Feed The Future India Triangular Training (FTF ITT)
International Training Programme on

Farm Mechanization of Small farm
for Executives of African and Asian Countries
11-25 April, 2017, ICAR-CIAE, Bhopal, Madhya Pradesh, India

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Feed The Future India Triangular Training (FTF ITT)
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Farm Mechanization of Small farm
for Executives of African and Asian Countries

11-25 April, 2017, ICAR-CIAE, Bhopal, MP, INDIA

REPORT

BY

Dr. K.K. Singh, Course Director
Dr. P.C. Bargale, Co-Course Director
Dr. P.S. Tiwari, Co-Course Director
From the Desk of Director, CIAE, Bhopal

Mechanization of small farms has been a major challenge especially for developing countries. Farm mechanization is essential to sustain the interest of small farmers. However, mechanization needs to be customized to the local social-agro-economic conditions and cropping patterns. Environmental issues will become more important in future. Therefore, the importance of mechanization for successful implementation of conservation agriculture technologies is imperative. Many climate smart technologies can’t be adopted without introduction of suitable mechanization. Robustness and affordability of the smart technologies is another important issue for the developing nations. Besides, smart agricultural technologies need location and crop specific fine tuning which could be achieved only through trained manpower.

This training course with emphasis on farm mechanization of small farms of African (Ghana, Kenya, Liberia, Malawi, Mozambique, Uganda) and Asian (Afghanistan, Mongolia) countries has been designed to meet these challenges. Concept of mechanization with an insight to improved tools, implements and machinery suitable for crops grown in selected African and Asian countries was the main focus of this training programme. Various types of farm machinery and technologies developed by the Indian Council of Agricultural Research (ICAR) and State Agricultural Universities (SAUs) for pre and post-harvest operations for major crops of the participating countries were covered in this course. In addition, topics like equipment operated by animal, power tiller and tractor, precision farming, conservation agriculture; horticultural crop mechanization, covered cultivation and women friendly tools, ergonomics and safety in agriculture, computer aided design (CAD), manufacturing technology of simple agricultural implements, testing of agricultural equipment, entrepreneurship through agribusiness and custom hiring of agricultural machinery for small farms, renewable energy gadgets post-harvest technology for small farms were also covered in this programme.

Major focus of the course was on the hands-on-training on manual and animal operated machinery. In this programme, lecture-cum-interaction sessions, practical’s-cum-field demonstrations and visits to mechanized villages, manufacturers, relevant institutes and stakeholders was included. The presentations of country papers, identification of technologies suitable for respective countries, preparation of back at work plan by participants ensured effective follow-up action that would help in achieving the major objectives of mechanization of small farms in African and Asian Countries.

Based on feedback received from the participants, collaborative mode was highly benefited from this programme and its objectives of the programme were successfully achieved. This program was a step forward in intensifying through agricultural mechanization among India and other Asian and African countries. I look forward to further opportunity of mutual learning and cooperation with these countries in future.

With Best Wishes,

(K.K. Singh)
Director
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1. INTRODUCTION

1.1 Background

A new Agriculture Partnership between US and India to achieve Ever Green Revolution to address Global Food Security was announced during the State visit of US President Mr. Barak Obama to India in November 2010. The effort included Triangular Cooperation adapting technological advances and innovative solutions to address Food Security Challenges in Africa. This pilot stage focused on three African Countries i.e., Kenya, Liberia and Malawi with potential to expand throughout the African Continent in future.

Consequently, National Institute of Agricultural Extension Management (MANAGE), Hyderabad and National Institute of Agricultural Marketing (NIAM), Jaipur conducted 7 training programs covering 219 executives from Kenya, Liberia & Malawi. Participants Surveys were conducted in Kenya, Liberia & Malawi to assess the impact of training programs. Results were beyond expectations. Due to the success of first seven training programs, there have been considerable enthusiasms from the prospective Executives from Africa and Asia to participate in the training program.

As a result, USAID and Ministry of External Affairs (MEA), Govt. of India identified 17 additional countries and designated as Feed the Future; India Triangular Training Program which was launched on 25th July, 2016 at New Delhi. During the program period until 2020, around 1400 Agricultural professionals will be trained in Africa and Asia in phased manner. The program will conduct 32, fifteen days training courses (excluding travel period) at select Indian institutions for 25 participants in each programme.

In addition 12 Nos. ten days duration trainings (excluding travel period), in selected partner countries in Africa and Asia, for up to 50 participants per programme. Each course module will focus on themes or sub sectors in which Indian institutions of reputed or have demonstrated comparative advantage to offer such trainings and ensure that it effectively responds to the target countries’ capacity gaps. This approach is designed to respond to the needs of target countries based on the Demand Analysis carried out at the beginning of this program.

Based on the demand analyzed, it was identified that Mechanization of small farms has been a major challenge for developing countries. Farm mechanization is essential to sustain the interest of small farmers. Accordingly ICAR-Central Institute of Agricultural Engineering was selected as a training institute based on the extraordinary works undertaken by the institute in the field of Farm mechanization.
The training programme on “Farm Mechanization for Small Farmers was announced in the month of January, 2017 and was scheduled during 11-25 April, 2017 at ICAR-Central Institute of Agricultural Engineering (ICAR-CIAE), Bhopal. The announcement was received huge response from partner countries and MANAGE selected 23 executives from nine countries viz., Afghanistan, Bostwana, Ghana, Kenya, Liberia, Malawi, Mongolia, Mozambique and Uganda to participate in the training Program (List of executives enclosed in Annexure II).

International Training was inaugurated at ICAR-CIAE by Mr. Vishwas Sarang, Hon’ble Minister of State (Independent Charge), Department of Co-operatives, Panchayat, Rural Development and Bhopal Gas Relief, Govt. of MP, Mr. Oliveira Amimo, Economics and Commercial Counsellor, High Commission of the Republic of Mozambique as the special guest and Mrs. V. Usha Rani IAS, Director General (MANAGE), Hyderabad as Special Guest. Dr. K.K. Singh, Director, ICAR-CIAE presided over the Inaugural session.

ICAR-CIAE: The ICAR-Central Institute of Agricultural Engineering is a flagship institute under Indian Council of Agricultural Research to provide engineering solutions for overall prosperity and sustainability of farming systems. The institute came into existence on February 15, 1976 with a general mandate to conduct research on agricultural mechanisation, post-harvest food processing, and energy management in agriculture and build capacity of appropriate stakeholders leading to effective management of farming operations, increased productivity, conservation of resources, reduction in drudgery, prevention of losses, generation of employment and improvement in the lives of farming and allied community. The mandate is fulfilled by providing national and international leadership by means of independent and coordinated research through network of research centers established all over the country that results in developing commodity and location specific technologies needed by farmers and manufacturers. Transfer of agricultural engineering technology and education are also important activities of the institute.
Inauguration function of Farm Mechanization for Small Farmers for executive of African and Asian countries on 11th April, 2017 at CIAE, Bhopal, India
First FTF ITT Training Program on “Farm Mechanization for Small Farmers” for executive of African and Asian countries on 11th April, 2017 at ICAR-CIAE, Bhopal, India
1.2 Objectives of the Training Programme

The role of mechanization in agriculture has increased as it enhances productivity through increased input use efficiency, timeliness of agricultural operations, reduced drudgery as well as the cost of cultivation. Mechanization interventions have been reported to increase the productivity by 15% and reduce the cost of production to the tune of 20%. The mechanization also facilitates conservation and sustainable agriculture while improving the livelihood opportunities, income and environmental sustainability. The present course was proposed considering the vital need of human resource development and capacity building for effective mechanization of small farms in African and Asian countries. The training programme was designed with following objectives:

- To introduce the concept of mechanization for different unit operations of production agriculture viz. land preparation to threshing for major cropping systems of African and Asian countries.
- To introduce and demonstrate appropriate technologies for production agriculture leading to conservation of natural resources for sustainable agriculture for different cropping systems of Afro-Asian countries.
- Field visits to the mechanized villages and interaction with local farmers and study their success stories and to relevant educational/training institutes.
- Identify country specific technologies for mechanization for selected cropping systems of Afro-Asian countries.

1.3 Key Focus Areas of the Training Module

- The training course emphasized on farm mechanization of small farms of African and Asian countries. Concept of mechanization, an insight to improved tools, implements and machinery suitable for crops grown in selected Afro-Asian countries and developed by ICAR-CIAE and its AICRPs were mainly covered for different operations of production agriculture viz. farm planning and irrigation systems & equipment, seeding and planting, weeding and interculture, plant protection, harvesting and threshing. In addition, the animal operated, power tiller and tractor operated equipment, precision farming, conservation agriculture; horticultural crop mechanization and covered cultivation and women friendly tools were also covered.
- An exposure was provided to ergonomics and safety in agriculture machinery, Computer Aided Design (CAD) and manufacturing technology of simple agriculture implements, testing of agricultural equipment, entrepreneurship through agribusiness and custom hiring of agricultural machinery for small farms and renewable energy gadgets for small farms.
- About 30% time was devoted in lecture-cum-interaction sessions, 40% time on hands on practices cum field demonstrations of selected tools and implements, 30% time for visits to mechanized villages, manufacturers, institutes of training and testing, and other relevant stakeholders. The presentations of country papers-cum-identification of technologies suitable for respective countries was also included.

The detailed program schedule is enclosed in Annexure-I
1.4 Selection of Executives

Due to the success of Pilot programs in Kenya, Malawi and Liberia during 2013 -15, there has been considerable enthusiasm from the prospective executives from partner countries to participate in the training program. In order to select right candidates, good publicity was given in partner countries through Point of Contact (POC) in respective countries, through Indian Embassies, USAID Missions of respective countries, National Governments and previously trained Executives. The nominations were sponsored by the agriculture and allied departments of the respective countries by the due date i.e., 12th September, 2016 were scrutinized by Program Management Unit (PMU), MANAGE to select suitable Executives. The following parameters received due weightage at the time of nomination/selection of Executives:

- At least 3 years of uninterrupted service in Public or Private sector in the training theme area. Exceptional nominations require separate justification.
- Executives may be nominated representing diverse working areas viz., Planning, Administration, Teaching, Research, Extension, Agri Industry, NGO, Farmers organizations/cooperatives, Agripreneurs in Agriculture and allied fields namely Horticulture, Sericulture, Forestry, Livestock, Fisheries, Natural Resources Management, Nutrition, Agribusiness, Post-Harvest and Value Addition, Marketing etc.
- Currently involved in Feed the Future [FTF] Programs. Exceptions must be demonstrated by evidence that the participant will actively be involved in the above Program.
- At-least 50 per cent of the nominations were reserved for female professionals in selected and waitlisted category.
- Applicant shall possess physical and mental skills and abilities for successfully completing the program.
- Working knowledge of English.

1.5 Profile of Executives

Twenty three executives from nine countries (2 each from Afghanistan, Ghana, Liberia, Mozambique and 3 each from Botswana, Kenya, Malawi, Mongolia and Uganda) have attended and successfully completed the programme. The selected executives belonged to diverse working areas viz., Agriculture and Rural Development Officers, Agricultural Economists, Agricultural Extension officers namely Livestock, Fisheries, Nutrition and Agribusiness etc. representing public, universities and private organizations in partner countries. Out of 23 executives, a good number of 05 women executives participated in the training program.

Complete list of Executives is enclosed at Annexure-II.
2. METHODOLOGY

2.1 Training Methodology

The training program was participatory in nature, which was included lectures, panel discussions, group discussions, case studies and field visits. Each participant was expected to contribute ideas and take part in group activities thereon forming small groups to undertake various tasks allotted under the training. Although, experiential learning methodology was effectively incorporated in the program, however the participants were expected to emulate learnings through group interaction, field visits and interactions with domain experts. A Back at Work Plan was in-built to ensure the transformation of learning into action at their workplace. The effectiveness of the training is proposed to be monitored after conducting Pre & Post Tests to understand the impact of the training on the knowledge of the participants. A learner-centred approach was followed to orient the participants on implementation of Farm machineries in the small farms. Methodology adopted for the program was as follows:

- Participatory approach
- Participants expected to contribute ideas and work in groups
- Experiential learning methodology (Cross learning, field experiences)
- Lectures, group discussions, panel discussions and field visits to premier agricultural research, agricultural implements manufacturing and testing institutions in and around Bhopal.
- Interactions with innovative farmers and Agri-entrepreneurs
- Special lectures/interactions with eminent personalities from the field were invited
- Participants were made to present “Back-at-Work-Plans”
- Regular feedback on the program were collected.

2.2 Study Material

- Study materials, prepared by Course Director of ICAR-CIAE, Bhopal on all the major themes were provided to the executives. The soft copies of all the presentations made during the sessions were also provided to the executives at the end of the course. More than 150 of photographs of lectures, field visits and other important activities of program were also provided to the Executives. The executives had full access to ICAR-CIAE Library which is having thousands of books, periodicals and online journals in the area of farm mechanization.

- In order to increase access to information and share knowledge on continuous basis, Wi-Fi as well as desk tops with Internet facility were provided during the entire course period.
Training Course Manual

CIAE technologies DVD
2.3 Resource Persons

- Besides ICAR-CIAE faculty members, resource persons were invited from reputed public and private institutions across the country. The list of organizations that contributed resource persons to the program is as follows:
  - Dr. Gyandera Singh, Ex-Assistant Director General (ADG), Engineering, ICAR, New Delhi
  - Dr. RP Kachru, Ex-Assistant Director General (ADG), Process-Engineering, ICAR, New Delhi
  - Dr. LP Gite, Ex-PC, Ergonomics & Safety in Agriculture (ESA), ICAR-CIAE, Bhopal
  - Director, Central Farm Machinery & Tractor Training Institute, (CFMTTI), Budhni
  - Director of Agricultural Engineering, Govt. of MP, Bhopal
  - Dr. Surendra Singh, Ex-PC, AICRP on FIM & Technical Advisor, Agricultural Machinery Manufacturers Association (AMMA-India)
  - ICAR-Indian Institute of Soybean Research (IISR), Indore
  - ITC e-Chaupal, Vidisha, MP
  - TMTL – TAFE Motors and Tractors Limited, Bhopal

2.4 Field Visits

The executives were exposed to various field visits i.e. Central Farm Machinery & Tractor Training Institute, (CFMTTI), Budhni, ITC e-Chaupal, Vidisha, TMTL – TAFE Motors and Tractors Limited, Bhopal, Kachibarkhera-village etc., to interact with the innovative, agriprenuer farmers and experts in specific areas and exposed them with live examples and success stories.
Visit to Central Farm Machinery & Tractor Training Institute, Tractor Nagar (CFMTTI), Budhni

Visit to Farmers Field at Kachibarkhera
Visit to Biomass Briquetting Plant

Field Visit
2.5 Visit to Places of Historical and Cultural importance

Executives were taken to places of various historical and cultural importances such as Sanchi, ITC e-chaupal, Lake View, ShauryaSmarak, DB City MALL etc. Sanchi is a Buddhist complex, famous for its Great Stupa, on a hilltop at Sanchi Town in Raisen District of the state of Madhya Pradesh, India. The Great Stupa at Sanchi is one of the oldest stone structure in India and world heritage.

At World Heritage – Sanchi Stupa

At Tropic of Cencer
Visit to ITC, e-Choupal, Vidisha for exposure of Electronic Business & Marketing of Farm Produce
2.6 Interaction with Dignitaries/ Experts

Executives had the opportunity to interact with subject matter experts during panel discussions, interactions with Policy Makers, Scientists, Extension Practitioners, Farmers and Cooperatives. Besides, had the opportunity to interact with key officials from USAID, India.

Interaction with Dr. Surendra Singh, Ex-PC, AICRP on FIM & Technical Advisor, Agricultural Machinery Manufacturers Association (AMMA-India)

Dr. Gyandera Singh, Ex-Assistant Director General (ADG), Engineering, ICAR, New Delhi
2.7 Cultural Evening - Culture for Global Harmony

A Cultural Evening was organized on 22.04.2017 evening with the intension to expose Indian culture to partner countries, at the same time each country executives were encouraged to present their cultural heritage to other partner countries including India. Organising committee of ICAR-CIAE informed all executives well in advance about cultural evening and facilitated them with required items and preparation at ICAR-CIAE. Cultural Evening - Culture for Global Harmony went well in the presence of Dr. P. Chandra Shekara, Director, PMU, MANAGE and Dr. K.K. Singh, Director, ICAR-CIAE, Bhopal.
2.8 Collective action and participatory learning

All the executives were divided into several groups to enhance learning in small groups throughout the training program including field/Institutional visits and prepare for cultural programme. The groups were given responsibility for learning from interactions, collection of literature, photographs, contact details, use of library and identify useful technology to their respective countries. The group also participated and managed cultural programme successfully.

2.9 Life Membership to Professional Bodies and Journals

All the executives were made International Members for Professional Society of life members of INDIAN SOCIETY OF AGRICULTURAL ENGINEERS (ISAE) journals of “Agricultural Engineering Today” and “Journal for Agricultural Engineering”. As life members, they will receive Journal time to time.

2.10 Back-At-Work-Plans

The present programme aimed at hands-on-training on advance machineries for small farms and human resource development and capacity building for effective mechanization of small farms. Hence, the expected outcome is a professional commitment by each Executive to try new initiatives learnt during the training programmes at their work place after the training programme. In the backdrop of orientation, inputs, interactions, study material and experiences received during the program, the executives prepared and presented individual “Back-at-work-plans” which would help operationalize the relevant concepts learned during the program in their respective countries. Back at work -plan also trace the connectivity between Indian experience and back home extension issues. Details of individual Back-at-work-plans are given at Annexure-III
3. TRAINING EVALUATION

3.1 Evaluation of Technical Sessions

Feedback of Executives was collected on all technical sessions taken by resources persons, and field visits on a scale of 0 to 10 i.e. ‘1 being the least and 10 being highest. In addition, their suggestions on other areas such as boarding and lodging were obtained in order to bring necessary changes. The executives expressed their satisfaction level by rating the program on an average score of 9.22 on a 10 point continuum indicating the overall impression on the programme was excellent. The feedback received from executives are tabulated and given at Annexure-IV.

3.2 Pre and Post-Training Test

Pre & Post Training Test were conducted for the Executives at the beginning and at the end of the training respectively. Twenty five thematic questions on Public Private Partnership in Agricultural Extension Management with a maximum of 25 marks were administered for pre and post-training test and obtained answers of the executives to assess their change of knowledge levels and effectiveness of the training programme. The average score of executives in the pre-training test was 10.83 (43.32%) whereas the average score of post-training was 18.43 (73.72%).

Thus, it is found that the level of knowledge of executives was increase by 30.40 percent after the training programme. Details of pre and post-training test are given at Annexure-V.

3.3 Evaluation

Executives rated the overall training program with a score of 9.22 on 10 point continuum i.e. Excellent.

3.4 Post-Training Monitoring

Post-training impact evaluation in respective countries by Program Management Unit (PMU) is an integral part of the programme. PMU will be regularly in touch with executives through emails to monitor the progress of their “Back-at-Work-Plans” and it will help the effective monitoring and impact evaluation which is one of the important aspects of Program Monitoring & Evaluation (M & E).
4. Valedictory, Media coverage and Feedback

4.1. Valedictory

The Valedictory function of Feed The Future India Triangular Training (FTF ITT) Training Programme on "Farm Mechanization of Small farm" at ICAR-CIAE, Bhopal was conducted on April 25, 2017 in presence of Shri Gauri Shankar Bisen, Hon'ble Minister for Farmers Welfare and Agriculture, Govt. of Madhya Pradesh. He congratulated all the participants and the institute for conducting such an important training in an area that relates to livelihood of millions of people across the globe. He emphasized that use of appropriate machinery helps in higher productivity, lower cost of cultivation, lower drudgery and ensures balanced use of inputs/ chemicals thus ensuring higher profits to farmers without harming the environment.

Dr. KK Singh, Director, CIAE assured continued support to the participating countries in future too. He urged all participants to continue ties with India in general and ICAR-CIAE, Bhopal in particular for knowledge and technology development and dissemination.

Dr. Chandrasekhar, Director, MANAGE, Hyderabad informed about the initiative – of hand holding of technology deprived nations – that was initiated with 3 countries, now offers help in different areas to 17 countries of Asia and Africa. He informed that ICAR-CIAE, Bhopal was selected for providing this prestigious training after thorough review of the gaps identified in the sector of agriculture for the concerned countries.

Executives receiving certificate from Shri Gauri Shankar Bisen, Hon'ble Minister for Farmers Welfare and Agriculture, Govt. of Madhya Pradesh
Executives with Shri Gauri Shankar Bisen, Hon’ble Minister for Farmers Welfare and Agriculture, Govt. of Madhya Pradesh, Executives with the dignitaries, Dr. P. Chandra Shekara, Director, PMU, MANAGE, Dr. K.K. Singh, Director, ICAR-CIAE, Bhopal

Executives receiving the Memento from Dr. K.K. Singh, Director, ICAR-CIAE, Bhopal
4.2 Media coverage

There was wide coverage given by Print and Electronic Media some of the clipping of media coverage are enclosed in Annexure VI.

4.3 Feedback from executives

The feedback were received from all the executive participant on all technical sessions taken by resources persons, and field visits. They expressed that the programme was excellent. The feedback received are mentioned in Annexure-IV.
## Feed The Future India Triangular Training (FTF ITT) Programme on Farm Mechanization for Small farmers

For Extension Practitioners of African and Asian Countries

April 11-25, 2017

Venue: ICAR-Central Institute of Agricultural Engineering Bhopal, India

### Participating countries

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<td>Asian Countries [2]</td>
<td>Afghanistan (2), Mongolia (3)</td>
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### Course Director Co-Directors

- Dr KK Singh, Director, ICAR-CIAE, Bhopal, India
- Dr PC Bargale, Head, Technology Transfer Division, ICAR-CIAE, Bhopal, India
- Dr PS Tiwari, Head, Agricultural Mechanization Division, ICAR-CIAE, Bhopal

### Training - Schedule

#### Day-1: 11/04/2017 (Tuesday)

<table>
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<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>0930 - 1000 HRS</td>
<td>Registration</td>
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<tr>
<td>1000 - 1100 HRS</td>
<td>Ice Breaking – Discussion on the proposed programme, content, suggestions, field visits, lodging and boarding etc.</td>
</tr>
<tr>
<td>1115 - 1145 HRS</td>
<td>Interaction with participants on respective country report vis-à-vis course content.</td>
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<tr>
<td>1230 – 1330 HRS</td>
<td>Lunch Break at Hotel Lake View Ashok</td>
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<tr>
<td>1430 – 1630 HRS</td>
<td>Inaugural Function</td>
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<tr>
<td>1630 – 1730 HRS</td>
<td>Visit to Technology Display Hall</td>
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#### Day-2: 12/04/2017 (Wednesday)

<table>
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<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>0930 - 1100 HRS</td>
<td>Planning and land development for small farms</td>
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<tr>
<td>1115 – 1300 HRS</td>
<td>Strategies for promotion of small farm mechanization in African &amp; Asian Countries</td>
</tr>
<tr>
<td>1400 -1530 HRS</td>
<td>Over view of CIAE &amp; Campus visit</td>
</tr>
<tr>
<td>1545 – 1730 HRS</td>
<td>Mechanization of millets production and its primary processing</td>
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#### Day-3: 13/04/2017 (Thursday )

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<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>0930 - 1100 HRS</td>
<td>Mechanization of maize and sorghum cultivation</td>
</tr>
<tr>
<td>1115 – 1300 HRS</td>
<td>Agricultural Machinery Manufacturing – Sector in India &amp; its potential for African &amp; Asian countries</td>
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<tr>
<td>1400 -1530 HRS</td>
<td>Mechanization of pulse and oilseed production</td>
</tr>
<tr>
<td>1545 – 1730 HRS</td>
<td>Calibration, Operation &amp; Repair Maintenance of Seed Drills and Planters</td>
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#### Day-4: 14/04/2017 (Friday ) Holiday – Good Friday

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<th>Time</th>
<th>Activity</th>
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<td>0730 – 1400 HRS</td>
<td>Visit to ITC, e-Choupal, Vidisha &amp; manufacturers of farm machinery, interaction with small farmers – Dr. NS Chandel, Er MB Tamhankar, Dr Chetan Sawant, Dr AP Magar</td>
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#### Day-5: 15/04/2017 (Saturday)

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<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>0930 - 1100 HRS</td>
<td>Animal operated farm machinery</td>
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<tr>
<td>1115 – 1300 HRS</td>
<td>Farm Machinery for small farms in African &amp; Asian countries</td>
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<tr>
<td>1400 -1530 HRS</td>
<td>Practical / Demonstration of tools and machinery related to millet, maize, rice, wheat and sorghum production system</td>
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<tr>
<td>1545 – 1730 HRS</td>
<td>Energy Gadgets for small farms</td>
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#### Day-6: 16/04/2017 (Sunday): Local Educational Visit & Homework and Reading

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**ANNEXURE I – PROGRAMME SCHEDULE**
### Day-7: 17/04/2017 (Monday)

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<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>0930 - 1100 HRS</td>
<td>Status of small farm mechanization in Asia and Africa</td>
<td>Dr CR Mehta, PC, FIM</td>
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</table>
| 1115 – 1300 HRS | Ergonomics & Safety in agriculture and women friendly technologies          | Dr. L. P. Gite, Ex-PC, ESA  
Er. Sweeti Kumari, Scientist |
| 1400 -1530 HRS | Economics and energetics of agricultural machinery                     | Dr. RS Singh, Pr. Sci.   |
| 1545 – 1730 HRS | Covered Cultivation Technologies for small Farmers                     | Dr. K.V.R. Rao, Pr. Sci, |

### Day-8: 18/04/2017 (Tuesday)

0730 HRS: Visit to Central Farm Machinery Training & Testing Institute & (CFMT&TI), Budni&Eicher Tractors, Mandideep – Dr NS Chandel, Er MB Tamhankar, Dr AshutoshPandirwar, PP Ambalkar,

### Day-9: 19/04/2017 (Wednesday)

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>0930 - 1100 HRS</td>
<td>Farm machinery management for small farms</td>
<td>Dr C R Mehta, PC, FIM</td>
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</table>
| 1115 – 1300 HRS | Strategies for promotion of post-harvest technologies and value addition in African and Asian countries. | Dr RP Kachru, Ex-ADG (Process Engg), ICAR  
Dr. L. P. Gite, Ex-PC, ESA  
Er. Sweeti Kumari, Scientist |
| 1400 - 1530 HRS | Farm Machinery for Precision Agriculture                                | Dr. P.S. Tiwari, Head AMD  
Dr BB Gaikwad, Scientist |
| 1545 – 1730 HRS | Farm Machinery for Conservation Agriculture                             | Dr. R.C. Singh, Head, AEP  |

### Day-10: 20/04/2017 (Thursday)

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<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker</th>
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</table>
| 0930 - 1100 HRS | Mechanization of tuber & plantation crops                               | Dr. SJK Annamalai, Head, RC  
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1115 – 1300 HRS | Technologies for post-harvest & value addition for small farms           | Dr. NachikatKotwaliwele Head, APPD  
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1400 - 1530 HRS | Mechanization package for dry land agriculture                           | Dr. DV Singh, Sr Sci., IISR, Indore  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1545 – 1730 HRS | Practical – Design of Farm Machinery using CAD                           | Dr. K.P. SinghSr Sci.,  
Dr Manoj Kumar, Sci.  
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |

### Day-11: 21/04/2017 (Friday)

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<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker</th>
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</table>
| 0930 - 1100 HRS | Mechanization of rice cultivation                                        | Dr. SJK Annamalai, Head, RC  
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1115 – 1300 HRS | Pressurized irrigation system including micro irrigation                 | Dr CK Saxena, Sr. Sci.   
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1400 - 1530 HRS | Testing of Agricultural Machinery                                        | Dr KN Agarwal, PC, EAAL  
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1545 – 1730 HRS | Manufacturing of Agricultural Machinery & Fabrication on Small Tools     | Dr. A.C. Saxena, PS and  
Dr. Dushyant Singh, SS & I/c PPC  
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |

### Day-12: 22/04/2017 (Saturday)

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<th>Time</th>
<th>Activity</th>
<th>Speaker</th>
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</table>
| 0900 - 1100 HRS | Visit to a CIAE adopted village Kachhibarkheda to demonstrate impact of CIAE intervention for mechanization – interaction with farmers | Dr RS Singh, Pr. Sci.  
ER. DK Diwedi, CTO.  
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1115 – 1300 HRS | Small farm mechanization through custom hiring of Agricultural Machinery - Case studies | Dr U.R. Badegaonkar,  
Pr. Sci. & I/c KVK  
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1400 - 1530 HRS | Mechanization of orchard production for small farms                        | Dr. BB Gaikwad, Scientist  
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1545 – 1730 HRS | Mechanization of vegetable production for small farms                      | Dr. AP Magar, Scientist   
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |

### Day-13: 23/04/2017 (Sunday)

Homework and Reading – Preparing for Country Report and Back at work Plan

### Day-14: 24/04/2017 (Monday)

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<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker</th>
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</table>
| 0930 - 1100 HRS | Processing opportunities, post-harvest technology and value addition      | Dr. K.K. Singh, Director, ICAR-CIAE  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1115 – 1300 HRS | Practical on soybean processing & utilization                             | Dr. (Mrs.) S. S Deshpande, PS  
Dr. KK Singh, Director, Chairman  
Dr PS Tiwari, Head, AMD  
Dr PC Bargale, Head TTD  
Dr AC Saxena, PS, TTD  
Dr K P Singh, Sr. Sci., AMD  
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1400 -1530 HRS | Back at Work Plan                                                          |                         
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1545 – 1730 HRS | Feedback of the programme                                                  |                         
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |

### Day-15: 25/04/2017 (Tuesday)

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<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>0930 - 1100 HRS</td>
<td>Valedictory Function</td>
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</table>
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |

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**Tea & Lunch Breaks**

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<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>F/N 1100 - 1115 HRS</td>
<td>Tea &amp; Lunch Breaks</td>
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</table>
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |
| 1530 – 1545 HRS | Lunch                                                                     |                         
Dr. RS Singh, Pr. Sci.  
Dr. K.K. Singh, Director, ICAR - CIAE |
Feed The Future India Triangular Training (FTF ITT)
International Training Programme on
“Farm Mechanization for Small Farmers”
11-25 April, 2017 at ICAR- Central Institute of Agricultural Engineering (ICAR-CIAE),
Bhopal, Madhya Pradesh, India
“For Executives of African & Asian Countries”

List of Participants

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<tr>
<th>S. No</th>
<th>Name and Address</th>
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<tr>
<td>A. Afghanistan</td>
<td></td>
</tr>
</tbody>
</table>
| 1. | Mr. Omid Farhad  
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Danesh-Nawin Agricultural Company,  
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Fax: +267 5921524  
Email: amodukanele@gov.bw, skabomo@gov.bw |
<table>
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<tr>
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<th>Name</th>
<th>Position</th>
<th>Organization</th>
<th>Address</th>
<th>Contact Information</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>Mr. Otisitswe Thapelo</td>
<td>Principal Technical Officer</td>
<td>Department of Crop Production</td>
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</tr>
<tr>
<td>6</td>
<td>Ms. Atchulo Azara</td>
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<tr>
<td>7</td>
<td>Mr. Barkah Nana Kuuku</td>
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<td>Department of Agriculture, GA-East, Abokobi, Greater Accra, Ghana</td>
<td>Tel: + 0553058233, 0502297378, 0244711717, 0574666300 Email: <a href="mailto:triller1a@yahoo.com">triller1a@yahoo.com</a>, <a href="mailto:smaddom@yahoo.com">smaddom@yahoo.com</a>, (Supervisor) <a href="mailto:cbobogh@yahoo.com">cbobogh@yahoo.com</a> (Director)</td>
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<tr>
<td>8</td>
<td>Mr. Macharia Simon</td>
<td>Assistant Director of Fisheries</td>
<td>National Aquaculture Development Centre - Sagana, P.O.Box. 26, State Department of Fisheries and the Blue Economy, Ministry of Agriculture, Livestock and Fisheries, Sagana, Kenya</td>
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<td>9</td>
<td>Mr. Opar Samwel Odoyo</td>
<td>Superintendent Engineer</td>
<td>ATDC Mtwapwa, Ministry of Agriculture, P.O.Box. 244, Mtwapwa, Kenya</td>
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<td>10</td>
<td>Ms. Wangila Catherine Namboko</td>
<td>Senior Assistant Livestock Production Officer</td>
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<td>11</td>
<td>Mr. Paye Archie S</td>
<td>Extension Officer</td>
<td>SAPEC, World Bank Community, Kakata, Margibi County, Liberia</td>
<td>Tel No: (+231)886909306, +231 776267299, +231 886768146 Email: <a href="mailto:archiespaye@yahoo.com">archiespaye@yahoo.com</a>, <a href="mailto:emusuyounn@gmail.com">emusuyounn@gmail.com</a></td>
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<tr>
<td>12</td>
<td>Mr. Woods Basie Konah</td>
<td>General Manager - Project Director</td>
<td>Boss Investment Limited, Ministry of Agriculture, Big Joe Town, Grand Bassa County, Liberia</td>
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<tr>
<td>13</td>
<td>Mr. Chiomba Mathews Mike</td>
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<td>Ministry of Agriculture and Food Security, Salima District Agriculture Office, P.O.Box. 491, Salima, Malawi</td>
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<td>14</td>
<td>Ms. Kalinga Charity</td>
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<td>15</td>
<td>Ms. Muhama Constance</td>
<td>Agriculture Extension Development Officer</td>
<td>Ministry of Agriculture Irrigation and Water Development, Mulanje District Agriculture Office, P.O.Box.49, Mulanje, Malawi</td>
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<td>16</td>
<td>Mr. NarankhuuKhurts</td>
<td>General Agronomist of Selenge Province, Mongolia</td>
<td>Department Crop Production, Food and Agricultural Organization of Province Selenge 6 Bag , SukhbaatarSolum, Selenge Province</td>
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<td>17</td>
<td>Mr. PurevBatjargal</td>
<td>Agri-technical Specialist</td>
<td>Ministry of Food and Agriculture and Light Industry &quot;KhalkhGoI&quot; National Creation and Establishment, Agriculture and Livestock Department</td>
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</tbody>
</table>
|18 | Mr. Tserenpil Zundui                    | Director, Nyambaigaldavaa LLC                           | Ministry of Food, Agriculture and Light Industry of Mongolia, Mongolia                | Tel: +976 99398833
Email: zundui@yahoo.com, mofa@mofa.gov.mn |
|19 | Mr. Danca Jose Manuel Jose               | Technology Officer                                        | National Directorate of Agrarian Extension, Ministry of Agricultural and Food Security, Mozambique
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Fax: +258 21415023
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|20 | Mr. Novidade Ciro Alexander Matlaba     | Supervisor of rural Extension, Planner and Agriculture Technician District Service of Economic Activities | Mozambique                                                                           |
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Email: cironovidade@yahoo.com |
|21 | Mr. Jafer Abubakar                      | Assistant Lecturer                                        | Bukalasa Agricultural College, Ministry of Agriculture Animal Husbandry and Fisheries, P.O. Box 102 Entebbe, Stationed in Bukalasa Agricultural College, Uganda |
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|23 | Mr. Oluka William                       | Farm Officer                                             | Sugar Cooperation of Uganda Limited, Ministry of Education, Science, Technology & Sports, Lugazi, Uganda |
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Email: welomsuccess@gmail.com |
## Activity
- Introduce and aware new technologies to Farmers, some Machinery Manufacture, Agriculture Investors and Agriculture Companies and Medium and Small Enterprises, my vision is to establish a Department in DADs Company, New Technology Consultancy Section (NTCS)
- Women Empowerment that technologies and machineries which is simple for women, and I want to work with ARDEP (Afghanistan rural Development Enterprises Program) in west part of Afghanistan.

## Problem
- Lake of Aware in the section of Machinery and new agriculture technologies
- Harvesting and process have some problems, and Value Chain high cost of agricultural machineries
- Lake of familiar to new technologies in Cultivation, Harvesting & Processing in rural Area.
- The Women income is very low in rural area.

## Indian Experience
- Herat City has large number of small and marginal farmers. Rice and Wheat, saffron, grape, grain Crops. All field operation are done by conventional methods. In this training, number of machineries and equipment's were shown for crop production and post-harvest technologies for these crops.
- Number of technologies for women for crop production and value addition were also shown which can be useful for empowerment of women and providing income source to women. It is my privilege and proud for your Experiences and Innovation that you work in CIAE, I am interested to transfer some technology that you design for Cultivation, Harvesting and Value addition Technologies that is simple and useful for Women and generate his Income.

## Place
Herat City

## Target Group
Farmers, women in Rural Area, Agriculture Investors Enterprises

## Duration
For 1 Years ( 1 May 2017-31-May 2018)

## Expected end result
- Aware and inform the investors, Farmers, SME etc.
- Increase farmers income due to mechanization
- Increase in employment opportunity to Expected to
- Introduce New Technologies and Machinery for 30 Agriculture Company, 200 Farmers and 50 Investors in mentioned Section
- Increase the Production Productivity of Agriculture Investors

## Other Information
Crop Processing and Value Addition Technologies Suitable for Women: Groundnut Decorticator, Double Screen Grain Cleaner with sack holder, Multi Purposed Tray Dryer, Vegetable Dryer, Motherzied Soybean
| Activity | Promote agricultural mechanization policy and strategies for small farmers based on training  
|          | Introduce mechanization package for dry land wheat cultivation  
|          | Promotion of custom hiring of agricultural machineries and technologies |
| Problem | Lack of awareness among the farmers regarding advance technologies  
|          | Poor economic condition of farmers  
|          | High cost of agricultural machineries  
|          | Lack of credit facilities for the farmers especially in case of agricultural machineries  
|          | More framers don’t have access to dry land mechanization and machinery  
|          | Scarcity of water for irrigation |
| Indian Experience | Afghanistan has large number of small and marginal farmers like India. Rice and Wheat are major crops of Afghanistan. All field operation are done by conventional methods. In this training, number of machineries and equipment's were shown for crop production and post-harvest technologies for these crops. These machineries can be introduced in Afghanistan.  
|          | India is operating custom hiring services to the farmers for agricultural machineries which can be introduced in Afghanistan for small and marginal farmers.  
|          | Number of technologies for women for crop production and value addition were also shown which can be useful for empowerment of women and providing income source to women. |
| Place | Provinces of Afghanistan like- Samangan, Kundoz, Takhar, Faryab, Balkha |
| Target Group | Policy makers, Small and marginal farmers, Agricultural machinery manufacturers, Agriculture cooperatives, NGO's |
| Duration | September, 2017 - August, 2020 (3 years) |
| Expected end result | Increase in wheat production and productivity of the country  
|          | Increase in farmers income due to mechanization  
|          | Increase in employment opportunity to youths when demand of agricultural machinery will rise leads to expansion of agricultural machinery industry  
<p>|          | Establishment of custom hiring centres will also provide employment and source of income |</p>
<table>
<thead>
<tr>
<th>Activity</th>
<th>TUBULAR MAIZE SHELLER</th>
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</thead>
</table>
| Problem         | • Small farmers use sticks for shelling dry maize kernels from cobs.  
|                 | • High degree of shelling losses occurs  
|                 | • Time consuming  |
| Indian Experience | • CIAE invented a portable and user friendly maize sheller  
|                 | • Small farmers are able to thresh maize without much drudgery  |
| Place           | Botswana  |
| Target Group    | Maize producers  |
| Duration        | August – October 2017  |
| Expected end result | • Reduction in shelling cost  
|                 | • Timeliness of shelling will be realized  
|                 | • Increase in output capacity  
|                 | • Reduction in drudgery  |
| Other Information | • Maize is one of the major crops grown in Botswana  
|                 | • Government assists maize producers with land preparation, weeding and planting up to five hectares for free.  
|                 | • Does not assist in post-harvest  
|                 | • For demonstration purposes will need about 200 to distribute across the country in every extension area.  |
**Problem**

- Groundnut is one of the cash crops in Botswana, they have higher selling market price and however, the groundnut producing farmers are experiencing losses in terms of damaged nuts, time and labor during post-harvest processes.
- These have led to high importation of groundnuts from neighboring countries.
- All groundnut producing farmers use manual labor for shelling

**Indian Experience**

- Indians have developed a groundnut sheller suitable for small farmers

**Place**

- Groundnuts are mostly planted in the central, north east and west of the country. So the groundnut sheller will be availed at these districts

**Target Group**

- Most growers of groundnuts are dry-land farmers

**Duration**

- The sheller is needed from June 2017 – January 2018

**Expected end result**

- After the supply and training on how to use the groundnut Sheller, the number of farmers growing groundnuts will increase since the losses will be reduced.

**Other Information**

- The country will need 45 groundnut decorticator for the three (3) districts mentioned above. The 3 districts have 9 Agricultural Service Centers (ASC’s) and each ASC will need 5 groundnut shellers.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Reduction in cost and drudgery of transplanting vegetables</th>
</tr>
</thead>
</table>
| Problem                      | - Horticultural farmers use manual labor for transplanting of seedlings from seedbeds which is expensive and time consuming therefore leading to reduction of profits  
    - Botswana imports 80% of the fruit and vegetable demand |
| Indian Experience            | - Development of vegetable transplanter that is suitable for their conditions  
    - To be guided in developing a vegetable transplanter suitable for our conditions |
| Place                        | Botswana                                                 |
| Target Group                 | Fruits and Vegetables producers                          |
| Duration                     | The sheller is needed from June 2017 – January 2018     |
| Expected end result          | - Growth in horticulture production  
    - Reduction on cost and drudgery |
| Other Information            | - The country has 10 districts and 15 agricultural service centres (ASC), so will need 3 per ASC (45) for hire to horticultural farmers  
    - Currently there is a program in place to promote horticultural production |
## Activity
Women Friendly Technologies for Cultivation of Maize, Groundnut and Rice for Empowering Rural Woman

### Problem
- In central Gonja District of Ghana 90% of the agricultural production comes from small scale farmers and about 45% farmers are rural women
- Women constitute the largest percentage of the work force in the agricultural sector, but do not have access to agricultural production resources such as mechanization
- Due to lack of mechanization and women friendly machines, women are mostly using manually operated tools (cutlass and hoe)
- Due to scarcity of labour, farmers broadcast legumes and cereals such as groundnuts, soybeans, maize, which always results into low yield
- In fact the drudgery level for the women farmers in the district is very high and they work in injury prone hazardous situations

### Indian Experience
Participation in this training programme has enhanced my knowledge in mechanized agriculture, especially women friendly machines such as rice seeder, dibblers, dry land and wet land weeders, groundnut strippers, groundnut decorticators, etc. I was amazed to know how women using women friendly tools and equipment can work easily with reduced drudgery and improved crop yield.

### Place
My activities are to be carried out in Central Gonja district in the northern region, Ghana

### Target Group
Rural women and small scale farmers

### Duration
May 2017 - April 2020

### Expected end result
- Improved capacity of woman workers by at least 25% by the use of women friendly machines in Central Gonja district
- Women will be happy with less drudgery by the implementation of Back to county plan
- Women will save their time with use of machines and use this time in some other productive activities
- Women farmers income will increase by increasing production and productivity of the crops

### Other Information
Hence the choice of the topic for successful implementation, I will humbly request the Indian government and USAID through the management of CIAE to help me get the women friendly machines to make my desire to empower women in the Central Gonja district come through.
| Activity | Training and education of vegetable and maize grower framers.  
| Most farmers in my municipality are vegetables growers. |
| Problem | Poor irrigation facility for vegetables and maize growing area  
| High cost of farm equipment  
| Low level of farm mechanization in vegetable cultivations  
| Non availability of small tools and gender friendly farm tools and equipment's |
| Indian Experience | Drip irrigation is most suitable for vegetable and maize growers because it drops water per plants compared to flood and sprinkler.  
| Heavy equipment become a problem on farm land since farmers cultivate on small farms (0.5 - 1.5 acre) So introduction of low cost, small and gender friendly tools on farm necessary.  
| Introduction of power tillers operated vegetable transplants |
| Place | Ga East Municipal, Greater Accra, Ghana, West Africa |
| Target Group | 300 progressive vegetable and maize growers |
| Duration | Three cropping season starting from July 2017 to June 2020 |
| Expected end result | Increase in productivity  
| Better production  
| Increase income  
| Effective and efficient use of water  
| No water wastage  
| Reduce drudgery  
| Time conscious  
| Enhancement of safety is assured |
| Other Information | The government of India and the USAID should assist Ghana farmers in the purchase of power tiller operated machines  
| Also help acquire the drip irrigational facility  
| Training and sensitization should be organized quarterly to refresh the memory of farmers  
| Manual maize Shellers should be introduce to growers  
| Farm machines do not operates on its own, human operates them and since a tractor is an on field slow moving vehicles;  
| The Indian government and USAID should take into consideration to train operators mainly on its safety when operating  
| The USAID, Indian government and Ghana government should collaborate in the funding of these activities. |
### Activity

**Problem**
- Fish farming growth is slow in Kenya due to expensive animal protein source fish feed
- Fish feed require high protein sources raw materials unlike other livestock
- Farmers rely on low protein source materials that are inadequate in type and nutritive requirement
- Farmers empowerment to produce high protein pulses in farm is prerequisite
- This will be through using economical and efficient farm machineries
- Farm-made feeds allow farmer to tailor feed inputs to their own financial resources and requirements, and facilitate the use of locally available agricultural products

**Indian Experience**
- Mechanization of pulses production at farm level will go a long way in problem evaluation
- Farmers will be self-reliant in fish feed production for sustainable fish farming in Kenya
- The machine to be adopted from India will include; Tractor drawn rotavator, Tractor drawn planter, manually operated wheel hoe and hand-operated knapsack sprayer.
- Mulch use coupled with drip irrigation during short rains season will be adopted for the crop farming throughout the year

**Place**
- The proposed Mechanization innovations learned from India will be demonstrated in National Aquaculture Development Centre - Sagana (NADC-Sagana) Kenya. The centre incubates new Technologies and disseminates it to the whole Republic of Kenya.

**Target Group**
- Hatchery operators, organized group of famers, individual farmers, County extension services staff, students (from tertiary institutions, secondary and primary schools)

**Duration**
- 3 years

**Expected end result**
- Increased fish production, increased farmers income and improved food security in the country.

**Other Information**
- The NADC-Sagana has a tractor and mouldboard plough, Fish feed pelletizer. Additional machines will facilitate pulses farming mechanization.
### Activity 1. Land development for increasing agricultural productivity

**Problem**
- The government of Kenya has embarked on many irrigation project to improve agriculture production.
- The project being constructed is for surface irrigation.
- Not all the area in the projects are under used as a result of none leveling of the fields.

**Indian Experience**
- Suitable land development machinery available
- for precision leveling, laser land leveler is very suitable for use in various irrigation schemes being developed by Kenya government

**Place**
- Oluch-kimira, kwale, migori, Turkana
- Tana –Kulalu is a major govt. flagship project in vision 2030

**Target Group**
- Small farmers in the various small schemes
- Government of kenya

**Duration**
5 years

**Expected end result**
- Increased land put under agriculture production
- Increased agriculture productivity
- Increased income for farmers
- Food security for the country
- Improve standard of life

**Other Information**
- Required support and collaboration from the government of India in terms of financial support and human skill

---

### Activity 2. Design and Development of motorized Coconut Grater

**Problem**
- Coconut is widely grown in the coast region of Kenya
- The crop is processed to obtain virgin coconut oil (VCO) which fetches high price
- In processing, the coconut flesh has to be grated.
- A traditional tool called “mbuzi” which has a lot of drudgery is used.

**Indian Experience**
- Mechanization solutions are offered through value chain of various crops. In order to improve the farm income.
- The problems in mechanization ones identified is researched on and design and development solution are made.
- Prototype are developed and tested and ones accepted and innovations is commercialized.

**Place**
- The place will be in the coastal region of Kenya.
- The centre will be at the agriculture technology development centre (ATDC) Mtwapa.
- The centre is mandated to develop and test appropriate farm machinery.

**Target Group**
- Small farmers in the various small schemes
- Government of Kenya

**Duration**
- 3 years

**Expected end result**
- Mechanized package for coconut agro processing
- Increased income
- Improved standard of living of farmers in the coastal area

**Other Information**
- Design and fabrication of prototype for commercialization to be done in collaboration CIAE
### Activity

<table>
<thead>
<tr>
<th><strong>PRESSURIZED IRRIGATION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
</tr>
<tr>
<td>- Water scarcity for crop cultivation as well as for both animal and human</td>
</tr>
<tr>
<td>- Inefficient water harvesting and utilization</td>
</tr>
<tr>
<td>- Food scarcity</td>
</tr>
<tr>
<td><strong>Indian Experience</strong></td>
</tr>
<tr>
<td>- Pressurized and efficient irrigation technologies have been deployed at many places, which need less water for crop production</td>
</tr>
<tr>
<td>- Use the sprinkler irrigation system</td>
</tr>
<tr>
<td>- Drip irrigation systems</td>
</tr>
<tr>
<td>- This technology is used for:</td>
</tr>
<tr>
<td>- Plastic mulching techniques</td>
</tr>
<tr>
<td>- Conservation agriculture technologies</td>
</tr>
<tr>
<td><strong>Place</strong></td>
</tr>
<tr>
<td>- KENYA</td>
</tr>
<tr>
<td><strong>Target Group</strong></td>
</tr>
<tr>
<td>- FARMERS-SMALL SCALE&amp;LARGE SCALE</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
</tr>
<tr>
<td>Two Years: 2017-19</td>
</tr>
<tr>
<td><strong>Expected end result</strong></td>
</tr>
<tr>
<td>- INCREASED WATER EFFICIENCY</td>
</tr>
<tr>
<td>- INCREASED AREA OF IRRIGATION</td>
</tr>
<tr>
<td>- INCREASED ANIMAL FEEDS</td>
</tr>
<tr>
<td><strong>Other Information</strong></td>
</tr>
<tr>
<td>- OUTREACH PROGRAMMES</td>
</tr>
<tr>
<td>- Other machinery such as twin wheel weeder, plastic mulch laying machine, seed-cum-fertilizer drills also needs to be promoted among farmers for timeliness of farm operations</td>
</tr>
<tr>
<td>- Since farmers in Kenya are resource poor, assistance from government will be required for promotion of these technologies</td>
</tr>
</tbody>
</table>

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Activity | Farm Mechanization For Smallholder Farmers of Liberia (FMSOL)
---|---
Problem | • Farmers are not educated and so they find it difficult to operate the machines.
• Land Tenure systems prevent large farm holdings.
• The debris from cleaning, stumping and logs poses an obstacle to mechanization.
• Spare parts are not available locally.
• There is inadequate manpower to servicer the implements and machines in Liberia.
• Farmers are too poor to be able to buy the expensive machines. This makes mechanization too costly to practice in Liberia.
• Farmers cannot effect repair when there is a breakdown.
Indian Experience | • We the executives of Liberia, have discovered that each small farming unit has at least one tractor, plough, rotavator, disc harrow, seeds-cum-fert drill and postharvest machine. Beside that, technologies and innovations in agricultural are major priorities in India.
Place | Grand Bassa County, Bong County, Margibi and Nimba County, Republic of Liberia.
Target Group | • Smallholder farmers in; cassava, corn, coconut, rice, potatoes, yam, sugarcane, Plantain, banana and vegetables.
<table>
<thead>
<tr>
<th><strong>Duration</strong></th>
<th>One to five years periods.</th>
</tr>
</thead>
</table>
| **Expected end result** | • This can referred to how we are going to closely work with our government, creams of the agricultural societies especially men and women who has make their marks in agriculture like Indian scientists, and other internal partners generate funds to find a possible ways of improving agriculture through mechanization in Liberia or our prospect of mechanization in Liberia within five years periods.  
• With the introduction of machines which will suit the nature of crops and types of soil in our environment like: tractor, bulldozer, cassava processer, coconut processor, mobile primary processer unit, raised bed planter, light weight power tiller, self-propelled power weeder, power operator paddy thresher, multi-crops thresher, multi-grain mill, vegetable trans -planter, inclined plate planter, self-propelled rice planter, sugarcane planter and harvester, and automatic sprayer.  
• We strongly believe that there will be agricultural transformation in: yields, productions, storage facilities, transportations, postharvest handling, soil and water management, mechanization to commercialization of farmers produce, enhancement of farmers income generational changes, reductions of food insecurity and poverty will alleviation will exist in Liberia. |
| **Other Information** | • In conclusion to the above problems of agriculture in our localities, experiences of Indian innovations in the various agricultural sectors, expected results, our target groups, project duration, other information's and suggestions that are needed to be provided, we conclude the following;  
• Farmer’s co-operative societies will be establish and supported to pool resources together to buy machines for their members.  
• Machines should be developed locally to suit the nature of crops and types of soil.  
• If Indian government ready want to makes the different in our country, then we suggest that avenue be created for more personnel to be trained to repair, operate and maintain machines in Liberia  
• We will recommend to our government that agro-service centres should be established in the rural areas to make tractors available to farmers at a cheaper rate.  
• We apologized that USAID and the India government to please provide subsidies or funding to support our project so that we can establish farm machinery and post -harvesting hiring units for smallholder farmers to enhance productivity in Liberia.  
• Bank should give enough capital to serious farmers who cannot afford the collateral for the purchase of machines. |
**Activity**  
FARM MECHANIZATION FOR RICE PRODUCTION IN MALAWI

**Problem**  
- For rice production we still depend on man power.  
- There is enough animal population but not suitable animal drawn machinery.  
- Government provides animals with low cost but there are no any animal drawn machines for rice production.

**Indian Experience**  
We have seen a lot of animal drawn and manual operated machinery are available in India for rice production for land and seed bed preparations  
- Improved Bakhar  
- Patela harrow  
- Patelapuddler  
- For sowing  
- Paddy drawn seeder  
- Manual Rice transplanter  
- Weeding  
- Conoweeder  
- Power weeder  
- Harvesting  
- Self-propelled  
- Vertical conveyor reaper  
- Threshing equipment  
- Pedal operated thresher

**Place**  
- Salima, Malawi

**Target Group**  
- Small farmers interested in rice production

**Duration**  
- 3 years

**Expected end result**  
- Mechanization package for rice production  
- High yield of Rice  
- Drudgery will be reduced  
- Saves time  
- Reduce cost of operation

**Other Information**  
In order to achieve farm mechanization in Rice production in Malawi, the following are supposed to be followed:  
- Conduct trainings for the farmers  
- Formation of Farmer clubs and Associations  
- Custom hiring centres  
- Demonstration of different available suitable machinery for Malawi
<table>
<thead>
<tr>
<th>Activity</th>
<th>Farm mechanization and uses of hand tools</th>
</tr>
</thead>
</table>
| Problem  | • Drudgery and un-timeliness operation mainly in weeding due to small farm tools.  
          • Majority of farmers in Malawi use hand tools such as hoes for cultivation. Ensuring timeliness weeding within the critical period of the maize crop, becomes difficult because of drudgery and scarcity of labour during peak agriculture seasons. This results into low production. |
| Indian Experience | During the farm mechanization training in India, I have learnt about the benefits of using farm equipments. Because;  
          • It reduces drudgery as well as the cost of cultivation.  
          • There is timeliness of agricultural operations.  
          • It facilitates conservation and sustainable agriculture while improving the livelihood opportunities, income and environmental sustainability.  
          • It enhances productivity.  
          By using intervention of Twin Wheel Weeder in Maize Crop:  
          • As one way of improving timeliness weeding in Malawi, I would like to introduce the use of twin wheel weeder using some approaches I have learnt from India training “farm mechanization for small holder farmers.” |
| Place | The project will be implemented in group Dzomodya area in Neno District. |
| Target Group | Implementation of Twin wheel weeder among interested men and women farmers (Will start with 30 farmers). |
| Duration | Ongoing project from May – to October, 2017: The farmers will be trained in Maize Production and the importance and use of twin weeder equipment.  
          • From December 2017 to April 2018, will be the implementation of Twin Wheel Weeder in the fields, conduct field days and monitoring of the project. |
| Expected end result | One farm mechanization group of at least 30 farmers will be trained. |
| **Increase in maize production (yields) as well as Income of the existing farmers.** |
| **Farm mechanization group will be able to reach 50 individual farmers through custom hiring.** |
| **Increase in no. of farmers involved in Farm Mechanization.** |

**Other Information**

- The requirement of Twin Wheel Weeder (Total 20) from government of India for group of farmers to learn the benefits.
- The targeted farmers will be identified through awareness meeting on farm mechanization in the area and registering of interested farmers.
- Project replicated in at least 4 groups in the successive years.
- The group will have a custom hiring centre so that other farmers can also be benefited.
- The group will have different types of farm equipment’s used in maize production.
- The group will have agro-processing equipment’s and centre as an income generating activity.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Sowing, Interculture &amp; Threshing of Rice and Maize. Maize-Legume, Rice-Rice are major cropping systems of Malawi with 60% of women in all activities</th>
</tr>
</thead>
</table>
| Problem  | • Improved hand tools and women friendly equipment are not available  
• Lack of available hand tools and equipment, a lot of drudgery on farmers which takes much time for farm operations |
| Indian Experience | • Mechanization in rice cultivation has taken roots in India, hence, increasing production.  
• More tools and equipment have to be introduced in all aspects as far as Agripreneurship in women is concerned.  
• Malawi Government should introduce and procure these improved tools and equipment’s in order to meet farmers demand as we depend much on agriculture. |
| Place    | Cluster villages namely Gojo, Kane, Lufaneti and Mchiwi in Mulanje district southern part of Malawi |
| Target Group | Small scale farmers club (20 clubs with 15 members each in total 300 farmers) |
| Duration | 3 years (November, 2017-october, 2020) |
| Expected end result | • Ultimate developed of cluster villages in respect to rice cultivation which will be beneficial to other parts of the country.  
• Increase in area under rice and maize cultivation.  
• High yield will be obtained.  
• Surrounding Communities will benefit after the intended duration because it will be a pass on.  
• Knowledge transfer to fellow extension workers. |
<p>| Other Information | • Sincerely hope that government of India through Malawi Government will help us in procurement other Improved machinery in all crops in order to achieve rural live hoods. |</p>
<table>
<thead>
<tr>
<th>Activity</th>
<th>Mechanization of Maize Cultivation in Mongolia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>- Summer duration shorter in nature.</td>
</tr>
<tr>
<td></td>
<td>- Maize is only livestock feed.</td>
</tr>
<tr>
<td></td>
<td>- Don’t have irrigation system.</td>
</tr>
<tr>
<td></td>
<td>- Don’t have mechanization in maize crop</td>
</tr>
</tbody>
</table>

**Indian Experience**
- During this training, I have learnt about seed bed preparation, planting, intercultural and weeding, and harvesting machineries in India which is suitable to farmers for maize mechanization in Mongolia.
- The introduction of mechanization package for maize crops in Mongolia which is suitable to commercial farmers.

**Place**
- The implementation of mechanization package for maize crops will be conducted in Selenge Province, Baruunkharaa Soum.

**Target Group**
- Total 15 farmers (10 men and 5 women) in Selenge Province, Baruunkharaa Soum up to 30 ha.

**Duration**
- The duration of this project from 2017 to 2020.

**Expected end result**
- Maximum crop yield by intervention of maize mechanization packages.
- More feed stock available for livestock.
- Training and demonstration to the farmers for better experience on the use of mechanization package for maize production technology.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Zero Tillage Agriculture Machine Utilization for Small Farmers in Mongolia</th>
</tr>
</thead>
</table>
| Problem | • Cultivated soil is small, the rest is hard pan.  
• Low rainfall in the country as a result there is low soil machine in the fields.  
• The traditional cultivation causes soil erosion.  
• Resolution of investment problem. |
| Indian Experience | • During this training, I have learnt about the zero tillage agriculture machine in India which is suitable to small farmers along with soil conservation.  
• Than the introduction of zero tillage machine in Mongolia which is suitable to commercial farmers.  
• Introduction of zero tillage machine along with 25 hp tractor is needed. |
| Place | The implementation of zero tillage agriculture machine will be conducted in Selenga province Baruunkharaa sum Zundui’s area |
| Target Group | Total 20 farmers (15 men and 5 women) in “NyamBaigalDavaa” LLC |
| Duration | The implementation will start from 2017 to 2020. |
| Expected end result | • Minimum soil erosion and maximum crop residue incorporation in soil.  
• High production of crop, with low energy input.  
• Training and demonstration to the farmers for better experience on the use of zero tillage machine/technology. |
| Other Information | The project might be started with necessary budget loan and technology support from Indian Government |
Activity | Micro Irrigation System for Small Farmers in Mongolia
--- | ---
Problem | • Land is undulated.  
• No drainage system available.  
• No electricity available for pumping.
Indian Experience | • During this training, I have learnt about the land leveller machine and micro irrigation system in India which is suitable to level farmers’ field along with soil conservation.  
• Than the introduction of laser land leveller and micro irrigation system in Mongolia which is suitable to commercial farmers.  
• Introduction of Laser Land Leveller along with 80 hp tractor is needed.  
• Introduction of micro irrigation system which is suitable to Mongolian farmers
Place | • The implementation of Laser Land Leveler and Micro Irrigation System will be conducted in Dornod Province KhalkhGol area.
Target Group | • Total 10 farmers (7 men and 3 women) in Dornod Province KhalkhGol area.
Duration | • The duration of this project from 2017 to 2018.
Expected end result | • Maximum use of available water.  
• No water being available to weeds.  
• Maximum crop yield.  
• Training and demonstration to the farmers for better experience on the use of Laser Land Leveller and Micro Irrigation System technology.

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Email: zundui@yahoo.com, mofa@mofa.gov.mn
<table>
<thead>
<tr>
<th>Activity</th>
<th>Mechanization for Cereals, Pulses and Vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>Use of human power in most of the operations during the cultivation and post-harvest of maize, rice, groundnut and vegetables.</td>
</tr>
</tbody>
</table>
| Indian Experience | A lot of experience in manufacturing simple and affordable machinery for small farmers  
• Transfer of technology to small farmers  
• Training of small farms and stakeholders  
• Acquire some (small) machines from India to benefit family sector farmers  
• Share technologies and machinery to Extension officers, research institutions, entrepreneurs and small farmers  
• Identify other machinery that does not exist in Mozambique and include them in the Mechanization Policies and Programs of the Government  
• Coordinate with the Agriculture Development Fund (FDA) and enterprisers to promote the trade of bigger to benefit private sector farmers  
• Promote local manufacturing of machinery |
| Place | Maputo, Gaza and Inhambane Provinces |
| Target Group | Trainings: Technologies officers and Extension Supervisors  
• Machinery: Small farmers associations |
| Duration | 2018 – 2020 |
| Expected end result | Reduced time of operations, giving producers time to do another activities  
• Reduced post-harvest losses and improved final quality produce  
• Trained 7 Technologies Officers, 18 Extension supervisors, 144 Extension Officers and 90 Stakeholders  
• Benefited 5400 small farmers with some production and agro-processing machinery |
<table>
<thead>
<tr>
<th>Activity</th>
<th>Mechanization for Cereals, Pulses and Vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>Use of human power in most of the operations during the cultivation and post-harvest of maize, vegetables and groundnut.</td>
</tr>
</tbody>
</table>
| **Indian Experience**  | Long experience in manufacturing simple and affordable machinery for small farmers  
|                        | Transfer of technology to small farmers  
|                        | Training of small farms and stakeholders |
| **Solutions/innovations:** |  
|                        | Acquire some (small) machines from India to benefit Family sector farmers  
|                        | Share technologies and machinery with Extension officers, research institutions, entrepreneurs and small farmers  
|                        | Coordinate with the Agriculture Development Fund and enterprisers to promote the trade of bigger machines to benefit Private sector farmers  
|                        | Promote local manufacturing of machinery |
| **Place**              | District of Magude |
| **Target Group**       |  
|                        | **Trainings**: Extension officers and stakeholders  
|                        | **Machinery**: Small farmers associations |
| **Duration**           | 2018-2020 |
| **Expected end result** | Reduced time of operations, giving producers time to do another activities  
|                        | Reduced post-harvest losses and improved final quality produce  
|                        | Trained 8 Extension Officers and 15 Stakeholders  
|                        | Benefited 900 small farmers with some production and agro-processing machinery |
### Activity

Establishment of Rain Water Harvesting Structure & Micro Irrigation system for Vegetable Production in Covered Cultivation

### Problem

- Inefficient rain water harvesting equipment’s and its utilization
- Unreliable rains due to climate change
- Limited supply of vegetables compared to the market demand especially during dry season
- Pest and disease attack is common in open cultivation hence low quality and quantity of vegetable

### Indian Experience

**The following technologies should be adopted:**

- Construction of dam for rain water harvesting structure from the roof of houses
- Popularization of micro irrigation system for vegetable production
- Tractor operated/manual ridger for water management.
- Tractor operated/plastic mulch layer for water management.

### Place

Bukalasa Agricultural College

### Target Group

Student and Community especially Women and Youth

### Duration

3 Years

### Expected end result

- At the end of the project;
- Vegetable production will increase by 30%
- Cases of malnutrition among children and expecting mothers will reduce by 20%
- Income status of the community especially women and youth will increase by 15-20%

### Other Information

**Following are locally available resources from the institute:**

- Tractor and disc plough
- One hectare of land
- Human resource for starting the project
**Activity**
- Promotion and use of women friendly technologies
- Promotion and use of covered cultivation technology in production of vegetables

**Problem**
- Due to lack of mechanization and women friendly machines, women are mostly using manually operated tools like hand hoe for all the field operations
- Due to scarcity of labour, farmers are not able to do farm operations timely, thereby reduced production and productivity
- In Uganda (Luweero district) 80% of the agricultural production comes from small scale farmers
- There is low production of vegetables due to lack of improved technologies, the production methods is still poor and production is mainly done in open fields depending on rain fed water
- Limited access to affordable machines and technologies
- Inadequate knowledge in farm mechanization

**Indian Experience**
- From this training, I learnt about women friendly tools and equipment to reduce drudgery in farm operations and use of greenhouse technologies and plastic mulching materials to improve the production of vegetables

**Place**
- Luweero district, Uganda

**Target Group**
- Vegetable farmers, Rural women groups and small scale farmers

**Duration**
- Three years: May 2017 - April 2020

**Expected end result**
- New employment opportunities for woman with reduced drudgery
- Increased food and vegetable production
- Reduction in poverty level

**Other Information**
- Since farmers in Uganda has limited resources, the technologies/equipment required for this activity need to be funded by the Government agencies.
- For success adoption of new technologies the farmers need skill development for operation and maintenance of new machines/equipment
- Training of extension personnel's is required for successful transfer of technologies to the farmers
- For development of new technologies establishment of new research centres is required
<table>
<thead>
<tr>
<th>Activity</th>
<th>Introduction of New Mechanization Technologies for Maize Cultivation among Women Farmers in Uganda</th>
</tr>
</thead>
</table>
| Problem                                                                | - Land preparation is mainly done manually by hand hoe, which is labour intensive, time consuming operation and involves a lot of drudgery  
- Most of the farmers use broadcasting method for planting maize, which leads to seed wastage and uneven plant population resulting in low yields  
- Weeding in maize is also mainly done by hand hoe, which is a slow, labour intensive and drudgery prone operation  
- After harvesting, maize shelling is done by hand, which is a slow and injury prone process as well |
| Indian Experience                                                      | A lot of low cost manually operated and animal operated equipment can be used in Uganda for mechanization:  
- Use of animal drawn ox-plough and clod breaker for land preparation  
- Use of manual/3-row animal operated inclined planter for planting maize  
- Use of twin wheel weeder for intercultural operations in the maize fields  
- Use of Tubular Maize Sheller for separating of dry maize kernels from cob. |
| Place                                                                  | SERERE DISTRICT, EASTERN UGANDA                                                                 |
| Target Group                                                           | WOMEN AND SMALL FARMERS                                                                           |
| Duration                                                               | 3 YEARS                                                                                           |
| Expected end result                                                    | - Timeliness in farm activity will be ensured, which will lead to increased yield  
- Reduced seed wastage and improved crop establishment for subsequent field operations  
- Reduced drudgery among the women farm workers in different field operations  
- Reduced injuries during maize shelling |
## ANNEXURE IV: FEEDBACK

**Feed The Future India Triangular Training (FTF ITT) Programme**

“Farm Mechanization for Small Farmers” for Executives from Africa and Asian Countries

11-25<sup>th</sup> April, 2017 at ICAR-Central Institute of Agricultural Engineering (CIAE), Bhopal, Madhya Pradesh, India

### Executive Feedback

<p>| 1. Pre-Training Test. – Dr. PS Tiwari, Head, AMD, ICAR- CIAE, Bhopal | 8 | 10 | 10 | 9 | 8 | 9 | 8 | 5 | 2 | 9 | 9 | 10 | 9 | 10 | 9 | 10 | 10 | 10 | 10 | 7 | 10 | Avg: 8.74 |
| 2. Planning and Land Development for Small Farms. - Dr. Ramadhar Singh, PS, IDED, ICAR- CIAE, Bhopal | 9 | 10 | 8 | 8 | 9 | 10 | 9 | 7 | 8 | 9 | 10 | 9 | 8 | 10 | 9 | 10 | 10 | 10 | 9 | 8 | 10 | Avg: 9.04 |
| 3. Strategies for Promotion of Small Farm Mechanization in African &amp; Asian Countries. - Dr. Surendra Singh, Technical Advisor, AMMA, India | 9 | 10 | 8 | 10 | 9 | 10 | 9 | 8 | 9 | 8 | 10 | 9 | 10 | 9 | 10 | 8 | 10 | 9 | 10 | 10 | 10 | 9.3 |
| 4. Over View of CIAE &amp; Campus Visit - Dr. PC Bargale, Head, TTD. - Dr AC Saxena, PS, ICAR-CIAE, Bhopal | 8 | 8 | 8 | 9 | 10 | 9 | 8 | 6 | 6 | 9 | 10 | 8 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 9.09 |
| 5. Mechanization of Millets Production and Its Primary Processing. - Dr. KP Singh, SS, AMD, ICAR-CIAE, Bhopal | 8 | 8 | 8 | 10 | 9 | 9 | 7 | 5 | 7 | 10 | 10 | 9 | 10 | 9 | 10 | 9 | 10 | 9 | 10 | 8 | 9 | 10 | 8.87 |
| 6. Mechanization of Maize and Sorghum Cultivation. - Dr B. M. Nandede, Scientist AMD, ICAR-CIAE, Bhopal | 8 | 8 | 8 | 7 | 10 | 9 | 9 | 5 | 9 | 9 | 10 | 9 | 10 | 10 | 10 | 9 | 10 | 9 | 10 | 8 | 8 | 10 | 8.87 |
| 7. Agricultural Machinery Manufacturing – Sector in India &amp; Its Potential for African &amp; Asian Countries. - Dr. Surendra Singh, Technical Advisor, AMMA, India | 9 | 9 | 9 | 9 | 9 | 10 | 8 | 7 | 6 | 9 | 10 | 9 | 7 | 10 | 10 | 10 | 10 | 9 | 10 | 7 | 10 | 8.96 |
| 8. Mechanization of Pulse and Oilseed Production. - Dr P. S. Tiwari, Head, AMD, ICAR-CIAE, Bhopal | 9 | 9 | 8 | 10 | 9 | 9 | 8 | 6 | 8 | 8 | 10 | 9 | 10 | 9 | 8 | 10 | 10 | 10 | 10 | 9 | 9 | 8 | 10 | 8.96 |
| 9. Calibration, Operation &amp; Repair Maintenance of Seed Drills and Planters. Dr NS Chandel, Scientist AMD, ICAR-CIAE, Bhopal | 8 | 8 | 9 | 8 | 9 | 9 | 8 | 6 | 10 | 8 | 10 | 9 | 7 | 10 | 10 | 10 | 10 | 8 | 9 | 9 | 5 | 7 | 10 | 8.48 |</p>
<table>
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<tr>
<th>No.</th>
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<th>Organizers</th>
<th>Speakers</th>
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<tr>
<td>10</td>
<td>Visit to ITC, e-Choupal, Vidisha &amp; manufacturers of Farm Machinery,</td>
<td>Dr. NS Chandel, Dr. Chetan Sawant, Er. Ramesh Sahani, Er. MB Tamhankar, Er. AP magar</td>
<td>Dr. NS Chandel, Dr. Chetan Sawant, Er. Ramesh Sahani, Er. MB Tamhankar, Er. AP magar</td>
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<td>11</td>
<td>Animal Operated Farm Machinery.</td>
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<td>Dr. M. Din, PC, UAE</td>
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<td>12</td>
<td>Farm Machinery for Small Farms in African &amp; Asian Countries.</td>
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<td>Dr. Gyanendra Singh, Ex-ADG [Engg], ICAR</td>
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<td>13</td>
<td>Practical / Demonstration of Tools and Machinery Related to Millet, Maize, Rice, Wheat and Sorghum Production System.</td>
<td>Dr. KP Singh, SS, Dr. Manoj Kumar (FMP), Scientist, ICAR-CIAE, Bhopal</td>
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<td>14</td>
<td>Energy Gadgets for Small Farms</td>
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<td>Dr. KC Pandey, PC, EAAI</td>
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<td>15</td>
<td>Status of Small Farm Mechanization in Asia and Africa.</td>
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<td>Dr CR Mehta, PC, FIM</td>
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<td>16</td>
<td>Ergonomics &amp; Safety in Agriculture and Women Friendly Technologies</td>
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<td>Dr. L. P. Gite, Ex-PC, ESA; Er. SweetiKumari, Scientist, ICAR-CIAE, Bhopal</td>
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<td>17</td>
<td>Economics and Energetics of Agricultural Machinery.</td>
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<td>Dr. RS Singh, PS, AMD, ICAR-CIAE, Bhopal</td>
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<td>Covered Cultivation Technologies for Small Farmers.</td>
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<td>Dr. KVR Rao, PS, IDED, AMD, ICAR-CIAE, Bhopal</td>
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<td>19</td>
<td>Visit to Central Farm Machinery Training &amp; Testing Institute &amp; (CFMT &amp; TT), Budni &amp; Eicher Tractors, Mandideep</td>
<td>Dr NS Chandel, Er. MB Tamhankar, Dr. Ashutosh Pandirwar, PP Ambalkar</td>
<td>Dr NS Chandel, Er. MB Tamhankar, Dr. Ashutosh Pandirwar, PP Ambalkar</td>
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<td>Farm Machinery Management for Small Farms.</td>
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<td>Dr. CR Mehta, PC, FIM</td>
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<td>21</td>
<td>Strategies for Promotion of Post-Harvest Technologies and Value Addition in African &amp; Asian Countries. <strong>Dr. RPKachru, Former ADG (ProcessEngg.), ICAR.</strong></td>
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</tbody>
</table>
| 22 | Farm Machinery for Precision Agriculture.  
- Dr. P.S. Tiwari, Head;  
- Dr BB Gaikwad, Scientist, AMD, ICAR-CIAE, Bhopal |
| 23 | Farm Machinery for Conservation Agriculture -Dr. R.C. Singh, PS, AEPD, ICAR-CIAE, Bhopal. |
| 24 | Mechanization of Tuber & Plantation crops  
- Dr. SJK Annamalai, PS, ICAR-CIAE, RC, Coimbatore |
| 25 | Processing Opportunities, Post-Harvest Technology and Value Addition  
- Dr. K.K. Singh, Director, ICAR-CIAE, Bhopal |
| 26 | Small Tractors And Power Tiller Operated Equipment for Small Farmers  
- Dr. PS Tiwari, Head, AMD, ICAR-CIAE, Bhopal |
| 27 | Practical – Design of Farm Machinery using CAD.  
- Dr. KP Singh, SS, Dr. Manoj Kumar, Scientist, ICAR-CIAE, Bhopal |
| 28 | Mechanization of Rice Cultivation  
- Dr. SJK Annamalai, PS, ICAR-CIAE, RC, Coimbatore |
| 29 | Pressurized Irrigation System Including Micro Irrigation.  
- Dr. CK Saxena, SS, IDED, ICAR-CIAE, Bhopal |
| 30 | Testing of Agricultural Machinery  
- Dr. KN Agarwal, PC, ESA |
| 31 | Manufacturing of Agricultural Machinery & Fabrication on Small Tools  
- Dr. A.C. Saxena, PS, ICAR-CIAE, Bhopal.  
- Dr.Dushyant Singh, SS, ICAR-CIAE, Bhopal |
|   | Visit to a CIAE Adopted Village  
Kachhibarkheda to Demonstrate Impact of  
CIAE Intervention for Mechanization –  
Interaction with Farmers. - Dr RS Singh, PS,  
AMD; Er. DK Diwedi, ICAR-CIAE,  
Bhopal | 9 8 5 4 7 8 8 5 10 10 10 10 9 10 10 8 8 10 9 9 10 8.57 |
|   | Small Farm Mechanization through Custom  
Hiring of Agricultural Machinery - Case  
Studies. - Dr. U.R. Badegaonkar, PS, ICAR-  
CIAE, Bhopal | 9 10 8 6 8 7 8 7 9 10 9 9 7 10 10 10 9 10 10 10 4 10 8.61 |
|   | Mechanization of Orchard Production for  
Small Farms. - Dr. BB Gaikwad, Scientist,  
AMD, ICAR-CIAE, Bhopal | 8 9 7 5 8 8 8 6 6 10 10 10 7 10 10 10 9 9 10 10 5 10 8.48 |
|   | Mechanization of Vegetable Production for  
Small Farms. - Dr. AP Magar, Scientist,  
AMD, ICAR-CIAE, Bhopal | 8 9 7 7 7 10 9 8 9 10 10 10 8 10 10 10 9 9 10 10 10 9.13 |
|   | Technologies for Post-Harvest and Value  
Addition for Small Farms. - Dr. NachikatKotwaliwale, Head, APPD,  
ICAR-CIAE, Bhopal | 9 9 8 7 7 7 10 9 9 10 10 10 8 10 10 10 10 10 10 10 9.26 |
|   | Practical on Soybean Processing &  
Utilization. - Dr. SS Despande, PS, CESPU,  
ICAR-CIAE, Bhopal | 9 9 9 8 5 9 9 10 8 10 10 10 9 10 10 10 10 10 10 10 9.35 |
|   | Post Training Test. - Dr. PS Tiwari, Head,  
AMD, ICAR-CIAE, Bhopal | 9 8 8 7 9 8 10 10 10 10 10 9 10 10 10 8 10 10 9 10 9.59 |
|   | Back at Work Plan | 9 9 9 10 10 9 10 8 10 8 10 6 10 10 10 8 10 9.15 |
|   | Food Facility | 8 8 7 7 5 7 10 8 10 10 10 10 8 10 7 9 7 10 10 10 10 8.74 |
|   | Accommodation Facility | 9 7 6 6 10 10 8 10 10 10 10 10 9 10 8 10 9 9 10 10 10 10 9.14 |
|   | Transport Facility | 8 6 6 6 4 8 6 5 10 10 10 10 10 10 10 7 8 7 10 9 7 10 8.67 |
|   | Overall Impression about Training Program | 9 9 8 7 7 9 10 7 9 9 10 9 10 10 10 10 10 10 9 10 9.22 |
# Pre and Post Training Test Evaluation Report of FTF ITT Programme

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<tr>
<th>Sl. No.</th>
<th>Executive name-Country</th>
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<th>Pre-Test Score (Max 25 Marks)</th>
<th>Gain Score (Post-Pre Scores)</th>
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<td>Mr. OtisitsweThapelo, Botswana</td>
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<td>Ms. Nakitto Sarah, Uganda</td>
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**Average Score**: 18.43, 10.83, 7.61, 30.4
ANNEXURE VI: MEDIA REPORTS
भारतीय कृषि की तकनीक अपनाएंगे नौ देशों के किसान

भारत, अफगानिस्तान और मंगोलिया सहित अफ्रीकी महाद्वीप के 7 देशों के किसान फसलों का उत्पादन बढ़ाने के लिए भारतीय कृषि तकनीकों और उपकरणों का सहारा लेने उठे हैं। इन देशों के उच्च स्तरीय प्रशिक्षकों ने इन तकनीकों और मशीनों का 15 दिवसीय प्रशिक्षण नवीनिताय स्थापित केंद्रीय कृषि अभियांत्रिकी संस्थान में लिया। प्रशिक्षण कार्यक्रम का समापन मंगलवार को कृषि मंत्री गौरींद्र सिंह ने किया। उन्होंने प्रतिभागियों की प्रशंसा की और उन्हें उपलब्धि में हारा।

भोपाल। अंतर्राष्ट्रीय प्रशिक्षण कार्यक्रम का समापन सनायी मंगलवार को कृषि मंत्री गौरींद्र सिंह ने समाप्त किया।