



IITA
Youth Agripreneurs
Agriculture is the future

TRAINING WORKSHOP REPORT

TRAINING YOUTHS FROM BORNO STATE OF NIGERIA ON AGRIBUSINESS



VENUE: IITA KANO STATION, NIGERIA
3RD – 24TH SEPTEMBER, 2014

Report Submitted by
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1. INTRODUCTION

1.0. Workshop Background

Unemployment has become a major concern in most African countries, including Nigeria. In Nigeria the national unemployment rate is about 24% and 70% of these are youths. The high rate of youth unemployment is one of the factors responsible for restiveness, violence and crime among Nigerian youths. To address this problem, both central and state governments are creating and generating opportunities for gainfully employing the youths in productive sectors of the economy especially agriculture.

In August 2012, a team of young, energetic and talented Nigerian National Youth Corp (NYSC) members, who were trained at the International Institute of Tropical Agriculture (IITA) Headquarters, Ibadan, established the IITA Agribpreneurs (IYA). IYA is an independent agribusiness enterprise involved in the production, processing and marketing that cuts across the value chains of cassava, banana/plantain, soybean and maize as well as the production and marketing of vegetables and fish. These activities are in consonance with the transformation agenda (ATA) of the Federal Ministry of Agriculture. The overall goal of IYA is to re-orientate rural youths towards more productive engagement in agriculture through expanded opportunities in agribusiness, service provision, and market-orientated agriculture in a manner that also offers secondary benefits to the larger communities.

In recognition of the urgent need to empower youths in some other parts of Nigeria, with the capacity to generate wealth from agriculture and reduce unemployment among youths by providing opportunities in agribusiness, the IYA in collaboration with the N2 Africa project organized a training workshop on **“Agribusiness, a key to productive youth engagement”** from 3rd- 24th of September, 2014 at the IITA Kano Station, Kano. The workshop was supported by the Bill and Melinda Gates Foundation under the N2 Africa Borno Program.

This report presents the proceedings of the workshop.

1.1. Workshop Goal and Objectives

The overall goal of the workshop is to enable youths from southern Borno to increase their Knowledge in sustainable crop and fish production practices and develop the entrepreneurial skills in agribusiness to promote self-dependence and promote the replication of the IYA model.

The objectives of the training workshop are to:

- Build the capacity of youths to embrace agriculture and agribusiness as income generating activities by training them on the best practices across value chains of appropriate commodities
- Develop their entrepreneurial skills in agribusiness to promote self-dependence
- Facilitate the replication of the IYA model in Borno State.

These objectives were achieved through lectures, practical demonstrations, plenary discussions, and field excursions. At the end of the training, the trainee participants were provided materials in the form of e-books and removable disks (flash drives) containing the presentations.

1.2. Participants at the Training Workshop

The participants at the training comprised various groups and individuals which included the following.

1.2.1. Trainees: The trainees consisted of 20 participants, (13 males and 7 females) from southern Borno State. They studied various disciplines (science, technology, social sciences, arts,) in tertiary institutions. The complete list of the trainees is given in Table 1.

Table 1. List of trainees from southern Borno State that attended the IYA training workshop, IITA Kano Station, 3rd- 24th September, 2014

S/N	NAME	LGA	GENDER	PHONE
1	Richard M. Wakama	Biu	Male	07034505250
2	Ali Maidugu Adamu	Biu	Male	07035582285
3	Mohammed Adamu	Biu	Male	08166425278
4	Mohammed Zubairu	Biu	Male	07069043793
5	Zianab Emmanuel Tarfa	Biu	Female	07067449055
6	Zainab Yalma	Biu	Female	07035229670
7	Rebecca Haruna	Biu	Female	07069155108
8	Gabriel Mohammed	Hawul	Male	08064748036
9	Mairo Sikta	Hawul	Female	08038862242
10	Mercy HarunaWakama	Hawul	Female	08065127024
11	Abubakar Maina	Hawul	Male	08167968680
12	Abdullahi Ibrahim	Hawul	Male	07066301611
13	Jeremiah Emmanuel	KwayaKusar	Male	07035997015
14	Rejoice D. S. Yanga	KwayaKusar	Female	08029152009
15	Suleman Maina	KwayaKusar	Male	07087450518
16	Hajara Bitrus Chama	KwayaKusar	Female	08084141015
17	Usman Adamu	Bayo	Male	07068369621
18	Abdullahi Umar	Bayo	Male	07036572376
19	Saidu Idrisa	KwayaKusar	Male	07087450518
20	Mohammed Adamu	Bayo	Male	07069511661

1.2.2 Trainers: IITA Youth Agripreneurs

S /N	NAME	GENDER	PHONE	E-MAIL
1	Owoeye Molayo	Female	07069387567	owoeyemolayo@gmail.com
2	Dawodu Olabisi	Female	08058153609	dawoduolabisi@gmail.com
3	Odusanya Oludare	Male	07038587093	ibuksreda@gmail.com
4	Ibironke Ifedayo	Male	07069141525	ifedayoibironke@gmail.com
5	Adefioye Adebayo	Male	07036724144	adefioyedayo@gmail.com

1.2.3. Resource Persons from IITA

The following staff of IITA Kano Station made presentations which are indicated below their respective names.

1. **Dr. Alpha Kamara:** Using stakeholders' platform to increase the productivity of cropping system in the Nigerian savannas.

2. **Mr. Reuben Solomon:**
 - Cowpea production in Nigeria
 - Farming systems in the developing world
 - Maize agronomy and farming systems
 - Safe and effective use of pesticides for crop production
 - Guide to certified seed production of maize, cowpea and soybean
 - Soybean production in Nigeria

3. **Mr. Gbenga S. Olutayo:**
 - Provided field tour of IITA Agronomy trials and foundation seed production at IITA Shika (Zaria) Station.

4. **Dr. Emmanuel A. Sangodele**
 - Keynote Address

1.2.4. Resource Persons from ICRISAT

The following scientists of ICRISAT- Nigeria made presentations which are indicated below their respective names.

1. **Dr. Hakeem Ajeigbe**
 - Improving the productivity of small holder-farmers in the dry savanna of West Africa through research and extension partnership

2. **Dr. Babu N. Motagi**
 - Groundnut seed production

3. **Dr. Ignatius Angarawai**
 - Sorghum and millet production

4. **Mr. AliyuAdinoyi**
 - Post harvest mechanization for sorghum, millet and groundnut

5. **Mr. Abubakar H. Inuwa**

- On farm extension activities and dry season groundnut seed production

1.2.5. Programme Manager, Borno State ADP: (Alhaji Sani Meedugu)

Opening remarks for the training program and gratitude to the Bill and Melinda Gates Foundation (BMGF), donor for the N2Africa –to – Borno Project

1.2.6. Administrative/Support Staff of the IITA Kano Station

1. Alhaji Ado S. Rabo (IITA Kano Station Administrator): Overall administrative support.
2. Mr. Aliyu Isa Gude (Admin Assistant): Support to the Station Administrator
3. Mr. Segun Agbejule (Station Accountant): Financial matters
4. Ms Kaka T Bukar (Admin Assistant): Tea/ coffee break and refreshments
5. Mr. Andrew Ibrahim: Flight reservations and airport formalities

1.3. Workshop Program

The 3-week training workshop covered the following three themes:

- Sensitization and changing the mindset of youths
- Production, marketing and utilization of crops (sorghum, pearl millet, maize, cowpea, soybean, and groundnut) and fish
- Facilitating the existence of a viable youth in agribusiness group in Borno State.

The detailed daily programme for the 3 weeks is present in Annex 1

2. PRESENTATIONS AIMED AT SENSITIZATION AND CHANGING OF THE MINDSET OF YOUTHS

This section summarizes presentations aimed at sensitizing the youths from southern Borno to regard agriculture as a viable, rewarding business venture. The presentations were also intended to effect change in the mindset of the trainees not to regard agriculture as a profession for the aged and uneducated, but as a profession that could gainfully provide employment for graduates of tertiary educational institutions along the commodity value chains

2.1. Highlights of Remarks Made During Opening Ceremony

The opening ceremony on September 3, 2014 was attended by the IITA-Kano Station Manager (Dr. Alpha Kamara), the N2AfricaCountry Coordinator (Dr. Emmanuel Sangodele), the Program Manager, Borno State ADP (Alhaji Sani Meedugu) and his deputy (Mr. Teli), five members of IITA Youth Agripreneurs (IYA), the trainees from Borno State, and some of the resource persons.

2.1.1. Opening remarks by Dr. Alpha Kamara

The IITA-Kano Station Manager and N2Africa-Borno Coordinator, Dr. Alpha Kamara, welcomed participants to the training workshop. He informed the participants that the IITA was hosting the workshop as a component of its activities as the Manager of N2Africa Project which is focusing on legumes. Dr. Kamara noted that the N2Africa Scientist (Dr. E. Sangodele) would provide more information about the project. He, however, emphasized that participants and other stakeholders must regard agriculture as a business to benefit from all these initiatives. Finally, it was noted that a good proportion of the training topics would be taken by members of IYA.

After Dr. Kamara's remarks, the participants introduced themselves, with each participant stating his/her name, the present occupation and what he/she studied at tertiary institution.

2.1.2. Key Note address by N2Africa Country Coordinator, Dr. Emmanuel Sangodele

The N2Africa Country Coordinator (Dr. Emmanuel Sangodele), welcomed participants to the workshop. He noted that 54% of Nigerian youths (aged 15 to 35 years) are unemployed, and that the high youth unemployment rate is one of the factors associated with different types of crimes among the youths. To reduce this problem, IITA has taken the bold step of training Borno youths in agribusiness, aimed at improving food and nutrition security of farmers. Specifically, N2Africa, in collaboration with IYA, was launching agriculture-based job creation campaign in Borno State to eradicate unemployment among the youth.

N2Africa involves **“Putting nitrogen Fixation to work for smallholder farmers in Africa”** through enhancing the yield of grain legumes and expanding the area cropped to legumes. N2Africa's **Vision of Success** is to build sustainable, long-term partnership to enable African smallholder farmers to benefit from symbiotic N₂-fixation by grain legumes through effective production technologies, including inoculants (which are expected to increase yields by 20%) and fertilizers (NPK), which are expected to increase yields by another 20%.

The project is planned to last for four years, starting August, 2014. It is specifically focused on the youths. It is funded by Bill and Melinda Gates Foundation (BMGF)

2.1.3. Opening remarks by the Program Manager, Borno State ADP

The Program Manager, Borno State ADP, Alhaji Sani Meedugu, welcomed participants to the workshop. He thanked Bill and Melinda Gates Foundation (BMGF) for generously funding the N2Africa project for Borno State. The PM was particularly grateful to IITA for training Borno youths in agribusiness, thereby reducing youth unemployment. He recalled, with gratitude, the previous roles of IITA in changing the farming systems of Borno through several past projects, such as PROSAB project, DTMA project, and Tropical Legumes project.

The PM urged the trainees to make maximum use of the opportunities to pick up skills being offered at the workshop; they should be prepared to impart what they have learned to four or more other youths on their return to Borno State. He wished the workshop huge success

2.2. Exploiting Agribusiness to Unlock Jobs: (Presented by Ms. Owoeye Molayo- details, including many photographs, are in removable disk given to each of the trainees)

This presentation described the genesis of IITA Youth Agripreneurs (IYA) and their achievements to date.

- i. **Youth unemployment statistics:**
 - Unemployment rate in rural areas of Nigeria increased from 4.8% in 2006 to 24.2% in 2010.
 - The youths account for 70% of unemployed people in Nigeria
 - Borno youths unemployment rate was 6.4% in 2002 and 29.1% in 2011.
- ii. **Challenges to youths in agribusiness:** The following are some of the challenges confronting the youths to adopt agriculture as a business
 - Lack of access to land for farming
 - Lack of practical agricultural knowledge
 - Lack of start-up capital
 - Lack of entrepreneurial skills
 - Poor access to market for sale of agricultural produce
 - Poor delivery of agricultural services
 - Inconsistent government policies
 - Poor infrastructure (roads, electricity, piped water, etc.)
 - Security challenges for young women working on farms
- iii. **To overcome the above, we need to:**
 - Change the perception of African agriculture as a business, one that offers rewarding economic opportunities along the various commodity value chains
 - Restructure agriculture to make it more productive, efficient, profitable and competitive

- Rebrand agriculture as a vibrant and enterprising sector

iv. Motivational call for action by the Director General (DG) of IITA

- The DG of IITA (Dr. Nteranya Sanginga) in 2012 convened a meeting of graduates of widely different academic backgrounds doing their NYSC service at IITA
- The DG encouraged them to consider actualizing his vision of using agriculture as a platform for unlocking jobs for the youths in Africa.
- With the above motivation and empowerment, the youths:
- Formed into value chain groups
- Were provided with office space and facilities at IITA
- Were trained and exposed to agribusiness workshops
- Visited seed companies in Nigeria and various ministries of agriculture
- Visited Songhai farm in Benin Republic
- Were trained in crop production and baking of breads containing 5-40% cassava flour
- Were linked to large scale processing centers and donors currently producing seeds of various types (cowpea, maize, soybean) and planting materials (cassava, plantain) and catfish

v. Objectives of IYA

- To increase the availability of improved quality planting material
- To reduce the unemployment rate among the African youths
- To serve as a model for youth
- To provide extension services

2.3. Agribusiness: Key to Productive Youth Employment (Presented by Ms Dawodu Olabisi- details in a flash drive given to each of the trainees)

i. Reasons why youths perceive agriculture as unattractive

- Lack of investment from the government
- Inability to incentivize involvement of the younger generation
- Young, ambitious people think that agriculture is meant for the old and is not a means to good living

ii. Nigerian youths perception of Agriculture

- Agriculture is a job for the poor
- Agriculture is an occupation of last resort
- It is a job for the idlers
- It is practiced in rural areas while youths dislike village life

iii. Definition of agribusiness

Agribusiness is the business of agricultural production which involves agrochemical, breeding, crop and animal productions, distribution, farm machinery, processing and seed supply as well as marketing and retail sales.

Agribusiness encompasses all activities that are relevant to the eventual production, transformation/value adding, distribution and retailing of food, fiber and associated products.

iv. Major types of agribusiness in Nigeria

- **Crop production:** production of crops and sale of crop produce
- **Livestock production:** rearing of various animals and sale of animals and animal products
- **Poultry keeping:** rearing of various types of birds and the sale of poultry and poultry products
- **Fish farming:** rearing and sale of fish
- **Agricultural support business:** these provide support services, e.g., extension services, input supply, etc.

v. **Agricultural value chain :** A system that links producers, processors, marketers, food service companies, retailers and supporting groups such as shippers, research groups and suppliers

vi. Reasons to involve youths in agribusiness

- Need to replace present ageing farmer population with younger farmers.
- The need to exploit potential, diverse opportunities that exist in agribusiness: better and fuller exploitation of these opportunities requires young people that are generally more educated and innovative than older farmers
- Need to reduce unemployment: the various activities of agribusiness offer opportunities, productive employment of youths along the value chain.
- Youths are generally more educated than older farmers and are consequently better able to make productive use of ICT
- Involvement of the youths in agribusiness is one approach to reduce rural-urban migration

vii. Opportunities for youths in agribusiness

- Input supply (agro chemicals, planting materials, etc.)
- Farm management / production / entrepreneurship
- Processing (value addition / processing of products)
- Wholesale, retail, exporting
- Research
- Agricultural consultancy

2.4. ICT in Agribusiness (Presented by Mr. Adefioye Adedayo - details in a removable disk given to each of the trainees)

i. **Agribusiness** in the present context means enterprise which involves

- Retailers such as supermarkets and convenience stores
- Food processors and manufacturers
- Suppliers of inputs (e.g. seeds, fertilizers, pesticides, farm machinery)
- Wholesalers, traders or processors

- ii. **ICT (Information Communication Technology) is defined** in several ways, but in this context, **ICT is defined** as an electronic means of meeting information, communication and knowledge needs of farmers and agribusinesses.
- iii. **Characteristics of ICT:** for a tool/device to be considered as an ICT, it must have majority of the following characteristics: E- collaboration, interactivity, mobility, market transparency and affordability, in addition to being sensible.
- iv. **Agricultural production: Entry point of ICT in Agribusiness**
 - With respect to agricultural production, ICT increases efficiency, productivity and sustainability of enterprises
 - ICT provides information about several aspects of agricultural production including:
 - Pest and disease control
 - Early warning systems
 - New varieties and methods to optimize their production
 - Regulation for quality control
- v. **Market access: Entry point of ICT in Agribusiness**
ICT improves access to market information, intelligence, and knowledge through:
 - Reduced logistics and transportation costs
 - Improved negotiation power
 - Sophisticated marketing plan based on price information
 - Broader and deeper networks
 - Innovative partnership
 - Informed use of inputs
 - Improved farm business management
- vi. **ICT provides product-based information systems, including:**
 - General overview of the market
 - Product specification
 - Market issues
 - Key contacts

2.5. Using Stakeholders' Platform to Increase the Productivity of Cropping Systems in the Nigerian Savannas (Presented by Dr. A. Y. Kamara – details in removable disk provided to each trainee)

- I. The linear approach (research – extension - farmer) to agricultural research and development has not been effective in delivering the product of research to farmers and other stakeholders.
- II. The linear approach has now been replaced by the participatory research and extension approach (PREA) which uses the innovation platform to enhance agricultural productivity and income of rural farmers along the value chain.
- III. The PREA involves a series of activities consisting of social mobilization (entering communities and building trust), community analysis (identifying local organizations and institutions, feedback to community, raising awareness, identifying needs and problems), action planning (prioritizing needs and problems, searching for solutions, mandating local institutions and action planning), and self evaluation and planning for the next learning cycle

The PREA was used to implement the integrated *Striga* management project in Kano and Bauchi states, with three objectives

Objective 1: Develop partnership and strengthen stakeholders' capacity in **Striga** research, technology development and application. Results attained under objective 1 included:

- Formation of coalition of groups of partners (research, extension, input dealers, policy makers, agro-processors, seed companies, farmer organizations and outfits)
- Meeting held in Kano with partners to plan and undertake a complimentary set of activities
- Stakeholders meeting held in Bauchi to plan and undertake complimentary set of activities

Objective 2: Use new tools and methodologies to better understand **Striga** biology and to develop new technologies for its effective control. Achievements under this objective included:

- Screened more legumes to identify more promising cultivars capable of inducing suicidal **Striga hermonthica** germination that will be used in rotation with cereals
- Developed and evaluated combinations of new **Striga** control options to generate integrated packages

Objective 3: Deploy and disseminate existing effective **Striga** control technologies in Kano and Bauchi. The presentation gave tables that showed effectiveness of several technologies in the control of **Striga**, including the following.

- Effect of maize/soybean rotation on the control of **Striga hermonthica** in maize
- Effect of **striga** resistant cowpea varieties on control of **Striga gesnerioides** in cowpea
- Effect of maize-soybean rotation and nitrogen fertilizer application on control of **S. hermonthica** in maize
- Effect of imazapyr seed treatment on maize grain yield and **Striga** count
- Effect of herbicide treatment of MSM- resistant maize on **Striga** emergence and maize yield on farmers' field.

2.6. Improving the Productivity of Small-Holder Farmers in the Dry Savannas of West Africa Through Research and Extension Partnership (Presented by Dr. Hakeem A. Ajeigbe – details are in removable disk given to each of the trainees)

The presentation was given under several subheadings, including:

- Constraints to production
- Probable solutions
- Implemented activities
- Partnership/collaboration opportunities

- Constraints to crop production** listed included: low soil fertility and drought stress, diseases and pests, lack of inputs
- Constraints to livestock production included:** poor/inadequate livestock nutrition, diseases and pests, inadequate housing of small ruminants during wet season, and low productivity/potentials of local livestock breeds

Probable solution to the above included appropriate research, reduction of drudgery, deployment of research results, competitive market, availability of finance and collaborative partnerships

The following have been achieved through research

- Effective use of inputs (fertilizers, pesticides, etc.)
- Use of resistant and improved crop varieties
- Use of improved cropping systems
- Improved quantity and quality of livestock feeds, including use of crop residues
- Improved veterinary services and housing

At ICRISAT, drudgery has been reduced through the design and local fabrication of the following:

- **Multipurpose planter:** designed to adjust to the recommended spacing of pearl millet, sorghum and groundnut; it is animal-drawn, fabricated on demand in Kano; Output: 1ha/day
- Multipurpose thresher: handles a wide range of cereal crops; fully motorized; locally fabricated in Kano by Dandago Agro-machinery Construction.
- Multi-purpose hammer mill: for cereal flour; motorized diesel engine; fabricated by the above company in Kano
- Groundnut oil extraction machine: produces oil and cake; motorized diesel engine
- Manually operated kneader groundnut oil extractor: uses already milled groundnut; designed for rural women

iii. Discussed the following extension methods

Linear approach, (b) Innovation platform (participatory research and extension approach; farmer field school), and (c) Private extension service providers (agro input dealers, seed companies and processing companies)

The linear approach is out- modeled

The participatory research and extension approach (PREA) is currently the most acceptable.

It involves farmers and their local organizations in all stages of research and development including defining research agendas and protocols, conducting field operations, evaluating results and disseminating important findings. Its advantages are that it:

- Ensures that appropriate local technical knowledge is utilized
- Motivates farmers participation
- Allows technologies to be better compared and adopted to local conditions
- Stimulates farmer-to-farmer exchange and technology dissemination

iv. Partnerships involve collaboration among multiple institutions and organizations including national and international research institutes, extension service providers, input and output markets, policy makers, farmers and farmer groups, financial institution, training institution, and donor agencies.

3. PRESENTATIONS AIMED AT IMPROVING TRAINEES' KNOWLEDGE OF PRODUCTION, HANDLING AND MARKETING OF AQUACULTURE AND SELECTED CROPS

This section highlights the presentations on the production, and (where appropriate) handling and marketing of aquaculture and selected crops (cowpea, soybean, groundnut, maize, pearl millet and sorghum). These presentations were aimed at educating trainees that are not farmers while up-dating the knowledge of practicing farmers among the trainees. The section also includes presentations on agricultural production – related topics, including cropping systems, seed production, and appropriate use of pesticides.

3.1. Cowpea Production (Presented by Mr Reuben Solomon – details are in removable disks provided to each of the trainees)

- i. Seeds should be treated with benomyl-containing, fungicide (Apron Plus or Apron Star) before planting.
- ii. **Sole-crop cowpea** should be planted at spacing of: 50cm x 20cm (for erect vars), 75cm x 25cm (for semi-erect vars), and 75cm x 50cm (for prostrate vars); sow 3 seeds/ hill and thin to 2 stands at 2 weeks after planting.
- iii. Plant **intercropped or relayed cowpea** at spacing of 75cm x 50cm about 4-6 weeks after planting the cereal component (maize, sorghum or pearl millet).
- iv. For strip intercropping, adopt 2 rows of cereal to 4 rows of cowpea **Fertilizer application:** Apply 15 kg/N/ha (for poor soils) plus 30 kg P/ha, for all soil types
- v. **For weed control:** apply mixture of paraquat and pendimethalin within 2 days of planting; subsequently weed first at 2 weeks after planting (WAP) and secondly at 4-5 WAP
- vi. **To control field insect pests:** Apply 3 sprays of mixture of cypermethrin and dimethoate, apply first spray at 4 – 5 WAP, later apply the second spray 10 days after the first spray and the third spray 10 days after the second spray.
- vii. Current recommendation for control of storage pest (cowpea bruchid) is to use triple bagging technique but keep rodents away from the bags

3.2. Soybean Production (Presented by Mr. Reuben Solomon – details are in removable disks provided to all trainees).

- i. Late– to medium-maturing soybean vars perform well in southern and northern Guinea savannas of Nigeria while short-duration varieties can be cultivated in the Sudan savannah.
- ii. Because soybean seed germination declines during storage, it is vitally important to conduct germination test for seed intended for planting:
 - Plant 4 replicates of 100 seeds per replicate (in wooden boxes or seedbed) at 1 seed/hole at a distance of 10cm between holes
 - Water morning and evening
 - Start counting seedlings from 5 days after sowing and continue for next 5 days
 - To obtain a good stand, the germination rate should be 85% or higher
 - When germination is 80% or less, the seed rate should be increased to achieve 100% germination.
- iii. **Planting date:** June/July in northern and Southern Guinea savannah; July in Sudan savannah

- iv. Sowing of Soybean is by hand or by drilling:
 - Plant 4 to 5 seeds/hole at spacing of 75cm between rows and 10cm between stands, or
 - Drill seeds at 50 – 75 cm between rows and 5cm within rows
 - Do not sow seeds more than 2 -5cm deep
- v. **Apply fertilizer** at rate 30kg P/ha in form of single super phosphate and 2.5 x 50kg bags of NPK, 15:15:15, both applied at land preparation during harrowing and levelling the field.
- vi Manual weed control: First weeding at 2 WAP and second at 5 – 6 WAP
- vii **Chemical weed control:** Apply pre-emergence herbicide (pendelin or metaforce) followed by manual weeding at 5 -6 WAP
- viii **Control of Insect Pests:** to control pod-sucking bugs, apply single spray of mixture of cypermethrin and dimethoate IOEC at rate of 100ml in 15L of water.
- ix **Control of diseases:** Use high quality seeds treated with fungicides (benomyl + mancozeb) and use disease resistant vars and rotate soybean with maize.
- x **Harvesting:**
 - Harvest when 85%of pods have turned straw-coloured (for non-shattering vars) or when 80% of pods have turned straw-coloured (for shattering vars)
 - Cut mature plants at ground level (using cutlass, hoe or sickle)
 - Stack cut plants on tarpaulin and allow them to dry in the open for 2 weeks before threshing
 - Do not harvest by hand-pulling
- xi. **Threshing** can be done manually or mechanically when the plants are properly dry
- xii. **Storage:** Store soybean ideally at moisture content of 10% or less

3.3 Maize Production (Presented by Mr. Reuben Solomon – details in removable disk provided to each of the trainees)

- (i) **Site selection:** Use fields that have been cropped to legumes (cowpea, soybean or groundnut) or cotton; fields coming out of fallow are also suitable.
- (ii) **Land preparation:** Prepare land for planting a few days before planting to enhance weed re-growth for effective control with herbicides.
- (iii) **Seed treatment:** Dress seed with metalaxyl-containing fungicide (eg Apron Plus or Apron Star).
- (iv) **Planting date:** Depends on previous history of rains in the agro-ecological zone but it is recommended to plant after 2-3 consecutive rains.
- (v) **Planting/Spacing for sole maize:**
 - Seed rate: 20-25kg maize seed per hectare
 - Sow 2 seeds/hole, spaced 25cm on 75cm ridge and thin to 1 plant/hill at 2 WAP, or
 - Sow 3 seeds/hole, spaced 50cm on 75cm ridge and thin to 2 plants/hill at 2 WAP
- (vi) **Fertilizer application:**
 - At sowing or 7 to 10 days after sowing, apply 6-8 bags (300-400kg)of NPK (15:15:15) per hectare, or
 - At sowing, apply 8 bags of NPK (20:10:10) plus 100kg (2 bags) of SSP/ha
 - Apply 2-3 bags (100 – 150kg) of urea/ha, 4-5 WAP
 - When applying fertilizer to growing plant, dibble the fertilizer into the soil about 5-7cm away from plant stand

(vii) **Weed control with herbicides:**

- **Pre-sowing:** Prepare field for planting and leave for 2-3 weeks for weeds to emerge; then apply non-selective contact herbicide containing glyphosate (e.g., Round Up)
- **Pre-emergence:** Apply selective herbicide (e.g., diuron, Lasso GD or atrazine) at recommended rate, 1 day after sowing
- **Post-emergence:** Apply selective post-emergence herbicide (e.g., 2, 4-D or atrazine) on growing weeds

(viii) **Manual weeding:**

- Do manual weeding just before the second dose of fertilizer

(ix) **Wearing personal protective clothing:**

- When applying pesticides (herbicides, insecticides or fungicides) wear personal protective clothing as recommended on the label

(x) **Disease control:**

- Plant varieties and hybrids resistant to various diseases, including Striga
- Apply Aflasafe to control aflatoxin contamination caused by *Aspergillus flavus*

(xi) **Harvesting:**

- Harvest as soon as maize cobs are mature; time of harvesting depends on type of maize var planted (extra-early, early, intermediate or late) and utilization (as fresh cobs or as grains)

(xii) **Storage of cobs:**

- Remove all rotten cobs, debris and other contaminants
- Spray all harvested cobs with insecticides (e.g., Actellic) to prevent field pests from getting into the store
- Dry the cobs on a flat concrete surface
- Store dried cobs in cribs and wrap the legs of the cribs with smooth metal sheets (rat guards) to prevent rodents from climbing up into the cribs
- Spray the cribs and the cobs at regular intervals with Actellic

(xiii) **Storage of grains:**

- Shell the maize
- Pack the grains in 100kg Bagco sacks
- Fumigate bags with one tablet of phostoxin placed in middle and sew the mouth tight
- Clean a well-ventilated area, place the wooden slates or slabs on the floor and stack the maize bags on them
- Spray the bags at regular intervals with Actellic

3.4 Sorghum Production (Presented by Dr. Ignatius Angarawai – details in removable disk provided to each trainee)

- (i) Site selection, and preparation and planting time:**
 - Well-drained loamy soil of high fertility
 - Freshly prepared 75cm ridges
 - Planting should be done soon after the rains are well established
- (ii) Spacing:**
 - Inter-row spacing, 75cm, intra-row spacing: 25 – 30cm
 - Plant 6 -8 seeds/hole at depth of 2.5cm
- (iii) Seed treatment and fertilizer application**
 - Treat seed with Apron Star 50DS, Super Homai or Lexan to improve germination
 - Apply 64kg N/ha, 32kg P/ha and 30kg K₂ O/ha at planting
 - If possible apply 5 -10 t/ha of manure
- (iv) Weed control:**
 - Pre-emergence herbicides can be applied not later than 2 days after planting on a weed-free seedbed
 - To control Striga, Rottboellia, sedges and spear grass, application of glyphosate (as Round Up or Delsate or Touchdown) at rate of 3.5L/ha is recommended
- (v)** To control loose smut and head smut (which are visible at heading), pull out the whole plant from the farm and burn it
- (vi) Harvesting and threshing**
 - Harvest as soon as crop is mature, especially the farafara types, to avoid shattering which causes crop loss
 - Threshing can be done mechanically, using the threshing machine, 1-2 weeks after harvesting at moisture level of about 14%
- (vii) Drying**
 - Dry seeds as quickly as possible in the sun to about 10-11% moisture content
- (viii) Storage:**
 - To control storage pests (namely, grain moth, *Sitotroga cerealella*, and grain weevil, *Sitophilus* spp) store sorghum grain in airtight containers or triple bags with a phostoxin tablet per 100 kg grain.
- (ix) Specific recommendation for seed production**
 - Seed production plot should be 500m away from any sorghum pollen source
 - Cluster 5 ha with one var and harvest 3 ha from centre, if isolation is not viable.

3.5. Pearl Millet Production (Presented by Dr. Ignatius Angarawai – details in removable disk given to each trainee)

i. Site selection, land preparation and planting time

- Sandy loam, well-drained soil, rich in organic matter
- Plant on 75cm ridges prepared well at the onset of rains
- Planting at the beginning of early rains

ii. Spacing:

- Plant at inter-row spacing of 50-75cm and intra-row spacing of 25-30cm. Plant 6-8 seeds/hole at 2-3cm deep; thin to 2-3 plants/stand after a rain. Aim at a plant population of 50,000/ha

iii. Seed treatment and fertilizer application:

- Dress seed before sowing with Apron Star 50DS, super homai, or Lexon to enhance germination
- Apply 60kg N/ha, 30kg P/ha and 30kg K₂O/ha using compound fertilizer (15:15:15) at planting and urea top dressing at 4-5 weeks after sowing
- Apply 5-8 t/ha of farmyard manure or compost during land preparation

iv. Weed Control:

- Spray about 4 L/ha of Gardoprim“A” (as pre-emergence herbicide) at planting or within 2 days after sowing.
- For heavy Striga infestation, apply Bladexpowder at 2 kg/ha in 200-250L of water, using knapsack sprayer.
- Weed manually 2 or 3 times

v. Pest and disease control

- To reduce build-up of stem borers, destroy crop residue by burning or composting
- To control downy mildew, remove and burn or bury crop residue; this reduces disease incidence in the following season.

vi. Harvesting and threshing:

- Harvest when the grains are hard during suitable dry period
- Dry the heads further after removing them from the field
- Thresh on clean slabs, to avoid contamination

vii. Storage of grains

- Treat millet destined for storage for 6 months or longer with phostoxin; alternatively grains can be stored in triple bags
- Store bagged grains under shade in a protected building.

viii. Special recommendation for seed production

- Seed production plot should be 1000m away from any source of millet pollen
- Cluster 10ha and harvest 5 ha from the centre, if isolation is not possible.

3.6 Groundnut Seed Production (Presented by Dr. Babu N. Motagi – details are available in removable disk provided to each trainee)

i. Site selection

- Use well drained and fertile sandy loam or loamy soil
- Avoid water-logged soils
- Preferably, select field that was not grown to groundnut in the immediate past season
- Groundnut performs well on heavy soils but great losses may occur during lifting of pods at harvest and thus is not advisable

ii. Land preparation

- Clear the field of all shrubs and stubbles before ploughing
- Preferably, harrow and ridge groundnut plots
- Adopt minimum or zero tillage where the soils are fragile and prone to erosion

iii. Planting

- Sow groundnut immediately after rain is established, this means that planting should be done as soon as there is adequate, and consistent moisture in the soil to ensure good seed germination and subsequent plant growth

iv. Seed rate and spacing:

- Use 35-40kg of seed/ha
- Planting spacing is 75cm inter-row and 20cm intrarow
- Sow 2 seeds per hole at depth of 4-5cm; cover seeds properly and compress soil slightly to avoid picking by birds and rodents

v. Plot isolation requirements:

- A minimum of 3 metres isolation is required for both the foundation and certified seed production

vi. Fertilizer application:

Note: Groundnut has been reported to respond better to residual fertility than to direct fertilizer application

- If fertilizer is needed, it should be broadcast and incorporated into the soil during land preparation
- Apply 0.0kg N, 54kg P₂O₅/ha and 25kg K₂O/ha
- If groundnut crop follows a well fertilized cereal crop, then 2 bags of SSP/ha is sufficient

vii. Weed Control:

Note: Groundnut does not compete effectively with weeds, especially during the first 3-6 weeks after sowing

- Once the canopies are formed groundnut plant can suppress emergence of weeds
- Both manual and chemical weed control are acceptable in groundnut seed production
- The most effective way is to apply a pre-emergence herbicide followed by one or two mechanical or manual weeding: this keeps the crop free of weeds after emergence

viii. Control of diseases and pests

- For groundnut rosette disease, use resistant vars, e.g., SAMNUT 25 and SAMNUT 26
- Treat seeds with Apron Plus or Apron Star to control seedling and root diseases
- Early sowing reduces severity of leaf spot diseases and groundnut rosette disease
- Burning or deep ploughing of crop residue reduces initial inoculum of leaf spot diseases

- Insect pests can be controlled with insecticide sprays, e.g. dimethoate 30EC at 650 ml/ha

ix. Roguing:

- Remove all diseased plants and off-types in the groundnut seed production plots; remove also volunteer groundnut plants

x. Harvesting:

- Harvesting should be done as soon as 70 -80% of the pods have matured and seeds are plump and show true colour of the variety
- Keep harvested plants inverted, with the pods facing upwards, for 2 or 3 days; this allows faster drying of the pods and prevents fungal growth

xi. Drying and storage:

- Store only well-dried pods
- Store groundnut unshelled (in pods), to avoid deterioration
- Store in bags in dry store and protect them from rodents and storage insects

3.7 Guide to Certified Seed Productions of Maize, Cowpea and Soybean (Presented by Mr Reuben Solomon – details in removable disk provided to each trainee)

(i) What are good seeds?

- Good seeds are pure (of the chosen variety), full and uniform in size, viable (with more than 80% germination) and free from weed seeds, seed-borne diseases, live insects or other foreign matters. Every seed package should have a label.

(ii) Why farmers should use good seeds:

- Good seeds give better germination (over 80%)
- They reduce need for replanting
- Good seeds give uniform plant stands and more vigorous early plant growth which helps the plant to compete better with weeds and resist insect attack and seedling diseases
- They give higher yields

(iii) Types of seeds: there are 3 types of seeds:

- Breeder Seed: produced by plant breeders in research institutes and universities
- Foundation Seed: Produced from breeder seed given to National Agricultural Seed Council or private seed companies
- Certified Seed: produced from foundation seed by trained farmers

(iv) Site selection for certified seed production:

- Select flat, fertile, well drained land that is exposed to the sunlight and not prone to erosion
- Avoid land with a lot of stones and fields that had been used to produce another variety of the same crop in the previous year
- Avoid field infested by pernicious weeds like Striga, Rottboellia, sedges, etc.

(v) Field isolation distance: very critical step that ensures high quality seeds

- Seed producer should consult neighbors to find out what they intend to grow and when they plan to plant them during the season
- Field isolation distance for Maize: 400 – 600 m of land free of any other maize in all directions

- Field Isolation distance for Cowpea and Soybean: 5 -10 m of land free of any other cowpea or soybean variety in all directions
 - Certified seeds can also be grown in farms which are isolated by natural barriers, e.g., hills and forests.
 - If possible, the purpose of isolation can be accomplished by persuading owners of surrounding farms to grow the same variety intended for seed production
 - For maize, isolation of seed field can be achieved by planting the seed field 30 days earlier or later than neighboring maize fields in the area.
- (vi) **Agronomic practices:** All agronomic and management practices for certified seed production are the same as those for routine production of the various crops
- (vii) **Field inspection and roguing**
 - Regular field inspections are critical to identify off-types and to remove them before they pollute the seed farm
 - Conduct field inspection at vegetative, flowering, pre-harvest and harvest stages
 - Walk in the farm in a clockwise direction and identify and pull out diseased plants and off-types in the field
 - Removing off-types and diseased plants before the visit by external inspectors (from National Agricultural Seed Council) will save farm from being rejected
- (viii) **Seed processing:** The purpose is to produce clean and adequately graded seeds that are free of all foreign matter, e.g., plant debris, dust, dirt, diseased and cracked seed, weed seeds, and seeds of other varieties.
 - Sort out and remove immature cobs (for maize) and pods (for cowpea and soybean) and diseased seeds, seeds of different colour from the majority of the produce.
- (ix) **Seed purity standards for certified Seeds**
 - Ensure your seeds meet standards prescribed by the Nigerian Seed Law (e.g 97% pure seeds, maximum of 0.05 weed seed and other crop seeds, maximum of 3% inert matter, minimum of 80% germination and maximum of 14% moisture content)
- (x) **Seed packaging and labeling**
 - Package clean and pure dry seeds in 1,2,5,10,25 and 50kg packs
 - Label each pack properly, indicating the crop, variety, date of germination test, percentage germination, purity, and moisture content, the farmers' name as seed producer or the company's name, and contact address.
- (xi). **Producing and marketing certified seeds**
 - Farmer may serve as an out grower to a larger private seed company; in that case the farmer signs a contract agreement with company which may provide the foundation seed and other inputs.
 - The farmer should bargain well and agree on a competitive selling price with the seed company
 - Marketing and sale of seeds will be the responsibility of the company.

3.8 Safe and Effective Use of Pesticides (Presented by Mr Reuben Solomon – details in the removable disks given to each trainee at the end of the program)

This presentation was actually a general presentation on pesticides. The information on the safe use of pesticides was provided at the end of the presentation.

The general topics on pesticides treated in the presentation included: pesticide names (chemical, common and commercial product names); some definitions; types of formulations; gross classification of pesticides by chemistry; classification of organic herbicides by chemistry; classification of organic insecticides by chemistry; basic chemical groups for herbicides; mode of action of herbicides; mode of action of insecticides; persistence and degradation of pesticides; pesticide movement and degradation. After all the above (up to 70% of the material covered), the following points were made about safety of pesticide use:

(i) Application safety:

- One must comply with label guidelines
- Always wear appropriate personal protective clothing/equipment (gear)
- Clean, service or replace personal protective clothing/equipment regularly

(ii) Pesticide gear recommended:

During mixing and filling of pesticides:

- Goggles/face shield, head gear, apron, boots, gloves, full respirator with dust filter,
- During application of pesticides
- Boots, gloves, goggles
 - ❖ When handling spills
 - ✚ Wear all personal protective clothing and equipment recommended by the manufacturer of the product that spilled

(iii) Pesticide poisoning symptoms: These vary with: type of pesticide, part of body exposed, amount of pesticide absorbed and health of the individual. Onset of symptoms can occur suddenly or gradually

(iv) Symptoms of pesticide poisoning by fungicides in general include:

Headache; skin irritation; sweating; muscle twitching or fatigue; coughing, hoarseness and chest pain; and burning sinuses, throat and lungs.

(v) Symptoms of pesticide poisoning by phenoxy herbicides include:

Skin and eye irritation; mouth and throat irritation; abdominal pain; diarrhea; chest pain; muscle twitching or weakness.

(vi) Symptoms of pesticides poisoning by arsenical herbicides include:

Mild skin irritation; ingestion may result in burning of throat, stomach irritation, vomiting and bloody diarrhoea

(vii) Symptoms of poisoning by insecticides in general include:

Headache; blurred vision; abnormal eye pupils; greatly increased sweating; salivating; respiratory secretions.

(viii) Symptoms of mild poisoning by cholinesterase inhibiting insecticides

Fatigue, dizziness, blurred vision, excessive sweating, salivation, nausea, vomiting, stomach cramp, diarrhoea

- (ix) **Symptoms of moderate poisoning by cholinesterase inhibiting insecticides include:**
Inability to walk, weakness, chest discomfort, pinpoint pupils
- (x) **Symptoms of severe poisoning by cholinesterase inhibiting insecticides include:**
Unconsciousness, severe pin point pupils, muscle twitching, secretions from mouth and nose, breathing difficulties, coma and death.
- (xi). **First aid for poisoning from dermal exposure:**
- Remove contaminated clothing
 - Drench skin with water
 - Wash body with soap and water
 - Wash body and rinse repeatedly in water
 - Dry body and wrap in clean clothing
- (xii). **First aid for poisoning due to inhalation exposure:**
- Get to fresh air
 - Do not attempt rescue in enclosed area without proper respiratory gear
 - Keep victim clam
 - Prevent chilling but do not overheat
 - Loosen tight clothing
 - Resuscitate, if necessary
 - Keep air passages clear
- (xiv) **First aid for poisoning due to eye exposure:**
- Immediately wash eyes with gentle stream of water, but use large amounts of water; continue eye washing for up to 15 minutes
 - Use pure water only
 - Seek medical attention if there is pain or reddening of the eye
- (xiv) **First aid for oral exposure:**
- If pesticide has entered the mouth but not swallowed: rinse mouth thoroughly many times
 - If pesticide is swallowed: follow label instruction on whether to induce vomiting

NOTE

In all cases, seek immediate medical attention; in this regard, take the package of the pesticide (with the label) along with you.

3.9. Fish Farming: Catfish Hatchery and Production (Presented by Mr. Ibironke Ifedayo- details in removable disk given to all trainees)

(i) Definitions of:

- Hatchery: place for artificial breeding, hatching and rearing through the early life stages of fish
- Broodstock: Group of mature individuals used in aquaculture for breeding purposes
- Hatching: The mechanical and enzymatic process of breaking the egg shell and release of larvae
- Fingerlings: Second stage of fish growth; usually between 5-8 weeks old
- Juvenile: A stage at which fish is ready for the on-growing pond, usually between 2-4 weeks after fingerling stage

(ii) Requirements for successful fish hatchery

- Regular and adequate maintenance of good water quality
- Availability of brood stock from reliable stock
- Availability of quality feed
- Experienced hatchery supervisor
- Proper management and availability of market

(iii) Biosecurity measures in hatchery: These include stocking with certified, disease free brood stock; use of pathogen-free water supply; and availability of disinfection facilities

(iv) Identification of male and female brood stock: The criteria are in flash drive provided to trainees.

(v) Criteria for selecting broodstock: These were specified and are detailed in flash drive given to each trainee

(vi) Hatching procedure and fertilization

- Identification of breed and brood stock to use and purchase from reputable source
- Condition brood stock before use and separate male from female
- Measure 0.5ml of ovaprim injection at 1kg body weight, using syringe and needle, mixing ovaprim with 30% saline water.
- Inject female at back either towards the neck (for big-size fish) or tail (for small-sized fish)
- Observe latency period of 10 hours between injecting female and stripping the egg

(vii) Collection of milt (semen) from male brood stock: This technical procedure was described and is available in the provided flash drive.

(viii) Collection of egg and fertilization: These processes were detailed during the presentation and are available in the removable disk given to each trainee.

(ix) Management practices in the hatchery:

- Siphoning: Removing dirt or mortality from base of tanks using either hatching net or pump daily
- Chlorination: Mixing chlorine with water to disinfect tanks and hatchery environment
- Grading/Sorting: Maintain equal sizes of fingerlings or juveniles to avoid cannibalism by shooters or jumpers
- Salting: The use of industrial salt as anti-stress agent and neutralize water acidity.
- Stocking: Transferring graded fries, fingerlings or juveniles to the tank and allowing acclimatization of fishes with the water present in the tank for 5 minutes before pouring directly into the tank.

- Flushing: Cleaning sedimentation block and the inside of tanks with water blown with pressure

(x) Transportation of fingerlings and juveniles

- Leave fingerlings in clean water for 24 hours without feeding before transporting them to farms
- Transport fingerlings in well-oxygenated polythene bags with water to reduce stress, or in plastic cans with the top cut open
- Transport them very early in the morning or late in the evening when sun is down

3.10 Fish Farming: Fish Pond Systems and Management (Presented by Mr. Ibrinke Ifedayo – details are in removable disk provided to all trainees)

• Definitions of:

- Aquaculture: The breeding, rearing and harvesting of plants or animals in all types of water environment (ponds, river, lakes and the ocean)
- Fish Farming: The principal form of aquaculture involving raising fish commercially in tanks and pond, usually for food
- A Pond: Water where the fish are raised or reared under a manageable, controlled condition

(ii) Types of pond (two main types):

- Excavated pond (earthen pond), often built on level terrain and its depth achieved by excavation
- Concrete pond: confinement of water in various sizes, shapes and styles made of brick, concrete, stone or tile

(iii) Steps involved in earthen pond construction

- Clearing of proposed site
- Setting out: pond space determination
- Marking – out the inlet and outlet area
- Topsoil removal and storage
- Construction of embankment/dykes
- Construction of inlet drainage pipes/water control structures
- Construction of screen at both inlet and outlet

(iv) Steps involved in concrete pond construction

- Clearing of proposed site
- Setting out: pegging and lining with rope
- Topsoil stripping to form strong basement
- Surface blinding with concrete mixture (sharp sand, cement and gravel/granite at ratio of 3:1:6)
- Block laying and stuffing of holes with concrete mixture
- Placement of water inlet and outlet pipes
- Plastering of tanks

- (v) Concrete pond preparation prior to stocking:** The activities include the following in this order: brush washing of tank; leaving tank to dry for 1- 2 days; filling tank with water; fertilizing tank and water left to stand for 4 weeks; flushing out water and lime- washing tank; brush washing tank walls; allowing washed tank to stand for 1 day; and re-impound with water and fertilizing at least 3 days before stocking

- (vi) **Application of lime:** Apply lime evenly on the pond surface and leave on the pond surface and leave for about 24 hours before filling the pond with water.
- (vii) **Fertilization of pond:** Apply either organic fertilizer (chicken droppings, cow dung or pig manure) or inorganic fertilizer (NPK, K₂O or urea).
- (viii) **Stocking management**
- Leave the bag of fingerlings in the pond for 5 mins without opening it
 - Make a solution of 4% salt with pond water and transfer fingerlings into the salt solution; leave them in the solution for 2 minutes
 - Drain out the salt solution and release fingerlings into the pond
- (ix) **Feeds and fishing system**
- Fish do best when fed right quality and quantity of feed at fixed times and position
 - Catfish perform best if fed only the amount they will finish in 5 – 10 minutes
 - Catfish should be fed 7 days a week
 - Spread feed out over a large surface of the pond
- (x) **Weed Control**
- All aquatic weeds should be removed from the pond surface as soon as they appear
 - Grasses on dykes should be maintained manually by slashing or mechanically to prevent predators
- (xi) **Correction of low dissolved oxygen in the pond:**
- (NOTE:** Causes and signs of low dissolved oxygen were given in the presentation)
- Reduce water in pond and refill with fresh water as this contains higher oxygen level
 - Pump oxygen into the pond
 - Stop feeding for some days and resume feeding when dissolved oxygen has been corrected
 - Reduce feeding rate, if problem persists
- (xii). **Ammonia management**
- Avoid excessive feeding and stop feeding until excess ammonia present is corrected
 - Flush and allow fresh water into the pond
- (xiii) **Control of Fish Predators** (e.g., water snakes, turtles, crabs, frogs, alligators, and water birds):
- Ensure regular cleaning of pond sides
 - Fence pond site and screen the top
 - Protect the pond from flood water
 - Hunt predators by using traps
- (xiv) **Harvesting tips:**
- Harvesting is done either by drag netting or by cast netting (in case of small ponds) or by draining the pond
 - Stop supplementary feeding a day before harvesting date

4. PRESENTATIONS AIMED AT FACILITATING ESTABLISHMENT OF VIABLE YOUTH IN AGRIBUSINESS IN BORNO STATE AS A PIONEER MODEL

4.1. The IYA Organogram (Presented by Ms. Owoeye Molayo – details in removable disk provided to each trainee)

The first step in replicating the model among the youths of Southern Borno State is to understand the IYA organizational structure (organogram). The basic IYA organogram consists of three departments ((i) Partnership and Marketing, (ii) Production and Operation and (iii) Administration and Logistics), all three of which report to a Steering Committee (Annex 2). The Production and Operation department comprises three units, namely,

- i. Roots Tubers and Vegetables,
- ii. Fisheries and Livestock, and
- iii. Cereals and Legumes.

Similarly, the Partnership and Marketing department consists of three units:

- i. Marketing and Processing,
- ii. Capacity Building, and
- iii. Communications, ICT, and Monitoring and Evaluation.

On the other hand, the Administration and Logistics department is the financial department and has no sub-units.

Thus, the Borno youths have to decide how to structure their organization to take care of their probable six crops and fish farming. The IYA Steering Committee comprises reputable individuals under the chairmanship of the DG.

It is expected that the Borno youths will find a suitable Steering Committee.

4.2. Introduction to Business Development (Presented by Mr Odusanya Oludare - details are in removable disk given to each trainee)

The essentials of business development are highlighted below as a guide to Borno youths.

- i. Business development can be **defined** as the creation of long-term value for an organization from customers, markets, and relationships.
- It is the key to successfully sustain a business enterprise
- ii. **Four stages of business development are:**
 - a. Start up stage ,
 - b. Growth stage,
 - c . Maturity stage and
 - d. Declining stage.

(a) Startup stage: Business is born and legally exists and is producing products/services; requires adequate investment of time, effort, energy and money to create stable customer base; characterized by innovation, high risk and low profit margins.

(b) Growth stage: At this stage, decision is taken to expand and enhance products and services, with increasing customer demand as sales and profit margins also increasing.

(c) Maturity stage: Characterized by stable monthly income and good number of loyal customers; Sales require less effort and borrowing becomes easier, although competition remains fierce

(d) Declining stage: Characterized by lack of product innovation while costs are cut to preserve profits which are usually low as market shrinks

iii Product level of business development:

- Is the more appropriate among the 3 levels (product, commercial & corporate)
- At product level, business development involves developing a new product or technology. It may be either incremental development (which increases functionality of an existing product /technology) or disruptive development (which involves developing new products from scratch)

iv Characteristics of a business developer:

- Works to improve the organization's market position to achieve financial growth.
- Helps to build key customer relationships
- Identifies business deals
- Helps to manage existing clients and ensures that they stay positive and satisfied

4.3. Concepts of Entrepreneurship (Presented by Mr. Odusanya Oludare - details are in flash drive given to each trainee)

(i) Concept of entrepreneurship: Entrepreneurship is the capacity and willingness to develop, organize and manage a business venture along with any of its risks in order to make profit.

It is essentially the pursuit of opportunity without regard to resources currently controlled.

(ii) Definition of entrepreneur: An entrepreneur is:

- Someone who organizes, operates, and manages a business while taking greater than normal risk, or
- A person who creates and innovates to build something of value around perceived opportunities

(iii) Characteristics of an entrepreneur:

An entrepreneur, among other things is:

- Determined , energetic and self-confident
- Goal-oriented and able to act quickly
- Creative, motivated and innovative
- One that spots and exploits opportunities
- A good team builder and networker
- Audacious about challenging the system
- One that accepts failure without feeling defeated
- Curious and optimistic

(iv). Steps on how to become an entrepreneur:

(a) First thing to do is to determine:

What the product should be:

- Is it brand new or an existing product?
- Is it good enough and will it withstand test of time and competition?
- How will it be made available to the public and at what price?

What the product's geography should be:

- Who are the customers?
- How will it reach or attract customers?
- Where will products be sold?

(b) Secondly consider the following:

- Formation of legal ownership and determine whether enterprise is solely owned or is corporate
- Sources of resources to do the business
- Availability of skills to do the enterprise

(c) Other things to Consider:

- Is it profitable?
- Is there a ready market for the product?
- What are the risks involved?

(v) Strengths of an entrepreneur include:

- Being one's own boss
- Having luxury to choose what he/she wants to produce
- Being able to determine what the business would look like
- Being master of his/her time

(vi) Etiquette of an entrepreneur:

- Take what you do seriously
- Plan everything
- Manage money wisely
- Remember, it is all about the customers
- Project a positive business image
- Build top-notch business team
- Invest in your staff and be accessible
- Build a rock- solid reputation
- Master the art of negotiation

(vii) Why entrepreneur are few: the following are some of the reasons:

- Insecurity of lives and property
- Unstable political system which increases uncertainty
- Non-availability of cheap sources of energy
- Poor transportation system (roads, railway and waterways)
- High capital lending rates

4.4. Book-keeping and Accounting (Presented by Ms Dawodu Olabisi - details in flash drive given to each trainee)

1. **Bookkeeping:** the process of recording in chronological order, the daily transactions of a business entity.
2. **Accounting:** interpreting, classifying, analyzing, reporting, and summarizing financial data
3. **Users of accounting Information are the following:**
4. Managers, general staff members, internal auditors, sales staff, budget officers and controllers of funds

(i) Types of farm records:

- (a) **Inventory records:** Complete listing (number, weight, size, value, year acquired) of all tangible farm property, e.g., machinery, buildings, livestock and supplies. It is usually taken at both beginning and end of the production year.
- (b) **Farm receipts record:** Whenever a payment is made, a receipt of that payment should be obtained
- (c) **Production record:** Record of physical quantities of crops and livestock produced and the corresponding inputs used to produce them
- (d) **Payroll/Labour record:** Used to determine the relative share of the input in total production cost as well as ascertain labour efficiency information in this record; this may include category of employee, wage rate for operations, like planting, harvesting, etc.
- (e) **Farm operation record:** This records several farm operations on the farm. It shows type of operations, amount of labour, type of machinery used, time taken, the area worked, material inputs used, including their quantity and unit costs

(ii) Balance sheet:

- This is a document that summarizes the assets and liabilities of a business venture at a particular point in time
- It determines the financial position of an organization at a particular point in time
- It gives a snapshot of picture of performance of business from figures in accounting books that were not used in calculating the profit and loss statement

(iii) Some facts about balance sheets

- **Capital:** resource owned by owner of business
- **Assets:** all resources in the business
- **Liabilities:** assets supplied by other people whom are owed by the business
- **Current assets:** resources with short life, or can be converted into cash in a year
- **Long-term assets:** resources acquired for use in the business and not for sale e.g., Land, building, motor vehicles

(iv) Trading profit and loss account:

- A special account that summarizes expenditure and income in order to show business performance, e.g., profit at a particular period of time
- It helps to calculate profit or loss, and is used to compare current performance with a previous or planned one, or with performance of competitors
- It helps to plan for the future
- It helps to calculate tax payable

(v) Profit and loss account:

- **Gross profit:** This sales revenue minus cost of total production (COP)
- If sales revenue is more than COP, there is a gross profit
- If sales revenue is less than COP, there is a gross loss
- **Net profit: This is** gross profit minus any other revenue, (e.g., royalties, commissions, rent) minus cost of sales

4.5. Fish Farming Logistics and Profitability (Presented by Mr. Ibironke Ifedayo – details in flash drive given to each trainee)

- **Logistics:** detailed organization and implementation of a complex operation
- **CBR:** Cost: benefit ratio: comparison of present value of an investment decision or project with its initial cost. A ratio greater than one, indicates that the project/investment is a viable one.
- **Logistics Components:** Stocks, Labour, feeds, chemicals, water testing kits, pumps, aerating devices, harvesting net, handling and grinding equipment, transport facilities
- **Logistics: Operating items:** (a) Purchasing eggs/fingerlings, (b) Fish feed, (c) Electricity & fuel (d) Labour and maintenance, (e) Chemicals and drugs

Logistics: Capital items: Land & buildings, trucks & tractors, plumbing & pipes, tanks & aerators, oxygen meters, nets & boots

Opportunities in logistics

- **Hatchery:** Manager/operator, fingerling and/or juvenile farmer, breeder
- **Pond:** Manager/supervisor, out-grower
- **Aquaponics**
- **Processing**
- **Feed formulation**
- **Pond and hatchery contractor**

Risks and challenges in fish farming:

Production risks

- Water quality, fish diseases, off flavor, thieves and vandals
- Legal risks
- Fish predators
- **Factors promoting diseases**(over stocking, wounds, presence of dead matter, low amount of dissolved oxygen)

Tips for successful fish farming: Good pond preparation, (b) Good quality brood stock selection, (c) Water quality management, (d) Feed management, (e) Health monitoring, (f) Pond bottom management, (g) Disease management, (h) Environmental awareness, (i) Start small, (j) Seek advice from proven experts, etc

Record keeping: Pond number, (b) Pond capacity, (c) Stocking date, (d) Quantity stocked, (e) Weight of fingerlings at date of stocking (f) Fingerling source, (g) Fish mortality

5. NOTES ON VISITS TO IITA AND ICRISAT RESEARCH FIELDS

This section provides notes on the visits by both the trainers (IYA) and the trainees to research fields of ICRISAT and IITA.

5.1. Visit to ICRISAT Pearl Millet and Sorghum Trials at Minjibir Farm

The following trials were visited under the guidance of Dr. Ignatius Angarawai

- i. Response of pearl millet to different levels of phosphorus: Evaluating 3 millet vars and 3 levels of P (0, 30, 45, kg/ha).
- ii. **Response of sorghum to different levels of P.** Treatment: 3 sorghum vars and 3 levels of P (0, 30, 45, kg/ha).
- iii. Sorghum-groundnut mixed cropping trials: Treatment: 1 var each of groundnut and sorghum at varying populations and patterns
- iv. Response of sorghum to nitrogen. Treatment: 3 levels of N (0, 60, 100 KgN/ ha) and 3 vars of sorghum.
- v. Millet-cowpea relay cropping.
- vi. Evaluation of 5 lines of sorghum for agronomic character.
- vii. Characterization of 2014 collection of sorghum land races from various environments (Zaria, Kano, Jigawa, Adamawa).
- viii. Short and dwarf sorghum observatory nursery.
- ix. Multi-locational advanced sorghum yield trial. **Treatments:** 30 sorghum entries evaluated across 5 locations.
- x. Effect of plant population and fertilizer application on productivity of morphologically different millet vars. **Treatments:** 3 population levels; 2 levels of farm yard manure (0 and 5t/ha) and 3 millet vars.
- xi. Effect of var and row arrangement on millet- groundnut intercropping systems.
- xii. Evaluation of 72 millet breeding nursery lines.
- xiii. Evaluation of 10 sorghum hybrids.
- xiv. Demonstration of contrasting effects of poor soil fertility on sorghum and millet:
 - Sorghum doing very poorly, (almost grass- like) while the adjacent plot of millet was doing well with good heads

5.2 Visit to ICRISAT Groundnut Trials

Visited the following at Minjibir under the guidance of Dr. B. Motagi:

- i Groundnuts crossing blocks involving 21 male parents and 4 female parents
- ii Disease evaluation trials involving 1 susceptible infector row (Ex- Dakar) for every 2 rows of test line. Materials being evaluated: Initial evaluation trial and advanced trials 1 and 2 Diseases being evaluated: groundnut rosette disease, foliar disease, aflatoxin contamination

iii Effect of aflasafe and Apron plus seed treatment on 5 vars of groundnut (SAMNUT 22, SAMNUT 23, SAMNUT 24, Ex- Dakar and Kampala)

Note: Aflasafe was applied at flowering

iv. Evaluation of 400 groundnut germplasm lines collected from Nigeria (from Yobe, Borno, Kaduna, Kano&Jigawa states), Chad and Mali

v. Effect of weed control treatment on productivity of groundnut (a Ph.D. thesis research project)

(Note: the trip was under guidance of Dr. B Motagi)

5.3 Visit to IITA Agronomy Trials at Shika Farm, Zaria.

Participants were taken round the following trials/ demonstration plots by Mr. Gbenga Olutayo, Senior Research Supervisor of IITA.

i Soybean row spacing trial

Treatments: 3 rows inter row spacing and 4 vars of soybean planted at 5 plants/ stand

ii. Maize planting date trial

- **Treatments:** 3 maize vars and 5 planting dates (16/06, 23/06, 01/07, 07/07 &14/07); all 3 maize vars are late maturing

iii. Performance of maize/ soybean intercropping under different cropping patterns

- **Treatments:** sole maize, sole soybean, maize-soybean intercrop, date of introducing soybean into planted maize, and 2 maize spacing

iv. Response of drought tolerant maize to P fertilization

- **Treatments:** 3 maize vars; 4 levels of P (0, 20, 40 & 60 kg/ha)

v. Response of hybrid maize cultivars to N fertilization

- **Treatments:** 10 hybrid maize vars; 2 levels of N (0, 120 kgN/ha)

vi Maize/Cowpea intercropping trial

- **Treatments:** 5 cowpea vars planted 4 weeks, after planting 1 maize var; sole crop of each of 5 cowpea vars.

vii. Foundation seed multiplication plots

- 9 soybeanvars and 4 cowpea vars

viii. Soyabean inoculant and P fertilization trial:

- **Treatments:** 4 vars of soyabean, each planted with 4 inoculants/P fertilizer combinations (soyabean plus inoculant and no P; soybean plus P but no inoculant; soyabean with no P and no inoculant; soyabean plus inoculant plus P); sole maize

ix. Response of different cowpea vars to row spacing arrangement.

- **Treatments:** 5 vars of cowpea; each cowpea var planted in 3 different rows on same ridge, (1 row /ridge, 2 rows/ridge, and 3 rows/ridge)

x. Effect of maize following inoculated or non-inoculated soybean, with or without P fertilization

- **Treatments:** Maize following inoculated soybean but no P fertilizer; maize following non-inoculated soybean; maize following inoculated soybean; maize following inoculated soybean given P fertilizer

xi. Evaluation of ridged minimum tillage versus zero tillage and response to N fertilization

- **Treatments:** 2 tillage systems (minimum and zero) each with 3 N fertilization rates (0, 30kg and 60kg N/ha); In 2013, some plots were planted to maize and others planted to soybean; plots planted to maize in 2013 were planted to soybean in 2014 while those planted to soybean in 2013 were planted to maize in 2014

6. CLOSING OF WORKSHOP

The Training Workshop ended on September 24, 2014. The closing ceremony was attended by all the trainee youths from Southern Borno State and the IYA trainers. Also in attendance were Dr. Gbassey Tarawali (IITA Kubwa Station Manager) who represented the DG of IITA (Dr. Nteranya Sanginga), the Training Workshop Coordinator (Professor Alphonse Emechebe), and the IITA Kano Station Administrator (Alhaji Ado Rabo). The major events at the closing ceremony are outlined below.

6.1. Presentation of Results of the Training Evaluation Form Completed by the Trainees

A day before the closing ceremony (September 23), the trainees were requested to complete a training evaluation form, individually and in confidence, using a scale of 1 to 5 in which 5 indicates outstanding; 4, very good; 3, good; 2, fair; and 1, needs improvement. The components of the form were: A, Course Content; B, Course Facilitators; C, Course Materials; D, Facilities; E, Program Duration; F, Program Administration (with sub-heading comprised of: (i) Information dissemination, (ii) Planning and organization, and (iii) Others); and G, Overall Satisfaction.

Space was also provided for trainees to indicate: (i) what they like best and least about the program; (ii) what they learned from the program; (iii) what they expected to learn but did not learn; (iv) how the program could be improved, and (v) whether they would recommend the training program to others.

A summary of the responses of the trainees shows that 73% of the trainees rated the course content as very good or outstanding while 90% considered the relevance and usefulness of the course to be very good or outstanding. Similarly, 95% of the trainees indicated that the facilities were well-versed in the subject matter they handled. With respect to the communication skills of the facilitators, all the trainees rated them as good, very good or outstanding. The training materials were rated outstanding (21%), very good (58%) or good (16%). With regard, to the overall satisfaction with the training workshop, the trainees scored it as outstanding (47%), very good (42%) and good (11%).

6.2. Closing Remarks by Dr. Gbassey Tarawali

Dr. Gbassey Tarawali was the representative of the IITA Director General (Dr. Nteranya Sanginga) at the closing ceremony. Dr. Tarawali conveyed the apology of the DG for his absence because of other pressing demands on his time. He reiterated the DG's continued commitment to the IYA project, which the DG considers as his project.

After the trainees had introduced themselves, Dr. Tarawali noted they studied diverse courses at tertiary institutions as did their IYA trainers. He gave an overview of how IYA started in 2012, having been involved with that stage of the project. He urged the trainees to do their utmost to initiate some agripreneurial activities on their return to their LGAs, in particular and state in general; in this regard, the trainees should strive to do better than their IYA trainers.

6.3. Presentation of Plaque to Workshop Coordinator

The IITA Youth Agripreneurs (IYA) presented a plaque to the Workshop Coordinator, Professor Alphonse Emechebe, “in recognition of his passion to the growth of youths and creating a new generation of young entrepreneurs for agricultural sustainability and wealth creation”. Professor Emechebe, who was pleasantly surprised by the presentation, thanked the IYA for their kindness.

6.4. Presentation of Certificates of Attendance to the Trainees

All of the 20 trainees were presented with certificates of attendance of the Training Workshop: **Engaging Borno Youths in Agribusiness**. The certificates were presented by Dr. Gbassey Tarawali, Professor Alphonse Emechebe and Alhaji Ado Rabo.

Annex 1

*Program agenda of the training workshop
3rd – 24th September, 2014*

Time	Topic	Facilitator
3rd September 2014		
09:00-9:30	Arrival/Registration	IYA Training Team
09:30-10:00	Welcome Address/Opening Remarks	Rep. from Borno & Kano State N2Africa Rep IITA Rep
09:50-10:15	Introduction of trainees/trainers	Odusanya Oludare
10:15-10:45	Keynote Address: N2Africa Project in Borno State and Nigeria	Dr. E. Sangoldele
10:45-11:00	Coffee Break/Group Photograph	
11:00-11:30	Snippet from Nigeria/Borno youth unemployment	Richard Wakawa Borno State Youth Leader
11:30-12:45	Agripreneurs' experience: video, IYA presentation, sharing of Individual's experience	Adefioye Adedayo, Owoeye Molayo
12:45-14:00	Lunch Break	
14:00-15:30	Trainee's Expectation	Odusanya Oludare
15:30-16:00	Comments, Wrap-up, feedback and closing remark	Ibironke Ifedayo
18:00	Cocktail party	
4th September 2014		
09:00-9:30	Intoductory Symposium on the Program/discussion of agenda	Owoeye Molayo

Time	Topic	Facilitator
4th September 2014		
09:30-10:15	Agribusiness-Key to productive youth employment	Dawodu Olabisi
10:15-10:30	Coffee Break	
10:30-12:45	Contemporary issues facing Agriculture in Africa with emphasis on youth	Dr. A. Kamara
12:45-14:00	Lunch Break	
14:00-16:00	Group work/Plenary session	Dawodu Olabisi & Odusanya Oludare
5th September 2014		
09:00-12:45	Visit to Amardan Farms	Mr. Reuben Solomon
12:45-14:00	Lunch Break	
14:00-16:00	Visit to Seed Project Farm	Mr. Reuben Solomon
16:00-16:30	Feedback/Closing remark	
8th September 2014		
09:00-9:15	IYA Organogram – Production and Operations Arm	Odusanya Oludare
09:15-10:15	Entrepreneurship	Odusanya Oludare
10:15-10:30	Coffee Break	
10:30-12:45	Entrepreneurship cont'd	Odusanya Oludare
12:45-14:00	Lunch Break	
14:00-15:30	Cowpea Production	Mr. Reuben Solomon
15:30-16:00	Feedback/Closing remark	Odusanya Oludare

Time	Topic	Facilitator
9th September 2014		
09:00-12:45	ICT and Communication	Adefioye Adedayo
12:45-14:00	Lunch Break	
14:00-15:30	Farming systems	Mr. Reuben Solomon
15:30-16:00	Wrap-up, feedback and closing remark	
10th September 2014		
09:00-12:45	ICT in agribusiness	Adefioye Adedayo
12:45-14:00	Lunch Break	
14:00-16:00	ICT in agribusines cont'd	Adefioye Adedayo
11th September 2014		
09:00-10:15	Millet and Sorghum production	ICRISAT
10:15-10:30	Coffee Break	
10:30-12:45	CONTD: Millet and Sorghum production	ICRISAT
12:45-14:00	Lunch Break	
14:00-15:30	Millet and Sorghum production On-field demonstration	ICRISAT
15:50-16:00	Wrap-up, feedback and closing remark	Dawodu Olabisi
12th September 2014		
09:00-12:00	Practical session: ICT in Agricutlrue	Adefioye Adedayo
12:45-14:00	Lunch Break	
14:00-15:30	Safe and effective use of Pesticide	Mr. Reuben Solomon
15:30-16:00	Wrap-up, feedbank and closing remark	Owoeye Molayo
15th September 2014		
09:00-12:45	Groundnut Production	ICRISAT

Time	Topic	Facilitator
15th September 2014		
12:45-14:00	Lunch Break	
14:00-15:45	Groundnut Production: On-field demonstration	ICRISAT
15:45-16:00	Closing remark	Ibironke Ifedayo
16th September 2014		
09:00-10:15	Hatchery components and Hatching techniques	Ibironke Ifedayo
10:15-10:30	Coffee Break	
10:30-12:45	Pond system and Management practices	Ibironke Ifedayo
12:45-14:00	Lunch Break	
14:00-15:30	Fish farming logistics and Profitability	Ibironke Ifedayo
15:30-16:00	Closing remark	Odusanya Oludare
17th September 2014		
09:00-10:15	Post-harvest Mechanization	ICRISAT
10:15-10:30	Coffee Break	
10:30-12:45	Cont'd: Post harvest Mechanization	ICRISAT
12:45-14:00	Lunch Break	
13:00-15:30	Participatory Research and Extension	ICRISAT
15:30-16:00	Wrap-up, feedback and closing remark	Dawodu Olabisi
18 September 2014		
09:00-9:15	IYA Oganogram – Partnership and Marketing Arm	Owoeye Molayo
09:15-10:15	Business Development	Odusanya Oludare
10:15-10:30	Coffee Break	
10:30-11:30	Business Development Cont'd	Odusanya Oludare

Time	Topic	Facilitator
18th September 2014		
11:30-12:45	Accounting and Book Keeping	Dawodu Olabisi
12:45-14:00	Lunch Break	
14:00-15:00	Fish Farming Profitability and Logistics	Ibironke Ifedayo
15:00-15:30	Questions and Answers	
15:30-16:00	Wrap-up, feedback and closing remark	Adfioye Adedayo
19th September 2014		
09:00-16:00	Field Excursion	Mr. Reuben Solomon
22nd September 2014		
09:00-10:15	ICT Tools	Adefioye Adedayo
10:15-10:30	Coffee Break	
10:30-12:45	ICT tools cont'd	Adefioye Adedayo
12:45-14:00	Lunch Break	
14:00-15:45	Group Presentation	Adefioye Adedayo
15:45-16:00	Wrap-up, feedback and closing remark	Oduanya Oludare
23rd September 2014		
09:00-16:00	Trip to IITA Zaria	Mr. Olutayo Gbenga
24 September 2014		
09:00-9:30	Evaluation output and way forward	Oduanya Oludare
09:30-1100	Presentation of Certificate and closing ceremony	Dr. Tarawali

Annex 2

IYA's ORGANOGRAM

IYA Organogram

Steering Committee: G. Tarawali; Oyinlola Syvira; K Roing

DG OFFICE: N. Sanginga

Assistant: Lawal Victoria

