

Report of
International Training
on
**“Management of Technology and Extension for Soil Testing
based Advisory Services to Farmers”**

**for Participants of African and Asian Countries Under
Feed The Future India Triangular Training (FTF ITT)**

In Collaboration with
**National Institute of Agricultural Extension Management (MANAGE),
Hyderabad**

Date: 30th January – 13th February, 2018

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(An ISO-9001:2015 (QMS) Certified Institute)

CONTENTS

S. No.	Title	Page No.
1	Introduction	3
1.1	About Feed The Future – India Triangular Training	3
1.2	Background about Training	3
1.3	About Host Institute (ICAR-IISS)	3
1.4	Main Objectives of the Training	4
1.5	Key Focus Areas of the Training Module	5
2	List of Participants	6
2.1	Country wise and Gender wise Participation	9
3	Arrival of Executives and Ice Breaking	11
4	Inauguration of the Programme	13
4.1	Some of the Inaugural Function Events	14
4.2	Some more Glimpse during Inauguration	17
5	Day Wise Program Schedule	18
5.1	Some of the Moments During Various Classes	23
5.2	Some of the Snaps During Study Visits	29
5.3	Some of the Joyous Moments During the Training Program	35
6	Blissful Moments During Cultural Evening	38
7	Performance of Participants	45
7.1	Pre & Post Test Evaluation Scores	41
8	Evaluation & Feed Back	41
8.1	Evaluation Scores of Participants for Different Sessions	45
8.2	Country wise Overall Grading about the Training	48
8.3	Grading of Sessions of the instructors	49
9	Valedictory Session	60
10	Back at Work Plan	64
11	Final Meeting and Thanksgiving by the Executives	68

1. INTRODUCTION

1.1. About Feed The Future – India Triangular Training

Feed the Future India Triangular Training (FTF ITT) program is a joint effort of USAID and Govt. of India for fostering triangular cooperation for adapting technological advances and innovative solutions to address Food Security Challenges in Africa. The programme is expected to enable India and the U.S. to share improved agricultural technologies worldwide, helping countries in Africa and Asia revolutionize their agriculture practices and ultimately, improve global nutrition levels. The FTF-ITT program was launched on 25th July, 2016 at New Delhi.

This program aims to build capacities of 1400 agricultural professionals from 17 partner countries of Africa and Asia by 2020. The National Institute of Agricultural Extension Management (MANAGE), Hyderabad is implementing the program in collaboration with various Subject Matter Institutions.

1.2. Background about Training

The major challenges in 21st century are food security, environmental quality and soil health. And, soil testing is the key for monitoring the soil health. It also advises the farmer on the fertilizers and their quantities he should apply, and also the soil amendments to be undertaken, so as to realize optimum yield. Scientific fertilizer nutrient management based on soil fertility parameters is very important for developing countries of Asia and Africa as often they do not have fertilizer manufacturing capacities and appreciable amount of foreign exchange is spent every year on import of fertilizers. This imposes further burden on the Governments as fertilizers being a costly input need to be subsidized because farmers cannot afford to bear the actual cost. Use of fertilizer nutrients on scientific basis is expected to economize on fertilizer use, reducing the consumption in the areas where soil fertility is build up and increasing its use in the areas where it is required. This would also ensure an increased productivity on sustainable basis.

Equally important is the management of soil testing technologies and their extension as these technologies and advisories are often idiosyncratic in nature depending on the farmers' resourcefulness and other local conditions. India has had a successful experience of preparation and distribution of soil health cards to more than 140 million farmers in the country. In view of this and also based on the demand analysis from the participating countries the topic "Management of Technology and Extension for Soil Testing based Advisory Services to Farmers" was decided for the training.

1.3. About Host Institute (ICAR-IISS)

ICAR-Indian Institute of Soil Science (ICAR-IISS), Bhopal is a premier institute under the Indian Council of Agricultural Research, New Delhi. It is the only institution in the country dedicated exclusively to research on soils. The institute was established in the year 1988 at Bhopal with the mandate "To provide scientific basis for enhancing

and sustaining productivity of soil resources with minimal environmental degradation”. The prime objectives of the institute consist of “basic and strategic research on soils especially physical, chemical and biological processes related to management of nutrients, water and energy; development of advanced technologies for sustainable input management; and development of database repository of information on soils in relation to quality and productivity”. The institute, over the last 29 years, has generated several state-of-the art technologies of soil management. Some of the prominent technologies include Integrated Plant Nutrient Supply (IPNS) System for Soybean-Wheat Cropping System; Mechanical Harvest Borne Wheat Residue Management; Micro and Secondary Nutrients Recommendation for Indian Soils; Technologies of Enriched Compost Production; Rapid Composting Techniques; Technologies For the Use of Biofertilizers; Synthesis of Nano-Rock Phosphate; Oleoresin Coated Urea Fortified with Nano-particles; Conservation Tillage for Soybean-Wheat Cropping System; Broad Bed Furrow (BBF) System; Organic Farming Practices for Various Crops and Cropping Systems; Bioremediation of Heavy Metal Contaminated Sites; GIS based Soil Fertility Maps of Different States; Online Fertilization Recommendation System; Model for Predicting Soil C and N; and Software for Evaluating Municipal Solid Waste (MSW) Compost.

Recently, the institute has played a prominent role in the Central Government Soil Health Card Scheme to provide soil health card to more than 140 million farmers in the country. The institute has four All India Coordinated Research projects (AICRP) having 84 centers located in different parts of the country. The AICRPs dealing in the assessment of soil health and soil test based balanced fertilizer recommendations are AICRP on Soil Test Crop Response Correlations and AICRP on Micro- and Secondary Nutrients and Pollutant Elements in Soils and Plants. Through these AICRPs the institute has access to remote areas in the country. The institute has also developed a mini lab (Mridaparikshak) of soil health assessment. Mridaparikshak is a digital, mobile, quantitative, rapid, affordable and easy to operate mini laboratory, for the estimation of soil health parameters, fertilizer recommendations, and generation of soil health cards. It gives quantitative results of the soil health parameters that can be disseminated on real time basis to the farmers' mobile through Short Message Service (SMS). The institute closely work with farmers and has presently adopted 55 villages, frequently visited by institute Scientists. The present international training programme is planned to impart an insight to soil testing, soil health, the available technologies of soil test based balanced fertilizer applications and their dissemination to farmers.

1.4. Main Objectives of the training







- ❖ To introduce the concept of soil testing, soil health, and soil test based balanced fertilizer management.
- ❖ To apprise the participants about the basic requirement of establishing a soil water tissue testing laboratory.
- ❖ To impart skills on new and innovative soil health management strategies for sustainable agriculture leading to conservation of natural resources in different cropping systems.

- ❖ To impart training on soil analysis methods, obtaining results and their interpretation.
- ❖ To introduce the concept of farmers' participatory diagnosis of constraints and opportunities (PDCO) survey for soil fertility management in relation to crop production.
- ❖ To introduce the use of internet and mobiles in the dissemination of soil test based fertilizer recommendations, also the soil fertility maps and fertilizer nutrient recommendations based on these maps.
- ❖ Visit to National, International Institutes and farmers' fields to get exposure on issues and strategies related to soil testing and soil health management and extension.
- ❖ Identify country specific problems and their management options in the development and dissemination of soil test based nutrient management.

1.5. Key Focus areas of the training Module

- ❖ Soil, crop, and climate specific soil test based nutrient recommendation technologies.
- ❖ Concept of Integrated Plant Nutrient Supply (IPNS) system and the IPNS technologies generated by the institute and their dissemination.
- ❖ Participatory Diagnosis of Constraints and Opportunities (PDCO) Survey.
- ❖ On farm and off farm rapid compost generation technologies for the improvement of soil health.
- ❖ Demonstration and hands on training on Mridaparikshak mini lab and its role in quick dissemination of soil test results to farmers.
- ❖ Exposure to result and method demonstration in farmers' fields, an institute experience.
- ❖ Geo-referenced soil fertility maps, their generation and use in balanced fertilizer applications.
- ❖ Interpretation of soil water analysis report. Exposure to on-line soil test based fertilizer recommendation system Government soil. health card scheme: An Indian experience in the dissemination and impact of soil health cards.
- ❖ About 50% time shall be devoted in lecture-cum-interaction sessions, 40% time on hands on practices in laboratories and field demonstrations, 10% time for institutional visits and interaction.

2. LIST OF PARTICIPANTS

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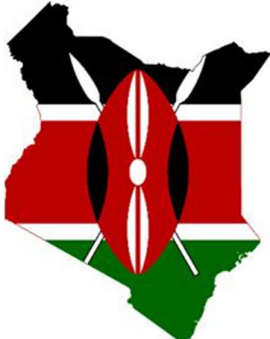


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**2.1. Country wise and Gender wise participation**

S. No.	Country	No. of Participants
1	 Afghanistan	 3
2	 Ghana	 3
3	 Kenya	  2 1

4	 <p>Liberia</p>	 <p>3</p> <p>1</p>
5	 <p>Malawi</p>	 <p>2</p> <p>2</p>
6	 <p>Myanmar</p>	 <p>1</p> <p>1</p>
7	 <p>Uganda</p>	 <p>2</p>

3. ARRIVAL OF EXECUTIVES AND ICE BREAKING

The training programme started on January 30, 2018. The executives were welcomed in the institute with garlanding by the members of the registration committee. This was followed by the ice breaking session where the executives and the faculty members first introduced themselves followed by discussion on the training objectives, expectations from the training programme. The executives also explained about the soil testing services and extension systems in vogue in their countries. The ice breaking session was also attended by Dr. A Amarendra Reddy, Director (Monitoring and Evaluation), National Institute of Agricultural Extension Management (MANAGE), Hyderabad. In the afternoon the lecture of Dr. Ashok K Patra, Director was held followed by visit of the executives to different Divisions/sections of the institute. Some photographs are given below:



Arrival of executives on January 30, 2018



Welcome of executives



An overview of ice breaking session



Dr. Ashok K Patra, Director addressing the executives during ice breaking



Some delightful moment during ice breaking



Interaction among executives during tea



Executives in the Division of Soil Physics of ICAR-IISS



Executives learning the functioning of MIR in the Division of Soil Physics



Executives in the Division of Soil Biology



ICP being demonstrated to executives in the Division of Environmental Soil Science

4. INAUGURATION OF THE PROGRAMME

The training program was inaugurated on 31st January 2018 by the Chief Guest Prof. Vijay Singh Tomar, Former Vice Chancellor, *Jawaharlal Nehru Krishi Vishwa Vidyalaya*, Jabalpur in presence of Dr. Ashok K. Patra, Director, ICAR-IISS, Bhopal. Other dignitaries present in the inaugural session were Dr. A. Amrendra Reddy, Director (M&E), MANAGE; Sh. B.M. Sahare, Addl. Director (Agri.), Govt. of Madhya Pradesh; Dr. A. K. Biswas, Head, Div. of Soil Chemistry & Fertility and Dr. Pradip Dey, Project Coordinator, AICRP on STCR. The details of the inaugural programme are given below:

10:00 am - 10:05 am	Lighting of the Lamp & ICAR Song	
10:05 am -10.10 am	Welcome and Remarks	Dr. Sanjay Srivastava Coordinator, FTF ITT, ICAR-IISS
10:10 am - 10:20 am	Welcome and Introduction to the Program	Dr. Ashok K. Patra Director, ICAR-IISS
10:20 am - 10:30 am	Introduction	All Executives
10:30 am - 10:40 am	Opening Remarks and introduction to Feed The Future India Triangular Training (FTF ITT) Program	Dr. A. Amarender Reddy Director (Monitoring and Evaluation) National Institute of Agricultural Extension Management (MANAGE), Hyderabad
10:40 am - 10:50 am	Remarks	Dr. A. K. Biswas Head, Division of Soil Chem. & Fertil., ICAR-IISS
10:50 am - 11:00 am	Address	Shri B. M. Sahare Additional Director of Agriculture Department of Agriculture, MP
11:00 am - 11:20 am	Inaugural Address	Prof. Vijay Singh Tomar Former Vice Chancellor, JNKVV, Jabalpur
11:20 am – 11:25 am	Vote of Thanks	Dr. Pradip Dey Project Coordinator, AICRP on STCR, ICAR-IISS
11:25 am-11:30 am	Group Photograph	
11:30 am	Hi-Tea	

Prof. Vijay Singh Tomar, Former Vice Chancellor, *Jawaharlal Nehru Krishi Vishwa Vidyalaya*, Jabalpur was the Chief Guest who stressed upon the importance of soil and water and highlighted the expertise India has gained in the management of soil health. He also emphasized on cooperative learning and said that the participating countries

from Asia and Africa have great opportunity to get benefitted from the experience of ICAR-IISS in the management of soil health and development of soil health cards.

Dr. A. Amrendra Reddy, Director (M&E), MANAGE expressed his satisfaction about the nitty-gritty of the training being taken care by the institute. He highlighted the role of MANAGE, Hyderabad in operationalization of the training programme and how the programme addresses to eradicate the problem of hunger in the Third World countries. Sh. B.M. Sahare, Addl. Director (Agri.), Govt. of Madhya Pradesh talked about the soil health card scheme and extension activities of the State Government. Before this, in his welcome address Dr. Ashok K. Patra, Director, ICAR-IISS appraised the gathering about the achievements of the Institute in the field of soil test based nutrient management. Dr. A. K. Biswas, Head, Div. of Soil Chemistry & Fertility highlighted the specific soil conditions and the soil management strategies of the participating countries. Earlier, Dr. Sanjay Srivastava, Principal Scientist and coordinator of the training at ICAR-IISS briefed about FTF ITT and the importance of the training programme in addressing the issues of soil test based balanced fertilizer application. Dr. Pradip Dey, Project Coordinator, AICRP on STCR proposed vote of thanks.

4.1. Some of the inaugural function events



Inaugurating the function by lighting the lamps by Prof. Vijay Singh Tomar, Former Vice Chancellor, JNKVV, Jabalpur



Inaugurating the function Dr. Ashok K. Patra, Director, ICAR-IISS



Inaugurating the function by Dr. A. Amarendra Reddy, Director (Monitoring and Evaluation), MANAGE, Hyderabad



Dr. Ashok K. Patra, Director, ICAR-IISS welcoming Prof. Vijay Singh Tomar



Dr. Ashok K. Patra welcoming Shri B. M. Sahare, Addl. Director (Agri.), Govt. of Madhya Pradesh



Dr. Ashok K. Patra welcoming Dr. A. Amarendra Reddy



Prof. Vijay Singh Tomar, Chief Guest addressing the audience



Executives Introducing themselves during inauguration



Releasing of Course Compendium



Group Photo after inaugural Function

4.2 Some more Glimpses during Inauguration





5. DAY WISE PROGRAMME SCHEDULE

Time (Hrs.)	Session	Resource Person
Day-1: 30/01/2018 (Tuesday)		
1000 - 1100	Registration	Dr. Kollah Bharati, Pr. Sci. Dr. Asha Sahu, Sci. Dr. Shinogi, K. C., Sci. Dr. Abhay Shirale, Sci. Dr. B. P. Meena, Sci. Dr. S. Bhattacharya, Sci. Dr. Sonalika Sahoo, Sci.
1115 - 1200	Ice Breaking – Discussion on the proposed programme, content, suggestions, field visits, lodging and boarding etc.	Dr. Ashok K. Patra, Course Director Dr. Pradip Dey, PC, STCR Dr. A. K. Biswas, Head, S.C. & F. Dr. S. Srivastava, Pri. Sci. Dr. Pramod Jha, Pri. Sci. Dr. Shinogi, K. C., Sci.
1200 - 1245	Interaction with participants on respective country report vis-à-vis course content.	

1245-1315	Pre Training Test	Dr. Sanjay Srivastava Dr. Pramod Jha
1315 – 1415	Lunch Break	
1415 – 1530	Importance of soil health for sustaining crop productivity	Dr. Ashok K. Patra, Director
1545 – 1715	Visit to Divisions/Units/laboratories, Library, Museum, AKMU of the institute	Dr. Sanjay Srivastava Dr. Pramod Jha
Day-2: 31/01/2018 (Wednesday)		
1000 - 1130	Inaugural Function	As per enclosed Programme
1145 – 1315	Soil Test Crop Response (STCR) in India: Concept, methodology, achievements and extension	Dr. Pradip Dey
1415 -1530	Balanced nutrient management is an Eco-friendly key to sustain long term soil productivity	Dr. Muneshwar Singh, Project Coordinator, LTFE
1545 – 1730	Extending soil test results in farmers' field: Follow up trials and Front-line demonstrations including farmers' day: Methodology, Results and Impact	Dr. Shinogi K. C. / Dr. S. Srivastava
Day-3: 01/02/2018 (Thursday)		
1000 - 1130	Biofertilizer technology and extension in India: Theory	Dr. D.L.N. Rao, Emeritus Scientist, ICAR-IISS, Bhopal
1145 – 1315	Practical exercise/experience on bio-culture	Dr. D.L.N. Rao, Emeritus Scientist, ICAR-IISS, Bhopal
1415 -1545	Soil fertility management aspects for sustainable agriculture	Dr. Sanjay Sharma Associate Professor Department of Soil Science and Agricultural Chemistry RSKVV, College of Agriculture, Indore, MP
1600 – 1730	Rapid Composting Techniques, their extension and adoptability by farmers	Dr. M. C. Manna, Head, Division of Soil Biology
Day-4: 02/02/2018 (Friday)		
1000 - 1130	Soil Fertility Maps as an aid to Fertilizer recommendations to farmers: Concept, and Methodology	Dr. Pradip Dey
1145 – 1315	Conservation Agriculture: Indian Perspective	Dr. A. K. Biswas, Head, Division of Soil Chemistry and Fertility
1415 -1545	Micro and secondary nutrients in agriculture: Analysis & interpretation of results, and nutrient recommendations	Dr. A. K. Shukla, Project Coordinator, AICRP on MSN

1600 -1730	Practical experience on micronutrients analysis, micronutrient mapping and its use in nutrient recommendations	Dr. A. K. Shukla/Dr. Sanjib K. Behera, Sr. Scientist, AICRP on MSN
Day-5: 03/02/2018 (Saturday)		
1000 - 1130	<i>Mridaparikshak</i> : A mini lab for the estimation of soil fertility parameters and preparation of soil health cards and establishment of SWTL	Dr. Sanjay Srivastava/ Dr. Ashok K. Patra
1145 – 1315	Practical on <i>Mridaparikshak</i> mini lab: Estimation of organic C, and available micronutrients	Dr. Pramod Jha/Dr Abhay Shirale
1415 -1730	Field visit: Visit to farmers' fields and <i>Soya Choupal</i> : Demonstration of vermicomposting, organic farming technologies in farmers' fields	Dr. A. B. Singh/Dr. Sanjay Srivastava/Dr. Pramod Jha
1900-2100	Cultural Evening	All Staff, executives, and artists
Day-6: 04/02/2018 (Sunday): Visit to monuments depicting history and culture of India: Tribal Museum (<i>Jan Jatiya Sangrahalaya</i>), <i>Indira Gandhi Manav Sangrahalaya</i> and Lake		
Day-7: 05/02/2018 (Monday)		
1000 - 1315	Visit to ICAR-CIAE, Technologies and extension activities of ICAR-Central Institute of Agricultural Engineering	Dr. P. C. Bargale, Head, ICAR-CIAE
1415 -1545	Panel discussion on soil testing advisory services to farmers	Dr U P S Bhaduria, Joint Director (Ext.), Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya (RVSKVV) Dr. Sanjay Srivastava Dr. Brij Lal Lakaria Dr. Pramod Jha
1600 – 1730	Soil and nutrient management under protected agriculture	Dr. K. V. Ramana Rao, Principal Scientist, ICAR-CIAE
Day-8: 06/02/2018 (Tuesday)		
1000 - 1130	New vistas of Soil Analysis/Testing with special emphasis on Infrared spectroscopy	Dr. K. M. Hati, Pri. Sci., ICAR-IISS, Bhopal
1145 -1315	Nano fertilizers: Production, efficiency of utilization and possibilities of its application in farmers' fields	Dr. Tapan Adhikari, Pri. Sci., ICAR-IISS
1500 – 1730	Visit to Madhya Pradesh Department of Agriculture: Government schemes, fertilizer management and extension activities of the state of Madhya Pradesh and interaction with state department officials, panel discussion (Accompanying persons from ICAR-IISS: Dr. Sanjay Srivastava and Dr. Pramod Jha)	Dr. M. L. Meena, Director of Agriculture, M.P., India, Dr. B. M. Sahare, Additional Director of Agriculture, M.P., India and other staff of Department of Agriculture, M.P., India

Day-9: 07/02/2018 (Wednesday)		
1000 - 1130	Development of Leaf Colour Chart for Nitrogen management	Dr. R. Elanchezian, Pri. Sci.
1145 – 1315	Diagnosing nutrient deficiency symptoms in standing crops	Dr B. L Lakaria, Pri. Sci.
1415 -1545	Farmers' friendly rapid techniques for assessment of physical parameters of soil health	Dr R. S. Chaudhary, Head, Division of Soil Physics
1600 – 1730	Efficient management of MSW for enhancing fertilizer efficiency and soil health	Dr. S. S. Khanna, Former Vice Chancellor, Narendra Dev University of Agriculture & Technology, Faizabad and Advisor of erstwhile Planning Commission
Day-10: 08/02/2018 (Thursday)		
1000 - 1130	Participation of Executives in National Conference on Organic Waste Management for Food and Environmental security	Course Director and Co-course Directors
1145 – 1315	Carbon sequestration: its importance and management	Dr Pramod Jha, Pr. Sci.
1415 -1545 HRS	Phytoremediation of soils contaminated with heavy metals	Dr. S. Ramana, Pri. Sci., Environmental Soil Science, ICAR-IISS, Bhopal
1600 – 1730	Soil and water management: achievements of natural resource management division of Indian Council of Agricultural research	Dr. S. K Chaudhary, ADG (SWM), NRM, ICAR
Day-11: 09/02/2018 (Friday)		
1000 - 1315	Visit to ICAR-National Institute of High Security Animal Diseases, Bhopal	Dr. Murugkar, Principal Scientist, ICAR-NIHSAD
1415 - 1730	Field visit: Visit to organic growers/farmers in Vidisha followed by visit to Buddhist monument, Sanchi, Vidisha	Dr. Sanjay Srivastava
Day-12: 10/02/2018 (Saturday)		
0800-1315	Government Soil Health Card Scheme for balanced fertilizer application and On-line fertilizer recommendation system	Dr. Pradip Dey
1415 -1545	Practical exercise on the preparation and interpretation of soil health card	Dr. A K Vishwakarma, Pri. Sci. / Pradip Dey
1415 -1545	Integrated Nutrient Management: Experience in farmers' fields	Dr. K. Sammi Reddy, Director, ICAR-CRIDA, Hyderabad
1600 – 1730	Climate change impact on nutrient acquisition. Visit to Open Top Chamber (OTC)	Dr. N. K. Lenka, Pri. Sci.

Day-13: 11/02/2018 (Sunday)-		
1000 - 1130	Soil fertility mapping using QGIS free software	Dr. Sanjay Srivastava
1145 – 1315	Soil Testing for pollutant and heavy metals and their remediation	Dr. J. K. Saha, Head, Division of Environmental Soil Science (ESS)
1415-	Homework and Reading – Preparing for Country Report and Back at work Plan	
Day-14: 12/02/2018 (Monday)		
1000 - 1130	Nitrogen and Phosphorus: Key elements in soil fertility, analysis, interpretation and best management practices	Dr. A. K. Biswas
1145 – 1315	Best management practices for sustaining soil quality	Dr. S. Kundu, Principal Scientist, ESS
1415 -1730	Back at Work Plan presentation by executives	Dr. Ashok K. Patra Dr. S. Srivastava Dr. Pradip Dey Dr. A. K. Biswas Dr. Pramod Jha Dr. Shinogi, K. C.
Day-15: 13/02/2018 (Tuesday)		
1000 - 1130	Valedictory function	All Staff
1145-1215	Post Training Test	Dr. Sanjay Srivastava Dr. Pramod Jha
1215-1315	Back at Work Plan presentation by executives Contd..	Dr. Ashok K. Patra Dr. S. Srivastava Dr. Pradip Dey Dr. A. K. Biswas, Dr. Pramod Jha Dr. Shinogi, K. C.
Evening	Departure of executives started and continued till the morning of 15 Feb.	

The details course material for each lecture was prepared and given to each participants which is enclosed with this report.

5.1 Some of the Moments during Various Classes













5.2. Some of the Snaps During Study Visits



While visiting the organic farming fields of adopted progressive farmer in Mugaliahat village



Executives observing the vermicomposting technique in Mugaliahat village



Executives-Scientists-Farmers interaction in Parwalia village



While observing drip fertigation technique in farmer's polyhouse



Executives having hands on experience on Mridaparikshak mini lab of soil testing



Dr P C Bargale, Head, Extension Division, ICAR-Central Institute of Agricultural Engineering apprising the executives on the technologies and extension activities of ICAR-CIAE



Observing Farm Implements during visit to ICAR-CIAE



During Library visit



While visiting Division of Soil Physics, ICAR-IISS



Executives in the State Department of Agriculture, Government of Madhya Pradesh, Bhopal



Dr. V. P Singh, Director ICAR-National Institute of High Security Animal Diseases (ICAR-NIHSAD) addressing the executives during their visit to the institute



Understanding animal feed technology while visiting ICAR-NIHSAD

5.3 Some of the Joyous Moments During the Training Programme







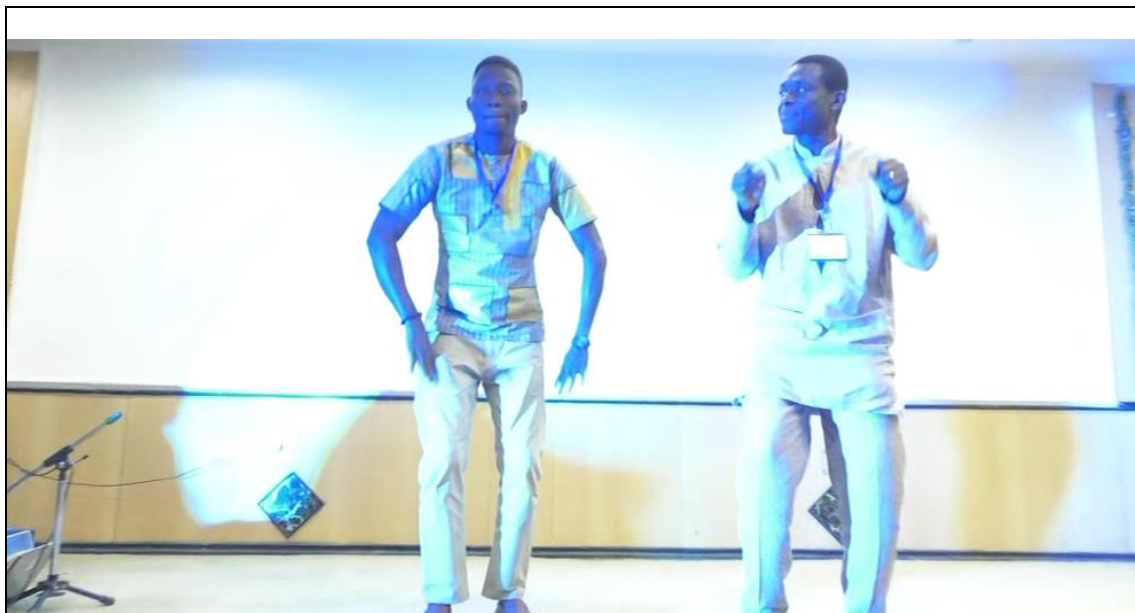


6. BLISSFUL MOMENTS DURING CULTURAL EVENING















7. PERFORMANCE OF PARTICIPANTS

7.1 Pre & Post Test Evaluation Scores

S. No.	Name	Pre Test Marks (Maximum 50)	Post Test Marks (Maximum 50)	% Increase from the Pre Test Score
1	Asadullah	14	17	21
2	Mathias Wafula Mukhone	25	28	12
3	Ghulam farooq Jonbish	20	21	5
4	Samuel Yao Adzivor	20	21	5
5	Tuchitech Hawonga	08	34	325
6	Jehu Prosper Banneyco	19	35	84
7	Bobby W. Chayea	17	25	47
8	Mphatso Prince Chodzi	19	21	11
9	Aung Aung khant	09	22	144
10	Omuron Geoffrey	35	36	3
11	Amandrua Ronald	21	31	48
12	Lindah Kamtogo	24	25	4
13	Mujahid Shagiwal	18	19	6
14	Maima D. Sirleaf	15	24	60
15	D. Wilson Solobert	21	25	19
16	Amissi Singo	22	26	18
17	Khin Mar Myo	26	36	38
18	Sampson Kwesi Dorcoo	28	28	0
19	Geoffrey Kwaku Honu	17	22	29
20	Bethuel Oduor Omolo	30	30	0
21	Jenifer bett	22	25	14
	Mean	20.5	26.2	28.1
	Range	8-35	17-36	0-325
	Average % Marks	41%	52.4%	

- Overall increase in performance = 28% from the Pre Test Score
- Increase in performance ranges from 0-325% in individual cases.
- Phenomenal increase in the performance of six executives.

8. EVALUATION AND FEEDBACK

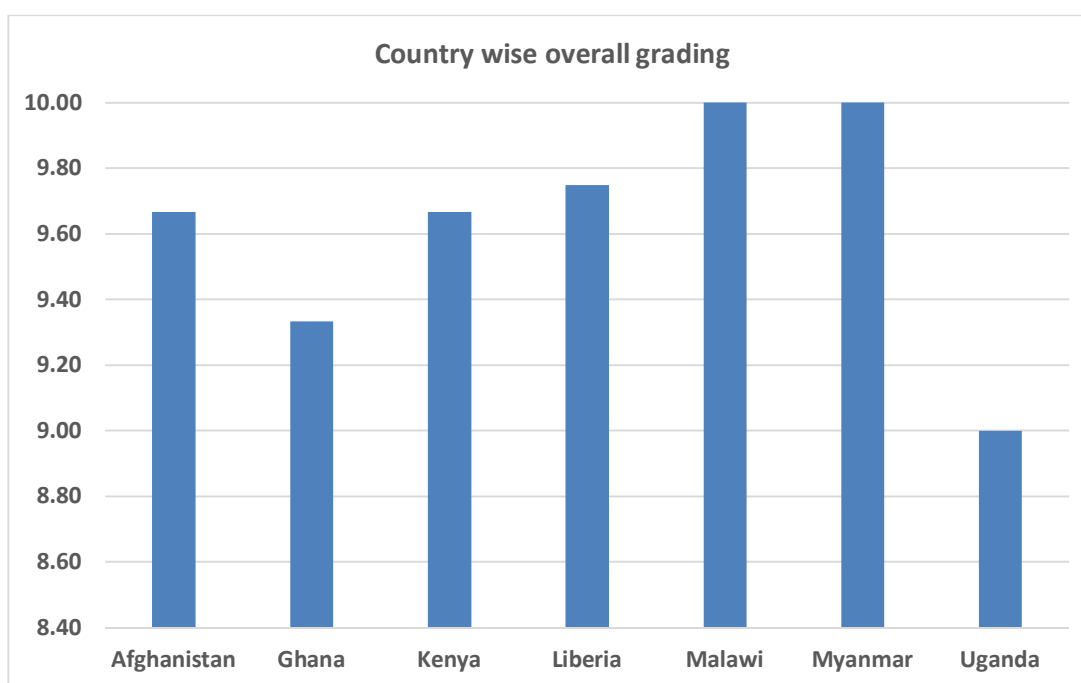
8.1 Evaluation Scores of Participants for different sessions

S. No.	Technical Session	Average Score (Out of 10)
1	Registration	9.10
2	Ice Breaking Session	9.38
3	Interaction with participants on respective country report vis-à-vis course content.	9.48
4	Pre Training Test	9.48
5	Importance of soil health for sustaining crop productivity	9.71
6	Visit to Divisions/Units/laboratories, Library, & Museum of the institute	9.29
7	Soil Test Crop Response (STCR) in India: Concept, methodology, achievements and extension	9.14
8	Balanced nutrient management is an Eco-friendly key to sustain long term soil productivity	9.00
9	Extending soil test results in farmers' field: Follow up trials and Front-line demonstrations including farmers' day: Methodology, Results and Impact	9.05
10	Biofertilizer technology and extension in India: Theory	9.38
11	Practical exercise/experience on bio-culture	9.19
12	Rapid Composting Techniques, their extension and adoptability by farmers	9.48
13	Soil Fertility Maps as an aid to Fertilizer recommendations to farmers: Concept, and Methodology	9.24
14	Conservation Agriculture: Indian Perspective	9.29
15	Micro and secondary nutrients in agriculture: Analysis & interpretation of results, and nutrient recommendations and visit to micronutrient laboratory	9.52
16	Fundamentals of soil testing and appraisal of Mridaparikshak mini lab for the estimation of soil fertility parameters and preparation of soil health cards	9.57
17	Practical on Mridaparikshak mini lab: Estimation of organic C, and available micronutrients	8.95
18	Visit to farmers' fields and Soya Choupal: Demonstration of vermicomposting, organic farming technologies in farmers' fields	9.52
19	Visit to places of historical, cultural and agricultural importance in Bhopal (Tribal Museum, Indra Gandhi Human Museum)	9.67

20	Visit to Madhya Pradesh Department of Agriculture: Government schemes, fertilizer management and extension activities of the state of Madhya Pradesh and interaction with state department officials, panel discussion	9.38
21	New vistas of Soil Analysis/Testing with special emphasis on Infrared spectroscopy	8.86
22	Nano fertilizers: Production, efficiency of utilization and possibilities of its application in farmers' fields	9.00
23	Development of Leaf Colour Chart for Nitrogen management	9.71
24	Diagnosing nutrient deficiency symptoms in standing crops	9.24
25	Nitrogen and Phosphorus: key elements in soil fertility, analysis, interpretation and best management practices	9.29
26	Farmers' friendly rapid techniques for assessment of physical parameters of soil health	9.33
27	Participation of Executives in National Conference on Organic Waste Management for Food and Environmental security	9.67
28	Phytoremediation of soils contaminated with heavy metals	8.95
29	Carbon sequestration: its importance and management	9.24
30	Visit to Sanchi Stupa, the World Heritage	9.67
31	Government Soil Health Card Scheme for balanced fertilizer application and On-line fertilizer recommendation system	9.62
32	Practical exercise on the preparation and interpretation of soil health card	9.33
33	Climate change impact on nutrient acquisition & Visit to Open Top Chamber (OTC)	8.90
34	Soil Testing for pollutant and heavy metals and their remediation	8.95
35	Best management practices for sustaining soil quality	9.33
36	Back at Work Plan	9.48
37	Post Training Test	9.48
38	Soil fertility management aspects for sustainable agriculture	9.57
39	Panel discussion on soil testing advisory services to farmers	9.29
40	Soil and nutrient management under protected agriculture	9.10
41	An overview of soil testing and extension in India	9.14
42	Soil and water management: achievements of natural resource management division of Indian Council of Agricultural research	9.14
43	Visit to ICAR-National Institute of High Security Animal Diseases, Bhopal and lecture	9.48

44	Integrated Nutrient Management: Experience in farmers' fields	9.14
45	Visit to ICAR-CIAE, Technologies and Extension Activities of ICAR-Central Institute of Agricultural Engineering	9.52
46	Cultural Evening – Culture for Global Harmony	9.62
47	Food facility	9.24
48	Accommodation facility	9.52
49	Transport facility	9.43
50	Overall impression about Training Program	9.67

8.2. Country wise overall grading about the training



8.3 Grading of Sessions of the Instructors

*First row numbers represent the executives. Name of the executives are given at the end of the table. Figures in bold indicate the average scoring of instructor/session, where an instructor has more than one sessions the scoring of session is shown in normal letters.

Instructor/Session	1*	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Avg.
Dr. Kollah Bharati, Pr. Sci., Dr. Shinogi, K. C., Sci., Dr. Abhay Shirale, Sci., Dr. B. P. Meena, Sci., Dr. Sudeshna Bhattacharya, Sci., Dr Asha Sahu, Dr. Sonalika Sahoo	8.0	9	10	10	9	9	10	10	8	10	10	8	10	8	10	8	9	10	8	9	8	9.10
Registration																						
Dr. Ashok K. Patra, Director, Dr. S. Srivastava, Principal Scientist, Division of Soil Chem. & Fertil.,Dr. Pradip Dey, PC, STCR, Dr. A. K. Biswas, Head, Division of Soil Chem. & Fertil., Dr. Shinogi, K. C. Scientist, Division of Soil Chem. & Fertil.	9.67	9.67	10.00	10.00	9.33	9.67	10.00	10.00	9.00	9.67	10.00	9.00	10.00	8.67	9.67	9.33	9.00	9.33	7.33	9.67	9.33	9.44
Ice Breaking Session	10	9	10	10	9	10	10	10	9	9	10	9	10	7	10	9	9	9	8	10	10	9.38
Interaction with participants on respective country report vis-à-vis course content	10	10	10	10	9	10	10	10	8	10	10	10	10	10	10	9	9	10	6	9	9	9.48
Back at Work Plan	9	10	10	10	10	9	10	10	10	10	10	8	10	9	9	10	9	9	8	10	9	9.48

Dr Sanjay Srivastava & Dr Pramod Jha	9.75	9.00	10.00	10.00	9.25	9.75	10.00	10.00	9.50	9.50	9.50	9.25	10.00	9.50	9.75	8.75	8.75	9.50	7.25	9.50	9.00	9.40
Pre Training Test	10	10	10	10	9	10	10	10	8	10	10	10	10	10	10	9	9	10	6	9	9	9.48
Visit to Divisions/Units/laboratories, Library, & Museum of the institute	10	9	10	10	8	10	10	10	10	9	10	7	10	9	10	9	9	9	8	9	9	9.29
Post Training Test	10	9	10	10	10	9	10	10	10	10	9	10	10	9	9	9	9	9	8	10	9	9.48
Visit to Madhya Pradesh Department of Agriculture: Government schemes, fertilizer management and extension activities of the state of Madhya Pradesh and interaction with state department officials, panel discussion	9	8	10	10	10	10	10	10	10	9	9	10	10	10	10	8	8	10	7	10	9	9.38
Dr. Pradip Dey, Project Coordinator, AICRP on STCR	8.33	9.67	10.00	10.00	9.67	10.00	9.67	10.00	9.67	8.67	10.00	8.00	10.00	8.67	9.67	9.67	8.67	9.33	8.33	9.00	9.00	9.33
Soil Fertility Maps as an aid to Fertilizer recommendations to farmers: Concept, and Methodology	8	10	10	10	10	10	10	10	10	8	10	8	10	9	9	10	8	9	7	9	9	9.24
Soil Test Crop Response (STCR) in India: Concept, methodology, achievements and extension	8	9	10	10	9	10	10	10	9	8	10	8	10	8	10	9	9	9	8	9	9	9.14

Government Soil Health Card Scheme for balanced fertilizer application and On-line fertilizer recommendation system	9	10	10	10	10	10	9	10	10	10	10	8	10	9	10	10	9	10	10	9	9	9.62
Dr. Sanjay Srivastava	9.25	9.75	10	10	9.8	10	9.75	10	10	9.75	10	9.3	10	9	10	9.75	9	9.3	8.75	9.75	9.5	9.64
Fundamentals of soil testing and appraisal of Mridaparikshak mini lab for the estimation of soil fertility parameters and preparation of soil health cards	8	10	10	10	10	10	9	10	10	9	10	10	10	9	10	10	9	10	9	9	9	9.57
Participation of Executives in National Conference on Organic Waste Management for Food and Environmental security	9	10	10	10	10	10	10	10	10	10	10	9	10	9	10	10	9	10	8	10	9	9.67
Visit to places of historical, cultural and agricultural importance in Bhopal (Tribal Museum, Indra Gandhi Human Museum)	10	9	10	10	9	10	10	10	10	10	10	10	10	9	10	9	9	9	9	10	10	9.67
Visit to Sanchi Stupa, the World Heritage	10	10	10	10	10	10	10	10	10	10	10	8	10	9	10	10	9	8	9	10	10	9.67

Dr. A. K. Biswas, Head, Division of Soil Chemistry & Fertility	8	9.5	9.5	9.5	8	9.5	9.5	10	10	10	10	8.5	10	9	9	9.5	9	9	9	9.5	9	9.29
Nitrogen and Phosphorus: key elements in soil fertility	7	9	10	10	8	10	9	10	10	10	10	8	10	9	9	9	9	10	9	10	9	9.29
Conservation Agriculture: Indian Perspective	9	10	9	9	8	9	10	10	10	10	10	9	10	9	9	10	9	8	9	9	9	9.29
Dr. D.L.N. Rao, Emeritus Scientist, ICAR-IISS, Bhopal	8	9	10	10	9	9.5	10	10	9.5	9	10	9	10	8.5	10	9	8.5	9	9	9	9	9.29
Biofertilizer technology and extension in India: Theory	8	9	10	10	9	10	10	10	10	10	10	10	10	8	10	9	8	9	9	9	9	9.38
Practical exercise/experience on bio-culture	8	9	10	10	9	9	10	10	9	8	10	8	10	9	10	9	9	9	9	9	9	9.19
Dr. A. B. Singh, Dr. Sanjay Srivastava, Dr. Pramod Jha	9	9	10	10	9	10	10	10	10	10	10	10	10	9	9	9	9	8	10	10	9	9.52
Visit to farmers' fields and Soya Choupal: Demonstration of vermicomposting, organic farming technologies in farmers' fields																						
Dr. U P S Bhadauria, Joint Director (ext.), Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya (RVSKVV), and Dr Brij Lal Lakaria, ICAR- IISS, Dr. Pramod Jha, ICAR-	9	9	9	10	9	10	9	10	10	10	10	8	10	9	9	9	9	10	8	10	8	9.29

IISS, Dr. Sanjay Srivastava, ICAR-IISS																						
Panel discussion on soil testing advisory services to farmers																						
Dr Pramod Jha and Dr. Abhay Shirale	9	8	9	10	10	9	9	10	9	9	10	7	10	8	10	8	8	10	8	8	9	8.95
Practical on Mridaparikshak mini lab: Estimation of organic C, and available micronutrients																						
Dr. A. K. Shukla, Project Coordinator, AICRP on MSN	8	10	10	10	10	10	9	10	10	10	10	9	10	8	9	10	9	10	10	9	9	9.52
Micro and secondary nutrients in agriculture: Analysis & interpretation of results, and nutrient recommendations and visit to micronutrient laboratory																						
Dr M. C. Manna, Head, Division of Soil Biology	9	10	10	10	9	9	10	10	10	10	10	10	10	9	9	10	9	10	8	8	9	9.48
Rapid Composting Techniques, their extension and adoptability by farmers																						

Dr B. L Lakaria, Pri. Sci., Soil Chemistry & Fertility Diagnosing nutrient deficiency symptoms in standing crops	8	9	8	9	8	10	10	10	10	10	10	7	10	9	9	9	9	10	10	10	9	9.24
Dr R. S. Chaudhary, Head, Division of Soil Physics Farmers' friendly rapid techniques for assessment of physical parameters of soil health	9	8	10	10	9	8	10	10	10	10	10	9	10	10	9	8	9	10	9	9	9	9.33
Dr. A K Vishwakarma, Pri. Sci., Agronomy Practical exercise on the preparation and interpretation of soil health card	9	9	10	10	9	9	10	10	10	9	10	9	10	10	9	9	9	9	9	8	9	9.33
Dr. Ashok K. Patra, Director Importance of soil health for sustaining crop productivity	10	10	10	10	9	9	10	10	10	10	10	9	10	10	9	10	10	10	9	10	9	9.71

Dr. J. K. Saha, Head, Division of Environmental Soil Science Soil Testing for pollutant and heavy metals and their remediation	8	8	8	10	9	8	10	10	9	9	10	8	10	9	9	8	8	9	9	10	9	8.95
Dr. K. M. Hati, Pri. Sci., Soil Physics New vistas of Soil Analysis/Testing with special emphasis on Infrared spectroscopy	9	8	9	10	9	9	9	10	9	9	10	8	9	9	9	8	8	9	7	9	9	8.86
Dr. K. Sammi Reddy, Director, ICAR-CRIDA, Hyderabad Integrated Nutrient Management: Experience in farmers' fields	9	9	10	10	9	9	9	10	10	9	9	7	10	9	9	9	9	10	8	9	9	9.14
Dr. K. V. Ramana Rao, Principal Scientist, ICAR-CIAE Soil and nutrient management under protected agriculture	9	9	10	10	9	9	10	10	10	10	9	6	10	8	9	9	8	9	9	9	9	9.10

<p>Dr. Muneshwar Singh, Project Coordinator, AICRP on LTFE</p> <p>Balanced nutrient management is an Eco-friendly key to sustain long term soil productivity</p>	7	9	10	10	8	8	9	10	10	10	10	7	10	9	9	9	9	10	8	8	9	9.00
<p>Dr. Murugkar, Principal Scientist, ICAR-NIHSAD, Bhopal</p> <p>Visit to ICAR-National Institute of High Security Animal Diseases, Bhopal and lecture</p>	9	9	10	10	9	10	10	10	10	10	10	9	10	8	9	9	9	9	10	10	9	9.48
<p>Dr. N K Lenka, Pri. Sci., Soil Physics</p> <p>Climate change impact on nutrient acquisition & Visit to Open Top Chamber (OTC)</p>	8	8	9	9	8	9	9	10	9	10	9	9	10	8	9	8	8	10	8	10	9	8.90

Dr. P.C Bargale, Head, Extension, ICAR-CIAE Visit to ICAR-CIAE, Technologies and Extension Activities of ICAR-Central Institute of Agricultural Engineering	9	9	10	10	10	10	10	10	10	9	10	9	10	9	9	9	9	10	9	10	9	9.52
Dr. Pramod Jha, Pri. Scientist, Division of Soil Chemistry and Fertility Carbon sequestration: its importance and management	9	8	9	10	10	8	10	10	9	9	10	8	10	9	10	8	9	10	9	10	9	9.24
Dr. R. Elanchezian, Pri. Sci. Development of Leaf Colour Chart for Nitrogen management	10	10	10	10	9	8	10	10	10	10	10	9	10	10	10	10	9	10	10	10	9	9.71
Dr. S. K Chaudhary, ADG (SWM), NRM, ICAR Soil and water management: achievements of natural resource management division, ICAR	9	8	8	10	10	10	8	10	10	9	10	9	10	9	8	8	9	10	9	9	9	9.14

Dr. S. Kundu, Pri. Scientist, Division of Environmental Soil Science Best management practices for sustaining soil quality	9	9	10	10	10	9	10	10	10	10	10	9	10	8	10	9	9	10	9	6	9	9.33
Dr. S. Ramana, Pri. Scientist, Plant Physiology Phytoremediation of soils contaminated with heavy metals	8	9	8	9	9	9	10	10	9	9	9	7	10	8	9	9	8	10	9	10	9	8.95
Dr. S. S. Khanna, Ex-Vice Chancellor, NDU&T, Kumarganj, Faizabad An overview of soil testing and extension in India	9	9	5	10	10	9	10	10	10	9	10	9	10	9	9	9	9	10	8	10	8	9.14
Dr. Sanjay Sharma, Associate Professor, Department of Soil Science and Agricultural Chemistry, RSKVV, College of Agriculture, Indore, MP Soil fertility management aspects for sustainable agriculture	8	10	10	10	10	10	10	10	10	9	10	9	10	9	10	10	9	10	8	10	9	9.57

Dr. Shinogi K. C., Sci., Extn. Extending soil test results in farmers' field: Follow up trials and Front-line demonstrations	8	8	10	10	8	9	9	10	10	9	10	9	9	9	10	8	9	10	7	9	9	9.05
Dr. Tapan Adhikari, Pri. Sci., Division of Environmental Soil Science Nano fertilizers: Production, efficiency of utilization and possibilities of its application in farmers' fields	9	8	10	10	8	8	10	10	10	9	9	10	10	9	9	8	8	10	7	8	9	9.00
Accommodation facility	9	9	10	10	10	10	9	10	10	10	10	10	10	8	9	9	9	9	9	10	10	9.52
Cultural Evening – Culture for Global Harmony	9	10	10	10	10	10	9	10	10	10	10	9	10	8	10	10	9	10	10	9	9	9.62
Food facility	9	9	10	9	10	9	9	10	10	10	10	9	10	9	8	9	9	9	8	10	8	9.24
Transport facility	9	10	10	10	10	10	10	10	10	9	10	9	9	8	9	10	9	10	7	10	9	9.43
Overall impression about Training Program	9	10	10	10	10	10	9	10	10	10	10	10	10	9	9	10	10	10	9	9	9	9.67

1	Asadullah Hamdard	4	Aung Aung Khant	7	Bobby Williams Chayea	10	Hawonga Tuchi Tech	13	Singo Amissi	16	Samuel Yao Adzivor	19	Omolo Bethul Odour
2	Mujahid Shagiwal	5	Khin Mar Myo	8	D. Wilson Solobert	11	Linda kamtogo	14	Honu Geoffrey Kwaku	17	Jenifer Wanjiku Bett	20	Amandrua Ronald
3	Ghulam Farooq Jonbish	6	Banneyco Jehu Prosper	9	Maima Diaba Sirleaf	12	Mphasto Price Chodzi	15	Sampson Kwesi Dorcoo	18	Mathias Wafula Mukhone	21	Omuron Geoffrey

9. VALEDICTORY SESSION

The valedictory session of the training program was conducted on 13th February 2018 with Dr. Pramod Verma, Hon'ble Vice-Chancellor, Barkatullah Vishwavidyalaya, Bhopal as Chief Guest. The details program schedule was as given below.

10:30 am - 10:35 am	Lighting of the Lamp ICAR Song	
10:35 am -10.45 am	Welcome	Dr. Ashok K. Patra Director, ICAR-IISS
10:45 am - 10:55 am	Introduction/Feed back	Executives
10:55 am - 11:05 am	Brief Report on the program	Dr. Sanjay Srivastava Principal Scientist, ICAR-IISS
11:05 am - 11:15 am	Address	Dr. V. P. Singh Director ICAR-National Institute of High Security Animal Diseases
11:15 am - 11:25 am	Address	Dr. K K. Singh Director ICAR-Central Institute of Agricultural Engineering
11:25 am - 11:35 am	Valedictory Address	Dr. Pramod Verma Vice-Chancellor Barkatullah Vishwavidyalaya
11:35 am - 11:45 am	Distribution of Certificates	Dignitaries
11:45 am – 11:50 am	Vote of Thanks	Dr. A. K. Biswas Principal Scientist & Head, Soil Chem. & Fertil., ICAR-IISS
11:50 am-11:55 am	Group Photograph	
12:00 am	Hi-Tea	

The programme started with lighting of lamp followed by welcome of guests by Dr. Ashok K Patra, Director, ICAR-IISS. This was followed by feedback from each executive. The executives generally expressed satisfaction on the training programme. A brief report of the FTF ITT was presented by Dr. Sanjay Srivastava, principal scientists and coordinator of the programme. He informed that there was 11.4% increase in the performance of executives based on the analysis of pre and post test scores. Increase in performance ranged from 0-325% in individual cases. There was phenomenal increase in the performance of six executives. It was also pointed out that the entire training programme went smoothly with full cooperation and active participation of the executives. Dr. V. P. Singh highlighted the importance of such training programmes and stressed upon the development of farmers' friendly technologies. Dr K. K. Singh that soil health got deteriorated because of unscientific fertilizer management in the past and learning on the soil testing and its extension is therefore timely and needed. He also said that the climatic and other conditions in several African and Asian countries are quite similar to that of India and therefore Indian technologies and know how have greater chance of adoptability in those countries. While stressing upon the importance of soil testing and soil health management, he highlighted the need of holistic approach including improved varieties, pest management, and post-harvest technologies among others. Dr. Pramod Verma, Chief

Guest stressed upon the importance of team work. He said that the state of Madhya Pradesh has been getting best agricultural state award due to the combined efforts of research institutions, state department, extension workers and farmers. He stressed upon the importance of good agricultural practices and told that the good practices, science and engineering go together. He congratulated the executives for successfully completing the training and urged them to encourage several others in their countries to come forward for training and education in India. After chief guest address, the certificates were distributed. Finally, the valedictory function ended by vote of thanks given by Dr. A K Biswas. Some of the snaps of valedictory function are given below.



Hon'ble Chief Guest Dr. Pramod Verma lighting the lamp



Director Dr Ashok K Patra, Director welcoming the Chief Guest



Executives giving feedback of the training programme





Executives receiving the certificate from the Chief Guest



Dr K. K. Singh, Director, ICAR-CIAE addressing the gathering



An executive from Afghanistan with the certificate



Group Photograph

10. BACK AT WORK PLAN

Towards the end of the FTF ITT, the executives prepared and presented back at work plan which they will be executing within six months of the completion of training programme. The summary of back at work plan of different is given below:

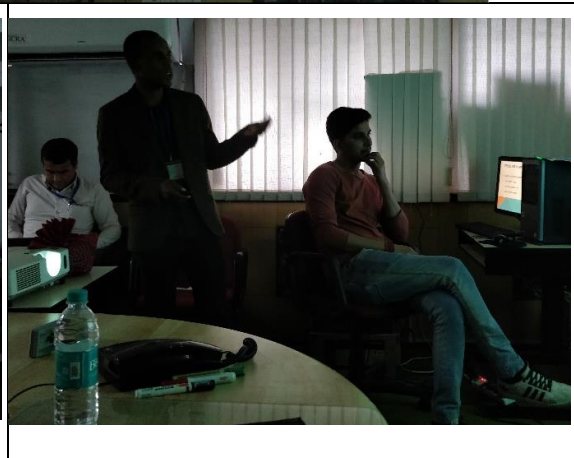
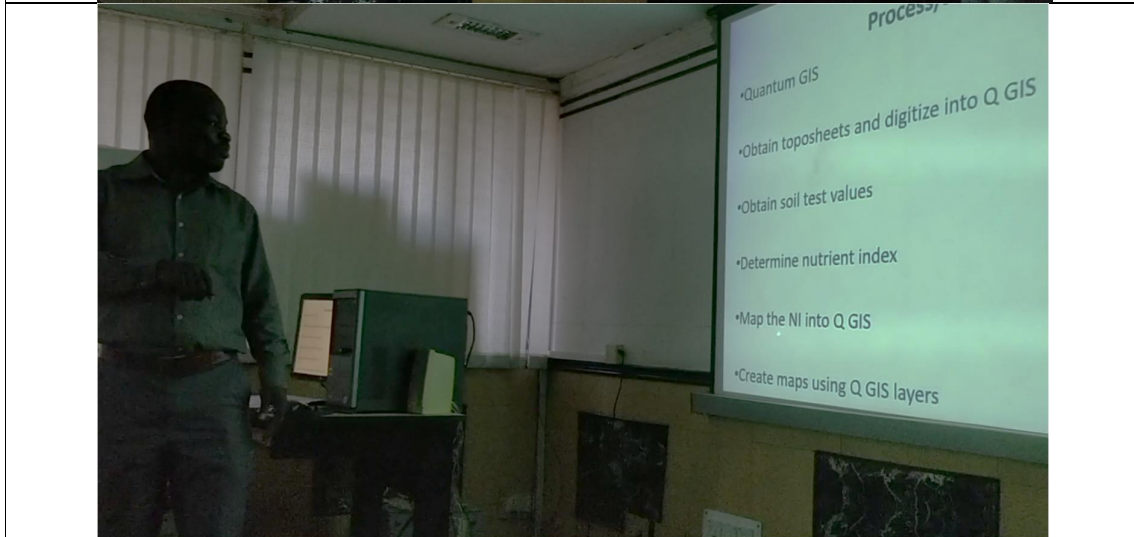
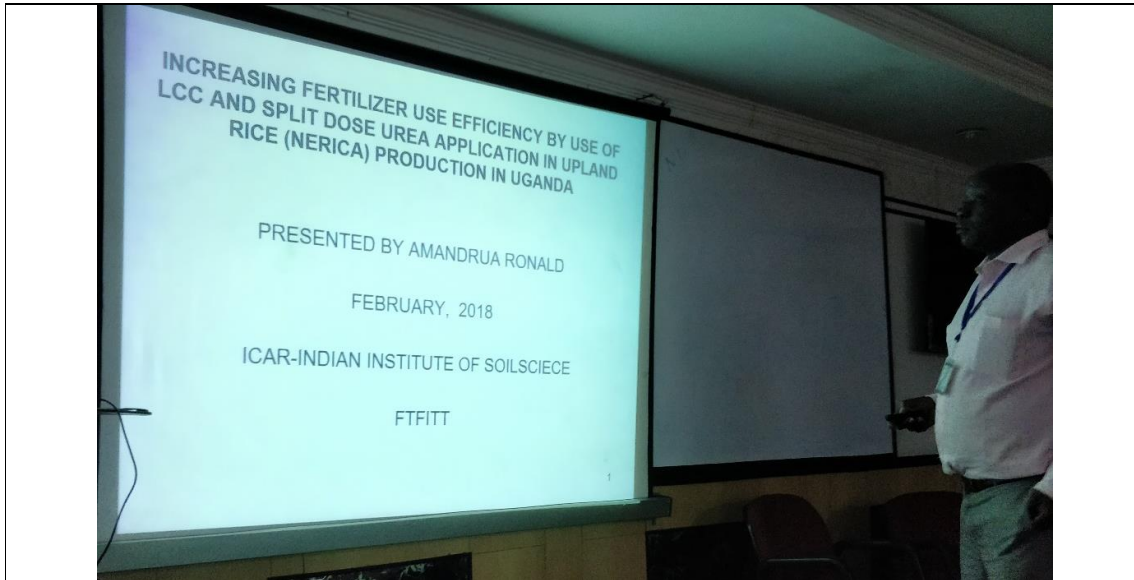
S. No.	Name	Back at Work Plan
1	Jehu Prosper Banneyco, Liberia	Extension outreach and Advisory Services to farmers on the use of Biofertilizer
2	Bobby Williams Chayea, Liberia	The establishment of compost technology

3	D. Wilson Solobert, Liberia	Composting
4	Maima D Sirleaf, Liberia	Development of compost for vegetable production
5	Khin Mar Myo, Myanmar	Soil test based fertilizer recommendation for rice
6	Aung Aung Khant, Myanmar	Using of Leaf Colour Chart for nitrogen management in rice
7	Hawonga TuchiTechi, Malawi	Participatory radio campaign (PRC) on the importance of soil health for sustainable crop productivity
8	Linda Kamtogo, Malawi	Conservation Agriculture
9	Amissi Singo, Malawi	Conservation agriculture
10	Mphatso Price Chodzi, Malawi	Bio-waste recycling compost
11	Asadullah Hamdard, Afghanistan	Soil fertility mapping
12	Ghulam Farooq Jonbish, Afghanistan	Extension of Vermicompost
13	Mujahid Shagiwal, Afghanistan	Bio-waste recycle compost
14	Omuron Geoffrey, Uganda	Develop soil fertility maps for the semi-arid part of Uganda
15	Amandrua Ronald, Uganda	Increasing fertilizer use efficiency by use of LCC and split dose urea application in upland rice (NERICA) production in Uganda.
16	Honu Geoffrey Kwaku, Ghana	Amendment advisory services to farmers in Birim central municipality, Ghana
17	Samuel Yao Adzivor, Ghana	Assessing leaf nitrogen status to determine the time of nitrogen top dressing in maize
18	Sampson Kwesi Dorcoo, Ghana	The use of LCC for nitrogen management in rice fields
19	Bethuel O. Omolo, Kenya	Documentation of fish pond effluent in Kenya
20	Mathias Wafula Mukhone, Kenya	Assessment of physical parameters of soil health with farmers' friendly rapid techniques for soil management and increased productivity
21	Jennifer W Bett, Kenya	Use of LCC to determine top dressing of maize crop in March may season

Most of the executives have chosen composting technology to be extended in their place of work. This may be because it is important and rather easily adoptable. Many executives during back at work plan presentation reported that the composting technologies at their places are not so user friendly and rapid. Learning from India on compost making using various locally available resources is interesting and adoptable. A large number of executives chose the use of Leaf Colour Charts (LCC) for prescribing nitrogen fertilizers to farmers. LCC is an easy way/method to assess the nitrogen status/fertility of soils in standing crop. It guides about the immediate need of N fertilizers. The

LCC is small and light weight and can be easily carried to field. Even farmers themselves can be educated on the use of LCC. Sixty LCCs were provided to the participants for assessment of N in rice, wheat, and maize crops. Two executives chose to make soil fertility maps of their area of interest in their respective countries. Soil fertility maps having spatial distribution of soil fertility parameters are the first step in efficient fertilizer management. The executives were provided the detailed methodology for making soil fertility maps. The use of QGIS, a free and open source software for making geo-referenced soil fertility maps was demonstrated to the executives. The process of projecting the maps, digitization of a scanned maps were explained. One executive has chosen to assess physical parameters in the fields. A session on rapid, low cost and farmers' friendly techniques for the assessment and interpretation of physical parameters was held during FTF ITT. Other activities for back at work plan are also very important, and as listed above, mainly refer to the extension of soil test based technologies. Some of the moments captured during presentation of back at work plan are given below:





11. FINAL MEETING AND THANKSGIVING BY THE EXECUTIVES



An overview of final meeting



Executives greeting Dr. Sanjay Srivastava, Coordinator of the programme



Executives of Malawi presenting the map of the country Dr. Ashok K. Patra, Director to keep the memory



Executives greeting Dr. Ashok K. Patra, Director



Good Bye

ACKNOWLEDGEMENT

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**Course Director & Co Course Directors
ICAR-IISS, Bhopal**