. M.K. Vishal	Dissemination of seed spices production and post-harvest technology through demonstrations, trainings, workshops and seminars under NEH and TSP	G. Lal, R.S. Mehta, N.K. Meena and R.S. Meena



12. Training/Refresher Course/ Summer / Winter Schools/ Seminars/Conferences/ Symposia/ Workshop Attended by the Scientists

12.1 Training (International)

Name of the participant	Name of the Training Programme/ Venue	Period
Dr. Balraj Singh	“Leadership and Decision making” at Harvard Kennedy School at Harvard University, Cambridge U.S.A.	Nov 17-22, 2013
Dr.B.K.Mishra	Biosecurity in Horticultural crops at International Programs, College of Agriculture and Life Sciences, Cornell University, Ithaca, NY, USA	Oct 1- December 29, 2013
	Agricultural worker protection standard under U.S. Protection (EPA) and National Association of state Departments of Agriculture Research Foundation (NASDAF) at Cornell University, Ithaca New York, USA	Oct 29, 2013
Dr. Sharda Choudhary	Marker Assisted Selection in Horticultural Crops at Department of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, Arkansas, USA	Dec 15 to March 15, 2014

12.2 Training/Refresher course (National)

Name of the participant	Name of the Training Programme/ Venue	Period
Dr. G. Lal	National Training Workshop on Scientific Report Writing and Presentation (NAIP Sponsored) at NAARM, Hyderabad	July 30- Aug 03, 2013
Dr. J. K. Ranjan	Two days training cum workshop on right to information from PIO at Institute of Secretariat Training and management, New Delhi	Nov 11-12, 2013
Dr. B. K. Mishra	Refresher Course on Agricultural Research Management at NAARM, Hyderabad (Andhra Pradesh).	Jul 15-27, 2013
Dr. S. Choudhary Dr. N. K. Meena Sh. S. R. Meena	Short course on “Hi-Tech Interventions in Seed Spice Production for Enhancing Productivity, Nutraceutical Quality and Value-Addition” at NRCSS, Tabiji, Ajmer	Oct 3-12, 2013



Name of the participant	Name of the Training Programme/ Venue	Period
Sh. M K Vishal	Installation cum Orientation Training Program in the project 'NAIP on Strengthening Statistical Computing for NARS' at Rajasthan College of Agriculture, MPUAT, Udaipur, (Rajasthan)	Oct 9-10, 2013

12.3 Conference/Seminar / Symposia / Workshop/ Meetings

Name of the participant	Name of the Conference/Seminar / Symposia / Workshop/ Meetings/Venue	Period
Dr. Balraj Singh	Chairman of the first technical Session in the Second International Conference on Emerging Food Safety Risks: Challenges for Developing Countries held at NIFTEM, Kundli (Haryana)	Jan 9, 2014
	Co-chairman of the third technical session in the National symposium on Climate change in Indian horticulture held at B.A.U., Sabour (Bihar)	May 25-27, 2013
	Co-chairman of the sixth technical session on “New seeds for food security” in the XIII National seed seminar held at U.A.S., Bengaluru (KT)	Jun 8-10, 2013
	Chairman of the first technical session in the National Seminar on “Non timber forest produce, medicinal, aromatic plants and spices: Innovation for livelihood security” organised by IGKV, Raipur (CH.)	Dec 23-24, 2013
	Chief Guest of the meeting of “Scientific Advisory Committee” at KVK, Ajmer (Raj.)	Apr 4, 2013
	Chairman of the technical session in the National Seminar on “New vistas in food processing with quality assurance for augmenting rural prosperity” organised by College of Technology and Engineering, Maharana Pratap University of Agriculture and Technology, Udaipur, (Raj.)	Jun 21-22, 2013
	Inception meeting for the GEF funded projects organised by Bioversity International at NASC complex, New Delhi	Sep 4, 2013



Name of the participant	Name of the Conference/Seminar / Symposia / Workshop/ Meetings/Venue	Period
Dr. G. Lal	“6th Agriculture Leadership Summit-2013” organised by Agriculture Today Group at hotel Taj Palace, New Delhi	Sep 19-20, 2013
	Participated in the “Working group on Agriculture” meeting of Rajasthan state held at Pant Krishi Bhawan, Jaipur (Raj.)	Oct 7, 2013
	XXIV National Workshop of AICRP on Spices held at SDAU, Jagudan (Guj.)	Oct 24-26, 2013
	National conference on Plant Physiology-2013: Current trends in Plant Biology Research, organised by Directorate of Groundnut Research and Junagadh Agricultural University in association with ISPP at Junagadh (Gujarat)	Dec 13-16, 2013
	XXIV Workshop of All India Coordinated Research Project on Spices, organised at CRSS (Sardar Krushinagar Dantiwada Agricultural University) Jagudan, (Gujarat)	Oct 24 -26, 2013
	IX CIC and CAC meeting of NAIP-2 on “Value chain in major seed spices for domestic and export promotion” held at CRSS (SDAU), Jagudan, (Gujarat)	Jun 13, 2013
	Implementation of food safety in supply chain management of spices organised by Spices Board held at Directorate of Horticulture, Govt. of Gujarat, Gandhinagar (Gujarat)	Jun 14, 2013
Dr. S. N. Saxena	Seventh annual review meeting of NHM, organised by DASD, Calicut held at Jagudan (Gujarat)	Jun 19-20, 2013
	International Conference on “Emerging Food Safety Risks: Challenges for Developing Countries” held at National Institute of Food Technology Engineering and Management, Kundli, Sonipat (Haryana)	Jan 9-10, 2014
	National seminar on “New Vistas in Food Processing with Quality Assurance for Augmenting Rural Prosperity” at Department of Processing	Jun 21-22, 2013



Name of the participant	Name of the Conference/Seminar / Symposia / Workshop/ Meetings/Venue	Period
	and Food Engineering College of Technology and Engineering MP University of Agriculture and Technology, Udaipur (Raj.)	
	Food Processing & Post Harvest Technology Industry Meet organized by ZTM, IARI, New Delhi	May 15, 2013
	13th Implementation Support Mission National Agricultural Innovation Project Indian Council of Agricultural Research at MPUAT, Udaipur (Raj.)	Aug 12-20, 2013
	Seminar on Advancing Separation and Detection held at Park Inn Hotel Jaipur Jai Singh Highway A-28/c/3, Sawai Jai Singh Hwy - Bani Park, Rajasthan - Jaipur (Raj.)	May 29, 2013
	Seminar on Advancing Separation and Detection Technology held at NRCSS, Ajmer (Raj.)	Oct 8, 2013
	Arogya Mela organized by Department of Ayurveda Jaipur, Rajasthan at BM Birla Auditorium, Statue Circle, Jaipur (Raj.)	Feb 28 to Mar 3, 2014
Dr. R. K. Kakani	XXIII Workshop of All India Coordinated Research Project on Spices held at CRSS (Sardar Krushinagar Dandiwada Agricultural University) Jagudan, (Gujarat)	Oct 24-26, 2013
Dr. Y. K. Sharma	Workshop on Pesticide Residues in Spice Crops held at IISR, Calicut (Kerala)	Jun 3, 2013
	Review Meeting of the schemes on spices & aromatic plants under NHM implemented through DASD held at Spice Research Centre (SDAU), Jagudan (Gujarat)	Jun 19, 2013
	Workshops of the projects on 'Monitoring of Pesticide Residues at National Level' and AINP on Pesticide residues held at TNAU, Coimbatore.	Jun 20-21, 2013



Name of the participant	Name of the Conference/Seminar / Symposia / Workshop/ Meetings/Venue	Period
	Meeting of State Pest and Surveillance & Advisory Unit held at Pant Krishi Bhawan, Jaipur (Raj.)	Sep 10, 2013
	XXIV Annual Workshop of AICRP on Spices held at Spice Research Centre (SDAU) Jagudan, (Gujarat)	Oct 24-26, 2013
	Meeting of Regional Committee VI- Midterm Review held at CAZRI, Jodhpur (Raj.)	Dec 18, 2013
	Meeting on generating GAP trial and monitoring data in spices for submission to JMPR held at Spices Board, Cochin (Kerala)	Jan 28, 2014
Dr.R.S. Mehta	International Conference on Water Management for Climate Resilient Agriculture, Jalgaon, (Maharashtra)	May 28-31, 2013
	CIC and CAC meeting of NAIP (component-2) held at CRRS,SDAU, Jagudan (Gujarat)	Jun 13, 2013
	World Congress on Argo-forestry held at Vigyan Bhavan & Kempinski Ambience, New Delhi	Feb 10-14, 2014
	ZREAC meeting of Zone III-A held at Rajasthan Agriculture Research Institute, Durgapura, Jaipur (Raj.)	Mar 19-20, 2014
Dr. R. Singh	National Symposium on Abiotic and Biotic Stress Management in Vegetable Crops held at IIVR Varanasi (UP)	Apr 12-14, 2013.
	Workshop to discuss the performance indicators for ICAR institutes and presented the NRCSS report for indicators at NCAP, New Delhi	July 15-16, 2013
	International Seminar on " Impact of Technological Tools on Food Security under Global Warming Scenario" held at Sobhit Institute, Modipuram, Meerut (UP)	May 11-13, 2013



Name of the participant	Name of the Conference/Seminar / Symposia / Workshop/ Meetings/Venue	Period
	Seminar on "Drip fertigation in horticultural crops" at IHITC, Durgapura, Jaipur (Raj.)	Aug 13-14, 2013
	A meeting to discuss the RFD midterm achievements of ICAR institutes of Horticulture Division at NASC complex, New Delhi	Oct 28, 2013
Dr. O. P. Aishwath	National Conference on 'Effect of Biotechnological Advancements on Environment' held at Dayanand Collage, Ajmer (Raj.)	Nov 22-23, 2013
	10th National Symposium on 'Managing Natural Resources for Enhancing Agricultural and Allied Productivity in Coastal Region under Changing Climate' at Bharuch (Gujarat)	Dec 11-14, 2013
	Annual convention of Indian Society of Soil Science and National Symposium on Development in soil Science-2013 held at CAZRI, Jodhpur	Oct 23-26, 2013
Dr. Krishna Kant	National Symposium on Recent Advances in Beneficial Insects (Apiculture, Lac Culture and Sericulture) at Indian Institute of Natural Resin and Gum, Namkum, Ranchi (JK)	Nov 27-29, 2013
	National Seminar on New Vistas in Food Processing with Quality Assurance for Augmenting Rural Prosperity at Department of Processing and Food Engineering, College of Technology and Engineering, Maharana Pratap University of Agriculture & Technology, Udaipur (Raj.)	Jun 21-22, 2013
Dr. S. S. Meena	International Conference on Water Management for Climate Resilient Agriculture, Jalgaon (Maharashtra)	May 28-31, 2013
	National Conference of Plant Physiology-2013 on "Current Trends in Plant Biology Research", Junagadh (Gujarat)	Dec13-16, 2013
	"World Congress on Argo forestry" held at Vigyan Bhavan & Kempinski Ambience, Delhi, India	Feb 10-14, 2014



Name of the participant	Name of the Conference/Seminar / Symposia / Workshop/ Meetings/Venue	Period
Dr. J. K. Ranjan	Attended “National Seminar on New Vistas in Food processing with quality assurance for augmenting rural prosperity” held at Department of Processing and Food Engineering College of Technology and Engineering MP University of Agriculture and Technology, Udaipur (Raj.)	Jun 21-22, 2013
Dr. S. S. Rathore	National seminar on “New Vistas in Food Processing with Quality Assurance for Augmenting Rural Prosperity” at held at Department of Processing and Food Engineering College of Technology and Engineering MP University of Agriculture and Technology, Udaipur (Raj.)	Jun 21-22, 2013
	Seminar on Advancing Separation and Detection held at Park Inn Hotel Jaipur Jai Singh Highway A-28/c/3, Sawai Jai Singh Hwy - Bani Park, Rajasthan - Jaipur (Raj.)	May 29, 2013
	Seminar on Advancing Separation and Detection Technology held at NRCSS, Ajmer (Raj.)	Oct 8, 2013
	International Conference on “Emerging Food Safety Risks: Challenges for Developing Countries” held at National Institute of Food Technology Engineering and Management, Kundli, Sonipat (Haryana)	Jan 9-10, 2014
Dr. B. K. Mishra	National seminar on “New Vistas In Food Processing With Quality Assurance For Augmenting Rural Prosperity” held at Department of PFE, CTAE, MPUAT, Udaipur (Raj.)	Jun 21-22, 2013
	International conference on “International Engagement In Agriculture and The Life Sciences” at IP-CALS, Cornell University, Ithaca, New York 14853, USA.	Dec 4, 2013
	Attended Indian Mushroom Conference 2013” at PAU, Ludhiana organized by Mushroom Society of India, Directorate of Mushroom Research, Solan (H.P.)	Apr 16-17 2013



Name of the participant	Name of the Conference/Seminar / Symposia / Workshop/ Meetings/Venue	Period
Dr. R. K. Solanki	Inception Meeting of the PPG Phase of 'Mainstreaming agro-biodiversity conservation and utilization in agricultural sector to ensure ecosystem services and reduce vulnerability' held at NASC Complex, New Delhi	Sep 2-4, 2013
	XXIV Annual workshop of AICRP on Spices held at Jagudan (Gujarat)	Oct 31- Nov1, 2013
	ICAR Regional Committee VI-Midterm review meeting held at CAZRI on , Jodhpur (Raj.)	Dec 18, 2013
	Regional workshop on the ICAR-Bioiversity project on 'Mainstreaming agrobiodiversity conservation and utilization in agricultural sector to ensure ecosystem services and reduce vulnerability' held at CAZRI, Jodhpur (Raj.)	Feb 5, 2014
	"Review meeting to finalize the technical programme and action plan of ICAR Seed Project (Horticulture component) XII Five Year Plan" held at IIHR, Bangaluru (KT)	Feb 22, 2014
	Brainstorming meeting and training programme on Cryopreservation and <i>in vitro</i> conservation in Horticulture Crop Genetic Resources held at IIHR, Bangaluru (KT)	Feb 22, 2014
Dr. S.Choudhary	“Indraprastha International Conference On Biotechnology” at Guru Gobind Singh Indraprastha University, New Delhi	Oct 22 - 25, 2013
	National Conference On “Effects of Biotechnological Advances on Environment” at Dayanand College, Ajmer (Raj.)	Nov 22-23, 2013
	“Pathology Seminar” at University of Arkansas, Arkansas, USA .	Feb 25, 2014
	“Horticulture Seminar” at University of Arkansas, Arkansas, USA	Mar 5, 2014



Name of the participant	Name of the Conference/Seminar / Symposia / Workshop/ Meetings/Venue	Period
	International Seminar on "Impact of Technological Tools on Food Security under Global Warming Scenario" held at Sobhit Institute, Modipuram, Meerut. (IP)	May 11-13, 2013
Dr. R. D. Meena	National seminar on new vistas in food processing with quality assurance for augmenting rural prosperity" held at CTAE, MPUAT, Udaipur (Raj.)	Jun 21-22, 2013
	International symposium on role of fungi and microbes in 21st century a global scenario held at (Kolkata)	Feb 20-22, 2014
	Capacity Building Workshop on IPV6 organized at IASRI, New Delhi	Feb 26-27, 2014
Sh. M.K. Vishal	NKN 2 nd Annual Workshop at IISc. Banglore (KT)	Oct 17-19, 2013
Sh. S. P. Maheria	National Conference of Plant Physiology 2013 on Current Trends in Plant Biology Research organized by Directorate of Groundnut Research Junagarh (Gujarat)	Dec 13-16, 2013
Sh. M.A. Khan	Attended Fasal Vichar Ghoshthi at Village Baghera Kekri, Ajmer. (Raj.)	Mar 5, 2014
Dr. N. K. Meena	Review meeting at IIHR, Bangalore to finalize the technical programme and action plan of ICAR Seed Project (Horticulture component)	Feb 22, 2014



13. Training/Refresher Course/ Summer/ Winter Schools/ Seminars/Conferences/ Symposia/ Workshop Organized at the Centre

13.1 ICAR sponsored short course

A ten days ICAR sponsored short course on “Hi-tech interventions in seed spice production for enhancing productivity, nutraceutical quality and value-addition” was conducted during 3 to 12 October, 2013. Eighteen participants from various ICAR institutes, State Agricultural Universities, State department of Agriculture and lectures from Agricultural colleges attended the course. The programme was inaugurated by Dr. Balraj Singh, Director, NRCSS and Course Director. In his inaugural address Dr. Singh highlighted the importance of seed spices in perspective of export demand and stressed upon intervention of modern technologies for efficient utilization of limited resources to derive higher production with excellent quality. This required the intervention of technologies that are less environment dependent, capital intensive with the capacity to improve the productivity and quality of the produce.

Course Coordinator, Dr. S. N. Saxena succinct about the concept and contents of the course. The course contained

lectures on GAPS for seed spices, integrated approaches for nutrient, water and pest management, Conservation agriculture and protected cultivation, micro-irrigation, fertigation, soil and leaf based fertilizer management, sensor based application of agricultural inputs, possibilities of mechanization in seed spice cultivation, seed fortification in the form of seed priming and pelleting, artificial hybridization techniques and postharvest technologies including value addition in the form of grading, grinding and packaging in 30 classroom lectures and 06 lectures based on practical, visit of specialized area and demonstration of technologies.

The course was concluded on 12th October 2013. Dr. S. K. Malhotra, ADH (Hort.), ICAR and Commissioner (Hort.), GOI, New Delhi was the chief guest of valedictory function. Dr. Balraj Singh, Director, NRCSS presided over the function. Prof. G. N. Mathur, Incharge, KVK, Ajmer was special guest of the function. Compendium of the lectures has been released by honourable guests. Participants were awarded by certificate on successful completion of the course.



13.2 Advancing separation and detection seminar

One day seminar was conducted on advance separation techniques during the short course on 8th October 2013. The seminar was inaugurated by Dr. Balraj Singh, Director, NRCSS. Organizing Secretary Dr. S. N. Saxena highlighted the significance of this seminar to researchers and academicians. This seminar was jointly organized by NRCSS and Agilent Technologies, USA. This seminar cum workshop offered an excellent opportunity to discuss day to day

challenges and hear from experts on the latest developments and benefits from innovations in high end analytical technologies. Experts from Agilent technologies, USA delivered classroom lectures and live demonstration on GC-MS. Apart from the participants of short course, NRCSS faculty, researchers from Academic Institutes like Central University Kishangarh, MDS University, Ajmer, Govt College Ajmer, Public Health Lab, Ajmer, JLN Medical College Ajmer, DAV College Ajmer also participated in this seminar.



14. Distinguished Visitors

S. No.	Name	Designation	Date of Visits
1.	Dr. N.K. Krishan Kumar	DDG (Hort.), ICAR, New Delhi	Aug 2, 2013
2.	Dr. Pratap Singh	Ex. Director Research, MPUA&T, Udaipur	Aug 19, 2013
3.	Dr. G.D. Singh	Ex. Dean PG, SKRAU, Bikaner	Aug 19, 2013
4.	Prof. N.L. Meena	Ex. Dean & Director (Ext.) SKRAU, Bikaner	Aug 19, 2013
5.	Dr. A. N. Ganeshamurthy	IIHR, Bangalore	Sep 9, 2013
6.	Dr. S. K. Malhotra	ADH (Hort.), ICAR, New Delhi	Oct 12, 2013
7.	Dr. Kirti Singh	Ex- Chairman, ASRB, New Delhi	Jan 17, 2014
8.	Dr. Brahma Singh	Ex- Director, DRDO	Jan 17, 2014
9.	Mr. Habib Khan Goran	Chairman, RPSC, Ajmer	Jan 17, 2014
10.	Kr. Vijay Singh Lalotra	Principal, Mayo Collage, Ajmer	Jan 17, 2014
11.	Dr. Gurbachan Singh	Chairman ASRB, New Delhi	Feb 2, 2014
12.	Sh. R. C. Choudhary	Chairman, Dugdh Utpadan Samiti, Ajmer	Feb 2, 2014
13.	Dr. S.M.K. Naquvi	Director CSWRI, Avikanagar	Feb 2, 2014
14.	Dr. O.P. Gill	VC, MPUAT, Udaipur	Feb 4, 2014
15.	Dr. R. K. Meena	Divisional Commissioner, Ajmer	Feb 14, 2014
16.	Dr. V.N. Sharda	Member, ASRB, New Delhi	Feb 24, 2014
17.	Dr. K. K. Singh	Director, Seed & Farms BAU, Sabour	Mar 6, 2014
18.	Dr. Govind Singh	Director (Res.), SKRAU, Bikaner	Mar 22, 2014
19.	Dr. R.C. Dadheech	Member XII-IMC Meeting	Mar 22, 2014
20.	Dr. A.K. Srivastava	Member XII-IMC Meeting	Mar 22, 2014
21.	Dr. P. Chowdappa	Member XII-IMC Meeting	Mar 22, 2014





DDG (Hort.) ICAR visiting NRCSS Farm



Dr. Gurbachan Singh, Chairman, ASRB, New Delhi
visiting NRCSS farm



Dr. V. N. Sharda, Member, ASRB, New Delhi
visiting NRCSS farm



Dr. Kirti Singh Singh, Ex- Chairman, ASRB, New Delhi and
Dr. Bramha Singh, Ex-Director, DRDO visiting NRCSS farm



Sh. R. K. Meena, Divisional Commissioner, Ajmer
visiting NRCSS farm



Members, IMC, NRCSS visiting laboratory at NRCSS



15. Empowerment of Women

Women farmers are the sphere of Indian Agriculture. They contributed agricultural production by their involvement in every step of farming. As a policy NRCSS always tries to educate women farmers about scientific crop production technologies. Emphasis is given to enhance participation of women farmers in the events organized by

NRCSS for extension of improved production technologies. During the reporting year many training programmes were organized exclusively for women farmers. They were not only provided scientific crop production techniques but also educated about importance of sanitation, nutrition and other social problems and their remedies.



Women participants from Dungarpur of five days training programme



Group of women farmers visiting NRCSS Farm



Women farmers participation in Western Zone Farmers Fair 2014



Women farmers participation in Krishak Sangoshthi during Western Zone Farmers Fair 2014



16. Infrastructure Development

16.1 Works under plan scheme

The only allocation of plan was for spill over works from the last plan. This budget of Rs. 13 Lakhs was utilized to complete the Scientists Training Hostel building.

16.2 Works under NHM Project

Construction work of a Seed Store was completed at an estimated cost of Rs. 10.0 lakhs through CPWD. The seed store is just behind the processing plant building and adjacent to the double walled mega seed store room.

16.3 Works under Non Plan

Renovation work of old office building and stores at an estimated cost of Rs. 18.70 lakhs was completed and the buildings were put under use.

Two renovated rooms were provided with attached and adjoining toilet bath facilities and the rooms converted into farmer's dormitory.

Construction work of a paver block footpath along the left side of training hostel road and along right side of front boundary road was taken up and completed.

Old paver block footpath along the farm road measuring 475 M length and 1.25 M width was renovated for weed control. A 400 GSM black poly sheet was spread below the paver blocks and road edge was repaired with cement concrete.

The environment friendly Solar CFL street lights were provided in the campus roads and two East West Roads of farm.

Low consumption LED 20W street lights were mounted on departmentally fabricated GI poles and installed along the North side 5M road of farm.



The old Poly house of 500 M² was renovated with UV stabilized net converting it into a Net House.

16.4 Information Technology related facilities

New Videoconferencing Cell (Lab) established

A new state-of-art Videoconferencing cell had been established in the National Research Centre on Seed Spices for conferencing, teaching and information dissemination. It is installed in committee room of the NRCSS. It has multi point HD video conferencing system which support IP and ISDN standards connectivity. It has HD VC camera with high optical zoom supporting various formats. This VC system supports all latest standards of video, audio and networks protocols. Especially in case of audio, has automatic gain control and audio error concealment. The system has full HD flat panel professional display in synchronization with projector. It has content sharing facility while doing conferencing. It is being operated through NKN internet connection of institute.





ARIS

ARIS (now known as Agricultural Knowledge Management Unit) facilitates management and looking of the various activities related to IT and networks of institute like Local Area Network (LAN) maintenances and ensures uninterrupted net connectivity to all sections. The repair and maintenances of IT equipments are also being facilitated. In current year various significant works had been done out of the major ones are mentioned here.

Internet Connection through OFC under National Knowledge Network (NKN) started

NRCSS received NKN facility of high bandwidth internet connectivity through Optical Fiber Cable (OFC). The NKN is a state-of-the-art multi-gigabit pan-India network for providing a unified high speed network backbone for all knowledge related institutions in the country. A new CISCO router ASR1002 had also been installed successfully .



IT equipments purchased under NAIP

Under NAIP, a fund was released to purchase of new computers, printers, server, on-line UPS and multimedia projectors. The same had been purchased which are very latest in configuration of reputed brand. New IBM server is installed and working.

LAN with wiring extended to new points

For better internet facilities to user new locations were provided with internet wiring as well as repairing of the existing was also done. Connection were provided and routed with manageable switches and Wi-Fi routers cum access point.



17. Personnel

18.1 Scientific Staff

S.No.	Name	Designation
1.	Dr. Balraj Singh	Director
2.	Dr. Gopal Lal	Principal Scientist (Horticulture)
3.	Dr. S.N. Saxena	Principal Scientist (Plant Physiology)
4.	Dr. R.K. Kakani	Principal Scientist (Plant Breeding)
5.	Dr. Y.K. Sharma	Principal Scientist (Plant Pathology)
6.	Dr. R.S. Mehta	Principal Scientist (Agronomy)
7.	Dr. Ravindra Singh	Senior Scientist (Agronomy)
8.	Dr. O.P. Aishwath	Senior Scientist (Soil Science)
9.	Dr. Krishan Kant	Senior Scientist (Entomology)
10.	Dr. S.S. Meena	Senior Scientist (Horticulture)
11.	Dr. S. S. Rathore	Senior Scientist (Biochemistry)
12.	Dr. B. K. Mishra	Senior Scientist (Microbiology)
13.	Dr. R.S. Meena	Scientist, Sr. Scale (Plant Breeding)
14.	Dr. N. K. Meena	Scientist, Sr.Scale (Entomology)
15.	Dr. R. K. Solanki	Scientist (Plant Breeding)
16.	Dr. Sharda Choudhary	Scientist (Biotechnology)
17.	Dr. R. D. Meena	Scientist (Plant Pathology)
18.	Sh. Mukesh Kumar Vishal	Scientist (Ag. Statistics)

17.2 Technical Staff

S.No.	Name	Designation
1.	Sh. S.P. Maheria	Chief Technical Officer
2.	Sh. M.A. Khan	Asstt. Chief Technical Officer
3.	Sh. S.R. Meena	Senior Technical Officer
4.	Sh. G.K. Tripathi	Senior Technical Assistant
5.	Sh. Pramod Agarwal	Senior Technician
6.	Sh. Sri Ram Balai	Senior Technician
7.	Sh. Ajit Singh	Senior Technician

17.3 Administrative, Audit & Accounts and Supporting Staff

S.No.	Name	Designation
1.	Sh. Ravinder Singh	Administrative Officer
2.	Sh L.K Sharma	Asstt. Administrative Officer
3.	Sh. Bhim Singh	Assistant Administrative Officer
4.	Sh. Sanjeev Sharma	Assistant
5.	Sh. R. K. Kanwaria	Sr. Clerk
6.	Smt. Sarla Devi	SSG-I
7.	Sh. Pukhraj Paroda	SSG-I



17.4 New appointment

S.No.	Name	Designation	Date of Appointment
1.	Sh. Sunil Kumar Agrawal	Assistant Finance and Account Officer	26.06.2013
2.	Sh. Amit Gupta	LDC	05.09.2013

17.5 Promotion

17.5.1 Scientist

S.No.	Name of Personnel	Post held	Promoted to	W.E.F.
1.	Dr. R.S.Mehta	Senior Scientist (Agronomy)	Principal Scientist	29.09.2012

17.5.2 Administrative staff

S.No.	Name of Personnel	Post held	Promoted to	W.E.F.
1.	Sh. Bhim Singh	Assistant	Assistant Administrative Officer	02.05.2013
2.	Sh M.M.Vanvi	Assistant (on deputation)	Assistant	16.04.2013

17.5.3 Technical staff

S.No.	Name of Personnel	Post held	Promoted to	W.E.F.
1.	Sh. S.P. Maheria	Asstt. Chief Technical Officer	Chief Technical Officer	08.05.2007
3.	Sh. S.R. Meena	Technical Officer (T 5)	Senior Technical Officer	28.03.2013
4.	Sh. G.K. Tripathi	Technical Assistant (T 3)	Senior Technical Assistant	12.12.2012
5.	Sh. Pramod Agarwal	Technical Assistant (T 1)	Senior Technician	04.11.2011
6.	Sh. Sri Ram Balai	Technical Assistant (T 1)	Senior Technician	22.02.2013
7.	Sh. Ajit Singh	Technical Assistant (T 1)	Senior Technician	11.12.2011

17.6 Transfer

S.No.	Name of Personnel	Transfer from	Transfer to	W.E.F.
1.	Dr. J. K. Ranjan	Sr. Scientist, NRCSS, Ajmer	IVRI, Varanasi	22.03.2014
2.	Dr. N. K. Meena	Scientist , NRC on Orchids, Sikkim	Scientist, NRC on Seed Spices, Ajmer	15.05.2013
3.	Sh M.M.Vanvi	Assistant, NRCSS, Ajmer (on deputation)	Assistant, CMRFI, Cochin	16.04.2013



18. Other Information

18.1 NRCSS obtained the ISO 9001 : 2008 standards

NRCSS, Ajmer obtained the ISO 9001: 2008 standards for seed spice research, providing laboratory analysis, providing consultancy, training and transfer of technologies to seed spice stakeholders on January 3rd 2014.

18.2 DDG (Horticulture) visited NRCSS

Dr. N. KrishanKumar DDG (Horticulture) and Dr. S. K. Malhotra ADG (Horticulture) visited NRCSS on 2nd August 2013. During the visit DDG interacted with scientists of NRCSS and reviewed the research programmes carried out at NRCSS. He advised the scientists to focus on priority research areas with special emphasis on quality parameters. He also launched the website of Indian Society of Seed Spices and accepted life membership of ISSS. On this occasion 2nd issue of International Journal of Seed Spices volume 3 was also released.



18.3 Biocontrol Laboratory inaugurated

A modern fully functional biocontrol laboratory has been established at NRCSS for large scale production of different biocontrol agents. DDG (Horticulture), Dr. N. Krishan Kumar inaugurated the laboratory on 2nd August 2013. During the year of 2013-14 more than 10 q of biocontrol products (*Trichoderma viride*, *Beauveria bassiana*, *Metarhizium* and *Verticillium lacanii*.) has been produced and distributed free to the farmers in Kishan Mela during September and February month and also utilized in DBT sponsored project.



18.4 NMPB approved project proposals of Dr. S. N. Saxena

A project proposal on "Exploitation of seed spices as a potential source of natural antioxidants, essential oil and oleoresins for enhancing export of value added products" was submitted by Dr. S. N. Saxena, Principal Scientist, NRCSS to National Medicinal Plants Board under Department of AYUSH, Ministry of Health & Family Welfare, Government of India. Dr. S. N. Saxena, principal investigator, presented and defended the proposal in 29th PSC meeting held on 20th September, 2013 at NMPB, New Delhi. The 58th SFC has approved the project for 3 years at the total cost of 44.30 lakh. Dr. R. K. Kakani, Pri. Scientist, Dr. S. S. Rathore, Sr. Scientist and Dr. R. K. Solanki, Scientist is associated in this project as co-principal investigators.



18.5 Project sanctioned under AMAAS

Research proposals on “Exploration of microbial diversity in seed spices through metagenomics approaches for crop improvement” submitted by Dr. Sharda Choudhary, Scientist (Biotechnology) under the platform Application of Microorganism in Agriculture and Allied Sectors has been approved in 12th plan SFC of NBAIM, Mahu, UP. The project was sanctioned with an amount of 39.22 lakhs. Dr. B. K. Mishra, Sr. Scientist (Microbiology) is associated in the project as Co-PI.

18.6 Launching workshop of NMPB project conducted

NMPB project on “Exploitation of seed spices as a potential source of natural antioxidants, essential oil and oleoresins for enhancing export of value added products” was formally started in a small workshop on March 7, 2014. In this launching workshop Principal Investigator Dr. S. N. Saxena made a presentation of the project in which he explained about the origin and rationale of the project. Project objectives and the activities to be carried out to achieve the objectives were elaborated by Dr. Saxena. Dr. Balraj Singh, Director, NRCSS, congratulated the project investigators for getting the proposal approved and advised to work hard for achieving the objectives of project. He also thanked to NMPB, New Delhi and member secretary SMPB, Jaipur for their co-operation.

18.7 14th Foundation Day celebrated

NRCSS has celebrated its 14th foundation day on 17 January, 2014. Dr Kirti Singh, Ex Chairman, ASRB, New Delhi

and Chairman, World Noni Foundation, Chennai was the chief guest of the function. Other dignitaries of the function were Sh. Habib Khan Gouran, Chairman, RPSC, Dr Brahma Singh, Ex Director, DRDO and Kunwar Vijay Singh Lalotra, Principal, Mayo College, Ajmer. Dr Balraj Singh delivered welcome address and presented the research achievements of NRCSS and progress made during last 13 years in the areas of seed spices research. Dr Kirti Singh, and Ex Chairman ASRB, delivered the 4th foundation day lecture on "Indian Spices Retrospect and Prospects". He made a progressive sketch of spice research in India and emphasized to work upon quality aspects of seed spices in perspectives of modern WTO regime and to maintain India's prime position in spice export. Sh Habib Khan Gouran, president of the function appreciated the efforts of scientist and farmers of the country in achieving self sufficiency in food grain production. Dr Brahma Singh, emphasized on the bee keeping and pollination management in seed spices as these are the cross pollinated crops. On this occasion, special issue of Indian Horticulture and Phal Phool (ICAR publications) dedicated to seed spices and first issue of volume 4 of International Journal of Seed Spices were released by honourable guests. The event was attended by more than 150 participants from NRCSS, KVK Ajmer, ATC Ajmer, State department officials, Agriculture faculty of Bhagwant University and DAV College. Dr Ravindra Singh, Organizing Secretary of the event presented the vote of thanks to all guests and participants.



18.8 राजभाषा हिन्दी पखवाड़ा कार्यक्रम

राष्ट्रीय बीजीय मसाला अनुसंधान केन्द्र तबीजी, अजमेर में दिनांक 13 सितम्बर से 30 सितम्बर 2013 तक हिन्दी पखवाड़ा मनाया गया। इस उपक्रम में दिनांक 13 सितम्बर 2013 को हिन्दी दिवस मनाकर कार्यक्रम को प्रारम्भ किया गया, जिसमें संस्था के निदेशक डॉ. बलराज सिंह महोदय द्वारा हिन्दी भाषा के महत्व को ध्यान में रखकर कार्यालय के सभी आवश्यक कार्य एवं पत्र-पत्रावलियों का हिन्दी में प्रकाशन करने पर ध्यान आकृष्ट किया। इसी क्रम में दिनांक 16 सितम्बर को संस्था के सभी वैज्ञानिकों एवं सहायक कर्मचारियों के लिए विभिन्न प्रतियोगिताएँ आयोजित की गयी। जिनमें वाद-विवाद, तत्काल भाषण, कार्यालय टिप्पणी लेखन एवं अन्य प्रतियोगिताएँ आयोजित की गयी। जिसमें सभी ने भाग लेकर प्रतियोगिताओं का आनन्द लिया। जिसमें कार्यक्रम के अन्त में निदेशक डॉ. बलराज सिंह ने सभी प्रतिभागियों को पुरस्कार प्रदान कर उन्हें इसी तरह प्रतियोगिताओं में भाग लेने के लिए प्रोत्साहित किया। राजभाषा हिन्दी पखवाड़ा कार्यक्रम के समापन पर पुरस्कार प्रदान किये गये। हिन्दी पखवाड़ा के अन्तर्गत कार्यक्रमों का आयोजन डॉ. बृजेश कुमार मिश्र ने संस्थान के सभी अधिकारियों एवं कर्मचारियों की सहभागिता में किया।



इस वर्ष (2013.14) में राजभाषा हिन्दी कार्यान्वयन समीति की तिमाही बैठक दिनांक 13 सितम्बर 2013 तथा 01 मार्च 2014 को की गई साथ ही साथ हिन्दी के प्रगामी प्रयोग के लिए दो एक. एक दिवसीय संगोष्ठी का आयोजन क्रमशः दिनांक 13 और 22 मार्च 2014 को किया गया।

18.9 एक दिवसीय हिन्दी तकनीकी संगोष्ठी

राजभाषा हिन्दी पखवाड़ा 2013 के अन्तर्गत एक दिवसीय हिन्दी तकनीकी संगोष्ठी का आयोजन किया गया जिसमें डॉ. बलराज सिंह, निदेशक, राष्ट्रीय बीजीय मसाला अनुसंधान केन्द्र तबीजी,

अजमेर ने संरक्षित खेती: अधिक उत्पादकता, पादप एवं पर्यावरण संरक्षण का मजबूत आधार विषय पर बहुत विस्तृत रूप में सहज एवं शुद्ध हिन्दी के वैज्ञानिक एवं तकनीकी शब्दों के प्रयोग के माध्यम से प्रस्तुत किया। इस तकनीकी संगोष्ठी में केन्द्र के वैज्ञानिक एवं तकनीकी अधिकारियों तथा प्रशासनिक कर्मचारियों ने उत्साह से भाग लिया। राजभाषा प्रभारी डॉ. बृजेश कुमार मिश्र ने भविष्य में वैज्ञानिक एवं तकनीकी लेखों में मानक हिन्दी के प्रयोग पर बल दिया तथा कार्यक्रम की सफलता के लिए सभी लोगो का आभार व्यक्त किया।

18.10 हिन्दी व्याख्यान एवं राजभाषा संगोष्ठी

विश्व जल दिवस 2014, मार्च 22 के अवसर पर एक हिन्दी व्याख्यान एवं राजभाषा संगोष्ठी का आयोजन किया गया। हिन्दी व्याख्यान का विषय "जल उपलब्धता, उपयोग एवं संरक्षण में चुनौतियाँ" था तथा डॉ. बलराज सिंह जी ने मुख्य वक्ता के रूप में इस जटिल समस्या पर विभिन्न पहलुओं पर प्रकाश डाला। आप ने कहा कि जल संरक्षण हेतु आधुनिक तकनीकी के साथ-साथ प्राचीन ज्ञान के समायोजन और बदलते पर्यावरण के साथ संतुलन बनाये रखने की आवश्यकता है। कृषि में जल प्रबंधन तथा जल उपयोग दर को समीति संसाधनों के प्रयोग से कैसे अधिकतम उपज प्राप्त की जाये, यह एक ज्वलंत समस्या है। संरक्षित खेती, टपक सिंचाई, सूक्ष्म सिंचाई, मल्टिचिंग और हाइड्रोजन आदि के माध्यम से कृषियोग्य जल का समुचित उपयोग सुनिश्चित किया जा सकता है। केन्द्र के समस्त वैज्ञानिकों, अधिकारियों एवं कर्मचारियों ने इस परिचर्चा में भाग ले कर जल संरक्षण के महत्वपूर्ण विषय पर हिन्दी में व्याख्यान एवं राजभाषा संगोष्ठी कार्यक्रम को सफल बनाया।



18.11 राजभाषा प्रकोष्ठ, भारतीय कृषि अनुसंधान परिषद्, नई दिल्ली द्वारा निरीक्षण

भारतीय कृषि अनुसंधान परिषद् नई दिल्ली के राजभाषा प्रकोष्ठ में कार्यरत श्री मनोज कुमार सहायक मुख्य तकनीकी अधिकारी ने राष्ट्रीय बीजीय मसाला अनुसंधान केन्द्र, अजमेर का हिन्दी में प्रगामी प्रयोग के लिए दिनांक 31 अगस्त 2013 को निरीक्षण किया तथा वैज्ञानिकों द्वारा हिन्दी में किए जा रहे कृषि प्रसार के कार्यों की सराहना की और कार्यालय सम्बन्धी कार्यों में राजभाषा हिन्दी के अधिकाधिक उपयोग पर विशेष महत्व एवं बल देने की बात कही।

18.12 राष्ट्रीय बीजीय मसाला अनुसंधान केन्द्र, अजमेर-हिन्दी में प्रकाशन

1. वार्षिक प्रतिवेदन 2012-13
2. बीजीय मसाला फसल विशेषांक – फल फूल भारतीय कृषि अनुसंधान परिषद्, नई दिल्ली से राष्ट्रीय बीजीय मसाला अनुसंधान केन्द्र, मेरअज के स्थापना दिवस के अवसर पर
3. स्मारिका . 2014 बीजीय मसाले : किसानों के लिए वरदान
4. कृषक प्रशिक्षण मैनुअल- बीजीय मसाला फसलों के उत्पादन की नवीनतम तकनीकियाँ

18.13 International training under NAIP

Dr. Balraj Singh

Dr. Balraj Singh visited Harvard Kennedy School, Harvard University, Cambridge (MA) USA for one week training on “Leadership and Decision Making: Optimizing Organizational Performances”. The training provided best opportunity to enrich knowledge about the qualities of leadership and decision making abilities in various organizations and different setups. During the training Dr. Balraj Singh discussed and exchange ideas on various aspects of leadership qualities and decision making abilities with the participants who were from various kinds of organizations and setups.



Dr B. K. Mishra

Dr. B.K. Mishra, Sr. Scientist (Microbiology), visited Cornell University, Ithaca, NY, USA for a World Bank funded training program under NAIP component-I of ICAR. He got opportunity to work under supervision of Prof. K.V. Raman, Associate Director, Special Programs, College of Agriculture & Life Sciences, Cornell University, Ithaca USA. He got trained on various aspects of Biosecurity (Horticulture). Biosecurity is a strategic and integrated approach that encompasses the policy and regulatory frameworks (including instruments and activities) for analysing and managing relevant risks to human, animal and plant life and health, and associated risks to the environment. It covers food safety, zoonoses, the introduction of animal and plant diseases and pests, the introduction and release of living modified organisms (LMOs) and their products (e.g. GMOs), and the introduction and management of invasive alien species. In doing so, biosecurity is an essential element of sustainable agricultural development. Interaction meeting with Dr. Hossien El-Nashaar, Consultant at the USDA Animal Plant Health Inspection Service -Plant Protection and Quarantine, Centre for Plant Health Science and Technology, Plant Epidemiology and Risk Analysis Laboratory, Raleigh, North Carolina. He got hands on training on “management of Salmonella and E. coli strains on alfalfa seeds”, Environmental risk analysis (ERA) and how to minimize Pathogen Contamination during Production and Harvest of Fresh Produce. He also visited Department of Food Science & Technology Farm at Geneva campus of Cornell University, New York State Agricultural research experiment station Geneva, New York. He also attended relevant classes and seminar lectures related to his area of specialization and Biosecurity.



Dr. Sharda Choudhary

Dr. Sharda Choudhary underwent foreign training in the Department of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, Arkansas, USA from December-15-2013 to March-15-2014 under the training grant of the World Bank funded NAIP project in the area of “Marker Assisted Selection (Horticulture)” under the guidance Prof. Andy Pereira, Anheuser-Busch Endowed Professor of plant molecular genetics.

During the training programme several technical discussions, lectures, practical and sessions were conducted/organised covering almost all relevant aspects of Marker Assisted Selection with reference to agricultural (rice) and horticultural (Cumin, Fennel, Fenugreek and Coriander) crops. Important areas covered during practical

and technical discussion sessions which include antioxidant potential analysis and development of molecular markers for seed spices and diversity analysis in rice varieties using SSR markers.

Three months training period has provided her with hands-on experience in various techniques in the laboratory, and also an opportunity to interact with researchers at the University of Arkansas (Fayetteville, Stuttgart and Little Rock). This interaction has facilitated her to expand knowledge in plant research and genomics. The knowledge and experience gained during the training period will help her in development of markers in seed spices as this is the basic need for these crops. She learnt the advanced techniques for DNA and RNA in seed spices which will help in genomic analysis studies of seed spices.



Seed Spices Area and Production 2012-13

Spices	Area (ha)	Area Share among Seed Spices %	Production (tonnes)	Production share among seed spices %
Coriander	547421	39.23	527390	42.76
Cumin	593980	42.56	394328	31.97
Celery	4070	0.29	5510	0.45
Fennel	99723	7.15	142995	11.59
Fenugreek	93090	6.67	112845	9.15
Ajwan	35376	2.53	26778	2.17
Dill seed	21900	1.57	23632	1.92
Total	1395560	100	1233478	100.00

Source: Spice Board of India



Annexure II

Item wise export of spice from India (2012-13) (Qty. in tonnes & value in Lakhs)

Item	QTY (Tonnes)	VALUE (Lakhs)	Export quantity % share	Export value % share
Coriander	35,902	20,182.59	19.04	11.83
Cumin	85,602	1,15,306.61	45.40	67.59
Celery	5,171	2,977.26	2.74	1.75
Fennel	13,811	10,466.12	7.32	6.13
Fenugreek	29,622	10,488.12	15.71	6.15
Other seeds (1)	18,442	11,178.60	9.78	6.55
Total	1,88,550.00	1,70,599.30	100.00	100.00

(1) include Bishops weed (ajwanseed), Dill seed, Poppy seed, Aniseed, Mustard etc.
 Source: DGCI&S Calcutta/shipping bills/exporters' returns.



Annexure III

English name	Scientific name	Hindi	Kannada	Malyalam	Tamil	Telgu
Coriander	<i>Coriandrum sativum</i> L.	Dhaniya, Kothamir	Dhaniya, Havija, Kambari, Kottambari	Kothamalli, Kotthampal, Malli	Kottamali, Kothamali	Dhaniyalu, Kotimer, Kotimir, Kustumburu
Cumin	<i>Cuminum cyminum</i> L.	Jira, Jeera, Saphed jira	Jirige	Jeeragam, Jirakam, Nallajirakam	Jiragam	Jilakara, Jilakarra
Fenugreek	<i>Trigonella foenum-graecum</i> L.)	Methi	Mente, Mentya	Uluva, Venthayam	Meti, Vendayam, Vetani	Mentikura, Mentulu
Fennel	<i>Foeniculum vulgare</i> Mill.	Saunf, Saumph	Badesopu, Badasompu, Dodde jirige	Perumjeerak amPerujiraka m, Perum jirakam	Perunjiragam Sohikirai, Sombu	Pedda jilakarra, Sopu
Carrom seed	<i>Trachyspermum ammi</i> [L.] Sprague	Ajwain	Ajamoda, Oma	Ayamodagam	Omam	Omamu, Vamu, Vayu



English name	Scientific name	Hindi	Kannada	Malyalam	Tamil	Telgu
Dill	<i>Anethum graveolens</i> L.	Sowa, Sova	Sabbasigi soppu, Sabbasige bija	Chathakuppa	Sataguppi, Guppai	Shatapushpa mu, Vakataraha
Celery	<i>Apium graveolens</i> L.	Ajmoda	Not available	Not available	Callari	Not available
Nigella	<i>Nigella sativa</i> L.	Kalaunji, Kalonji	Kari jirige	Karinjeeragam, Karuta jirakam	Karunjiragam	Nallajilakarra
Caraway	<i>Carum carvi</i> L.	Shia jeera	Not available	Sajirakam, Sajiragam	Not available	Not available
Aniseed	<i>Pimpinella anisum</i> L.	Vilayati sounf	Lakko sompu	Not available	Anisu, Magambu, Natchattirajiragam	Sompu



English name	Scientific name	Hindi	Kannada	Malyalam	Tamil	Telgu
Mustard	<i>Brassica nigra</i> [L.] Koch	Kali rai, Kali sarson, Lal sarson, Rai, Sarson	Sasive	Kadu, Kadugu	Kadugu	Avalu
Poppy	<i>Papaver somniferum</i> L.	Aphim posta, Khaskhas, Posta	Aphimu, Gasagase	Kaskasu	Casacasa, Kasakasa, Postakkai	Abhini, GasagasaaluP ostukaya
Sesame	<i>Sesamum indicum</i> L.	Til	Acchellu, Ellu, Tila	Chitelu, Ellu, Thilam	Ellu, Yellu	Nuvvulu, Tillu
Parsley	<i>Petroselinum crispum</i> [Mill.] Nyman ex A. W. Hill	Ajmod, Ajmud, Khurasani	Not available	Not available	Not available	Not available
Black Cumin	<i>Bunium persicum</i> [Boiss.] B. Fedtsch.	Shahajira	Shahajirige	Not available	Not available	Not available





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