



# Feed The Future India Triangular Training (FTF ITT) Program International Training Program on 'Value Addition in Spices'

15 - 29 May, 2018



15 - 29 May, 2018



**ICAR-Indian Institute of Spices Research**  
Kozhikode- 673012, Kerala, India



**FEED THE FUTURE INDIA  
TRIANGULAR TRAINING PROGRAMME**

**INTERNATIONAL TRAINING PROGRAMME**

**on**

**VALUE ADDITION IN SPICES**

**15- 29 MAY 2018**

**TRAINING COORDINATORS**

**Dr. T. JOHN ZACHARIAH**

**Dr. P. RAJEEV**

**ICAR- INDIAN INSTITUTE OF SPICES RESEARCH**

***(Indian Council of Agricultural Research)***

**MARIKUNNU, KOZHIKODE- 673012**

**KERALA**



**[www.spices.res.in](http://www.spices.res.in)**

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## TRAINING PROGRAMME SCHEDULE

### Feed the Future India Triangular Training Programme

#### ‘Value Addition in Spices’ 15 -29 May 2018

Day	Date	Programme	Speaker/Institute
1.	15- 5-2018	Registration, Introduction & other formalities	Hotel Malabar Palace
2.	16-5-2018	Inaugural Programme at ICAR -IISR	ICAR-IISR
		Introduction of the FTF IIT Programme	Dr. Ravi Nandi, MANAGE
		Pre evaluation Test / other formalities	Dr. Lijo Thomas, ICAR-IISR
		Visit to Laboratories and demonstration	Dr. Ann Jasmine Jose
3.	17-5-2018	Historical perspective of Spices	Dr. Sivadasan. P University of Calicut
		Value Addition in spices -Introduction	Dr. T. John Zachariah ICAR -IISR
		Breeding for Value Addition in Spices	Dr. J. Rema, ICAR -IISR
		Nutrient Management and Quality of Spices	Dr.V. Srinivasan,ICAR -IISR
4.	18-5-2018	Economics of Spices	Dr. Lijo Thomas,ICAR-IISR
		Mechanisation, processing and value addition mechanization in turmeric	Dr. R. Visvanathan, TNAU
		Status of Spice Processing –Country Presentation	Executives and Scientists of ICAR-IISR
5.	19-5-2018	Visit to ICAR-IISR Experimental Farm & Krishi Vigyan Kendra	Peruvannamuzhi
		Visit to Processing Units of Self help Group - SUBICSHA	Perambra
6.	20-5-2018	Sargaalaya Crafts Village	Iringal, Vadakara
7.	21-5-2018	Spices as functional Food	Dr. Anila kumar DFRL, Mysore
		Cultivation, agronomic traits and effect of climate change on spices	Dr. K. Kandiannan ICAR-IISR
		International Quality Standards in Spices	Ms. Anandavally UN/ FAO Consultant
		Chemistry of Spice s- Role in Value Addition	Dr. N.K. Leela ICAR-IISR
8.	22-5-2018	Visit to Kancor Industries	Angamally
9.	23-5-2018	Business initiatives in Spices at ICAR-IISR	Dr. T.E. Sheeja, ICAR-IISR

		Processing of Spices	Mr. C.K. Sunil IIFT, Thanjavur
		Spice in traditional Indian Medicine	Dr. P.R. Ramesh Varier Senior Physician & Head Clinical Research
		Quality issues in Spices – Spices Board	Dr. G.K. Vidyashankar Spices Board, Kochi
10.	24 - 5-2018	Visit to Panda Foods (India) Pvt. Ltd	Sulthan Bathery Wayanad
		Visit to RARS, Wayanad	Ambalavayal Wayanad
11.	25-5-2018	Visit to CFTRI	Mysore
		CFTRI Show Case	Dr. Parigi Ramesh Kumar Principal Scientist
		Opportunities in value addition to spices	Dr. B. V. Sathyendra Rao, Head, Technology Transfer & Business Development, CFTRI
		Post-Harvest Handling & Processing of Spices-An Overview	Dr. Madhava Naidu, Head Spices & Flavour Sciences, CFTRI
		Packaging requirements for Spices and Spice products	Dr. H. S. Sathish, Head Food Packaging Technology (FPT)
		Regulatory aspects for Spices and Spice products	Dr. M. A. Srinivasa, Food Safety & Analytical Quality Control
		Pilot Plant Visit	
		Valedictory Function	
12.	26-5-2018	Harvest and Post Harvest Processing and Value Addition of black pepper, ginger, nutmeg, and cinnamom	Dr. E. Jayashree ICAR-IISR
13.	27-5-2018	Preparation for cultural programme and report preparation of back at Work place	
14.	28-5-2018	Business Project Proposal preparation in Spice Sector	Dr. George Ninan CIFT Kochi
		Interaction with Director and Scientist of ICAR-IISR	Back at Work plan by Executives
		Post Evaluation Test	Dr. Rajeev, ICAR-IISR
		Cultural Programme	
15.	29-5-2018	Valedictory Function	ICAR-IISR
16.	30-5-2018	Departure of delegates	

## **FEED THE FUTURE INDIA TRIANGULAR TRAINING PROGRAMME**

### **INTERNATIONAL TRAINING PROGRAMME ON 'VALUE ADDITION IN SPICES' 15- 29 MAY 2018**

#### **HELD AT ICAR-INDIAN INSTITUTE OF SPICES RESEARCH, KOZHIKODE**

#### **PREAMBLE**

ICAR- Indian Institute of Spices Research Kozhikode Kerala ISR has successfully organized an international training program **Feed The Future-India Triangular Training (FTF-ITT)** on 'Value Addition in Spices' during 15- 29 May 2018. The program was sponsored by Project Management Unit (PMU) of National Institute of Agricultural Extension Management (MANAGE) Rajendranagar, Hyderabad. USAID India and Ministry of External Affairs (MEA), Govt. of India designed a program named as Feed the Future India Triangular Training (FTF ITT) Program which was launched on 25<sup>th</sup> July, 2016 at New Delhi. Each course module would focus on themes or sub sectors in which Indian institutions of repute or have demonstrated comparative advantage to offer such trainings and ensure that it effectively responds to the target countries' capacity gaps are chosen. Feed the Future India Triangular Training (FTF ITT) Programs were conducted in different ICAR Institutes across the country which is aimed at Triangular Cooperation adapting technological advances and innovative solutions to address Food Security Challenges in Africa and Asia. ICAR-Indian Institute of Spices Research, Kozhikode, Kerala, joined as a partner institute following the proceedings of the International Convention attended by the representatives from 19 Afro Asian countries at MANAGE, Hyderabad on July 2017. The module recommended for the institute was 'Value addition in Spices' and accordingly the FTFI Training programme was organized.

Twenty-two executive trainees from five partner countries; Uganda (5), Kenya (6), Malawi (5), Liberia (3) and Myanmar (3) attended the training programme.

The major topics covered in this training programme included harvest and post-harvest processing and value addition of spices, marketing, trade, value chain development, hands on training and demonstration of value added products from ginger, curry powder production

from spices, spices as functional food, international quality standards in spices, packaging and storage of spices and products, mechanization etc. The programme also included visits to institutions such as Central Food Technological Research Institute (CFTRI), Mysuru, and spice industries such as *Kancor* Ingredients Limited, Angamaly; Panda Foods (India) Pvt. Ltd., Wayanad etc. A training manual covering these aspects has also been brought out.

**FEED THE FUTURE INDIA TRIANGULAR TRAINING PROGRAMME  
INTERNATIONAL TRAINING PROGRAMME ON**

**VALUE ADDITION IN SPICES**

**15- 29 MAY 2018**

**DAY TO DAY ACTIVITY REPORT**

**15 May, 2018**

**Registration of Executive Trainees at Hotel Malabar Palace**

The first day of the programme began with a welcome to the Executive trainees at Hotel Malabar palace. On the first day there were 21 participants from 5 countries- three members from Myanmar, five from Uganda, six from Kenya, two from Liberia and five from Malawi had reported. All 21 participants were given study kit consisting of a bag and stationery materials. Arrangements were made to disburse visa charges, local transport, health insurance and per day allowance. Executive trainees were also divided into 4 groups and group leaders were identified

Post lunch session was an interaction session where the delegates were shown a video film on value addition in spices and followed by the introduction of the delegates and expectations of the participants from the training. An ice breaking session was also conducted by Dr. Anees, Scientist ICAR-IISR where the delegates came to know their fellow trainees.

**16 May, 2018**

**Formal Inaugural function of the FTF ITT programme at ICAR-IISR, Kozhikode**

The inaugural function of the FTF ITT programme was held at ICAR- Indian Institute of Spices Research, Kozhikode on 16 May 2018. Dr. K Nirmal Babu, Director, ICAR Indian Institute of Spices Research welcomed the gathering and the programme was inaugurated by Honourable Deputy Director General (Hort. Sci.), ICAR, New Delhi Dr. AK Singh. Other important guests present during the programme were Dr. Ravi Nandi, Programme manager National Institute of Agricultural Extension Management (MANAGE) who delivered the keynote address and Dr. Homey Cheriyan, Director, Directorate of Arecanut and Spices Development, Kozhikode presided the function. Dr. T. John Zachariah, Principal Scientist &



Training Coordinator briefed the programme schedule and Dr. Santhosh J. Eapen, Head, Division of Crop Protection, ICAR- IISR proposed the vote of thanks.

Dr. A K Singh in his inaugural address mentioned that promotion of value addition activities and strengthening of value chain in agricultural commodities are crucial for the efforts aimed at doubling farm income in India. Highlighting the significant role of value addition and post harvest processing in developing countries, Dr. Singh stressed the importance of creating awareness about cultivating specific varieties suited to meet the demand from industries. He hoped that the participating countries in the training programme will benefit from the expertise available in India and lead to deployment of ecologically sustainable spice processing and value addition technologies in the partner countries.

Mr. Ravi Nandi in his key note address detailed about how the Feed the Future India Traingular Training Programme came into reality with the agreement signed between governments of US, Indian and Selected African countries.

The inaugural programme was followed by a brief discussion by Dr. Ravi Nandi, in which he informed that the FTF ITT program aimed to provide training to about 1400 agricultural professionals from 17 partner countries of Africa and Asia by 2020. He also informed that the training programme is designed to address human and institutional capacity gaps in food & nutritional security in specific areas in select African and Asian countries. The training would enable the partner countries in adapting technological advances and innovative solutions to address Food Security Challenges in Asia and Africa. A video film of various FTF ITT programmes conducted at other institutes was also shown.

During the post lunch session a pre evaluation test was conducted by Dr. Lijo Thomas, Scientist, ICAR –IISR. This was followed by visit to the Biochemistry laboratory of the Institute where extraction of spice oils and oleoresins were demonstrated by Ms. Ann Jasmine, SRF. Principles of operation of various equipments like GC, GC-MS and HPLC were also demonstrated. The trainees were also taken to the exhibition arranged in the ATIC Hall of the Institute where varieties of black pepper, turmeric, ginger, nutmeg and cinnamon were displayed including their value added products.

### **17 May, 2018**

Four sessions covering different theme areas were presented on the third day of the programme.

In the first session on ‘Historical perspective of spices’ Dr. Sivadasan P, Professor & Head, Department of History, Calicut University, covered the historical developments which occurred in the spices trade. He has narrated spice trade and colonialism by world nations before India’s independence and after independence.

Dr. T. John Zachariah, Principal Scientist, ICAR- IISR and also one of the coordinators of the FTF ITT gave good briefing on value addition in spices. Executive trainees asked lot of clarifications. Dr.(Mrs) J.Rema Principal scientist and head in charge, Division of Crop Improvement and Biotechnology ICAR- IISR explained in detail the research in plant breeding studies targeting varieties for Value Addition in Spices. Dr. V. Srinivasan , Principal Scientist ICAR-IISR explained the importance of Nutrient management and cultivation practices required to improve intrinsic and trade quality of spices. Ms. Togba Henrietta Bubu from Liberia also joined the training along with other executives.

### **18 May, 2018**

Dr. R. Visvanathan, Professor of Agricultural Engineering TNAU Coimbatore Tamil Nadu, India illustrated various possibilities in Mechanization, processing and value addition in turmeric.

Dr. Lijo Thomas, Scientist ICAR- IISR made good presentation on economic aspects to be noted in development of spices. In the afternoon representatives from different countries presented their countries’ major research and development activities pertaining to cultivation and processing of spices. Director ICAR-IISR Dr. K. Nirmal Babu and about 14 Scientists of different disciplines of ICAR- IISR attended the programme and interacted with the participants.

### **19 May, 2018**

Executive trainees of FTF ITT were taken to IISR Experimental Farm and Krishi Vigyan Kendra at Peruvannamuzhi, Kozhikode district. At KVK, Ms. Deepthi, SMS Home Scientist

gave hands on training on ginger products like candy, ginger-garlic paste, ginger-lime squash and other related value added products. Dr. E. Jayashree Principal Scientist ICAR-IISR explained Business planning and Development (BPD) model of ICAR-IISR and different programmes of hand holding incubates in spices processing. Demonstration of various spices processing equipments in the unit were demonstrated like cleaning of whole pepper in the 'Cleaning cum grading unit', preparation of turmeric powder in the Curry powder production unit and the white pepper production in the white pepper production unit. The trainees were also shown how turmeric is cured by the traditional water boiling method and steam curing in the improved turmeric curing unit followed by the demonstration of turmeric polisher. In the afternoon, executive trainees of FTF ITT were taken to 'SUBICSHA' a women self help entrepreneurship group an FPO, involved in production, processing and marketing of coconut based value added products at Perambra Kozhikode district. Mr Kunjuammed master chairman and Mr. Balakrishnan, CEO explained the formation of self help groups and the mechanism of sustainable development of the beneficiaries. Executive trainees interacted with them in detail and were quite impressed by the model.

### **20 May, 2018**

On 20<sup>th</sup> May 2018 all executive trainees visited Sargaalaya Crafts Village Iringal, Vadakara , Which is an exquisite blend of tradition with beautiful handicrafts and that makes Sargaalaya the unique tourist destination, a soothing experience for every visitor. They also visited Kappad Beach where over 500 years ago in 1498, 170 men led by Vasco-da-Gama first stepped onto Kerala, an event which changed Indian history especially history of Malabar Coast.

### **21 May, 2018**

On 21<sup>st</sup> May Dr. K R Anila Kumar, Scientist 'F', Defence Food Research Laboratory, Mysore gave good presentation on Spices as functional Food. Dr. K. Kandiannan, Principal Scientist ICAR- IISR gave a good briefing on cultivation, agronomic traits and effect of climate change on spices. In the afternoon Dr Anandavally, UN/ FAO Consultant gave detailed information on quality standards to be followed in spices. Dr. N.K. Leela Principal Scientist ICAR- IISR gave reasonably good information on the chemistry of major

constituents of spices which will enable the participants the necessary precautions to remember when spices are put for different processing techniques.

### **22 May, 2018**

A field visit was organized to a leading spice oils and oleoresin extraction unit Kancor Ingredients at Angamaly near Kochi. Sri. Mathew Varghese, Vice President (Operations) explained the history of Kancor industry and various activities undertaken by the industry to obtain clean product. It was a wonderful experience for all the executive trainees. Different extraction units, storage of raw materials, packaging of oils, oleoresins, and quality analysis with the different machinery were shown to the participants.

### **23 May, 2018**

Dr. T.E. Sheeja, Principal Scientist, ICAR- IISR gave illustrative briefing on Business initiatives in Spices and the incubation facility at IISR. Er. Sunil C.K, Assistant Professor, Indian Institute of Food Processing Technology , Thanjavur, Tamil Nadu gave a detailed lecture on different processing techniques available in food especially for spices. Dr. P.R. Ramesh Varier, Senior Physician & Head Clinical Research, Kottakkal Arya Vaidyasala, Kottakkal a leading Ayurvedic hospital and Research centre for Indian traditional medicine in Kerala gave a very good presentation on application of different spices in Indian traditional medicine. Dr. G.K. Vidyashankar, Dy. Director (Marketing) & Co-coordinator CTC, Spices Board gave good briefing on quality issues in spices export and marketing.

### **24 May, 2018**

A field visit was organized to Panda Foods (India) Pvt. Ltd.– a curry powder and cereal powder manufacturing unit at Sulthan Bathery, Wyanad . It was a good field experience for participants on how spices and other food products are produced on a industrial scale. Executive trainees also visited the Horticulture garden of Regional Agriculture Research Station of Kerala Agriculture University at Ambalavayal, Wyanad. Executive trainees proceeded to Mysore in Karnataka and halted at the Mysore University Guest House.

## **25 May, 2018**

Executive trainees visited prestigious Central food Technological Research Institute Mysuru. A good package covering CFTRI show case, opportunities in value addition in spices, post harvest handling and processing of spices, packaging requirements for spices and spice products, regulatory aspects for spices, visit to pilot plant and demonstration of spice processing, analytical facilities etc. were covered from 9.30 am to 5.00 pm .

Dr. Parigi Ramesh Kumar, Principal Scientist made a formal welcome and briefed about the various activities of CSIR – CFTRI. During the visit to CFTRI Show Case he explained about the activities done by various departments and successful commercialization of the technologies. Sri B. V. Sathyendra Rao, Head, Technology Transfer & Business Development explained the ‘Opportunities in value addition to spices’, Dr. Madhava Naidu, Head Spices & Flavour Sciences detailed about the ‘Post-Harvest Handling & Processing of Spices-An Overview’. Packaging requirements for Spices and Spice products’ was explained by Sri H. S. Sathish, Head Food Packaging Technology (FPT) and Sri. M. A. Srinivasa, Food Safety & Analytical Quality Control Laboratory provided a lecture on ‘Regulatory aspects for Spices and Spice products’. This was followed by a demonstration of detection of adulteration in some of the commonly used spices in the quality control laboratory.

In the afternoon, the trainees were taken to the Pilot Plant where demonstrations on ginger slicing, drying and candy preparation were done. Turmeric powdering and black pepper powder were also demonstrated. This was followed by cryo- grinding of black pepper and determination of particle size of the ground powder. In the concluding session all the participants were given a participation certificate.

## **26 May, 2018**

Dr. E. Jayashree Principal Scientist, ICAR- IISR gave an elaborate briefing on Harvest and post harvest processing of spices for value addition including machinery. In the afternoon executive trainees prepared their business proposals to be taken up when they return to their country.

## **27 May 2018**

The trainees had informal discussion on back at work programme which they are expected to present on 28<sup>th</sup> May before Scientists of ICAR- IISR.

## **28 May 2018**

Dr. George Ninan, Principal Scientist, ICAR-Central Institute of Fisheries Technology, Kochi handled a class on 'Business project proposal preparation in spice sector'. In his lecture he elaborated on how the concepts of Incubation Facility and business initiatives were started at various ICAR Institutes with the support of World Bank aid. Success stories of few entrepreneurs in fisheries sector were also elaborated. The session was followed by a Post Evaluation Test which was conducted by Dr. P. Rajeev, Principal Scientist and Training Coordinator.

In the afternoon, there was an interactive meeting with the Director and Scientist of ICAR-IISR. In this meeting, all the trainees individually presented a report on the activities which they would do at their work place after returning back.

In the evening there was a cultural programme where 'Kalaripayattu' the traditional martial art of Kerala was performed by a group of artists. The trainees also performed their traditional dance forms of their respective countries and entertained all the audience.

## **29 May 2018**

On 29 May 2018, the valedictory function of the training programme was conducted at the Silver Jubilee Hall of ICAR- Indian Institute of Spices Research. Director, Dr. K. Nirmal Babu in his welcome address appreciated all the trainees on their successful completion of the training programme on 'Value Addition in Spices'. Chief Guest of the programme, Shri. V. S. Ramachandran, Director, Regional Science Centre and Planetarium, Kozhikode in his remarks informed that the trainees may transform the knowledge gained through the training in to reality at their respective countries and help in the upliftment of their nation. Certificates were awarded to all the participants for their successful completion of the training programme. Four participants were provided with appreciation certificated for their commendous performance during the training programme. In the feedback session, the

trainees shared their views about the training programme. All the participants appreciated ICAR- IISR for the efficient conduct of the training and also informed that they wished that the training may be extended for some more days. Dr. P. Rajeev, one of the training Coordinators, presented a brief report of the day to day activities of training programme and Dr. T. John Zachariah, the other training coordinator proposed vote of thanks.

### **30 May 2018**

All the trainees, except the trainees from Malawi departed on 30<sup>th</sup> May, while the team members from Malawi departed on 31 May 2018. We have also received messages from all the trainees that they have reached their destination and are back at home very safely.

## **FEED THE FUTURE-INDIA TRIANGULAR TRAINING (FTF-ITT)**

### **INTERNATIONAL TRAINING PROGRAMME ON 'VALUE ADDITION IN SPICES' 15- 29 MAY 2018**

#### **TRAINING ANALYSIS REPORT**

ICAR- Indian Institute of Spices Research Kozhikode, Kerala has successfully organized an International training program **Feed The Future-India Triangular Training (FTF-ITT)** on **'Value Addition in Spices'** during 15- 29 May 2018. The program was sponsored by Project Management Unit (PMU) of National Institute of Agricultural Extension Management (MANAGE), Rajendranagar, Hyderabad. Twenty two executive trainees from Uganda (5), Kenya (6), Malawi (5), Liberia (3) and Myanmar (3) attended the training program.

#### **Training Analysis**

Two exercises were carried out as assignments by the trainees - a presentation by one member from each country about the status of spice cultivation and processing. This was on the fourth day of the programme *i.e* on 18-5-2018. Secondly, on the penultimate day, each trainee prepared and presented a **'Back at Work Plan'** in an interaction session with the staff members of ICAR-IISR. These exercises served following purposes:

- a. A clear cut assessment of training needs of various countries.
- b. Identification of knowledge gaps and technology
- c. Identify suitable intervention programmes and potential domains of technology transfer
- d. Current evaluation of trainees participation and performance

A brief abstract of country wise status and potentials with respect to spice cultivation and processing is given below.

#### **Republic of Kenya**

Republic of Kenya with its capital at Nairobi (lies on equator) has diverse and expansive terrain as capital. The major spices grown are chillies and ginger with limited extends of black pepper and turmeric. The farmers follow traditional cultivation practices and primary



processing and are mainly used in culinary and traditional medicines. Spices are often considered as herbs and are not the mandate of the state machineries and there is a complete lack of institutional support. There is ample scope for propagating scientific technologies in production and cultivation. On the contrary, the introduction of seed spices in arid zone has promising prospects.

### **Uganda**

The country is located on the East African Plateau, lying mostly between latitudes 4°N and 2°S (a small area is north of 4°), and longitudes 29° and 35°E. It averages about 1,100 m (3,609 ft) above sea level, sloping very steadily downwards to the Sudanese Plain to the north.

There are good opportunities for cultivated crops suitable for the high value market sector of herbs, spices and essential and fixed cosmetic oils. Wild harvest products with commercial value also exist in this sector. It is necessary though, to first carefully consider market size and price, opportunity costs and net returns. For wild harvest materials realistic and reliable methods to maintain sustainable harvesting standards should be investigated. Products that grow well in the target regions such as ginger, cardamom and black pepper have sizable traditional export markets, and are suitable for out-growers as well as more intensive commercial farm production. As there are well organised community based women groups in the target regions and some have the support of many NGOs, it is possible to consider rural processing / value addition of basic products.

### **Malawi**

The Malawi government has placed the highest priority in the diversification of the country's production base particularly now that the major traditional products - tea, sugar and tobacco - on which Malawi has relied to generate foreign exchange, are facing various problems ranging from low prices and quota restrictions. The development of paprika is therefore one way of enhancing this diversification process. Presently two crops are given importance- Paprika and Birds eye chilli. Potential of including ginger and turmeric in to the value chain will enhance farmer's income. Many ecological areas in Malawi are suitable for production of these spices, however, major ones under industrial processors are chillies and paprika. In 2016-17 Malawi produced 728 tonnes of chillies with an increase of 1.11% from 2015-16 production which was 720 tonnes. Garlic, cinnamon, ginger, turmeric and cardamom are only

processed locally by using traditional methods as pounding using a mortar and pestle. The major constraints are low promotion of spice crops, poor marketing systems of the spices, few industries, inadequate knowledge on spices production by staff and farmers, lack of training materials/ information on processing and utilization of spice products.

### **Liberia**

Despite a high degree of involvement by the local population in agriculture, the sector's productivity remains low: little technology and poor pest management, combined with the extremely limited use of fertilizer and other modern cultivation methods, are some of the factors responsible for this. Other factors include the lack of good quality farm inputs, high pre and post harvest losses and the lack of incentives to produce food beyond subsistence level, given that marketing is difficult because of poor road networks and high transport costs. The rain forest soils, while well drained, are strongly leached, making Liberia better adapted to tree-crop agriculture than to annual field-crop production. The major rubber, rice, coffee, cocoa, vegetable, and fruit producing areas lie outside of Monrovia. Rubber is the leading cash crop of the country. Even though most of the tropical spices except ginger and chillies to some extent are very meager in the country. Crops like black pepper, cardamom can fit in to the plantation systems of coffee, cocoa, coconut etc.

### **Myanmar**

Agriculture in Myanmar (also known as Burma) is the main industry in the country, accounting for 60 percent of the GDP and employing some 65 percent of the labour force. Myanmar was once Asia's largest exporter of rice and rice remains the country's most crucial agricultural commodity.

Other main crops include pulses, beans, sesame, groundnuts, sugarcane, lumber and fish. Moreover, livestock are raised as both a source of food and labour. Ginger and turmeric are crops grown in the country and used for culinary purpose. However, farmers adopt traditional cultivation practices and low external input farming methods. The status of value addition of ginger as well as turmeric is comparable to Indian scenario as dried ginger is a product of export. Turmeric is used in powdered form. Seed spice crops like coriander and fennel are also cultivated and used by the natives. The prospects are widening the scope of spice cultivation through scientific farming and state of the art value addition and processing technologies.

## TRAINING EVALUATION REPORT

### Standard feedback from the Executive Trainees

The standard feedback from the trainees on the various sessions was recorded using a ten point rating scale to which the trainees responded their perceptions on each and every session of the course. There were 25 items for which the trainee’s feedback was requested. The results are summarized in Table-1 & 2 and in Fig.1. It was observed from the average score that visit to CSIR- Central Food Technological Research Institute ranked first with a score of 9.76 followed by other visits to various processing units.

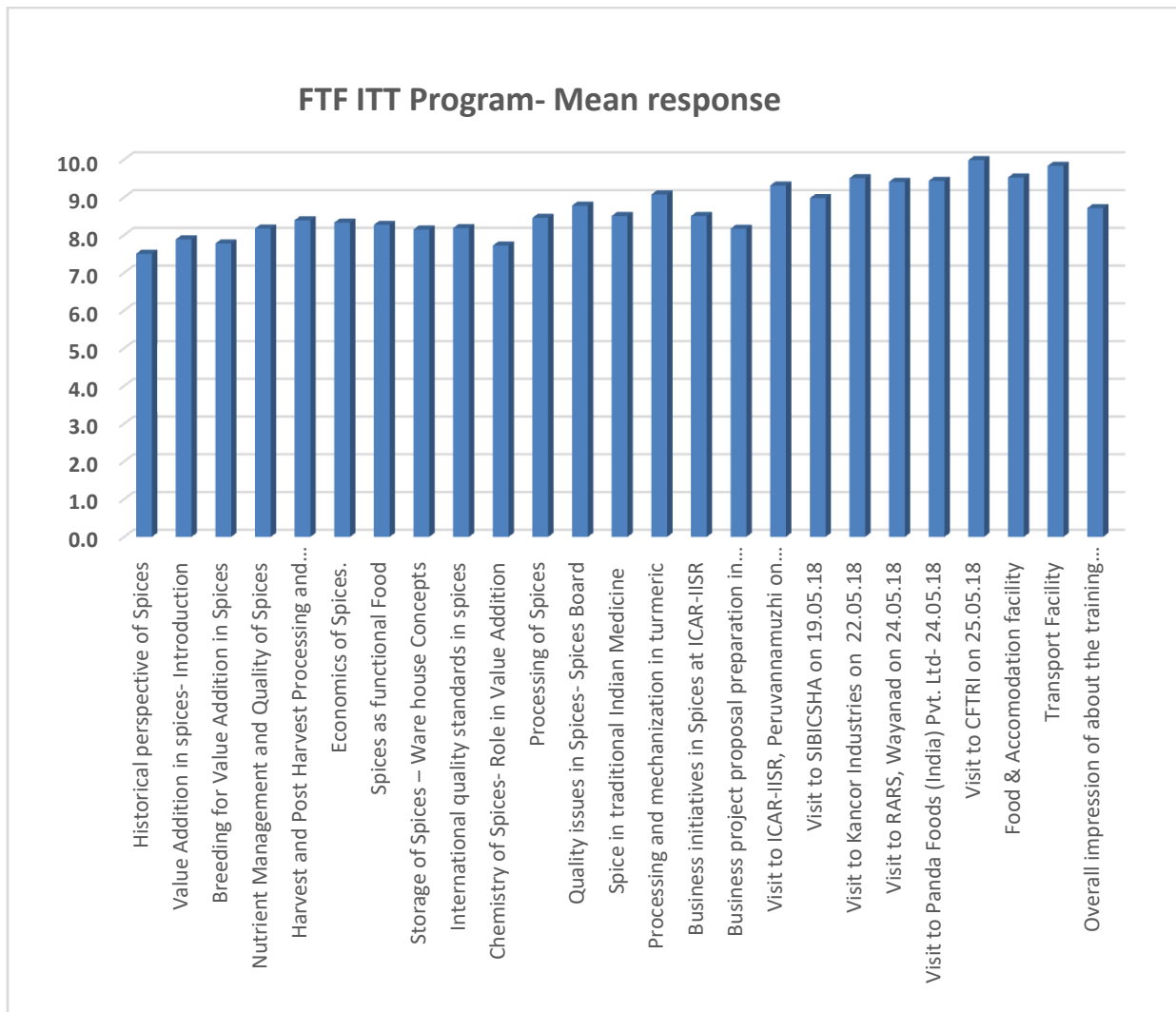


Fig. 1 Feedback from the trainees on various lectures offered to the executive trainees

**Table 1. Evaluation Score of Feed the Future India Triangular Training (FTF ITT) Program**

Item*	Evaluation form of Feed the Future India Triangular Training (FTF ITT) Program																				Average		
1	9	9	9	8	7	2	7	8	8	9	8	10	9	9	6	6	9	9	6	8	9	9	7.90
2	10	9	9	9	9	9	8	9	9	9	7	10	8	10	9	5	10	10	6	9	9	9	8.72
3	9	9	8	7	8	7	10	8	8	10	6	8	8	10	7	8	10	10	7	9	8	9	8.36
4	10	9	10	8	10	9	9	8	8	9	9	10	9	10	7	7	10	9	8	9	10	9	8.95
5	9	9	8	7	10	8	8	9	10	9	-	10	8	10	9	9	10	9	9	8	8	9	8.85
6	10	9	10	9	9	8	10	10	9	9	9	8	6	9	8	9	10	10	8	9	10	9	9.00
7	10	9	9	9	10	10	9	10	9	9	8	10	9	9	7	8	8	10	6	9	9	10	8.95
8	8	9	9	-	10	5	8	9	9	9	7	8	7	9	8	7	10	9	9	9	9	9	8.42
9	10	10	10	8	10	9	10	9	9	9	7	9	9	9	8	9	9	9	7	9	8	8	8.86
10	9	9	8	8	10	8	9	8	8	9	7	10	7	8	7	6	8	8	6	9	8	9	8.13
11	10	9	10	9	10	8	10	10	10	9	-	9	8	9	8	6	9	8	-	9	9	9	8.95
12	9	10	9	9	9	7	10	9	10	9	-	10	9	10	8	7	9	10	-	9	9	-	9.05
13	10	9	9	9	10	10	10	9	8	9	-	10	6	10	8	9	8	10	9	9	8	7	8.90
14	10	9	9	9	10	18	9	10	10	9	-	9	8	10	9	8	10	10	-	9	9	8	9.65
15	9	10	9	8	10	-	10	9	10	9	-	9	5	8	8	8	9	9	8	9	9	9	8.75
16	8	9	8	8	10	8	9	9	9	9	8	9	5	10	6	7	-	8	-	7	10	6	8.15
17	9	10	10	8	9	10	9	9	10	10	8	9	10	10	9	9	10	10	9	9	9	9	9.31
18	9	9	10	9	8	10	10	10	9	10	8	7	6	10	9	9	10	10	9	8	9	8	8.95
19	10	9	10	6	9	9	9	10	10	10	9	9	10	10	9	10	10	10	8	9	9	8	9.22
20	10	8	10	8	8	8	9	10	10	9	-	7	8	10	9	9	10	10	10	9	9	9	9.04
21	10	9	10	8	10	9	10	9	9	9	-	8	9	10	9	9	9	10	9	9	9	10	9.23
22	10	9	10	9	10	-	10	10	10	9	-	10	10	10	9	10	10	10	9	10	10	-	9.73
23	10	10	10	8	10	7	9	10	10	9	10	8	9	7	9	8	9	9	10	9	10	10	9.13
24	9	10	10	9	10	10	10	10	10	10	9	9	10	9	9	9	10	10	10	9	10	9	9.59
25	9	10	10	9	8	10	9	10	10	10	8	9	8	9	9	7	10	10	10	9	9	10	9.22

\*List of items are detailed in Table 2

**Rating 1 -10 scale**

1 - least and 10 - highest

**Table 2 List of items**

<b>S. No.</b>	<b>Items of Table 1</b>	<b>Avg. Score</b>
1	Historical perspective of Spices	7.90
2	Value Addition in spices- Introduction	8.72
3	Breeding for Value Addition in Spices	8.36
4	Nutrient Management and Quality of Spices	8.95
5	Harvest and Post Harvest Processing and Value Addition of Spices	8.85
6	Economics of Spices	9.00
7	Spices as functional Food	8.95
8	Storage of Spices – Ware house Concepts	8.42
9	International quality standards in spices	8.86
10	Chemistry of Spices- Role in Value Addition	8.13
11	Processing of Spices	8.95
12	Quality issues in Spices- Spices Board	9.05
13	Spice in traditional Indian Medicine	8.90
14	Processing and mechanization in turmeric	9.65
15	Business initiatives in Spices at ICAR-IISR	8.75
16	Business project proposal preparation in Spice Sector	8.15
17	Visit to ICAR-IISR, Peruvannamuzhi on 19.05.18	9.31
18	Visit to SIBICSHA on 19.05.18	8.95
19	Visit to Kancor Industries on 22.05.18	9.22
20	Visit to RARS, Wayanad on 24.05.18	9.04
21	Visit to Panda Foods (India) Pvt. Ltd- 24.05.18	9.23
22	Visit to CFTRI on 25.05.18	9.73
23	Food & Accommodation facility	9.13
24	Transport Facility	9.59
<b>25</b>	<b>Overall impression of about the training programme</b>	<b>9.22</b>

## PRE AND POST EVALUATION REPORT OF THE TRAINEES

An ‘Objective knowledge test’ was administered on the first day of the training as well as on the last day of the training. The gain in knowledge was assessed in terms of percentage. Also the mean knowledge score before and after training was compared using t- test of significance which yielded a t value which determined the level of significance in knowledge gain. The pre and post evaluation scores of the trainees are provided in the Table-3.

**Table 3 Pre and Post Evaluation Score of the Trainees**

Country/ Sl. No.	Name	Pre- evaluation Score	Post- evaluation Score	Percentage gain
<b>MYANMAR</b>				
1	Ms Htun Zar Gyi	12	22	83.33
2	Ms. Sein Dee	13	23	76.92
3	Ms. San MohMoh	14	21	50.00
<b>UGANDA</b>				
4	Mr. Francis Ogulli	8	21	162.50
5	Ms. Luzinda Lucy Nusula	11	20	81.82
6	Mr. Iisa Augustine	12	23	91.67
7	Mr. Gyagenda Alex	15	19	26.67
8	Ms. NabawanukaCrusum	16	23	43.75
<b>KENYA</b>				
9	Mrs. Kibisu Lynette Wanjiku	12	21	75.00
10	Mrs. Chirchir Grace Jepleting,	15	20	33.33
11	Mr. KamauEliudMathu	18	23	27.78
12	Mr. Wambugu John Mutahi	12	19	58.33
13	Ms. Karigu Mary Wanjiku	18	21	16.67
14	Ms. Gitonga Hannah Wairimu	13	18	38.46
<b>LIBERIA</b>				
15	Ms. Collins Sophia	15	13	-13.33
16	Mr. ZokungayMehn	8	13	62.50
17	Ms. TogbaHenreiettaBudu	-	7	
<b>MALAWI</b>				
18	Mr. Mambo Geoffrey Kasinja	7	19	171.43
19	Mr. Chautsi Precious William Brace	12	19	58.33
20	Ms. KachigundaPriscaTinenenji	11	20	81.82
21	Mr. Namonde Steve Ronald	12	15	25.00
22	Ms. MvulaSmangAlisoPriscillar	12	20	66.67

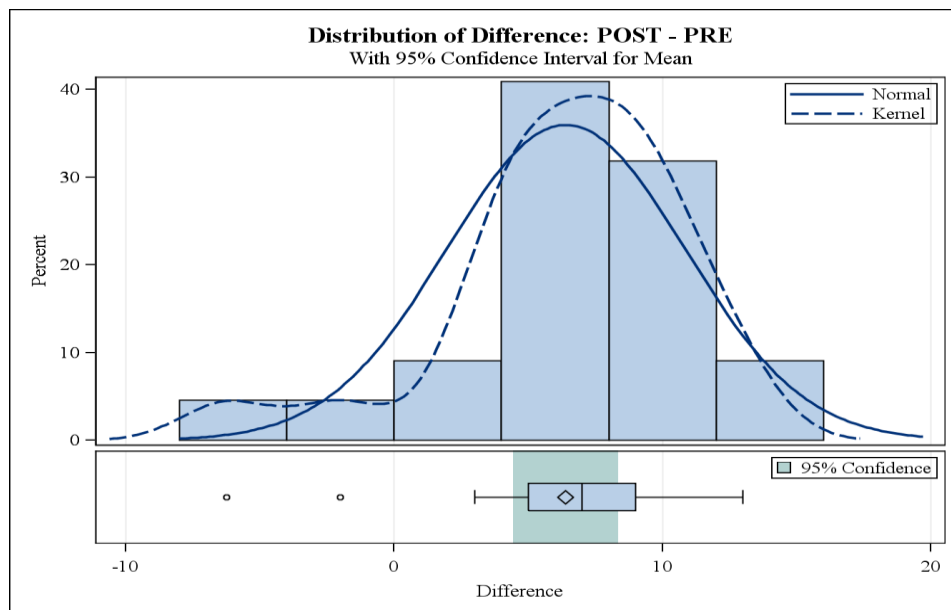
The computed t-value of 6.76 showed that the mean score before and after were statistically significant at 0.01% level of significance proving a substantial gain in knowledge from the training. The T test procedure and figures are reported below. Fig. 2 shows the Distribution of difference: Post and Pre Evaluation test and Fig. 3 provides the Paired profiles for Post and Pre Evaluation.

**The T TEST  
Procedure  
Difference: POST - PRE**

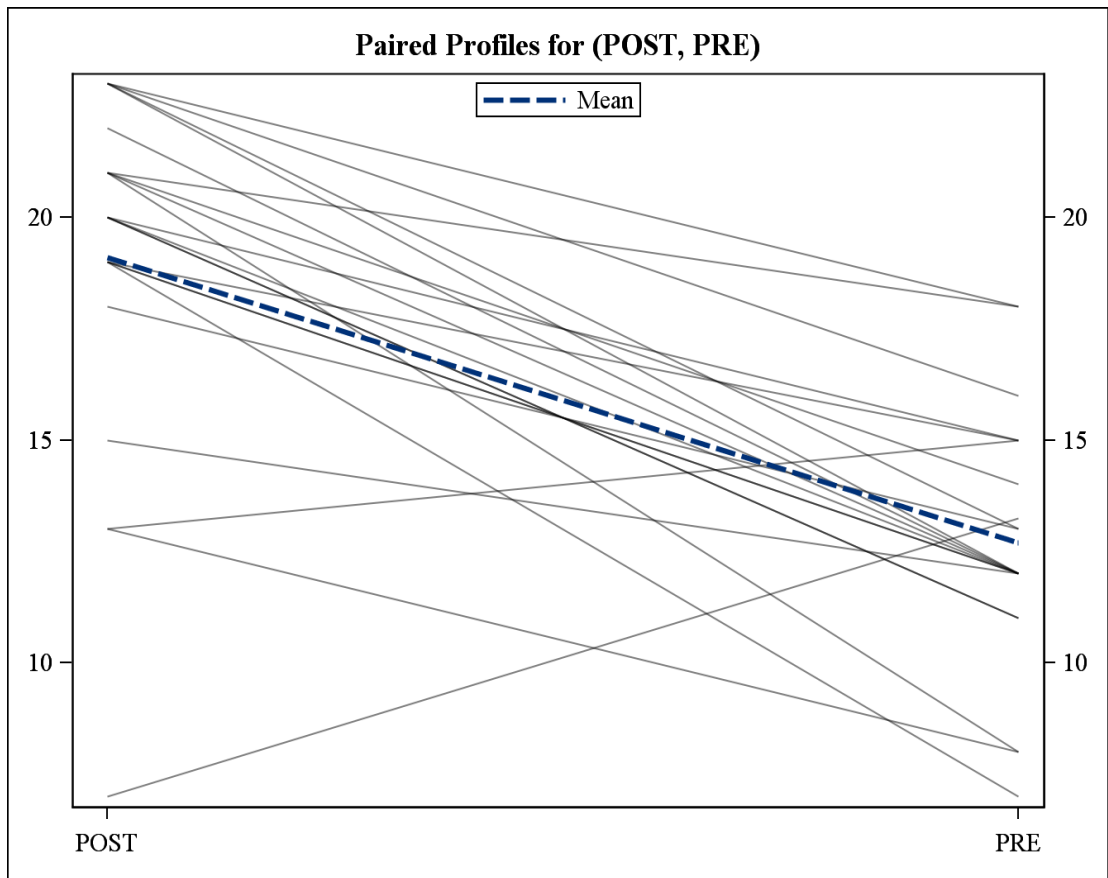
N	Mean	Std Dev	Std Err	Minimum	Maximum
22	6.3977	4.4378	0.9462	-6.2500	13.0000

Mean	95% CL Mean	Std Dev	95% CL Std Dev
6.3977	4.4301	8.3654	6.3420

DF	t Value	Pr >  t
21	6.76	<.0001



**Fig. 2 Distribution of difference: Post and Pre Evaluation**



**Fig. 3 Paired profiles for Post and Pre Evaluation**



## **FEED THE FUTURE-INDIA TRIANGULAR TRAINING (FTF-ITT)**

### **INTERNATIONAL TRAINING PROGRAMME ON 'VALUE ADDITION IN SPICES'**

**15- 29 MAY 2018**

#### **RECOMMENDATIONS**

ICAR- Indian Institute of Spices Research Kozhikode, Kerala has successfully organized an International training program **Feed The Future-India Triangular Training (FTF-ITT)** on '**Value Addition in Spices**' during 15 - 29 May 2018. The program was sponsored by Project Management Unit (PMU) of National Institute of Agricultural Extension Management (MANAGE), Rajendranagar, Hyderabad. Twenty two executive trainees from Uganda (5), Kenya (6), Malawi (5), Liberia (3) and Myanmar (3) attended the training program. Based on the country presentations made and the 'Draft back at work proposal' prepared by the Executive delegates, following draft recommendations were made on the status and future action plan for development and value addition in spices sector in the partner countries:

1. In almost all the partner countries – Kenya, Uganda, Malawi, Liberia and Myanmar the infrastructure facilities available for post harvest operations or value addition is rudimentary. Therefore, there is a need to develop small scale infrastructure facilities for storage, packaging as well as mobilization of machinery, local skills and resources.
2. More emphasis should be given for primary processing, post harvest handling processes and infrastructure facility development in the partner countries.
3. As the cultivation practices followed by the farmers are traditional, there is a need to create awareness on scientific methods of cultivation.
4. As there is a huge potential for tropical spices like black pepper, ginger, turmeric and tree spices, efforts should be undertaken for introduction of superior quality spices and area expansion under spice cultivation may be increased.
5. Campaigns should be organized to popularize the use of spices in their diet as well as for alternative uses like indigenous medicine.
6. As many countries presented lack of institutional support for spices promotion in their country, hence the concerned institution in the partner countries may set their agenda for spices development on a mission mode basis.
7. In countries like Uganda and Kenya there is more agro ecological diversity and therefore an inclusive plan, covering more crops like seed spices may be prepared.
8. Though many trainees envisaged tie up with ICAR-IISR, it was suggested that the respective authorized country representative may follow up the programme for spices by setting clear cut collaboration with appropriate institution in India.

## ANNEXURES

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21.	<p><b>Mr. Gyagenda Alex</b>  Agricultural Officer,  District Agricultural Office,  Kigandalo Sub County,  Mayuge District Local Government,  Mayuge, Uganda  Tel: +256 702151262, +256 703873717 (Supervisor)  Email: gyagendaalex@yahoo.com, kpeteri2004@gmail.com (Supervisor)</p>
22.	<p><b>Ms. Nabawanuka Crusum</b>  Agriculture Officer,  Bugiri Municipal Council, Production and Marketing Department,  Ministry of Education and Sports, P.O.Box.77,  Bugiri, Uganda  Tel: +256 777794006, +256 702 279072 (Supervisor)  Email: bugirimunicipal@gmail.com, crusnish@gmail.com, aakisubi@gmail.com</p>

## FTF ITT Inaugural Function on 16-5-2018



Dignitaries on the dais



Dr. K., Nirmal Babu, Director, ICAR-IISR



Dr. T. John Zachariah, ICAR-IISR



Dr. Ravi Nandi, MANAGE, Hyderabad



Lighting of lamp by Dr. A.K Singh, DDG (Hort. Sci.)



Inaugural address by Dr. A.K Singh, DDG (Hort. Sci.)



Dr. Homey Cherian, Director DASD



Dr. Santhosh J. Eapen, ICAR-IISR

## FTF ITT Trainees visit to Sargalaya crafts village, Vadakara on 20-5-2018



Welcome by Sargalaya officials



A group photos of the trainees at Sargalaya



Trainees enjoying the boat ride



Along the river side

## FTF ITT Trainees visit Kappad Beach on 20-5-2018



In front of the Vasco da Gamma monument



6. Trainees at Kappad Beach

## FTF ITT Trainees visit to Kancor Ingredients, Angamally on 22 -5-2018



Welcome by Sri Mathew Verghese, Vice President



A group photo at Kancor Ingredients

## FTF ITT Trainees visit to KVK, Peruvannamuzhi on 19 -5-2018



Welcome by Dr. P. Manoj, SMS, KVK



Ms. Deepthi, demonstrating ginger value addition



A view of the trainees at KVK



Group photo in front of KVK

## FTF ITT Trainees visit to Experimental farm, Peruvannamuzhi on 19 -5-2018



Trainees in front of solar tunnel drier



Demonstration of turmeric boiler



Demonstration of pulverizing unit



Staff and trainees at Experimental farm

**FTF ITT Trainees visit to RARS, Ambalavayal on 24-5-2018**



Trainees at the view point at Wayanad



Trainees at RARS, Ambalavayal

**FTF ITT Trainees visit to Panda Food (india) Pvt. Ltd. on 24-5-2018**



Staff of Panda Foods explaining the facility



Trainees in the flour milling unit



Roasting unit



6. Spice pulverizing unit



Trainees in the packaging section



Trainees purchasing spice powders

## FTF ITT Trainees visit to CSIR-CFTRI, Mysuru on 25-5-2018



Welcome by Dr. Parigi Ramesh Kumar



Slicing of ginger



Demonstration inside the pilot plant



Powdering of turmeric



Black pepper cryogenic grinding



Inside the Food Safety Laboratory



Awarding training certificate



In front of CSIR- CFTRI

## FTF ITT Valedictory Function on 29-5-2018



Dignitaries on the dais



Dr. K. Nirmal Babu, Director



Dr. P. Rajeev, ICAR-IISR



Sri. V. S. Ramachandran, Director, Regional Science



Distribution of training certificate



Mr. Kamau Eliud Mathu from Kenya



Ms. Nabawanuka Crusum from Uganda



Ms. Sain Dee from Myanmar



## FTF ITT Valedictory Function on 29-5-2018



View of the audience



View of trainees



Trainees honouring Dr. T. John Zachariah



Trainees honouring Dr. P. Rajeev

## Feed the Future - India Triangular Training (FTF ITT) Program INTERNATIONAL TRAINING ON "VALUE ADDITION IN SPICES"- 15-29 MAY 2018 ICAR - Indian Institute Of Spices Research Calicut,Kerala,India



GROUP PHOTO taken on the last day

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Trainees at the view point at Wayanad



Trainees at RARS, Ambalavayal

## FTF ITT Trainees visit to Panda Food (india) Pvt. Ltd. on 24-5-2018



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## FTF ITT Valedictory Function on 29-5-2018



View of the audience



View of trainees



Trainees honouring Dr. T. John Zachariah



Trainees honouring Dr. P. Rajeev

### Feed the Future - India Triangular Training (FTF ITT) Program INTERNATIONAL TRAINING ON "VALUE ADDITION IN SPICES"- 15-29 MAY 2018 ICAR - Indian Institute Of Spices Research Calicut,Kerala,India



GROUP PHOTO taken on the last day