**Report of 31st National Convention of Agricultural Engineers on Theme: *Engineering Interventions in Doubling the Income of Small and Marginal Farmers by 2022***

| Name of Centre / Overseas Chapter: | Delhi State Centre |
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| Title of Activity: | 31st National Convention of Agricultural Engineers on Theme: ***Engineering Interventions in Doubling the Income of Small and Marginal Farmers by 2022*** | | |
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| Activity under Divisional Board | | Agricultural Engineering Division Board | |
| Date: | Feb 2-3, 2018 | Venue: | Engineers Bhawan, 2, BSZ Marg, New Delhi - 110002 |


Photo of Inaugural Session with banner of IEI

**Report of All India Seminar/Workshop**

Brief Details about the Programme:

The Institution of Engineers (India), Delhi State Centre organized **31st National Convention of Agricultural Engineers** on the theme: ***Engineering Interventions in Doubling the Income of Small and Marginal Farmers by 2022*** during **February 2-3, 2018,** under the aegis of Agricultural Engineering Division, at Institution's premises, New Delhi.

**Shri Narendra Bhooshan**, IAS, Dy. Director General, UIDAI, Govt. Of India was the Chief Guest of the Inaugural function. Hon'ble **Shri Sisir Kumar Banerjee**, President, The Institution of Engineers (India) and **Shri Shyam Khadka**, FAO Representative in India respectively blessed the occasion as Guest of Honour. **Prof. Gajendra Singh**, Former DDG (Engg), ICAR; Former VC, Doon University delivered the key-note address in the Inaugural Function.

Convention started with the lamp - lighting ceremony.

**Shri Devendra Gill**, Chairman, IEI-DSC in his welcome address mentioned that it is desired to double the income of farmers by the year 2022, when the country completes 75 years of independence. If technology, input prices, wages and labour-use could result in per-unit cost savings, then farmers' incomes would rise at a much higher rate than the rate of increase in output. Another very important source of an increase in farmers' income is the relative increase in prices of farm products compared to non-agricultural commodities.

**Mr. Pradeep Chaturvedi**, Chairman of Technical Committee informed in his address stated that Agriculture is central to meeting nutritional needs of India and also remains the largest sector of India's economy as a source of employment. According to the Fifth Annual Employment - Unemployment Survey of the Ministry of Labour and Employment, 45.7% of India's workforce in 2014-15 was employed in agriculture. After two consecutive droughts, the sector has seen a turn around in 2016-17. For the prosperity of large section of India's workforce, it is essential that we sustain this turn around. The Prime Minister of India has set the goal of doubling farmers' income by 2022-23 over that in 2015-16. Achieving the goal would require significantly faster growth in nearly all variables that positively impact farmers' income.

**Dr. H G Kamble**, Convener of the National Convention in his address briefed about the details of various technical sessions.

**Dr. Indramani Mishra**, Head-Division of Agricultural Engineering, ICAR-IARI apprising about the theme of the Convention mentioned that agriculture sector has played significant contribution towards employment and livelihood creation and continued to be the mainstay of India's rural economy. The sector remains crucial for the economy, in order to create a ripple effect on the services and manufacturing sectors, to meet food and nutritional requirements of our population and to contribute to macroeconomic stability.

**Prof. Gajendra Singh**, Former DDG (Engg), ICAR; Former VC, Doon University delivered the key-note address on the occasion. Prof Singh informed that Farm mechanization in India has come a long way during the last 60 years and still there is tremendous scope as it is required in every unit operation of agricultural production, post-harvest, food processing and rural living. Indian farmer is fast adapting farm mechanization than ever before. Farmers, policy makers and developmental agencies now realize that for raising farm productivity at reduced unit cost of production, mechanization is essential. With increasing labour wages and agriculture produce market prices, farmers, specially, the medium and large ones are looking for labour saving devices to remain competitive. As demand for farm mechanization is escalating and it is almost becoming the today's farm necessity, mechanization has come to centre stage with the globalization of world markets. Innovation in farm machinery sector will drive the next phase of agricultural growth in the country. The Govt. of India has been encouraging farm mechanization through different policy interventions and schemes.

Guest of Honour of the function **Shri Sisir Kumar Banerjee**, President of The Institution of Engineers (India) in his address stressed that all round agricultural development with the application of innovations in the domain of Science & Technology has become a paramount necessity. Hon'ble President mentioned that Farming in India is characterized by small and fragmented holdings. It is an occupation in a sector where a large-scale of unemployment and uncertainties are involved at every stage of farm operations. In order to overcome this situation rather doubling the farmers' revenue, there is a need to increase the farm productivity in accordance with market access. There is a roadmap that has been designed by the Govt. in such a way that at least one member in a farm based family may be entirely dependent on the farming with no other occupation. By adopting this mechanism, the person containing to farming family will be more interested in this occupation and the income possibilities will be at higher range so that other dependents in that family may have the choice of doing different kind of jobs. Therefore, the small farmers will be more benefitted using this technique.

**Shri Shyam Khadka**, FAO Representative in India and Guest of Honour of the function in his address informed that Hon'ble Prime Minister of India has set a target for doubling farmers income by 2022 when India completes 75 years of its independence. If the income is to be doubled by the year 2022-23, it will require an annual growth rate of 10.4%. Hon'ble Prime Minister has talked of doubling farmers income and not the agricultural output, mentioned **Shri Shyam Khadka**. If technology, input prices, wages and labour use could result in per unit cost savings then farmers income would rise at a much higher rate than the output. Need for mechanisation of Indian farming has been felt as farmers are migrating to urban areas and more women are taking over farming activities. **Shri Shyam Khadka** stressed that Strong measures will be needed to harness possible sources of growth in farmers income within as well as outside agriculture sector.

**Dr Nutan Kumar Dash**, Chairman, Agricultural Engineering Division Board, IEI in his address stated that Agricultural engineering plays a very vital role in India for changing national economy in future days to come. Our ultimate goal is to contribute our genuine inputs in the sustainable food production to meet the maximum food requirement of the country alongwith raising economy of farming communities/stake holders.

Chief Guest **Shri Narendra Bhooshan** in his address raised concerns over various key-issues that are posing challenges to Food Security. Hon'ble Chief Guest stated the rising population of the country is posing severe threats on the food security of our Country.

On this occasion the Eminent Agricultural Engineers were conferred with **Eminent Engineer Award.**

- **Prof J S Panwar**, Former Head, Division of Agricultural Engineering, ICAR- Indian Agricultural Research Institute, New Delhi;
- **Dr S D Sharma**, Former Professor, Soil & Water Conservation Engineering, College of Agricultural Engineering & Technology, Odisha University of Agriculture & Technology, Bhubaneswar;
- **Dr A P Srivastava**, Former National Coordinator, ICAR- National Agricultural Innovation Project and
- **Dr Ashwani Kumar**, Former Director, ICAR- Indian Institute of Water Management, New Delhi.

On this occasion the Chief Guest also conferred the **Young Engineers Award** presented to:

- **Dr (Ms) A Sangamithra**, Assistant Professor, Department of Food Technology, Kongu Engineering College, Tamilnadu;
- **Dr V Eyarkai Nambi**, Scientist, TOT Division, ICAR- Central Institute of Post-Harvest Engineering and Technology, Ludhiana and
- **Dr Nanje Gowda**, Assistant Research Engineer, University of Agricultural Sciences, Bangalore.

The session ended with a vote of thanks presented by Shri Praveen Kr. Singh, Honorary Secretary, The Institution of Engineers (India)-Delhi State Centre.

## DETAILS OF THE SESSIONS

### Day – 1 (February 2, 2018)

**RATHINDRANATH TAGORE MEMORIAL LECTURE**

**Memorial Lecture by: Dr R C Srivastava**, Vice-Chancellor, Dr Rajendra Prasad Central Agricultural University
Topic: S*aving the Rivers – Role of Agricultural Engineers*

**STATE-OF-THE-ART LECTURE**

**State-of-the-Art Lecture by**: **Dr Indra Mani Mishra**, Head, Division of Agricultural Engineering, ICAR- IARI
Topic: *Agricultural Engineering Technologies for Profitable, eco-friendly and sustainable agriculture*

**TECHNICAL SESSION –I: TECHNOLOGIES FOR SMALL FARM MECHANIZATION**

**SESSION SPEAKERS:**

**Dr Dipankar De,** ICAR- Indian Agricultural Research Institute, Delhi
*Topic: Spatial Farm Power Usage Patterns In the State of Rajasthan*

**Prof Hifjur Raheman,** Indian Institute of Technology, Kharagpur
*Topic: Walking Tractors with Rubber Tracks- An improved Power Source for Farming Operations*

**Dr P K Sahoo**, Principal Scientist, ICAR- Indian Agricultural Research Institute, Delhi
*Topic: Design and Development of Multi-crop Planter for Small and Marginal Farmers*

**Dr Balaji Nandede**, Scientist, Central Institute of Agricultural Engineering
*Topic: Development and comparative evaluation of low cost single and double row hand held vegetable transplanters*

**TECHNICAL SESSION –II: FARM MECHANIZATION FOR INPUT SAVING AND ENHANCING PRODUCTIVITY**

**SESSION SPEAKERS:**

**Dr A P Srivastava,** Former National Coordinator, ICAR- National Agricultural Innovation Project, Delhi
*Topic: Sustainable Rural Livelihood Security in Tribal Districts under NAIP (2007-14)*

**Dr Ajay Kumar Roul**, Scientist, ICAR-CIAE
*Topic: Design and Stability Analysis of High Clearance Multi-Utility Vehicle for Horticultural Crops*

**Dr Abhijit Khadatkar**, Research Scholar, MPUAT, Udaipur, Rajasthan
*Topic: Vegetable Transplanting in India: Status, Scope and Future Prospects*

**Ms. Bhavya Botta**, Research Scholar, IIT, Kharagpur
*Topic: Classification of eggs into cracked and intact grades using Convolutional Neural Networks*

**Dr R Visvanathan**, Professor, Tamil Nadu Agricultural University
*Topic: Entrepreneurship through value addition of millets - A way for doubling farmers' income*

**PRESENTATION BY IEI YOUNG ENGINEERS**

**Dr (Ms) A Sangamithra,** Assistant Professor, Department of Food Technology, Kongu Engineering College, Tamilnadu

**Dr V Eyarkai Nambi, Scientist,** TOT Division, ICAR- CIPHET, Ludhiana

**Dr Nanje Gowda,** Assistant Research Engineer, University of Agricultural Sciences, Bangalore

**Day 2: February 3, 2018**

**TECHNICAL SESSION –III: POST HARVEST ENGINEERING AND VALUE ADDITION FOR FARM PROFITABILITY**

**SESSION SPEAKERS:**

**Dr. Mohammad Tanveer**, Asst. Professor & Head, Tamil Nadu Fisheries University
*Topic: Assessment of a media based aquaponics system: a way towards sustainability*

**Gomathi Nayagam**, Committee Member, Tamil Nadu State Centre
*Topic: Technological Disruptive ideas in Total Valuer Chain of Farming-De Risking-Sustainable Business Models*

**Dr R Manian**, Former Dean, Coimbatore
*Topic: Post harvest Equipment for Value Addition of Selected Spices and Plantation Crops*

**Dr R K Gupta**, Director, Central Institute of Post-Harvest Engineering and Technology
*Topic: Appropriate R & D Innovations in Post production Processing and Value Addition of Food Crops for Sustainable Livelihood at Rural level*

**Er. Pramod Aradwad**, Scientist, Indian Council of Agricultural Research
*Topic: Applications of Thermal Imaging in Post Harvest Operations*

**Dr Laxmikanta Nayak**, Principal Scientist, ICAR – NIRJAFT
*Topic: Product Diversification in Jute & Allied Fibre Sector : Key interventions for enhancing farmer's income*

**TECHNICAL SESSION –IV: ADVANCEMENT IN IRRIGATION FOR ENHANCING WATER PRODUCTIVITY**

**SESSION SPEAKERS:**

**Dr Susama Sudhishri**, Principal Scientist, ICAR- IARI, New Delhi
*Topic: Water Resource Assessment and water harvesting structures response in Biwari cluster watershed*

**Dr K S Reddy**, Principal Scientist (SWCE) & CCPI (ACRP-Water), ICAR- CRIDA, Telengana
*Topic: Rainwater harvesting through on Farm Reservoirs in Semi Arid Regions: Perspectives of Enhancing water productivity and profitability of farmers with crop Diversification*

**Shri R R Mohanty**, Instructor, SVCAET, IGKV, Raipur
*Topic: Rooftop Rainwater Harvesting- A Case Study*

**Dr M K Ghosal**, Professor, CAET, OUAT
*Topic: Studies on Solar Water Pumping Based Micro Irrigation System in Vegetable Cultivation*

**Dr Sumit Pal**, Water Technology Centre, ICAR-IARI, New Delhi
*Topic: Eco-Friendly and decentralise approach for waste water treatment and Impact of treated and untreated waste water irrigation on crop and soil quality*

**Dr Chitranayak Sinha**, Senior Scientist, National Dairy Research Institute
*Topic: Moisture content, hardness, bulk density and textural characterization of paneer prepared by automated pressing technique*

**Mr C K S Parmar**, Chairman, IEI- Kota Local Centre
*Topic: Command Area Development*

**Dr. Jitendra Kumar**, Scientist, (L & WM Engg.), ICAR- VPKAS
*Topic: Development and Field evaluation of automated system for irrigation scheduling under different methods of irrigation*

**Mr Dalip Singh**, President, Association of Energy Engineers, Delhi
*Topic: Optimal Resource Utilization and Productive Use of Energy to Enhance Farmers Income New opportunities for enriching India's rural economies*

## VALEDICTORY SESSION

Valedictory Session was chaired by **Dr. Nutan Kumar Dash**, Chairman, AGDB-IEI. **Shri Devendra Gill**, Chairman, Delhi State Centre-IEI delivered welcome address. He welcomed the participant and young professionals for their active participation in the convention. **Shri Pradeep Chaturvedi**, Chairman, Technical Committee apprised about the list of recommendations identified during the two days event. **Dr. Nutan Kumar Dash**, Chairman, AGDB-IEI in his address commended effort of Delhi State Centre in making event successful. To conclude the Convention a Vote of Thanks was proposed by **Shri Praveen Kr. Singh**, Honorary Secretary, IEI-DSC. He also thanked the sponsors and supporters for their support to the Convention as well as authors who have contributed their papers for the publication and speakers in various sessions.

## RECOMMENDATIONS

1) Mechanisation of horticultural plantation crops/ Medicinal and aromatic plants /vegetables crop cultivation/intercropping farming should be given priority to double the farmers income.

2) Vegetable planner already developed and vegetable transplanted already developed at ICAR-IARI, Central Institute of Agricultural Engineering, Bhopal hold a promise for its adoption on marginal farms. These machines should be extensively evaluated, modified if required and taken up for commercialisation. Development of such machines should be undertaken at need based/location specific at various states. For which field application and trials at farmers field/farms may be taken up location specific/ need based/suitability through extension services/developers/researchers together at various states.

3) Based on mechanisation status, customised mechanisation policy for different region/states should be developed and implemented on priority.

4) Farmers/ stakeholders/ beneficiaries should be identified using Aadhar number, which should me compulsory for all Universities/ Research Institutes/ State machineries. For which Union Govt. may prepare one standing instruction to incorporate in Action Plan of their various schemes etc. at the time of approval and oversee/ verifications after execution and at the time of submission for utilisation certificate to get more funds.

5) Gap between Extension Departments/ Research Institutes/ Universities/ Manufacturers/ producers societies/ NGOs/ farmers/ stakeholders/ beneficiaries should be bridged properly for which incorporation/ revised/ new guidelines/ procedure is to be imposed/ thought of by Union Govt.

6) Women scientists/ women researchers/ women academicians/ women extension experts/ women beneficiaries/ women stakeholders/ women producers may be identified in every states/ union territory and short listed/ promoted to inter act on various subjects location specific/ need based as per need of the day for new innovative practices/ procedures at one created platform at various places frequently which will double the farmers income. This should be planned properly to incorporate in every schemes/ Guidelines/ procedures and reviewed frequently by the directive/ funding agencies.

7) Integrated Farming System (IFS) based models for enhanced income should be developed and adopted for different regions/states of the country. Market linkages and policy for post project sustainability of various programmes was emphasized.

8) Mechanisation should be looked as a source of livelihood not merely time and labour saving device.

9) Number of machines and technologies such as multi-utility vehicle for orchards/plantation crops etc. are needs to be developed. These machines should be brought to logical conclusion leading to its commercialisation. No effort should be left midway.

10) Stable burning solution may be thought of by research Institutes/ Universities/ Govt./ IEI at location specific with the help of experts/ scientists/ engineers at one created platform.

11) Use of robotics/ remotes ensuing/ unmanned vehicles, automation, e-agriculture may be planned as per location specific research to develop for small and marginal farmers and to be popularised by various extension agencies for the use by farmers/ stakeholders/ producers / others.

12) Use of solar energy, non-conventional energy, wind energy etc. should be planned through guidelines/ schemes for extensive use by the small and marginal farmers to double their income.

13) To enhance/ double the income, Skill Development Training may be planned and imparted on fabrication and repair of small tools and machines, repair of tractors/ power tillers of various makes & models; pump sets, electric motors, laser levellers, vermi compostpits, bamboo handicrafts, construction of various god owns using local materials for storage of various produces for longer time, value addition of forest produce etc. For these rural/ urban artisans may be given due

training/ shot-term courses/ certificate courses through various master trainers/ experts/ scientists on participatory basis only on identification of various areas as per need based/ location specific. These should be carefully planned after assessing the needs/location/region specific so as to provide adequate income to rural/ urban various categories of artisans, skill workers, semi skilled workers entrepreneurs by the created platform of IEI at various states to assist/ advise to the technically as advisors for doubling the farmers income.

14) Processing & value addition of agri-produce through cottage/small scale industries may be given priority for financial and regulatory support.

15) In primary processing cleaning and packing of their produces should be strengthen more and vigorous awareness trainings on local languages may be planned /reviewed properly, which will reduce distressed sale of farmers/ stakeholders.

16) Bankable business models may be prepared for processing and value addition, cold chain practices in rural/ urban areas and Gap between bankers & Govt. By creating frequent awareness planned programmes/ close monitoring etc.

17) Modern grain handling and high cost/ medium cost/ low cost storage facilities may be created. For low cost storage facilities various areas may be identified at various regions/ states/ location specific for which urban/ rural artisans may be identified and trained with certificates to help on various races. Guidelines/ procedure may be prepared imposed through Union Govt., Ministry of Agriculture and farmers welfare department to all state Govt., research Institutes, Universities, ICARs, IARI, CIA etc.

18) Setting up of Units for minimal processing of fruits and vegetables to be encouraged.

19) Utilisation of natural fibres for packaging and storage may be encouraged. Action plan may be strengthened more to cover up location specific/need based areas if the country.

20) An all India study may be commissioned to evaluate the level of processing of agri-produce by organised and unorganised industries in the country.

21) Agricultural waste management should be thought for reutilisation by the farmers/ beneficiaries/ stakeholders.

22) Proper design of rain water harvesting structures need to be considered for larger life and sustainability.

23) In situ moisture conservation technologies like, mulching, ring basins, lesser land levelling, integrated land and water management systems must be promoted.

24) On farm reservoirs with integrated farming system with portable irrigation system must be implemented in package made under PMKSY for doubling the income along with improved water productivity.

25) Waste water technologies must be promoted for use in irrigation of dry lands with micro-irrigation.

26) Alternate land use system with moisture conservation technologies will improve the clean water productivity and sustainability.

27) Precision micro-irrigation system with small scale automation will improve the water saving and water productivity & it must be promoted under micro-irrigation projects.

28) Energy use must be optimised to have the maximum benefit of overall system in forest and environment carbon footprints.

29) Establishment of Directorate of Agricultural Engineering with availability of adequate expert of various fields/ extension services to popularise various innovative practices of Agricultural Engineering in every state of the country to promote the Agricultural Engineering for enhancing the farmers' income doubling the income by 2022.

30) Awareness' trainings should be taken seriously through nongovernmental agencies through PFDC of the concerned locations with identified/ short listed real experts having original work contributions and expertise because it is one of the innovative practice not fully accepted by various farmers/stake holders/producers societies of various states of India.

31) Research in the field of micro irrigation is more in various research institutes and universities but not transmitted/ transferred the technology fully to beneficiaries/ farmers for their actual practice. So the gap may be bridged with planned manner with close monitoring.

32) Along with loan, subsidy should be also routed through bankers so that it will reduce wrong reporting for utilisation and

farmers/ beneficiaries will get full benefit out of it.

33) Identified experts may be shortlisted those are having original contribution and ample of knowledge involvement in this field to advise and operate this innovative high technology at the farmers field on location specific.

34) Legislature act may be thought of imposing on various collectors at various Districts/ Taluka for implementation and popularise of this scheme as per location specific. Telengana is already formulated act, legislation and passed in their assembly, implemented which may be relooked to be planned as per need of the day for uniformity by the Ministry of Agriculture and family welfare department.

35) Evaluation after execution and after sales maintenance, review, used of standard equipments/ materials one uniform procedure should be strengthened seriously identifying quality test, water test, design study/test agencies at various states for their participation and involvement to promote this technology.