2013

Innovation Platform Report for NaSARRI/ASARECA Sorghum Legume Project held on 21st FEBRUARY 2013 at Eneku Village.

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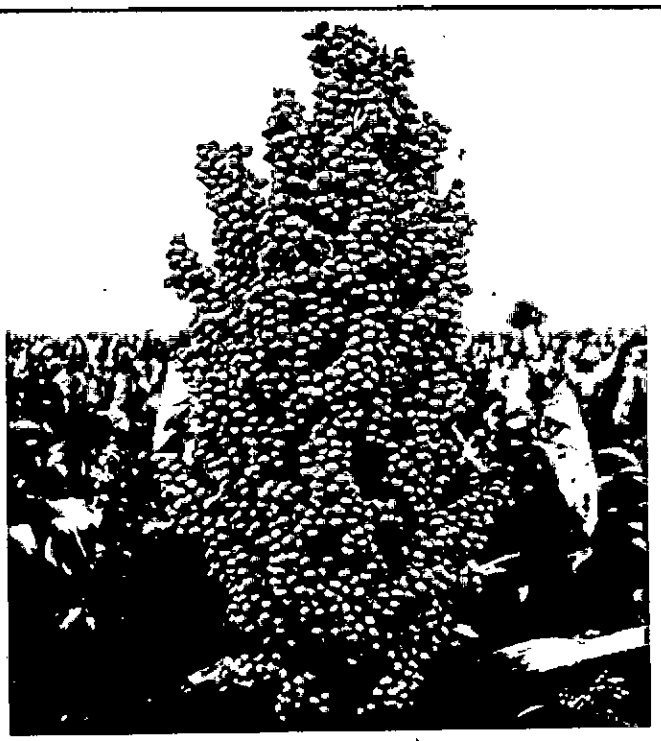

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NATIONAL CROP RESOURCES
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RESOURCE CENTER

Executive summary

NaSARRI held a one day innovation platform workshop at Eneku village on the 21st February 2013 for the ASARECA supported project, ***'Sustainable Intensification of Sorghum - Legume systems to improve livelihoods and adaptation to climate change in East and Central Africa'***. The workshop drew many participants that included farmers, district Agricultural officers from the implementing districts, researchers from NaSARRI and NaRL, traders, processors, bakeries, Non Governmental Organization (NGOs) like TERUDO, NAADS, Millers, Community based Organizations (CBOS) like SSOSPPA and politicians. The workshop had an attendance of thirty five (35) participants from various districts of Uganda that covered twenty (20) males and fifteen (15) females.

The purpose of the workshop was to come together to share lessons, experiences and identify opportunities that could be exploited in the project. The various stakeholders were requested to group together according to what they do and prepare a presentation on activities they perform, achievements so far obtained, challenges encountered, gaps identified, opportunities available, lessons learnt and suggestions for future implementation of the project activities.

The general issues that were discussed as a way forward included among others, develop model farmers at lower levels to receive and multiply the technologies, use of revolving funds for up-scaling technologies, set bigger demonstration plots, use media (like radio talk-shows) for information dissemination, call sensitization workshops for political leaders, further training of farmers and extension staff on agronomy of technologies, set up seed banks with model farmers, packaging of technologies/information and passed to district extension personnel that also send it down to sub-counties and eventually to farmers, setting up market-link centers for traders to easily access produce, use of traders association executives to provide information to farmers and traders and use of district commercial officers. To achieve all these, team work was encouraged from all the various stakeholders.

Agenda of the workshop

The agenda included:
1. Arrival and registration
2. Prayer
3. Introductions
4. Remarks and Objectives of the innovation platform
5. Opening remarks
6. Over-view of the project
7. Presentation of the available technologies and reactions
8. Presentation from farmer representative (crop) and reactions
9. Presentation from farmer representative (Livestock) and reactions
10. Presentation from Research representative (NaRL) Post- harvest and food technology programme (Kawanda) and reactions

11. Presentation from Community based Organization (CBOS) SSOSPPA representative and reactions
12. Presentation from Non Governmental Organizations (NGOs) Vision TERUDO representative and reactions.
13. Presentation from NAADS representative and reactions (Katakwii and Serere)
14. Presentation from District Agricultural Officers (Kumi, Katakwii and Abim districts) and reactions
15. Presentation from the traders
16. Presentation from the political arm representative and reactions
17. Issues for general discussions/ a way forward.
18. Presentation from research (NaSARRI) representative. Why farmers don't get potential yields (why crop production may not be profitable?)
19. Closure

Attendance
The following attended:
1. Extension agents - DAOS from Kumi, Katakwii, Abim
* NAADS Coordinators- Abim and Katakwii
* NGO from Vision TERUDO
2. Local Government (Local Councilors)
* Secretary production Kumi
* Secretary production Katakwii
* Secretary production Serere
* District production Coordinator Abim
3. Processors - Bakeries from SSOSPPA Serere
* Bakeries from Soroti
4. Traders - Trader from Soroti
5. Farmers - Farmers from Kumi
* Farmers from Katakwii
* Farmers from Soroti
* Farmers from Abim
6. Researchers - NaARL & NaSARRI
Districts that participated included:
* Serere
* Soroti
* Kumi
* Katakwii
* Ngora
* Abim and
* Wakiso

1. Arrival and registration
This started at 8:30 am and continued throughout the workshop as rain disrupted the arrival of most of the participants on time.

2. Prayer
Mrs. Florence Imaikorit – Oumo, NaSARRI communication specialist called the workshop to order at 11:15 am and said a short prayer.

3. Introductions
Self introductions followed the prayer, each participant introduced his/her name, what he/she does, district they came from.
The Principal Investigator of the Project started introducing himself followed by everybody.

4. Remarks and Objectives of the innovation platform

The platform was introduced by Mrs. Florence Imaikorit - Oumo who took the members through the program, guidelines for the presentations major expectations and the fears of the members present at the platform.
In her remarks, she told members that the objective of the innovation platform was lesson sharing, experiences and identify opportunities in the project and for the objective to be achieved, members needed to break into smaller groups according to the activities they do. In their discussions the following areas would be observed:
* Activities performed in the project
* Achievements/progress so far registered
* Challenges encountered in implementing project activities
* Gaps identifies and
* Opportunities (lesson learnt and suggestions for the future implementation of the project activities) i.e. what stakeholders can contribute to the success of the project.
She further went ahead and asked on participant's expectations and fears and they were recorded as follows:

Participants' expectations during the workshop
* Sharing information
* Getting to know the new varieties and technologies
* Getting knowledge on how farmers can use herbicides
* Sharing experiences with other stakeholders
* Understand what NARO has for the people
* Knowledge on value addition
* Feeding and transport back

Participants' Fears during the workshop
* More farmers will engage in sorghum production and not have market
* Production of legumes is more costly
* Workshop may take long
* Whether the project will benefit all the participants
* Long sessions leading to late closure of the workshop
* Unsolved problems due to collective presentations
* Those not in the project may not participate fully in the meeting
* Rain may affect the turn up

* Time management
* Failure of respecting others opinions/criticism
* Phone ringing
* Quarrels
* Low attendance hence little will be achieved
* Concept of the project looks new
* Terms may be used

6. Opening remarks

These were said by Dr. Olupot Robert on the behalf of Director as delegated to him. He welcomed all participants to the platform and forwarded Director's apologies to them because of her busy schedule. He enlightened members on the meaning of NaSARRI, which he said was an abbreviation that stands for National Semi- arid Resources Research Institute. It is one of the five (5) National Agricultural Research Institutes (NARIs) of National Agricultural Research Organization (NARO), an arm of Ministry of Agriculture Animal Industries and Fisheries (MAAIF) which generates technologies for the farmers in Uganda.

He continued by saying, NARO is divided into 5 NARIs and 10 Zonal Agricultural Research Development Institutes (ZARDIS) distributed throughout Uganda. The NARIs conduct research to address issues across the country he added. So NaSARRI is mandated to develop technologies for the semi- arid regions that have frequent droughts, he enlightened. While on the other hand, the ZARDIS are based in different agro – ecological zones of the country and they multiply the developed technologies and disseminate to farmers.

At Serere, he said, there are four (4) programmes that include:

1. Dry land Cereal s improvement programme that handles crops like sorghum, finger millet and pearl millet.

2. Dry land legumes improvement Programme- handles cowpeas, Green/Black grams and pigeon peas.

3. Oil crops improvement Programme- handles crops like groundnuts, simsim and sunflower

4. Cotton improvement programme that does research on cotton crop at Serere.

He advised farmers to approach Serere for any problems related to these mandate crops.

He also mentioned the partners that collaborate with NaSARRI that included NAADS, District Agricultural offices in various districts, NGOs like Vision TERUDO, CBOs like SSOSPPA, farmers, traders, seed companies and processors like breweries and

politicians among others. These help in technology dissemination to the farmers. He added that, the different stakeholders who are here today are involved along the whole value chain that starts from production right to consumption.

In conclusion, he wished all participants successful deliberations.

7. Over-view of the project

The team leader Dr. J. R. Olupot gave an overview of the project, citing ASARECA as the supporter of the project, which he said was also operating in Kenya, Tanzania, Sudan and Eritrea. The project seeks to improve food security, soil fertility and adaptation to climate change through sustainable intensification of sorghum-legume as well as pasture legumes production in the districts of Kumi, Katakwii and Abim. He said this meeting was part of the implementation of the project activities that was to be accomplished before the projects ends at the end of this year.

In Uganda, the project operates in three (3) districts: Kumi, Katakwii and Abim but there were also other two districts that were already working with us that included: Soroti and Serere making the districts five (5). The purpose of the project is to improve the production of sorghum/legumes in the semi arid areas of Uganda at household level for food, income and for feeding livestock (livestock nutrition). Research produces varieties and involves the whole value chain (from production to consumption).

The project started in December 2011 by conducting an inception workshop at Green Top Hotel - Kumi and a baseline survey followed in the three participating districts of Kumi, Katakwii and Abim. Training on the agronomy of sorghum and selected legumes was done and technologies were distributed to the participating districts to set demonstration sites on improved varieties. Seed multiplication was also done on – station and this year it will be upscaled. The extension staff is expected to extend these technologies to farmers and value should also be added to them. Other stakeholders like the traders are expected to trade on these and the processors to do the processing he mentioned.

In this innovation platform, we are required to share lessons, experiences and see the opportunities available, he informed members. He concluded by saying the project is expected to end in December 2013.

8. Presentation of the available technologies and reactions

Mr. Ebiyau Johnie gave a presentation on the Sorghum and legume technologies being disseminated.

Sorghum and legume technologies being disseminated are as follows:

Sorghum available technologies

* Improved high yielding and striga tolerant varieties
* SESO 1(white)
* SECO 2(white)
* SECO 3(brown)
* Epuripur
* Sekedo

SESO 1 White: White Sorghum Variety:
General Characteristics:
* High yield potential 1460-2080 kg/acre
* Tolerant to Striga weed
* Has good brewing qualities (67.1%) for commercial lager beer production
* Drought tolerant
* Early maturing (within 90 days

SESO 2 White: White Sorghum Variety
General Characteristics:
* High yielding (1736.5-2137.5) Kg/acre
* Tolerant to Striga weed
* Has good brewing qualities (69.6%) for commercial lager beer production
* Drought tolerant
* Early maturing (within 100 days)

SESO 3: Brown Sorghum Variety
General characteristics:
High yielding (1460-2080) Kg/acre
* Resistant to sorghum shoot fly pest
* Resistant to striga weed
* Higher tannin level (good for local brew)
* Early maturing (within 85 days)
* Tolerant to drought

Sorghum variety	**Days to Maturity**	**Yield (kg/acre)**	**Grain color**	**Gross Margin/ha(shs)**
Seredo	100	1460-2080	Light brown	400,000-750,000
Sekedo	100	1250-2080	Light brown	400,000-750,000
Epuripur	110	1042-1250	white	400,000-750,000
SESO 1	90	1460-2080	white	400,000-750,000
SESO 2	100	1460-2080	white	400,000-750,000
SESO 3	85	1460-2080	Brown	400,000-750,000
Local	100-250	300-520	Red	100,000-200,000

Cowpea technologies
* 3 Cowpea varieties resistant to CABMV:
* SECOW-3B,
* SECOW-4W,
* SECOW-5T
* High yielding cowpea varieties (850-1040 kg/acre):
* SECOW-1T
* SECOW-2W

Cowpea variety	Days to maturity	Yield kg/ha	Gross margin/ha(shs)
SECOW 1T	85-90	600-1000	416,000-625,000
SECOW 2W	80-85	420-1050	500,000-700,000
SECOW 3B	72-74	460-1050	500,000-800,000
SECOW 4W	73-76	500-960	500,000-700,000
SECOW 5T	73-77	600-1050	300,000-600,000
LOCAL	90-100	300-400	100,000-150,000

Technologies under animal traction
Other available technologies
* Ox-ploughing
* Ridging and tie-ridging
* Ox-drawn weeders e.g. SAARI weeder

Agronomy technologies:
* Optimum spacing
* Intercropping arrangement

Sorghum and cowpea products (value addition):
* Eagle lager
* Porridge flour

Reactions
* In the newspapers of 13th/2/2013, it was indicated that there are new diseases that are attacking cow peas.
* Have the farmers adopted the new varieties /technologies?
* How do we make sorghum products?
* What is the price of SESO 1 and 3?
* Which varieties are good for the farmers of Katakwii?
* How can farmers be helped to differentiate between the new varieties of SESO 1 and SESO2?

Responses

* Yellow rust is the new disease of cow peas that common in rainy seasons for the last two years. It attacks leaves with some spots which have yellow powder. It is a very serious disease of cow peas and one key thing about it is that, it is on and off but predominant in rainy season.

* Prevention:
* Crop rotation
* Fresh fields
* Rouging/removing the affected plants and burn or burry
* Spraying using any recommended fungicide like Dithane M 45

* Addressing the problem by selecting superior varieties like the SECOW 2 that is slightly to it.
* On adoption- it can be yes or no, keen farmers have adopted them but doubting ones haven't.
* This project promotes ridge farming to control floods and soil and water conservation. Intercropping is also done in the project.
* On products', we promote them through our partners like SSOSPPA.
* The difference between SESO 1and 2 is that SESO1 matures early (85- 90 days) while SESO 2 matures late (90 – 100 days). SESO 1 has broader seeds and the height is 150 cm.
* Source of seeds give you the difference between the two varieties.
* The sorghum prices are 3,000/- per kilo gram.

9. Presentation from farmer representative (crops) and reactions

The crop farmers presented the following:

Progress and achievements
These included:
* On- farm demonstration
* Farmers' willingness to adopt new technologies

Challenges
The following were the challenges identified by the crop farmers:
* Opening of land i.e. labour and inputs
* Delayed seed delivery
* Diseases and pests
* *Striga* weed/*emoto*
* Bad weather i.e. floods and drought
* Lack of markets
* No extension services
* Variety selection

Opportunities
* Land availability within farmers
* Guarantee of food security
* Availability of new improved seed varieties
Local contribution
* Land
* Encouragement /willingness from the communities

Lessons learnt
Included the following:
* Yields - SESE1, 3, do well in loam soils
* SECOW 1 white does well in all soils and has available market

* SESE2 and SECOW 2 are not doing well on on- farm
* Help us acquire new technologies
* Food security will be guaranteed
* Timely planting should be observed for good yields
* We expect to get more income through these technologies.

Recommendations
There is need to:
* avail farmers with improved seeds variedly and timely
* give farmers knowledge of access to markets
* help farmers access loans, inputs and how to use herbicides
* To train farmers on new technologies

Opportunities
There is:
* A processing site for value addition of the technologies
* Market for the technologies and
* Farmer groups in existence.

9. Presentation from farmer representative (Livestock) and reactions

Mr. Ekochu Joseph presented the following on behave of livestock farmers in Soroti district:
Progress and achievements
* They were trained on the agronomy of the technologies
* Improved seeds were distributed to the farmers
* On- farm demonstration plot were set
* There is food for the household- hence food security in the district
* There is feed for livestock hence improved nutrition especially in the dry seasons
* There is increased milk yield due to improved nutrition of livestock
* Row planting has resulted to economical use of improved seeds
* Easy management of the technologies in the field due to row planting
* There is increased yield from the technologies
* Encourages intercropping that leads to maximum land use and provides balanced crop residues for livestock
* Farmers learn from other farmers who had demonstration plots
* Farmers have learnt feed conservation for dry season (hay and silage making)
* The technologies are early maturing

Challenges
* Disease attack on SESO 3 and elephant grass
* Value addition on milk

Opportunities
* There are already existing farmer groups in the areas for technology multiplication
* Acquired knowledge and skills could be used to multiply the technologies

* Availability of land
* Availability of the District Agricultural Officers and extension staff in the district and sub counties
* The available research team in the project
Recommendation
* Strength the ties with farmers and farmer groups

10. Presentation from Research representative (NaARL) Post- harvest and food technology programme (Kawanda) and reactions

Ms. Apio Stella, a laboratory food technologist, representing Ms. Natbirwa Avira, a food scientist at Kawanda said since they have not been participating in the project, they would come in for value addition and cover the following areas:

1. Milk
* Hygienic handling of milk
* Processing of milk and milk products to shelf
* Ghee
* Acidified milk
* Yorghout
* Condensed sweetened milk

2. Sorghum
* Pre- post harvest and post harvest handling
* Storage
* Primary processing
* Processing value added products
* Secondary products
* Tertiary products

3. Cowpeas
* Post harvest handling
* Storage
* Primary processing- threshing, dehulling and milling.
* Value added products.
She promised to work with the farmers.

11. Presentation from Community based Organization (CBOs) SSOSPPA representative and reactions

Mrs. Ekinyu Christine presented the following:
Progress and achievements
* Many farmers from our group are growing sorghum and cowpeas.
* Besides the above mentioned crops, we also grow other crops for food and income.

* We add value to our crops to make other products like cakes, crakies, *'bargia'* bread, pop sorghum, and sorghum bites, composite flour for porridge made out of sorghum, cowpeas and cassava, biscuits among others.
* Our value added products were taken to South Africa for quality analysis and Makerere University is also handling the same.
* UNBS also took our products for testing to enable us get certification so that we can sell the products in the supermarkets.
* An improved oven is in plan for the group
* Members have attained training on improved technologies of sorghum, cowpeas and lablab
* One member was trained on food safety standards
* We also train other farmers on value addition.
* We have opened 5 acres of land for technology multiplication
* We managed to sell sorghum/legume value added products in various agricultural shows and other places and earned **2.5 million** Uganda Shillings
* We trained 20 farmer groups on value addition

Challenges
* Lack of inputs to use
* The construction of the processing plant is not complete but there is a promise to accomplish this task
* Nutrition qualities in the products are yet established

Opportunities
* Land is available
* There is a processing site
* There is ready market even in east and central Africa
* We are in a group
* We have a web site
* Our members are registered with NAADS

Reactions
* Where can we get these products?
* Which quantities of products has SSOSPPA made?
* Which variety of sorghum makes these products?
* Why are the products not on the market?

Responses
* The location for SSOSPPA is Serere district, Kyere Sub County, Obuket Parish and Odoo village (near Abuket P/S). For more information contact SSOSPPA Coordinator.
* To get pop sorghum, use white seeded varieties
* The quantity of sorghum used is 1 ton per day and 200 cakes can be obtained
* We are still processing a certificate for the products that is why there not in the market. The composite flour was taken to South Africa and Makerere University to analyze nutrient value.

12. Presentation from Non Governmental Organizations (NGOs) Vision TERUDO representative and reactions.

A presentation was given by Omiat Lucy Akareut- (0772827594), a programme Coordinator in the organization.
Activities done
* Training of farmers on:
* Cereal of OVCs on agronomy of cow peas and sorghum
* post harvest handling
* *Striga* control/management
* value addition of sorghum and cow peas
* Distributed sorghum and cow peas seeds to the beneficiaries
* Developed a poem on striga and its control
* Linked farmers and still linking farmers to NaSARRI.
* It collaborates with NaSARRI on technology up take ways
* It linked NaSARRI to P'KWI farmers' group of value addition (making 'Bagia').

Achievements
* Farmers and orphan caretakers gained knowledge and skills on sorghum and cow peas agronomy and post harvest handling.
* NaSARRI visited farmers in Kumi and Bukedea districts headed by NaSARRI communication specialist.
* Farmers are able to control *Striga* in their fields in Mukura, Ongino and Tajer and they received seed from SESO 3 and SECOW 2.
* Vision TERUDO has been able to share with NaSARRI as partners in different fora.
* Partnership of VT and NaSARRI has enabled farmers get access to new technologies.
* Most framers have appreciated value addition as a way of improving shelf life of agricultural products.

Opportunities
* Vision TERUDO has a department of agriculture and staff who are trained in the field of agriculture.
* Vision TERUDO has in place structures in the communities which enable work to be done easily.
* Vision TERUDO has a resource centre where farmers can be trained on many technologies.
* Farmers have indigenous knowledge which we can build on.

Challenges
* Overwhelming numbers of farmers that want the new technologies and yet funds in Vision TERUDO are limited.
* Unreliable weather conditions which tend to affect the yields.
Lesson learnt
* Farmers need continuous link for information dissemination

* In conclusion, let's embrace sorghum and cow peas production for food and feed security and soil improvement.

13. Presentation from NAADS representative and reactions (Katakwi and Serere)

Progress
* The baseline survey was administered on them in 2011 in two sub counties and Abim Town council
* Six (6) farmer groups were formed
* Training on agronomy of the technologies was done in these groups
* Demonstrations sites were established in these groups on sorghum varitiesSESO1,2, and 3 and cow pea varieties and black grams
* The improved varieties were demonstrated along with the local varieties for comparisons and the improved varieties performed better than the local ones.
* Host farmers were selected

Challenges
* Famers expected more technologies than the ones they were given for the demonstration
* Inadequate facilitation to clear the fields
* They were not enabled to clear their fields
* Lack of ownership of the technologies
* Late delivery of the technologies that caused poor results
* The baseline tool was bulky (very big) hence more time was required for the respondents to answer the question hence impossible to complete the whole questionnaire

Gaps
* Farmers did not understand the use of black seeded grams (for food or for something else)

Opportunities
* Farmers appreciated the demonstrated technologies especially with their performance and attributes
* Farmers believed that these technologies could help them in income generation
* The technologies could help in food and feed security
* Farmers have fertile soils and large acreages to support the multiplication of the technologies
* Future markets anticipated e.g. World Food Programme

What NAADS can do
* Provide advice to farmers
* Mobilize farmers to produce in groups and do the marketing
* Link farmers to markets
* Develop (HLFO) as cooperative
* Dissemination of the technologies thro adaptive research
* Triple helix arrangement (block farming)

Lessons learnt
* The farmers were willing to adopt the technologies
* Poor preparation of land
* Late delivery of seeds resulting to poor performance
Recommendations
* Distribute enough seeds to farmers
* Farmers should ensure proper preparation of land
* Deliver inputs on time so as to achieve the project targets

14. Presentation from District Agricultural Officers (Kumi, Katakwii and Abim districts) and reactions

Progress
Sorghum crop in the Region
Teso and Karamoja
* Major crop in the region grown by all farming households
* Sorghum In Teso- Overtaken millet as a lead cereal crop
Planting:
* Planted in 2 seasons in Teso
* 1st season major in Katakwi, and parts of Kumi-Ongino and Kumi sub-county, Bukedea- Malera sub-county)
* 2nd season being major in Soroti, serere, Bukedea and part of Kumi)-planted once in Karamoja (have only 1 major rain season)
Varieties grown:
* Mixed Local varieties (abir-Abim)
* Releases from research
* Sekedo, Epuripur
* Latest releases not widely known and grown- Apart from Serere district because of proximity to NaSAARRI
System of Planting
* Mainly broad cast method of planting in pure or intercrop
* Main intercrops
* Groundnuts
* Cowpeas
* Cassava-young crop
* Millet- though Not a good practice

Challenges
* Weeds-*Striga* ('Emoto')
* Especially in marginal or poor soild
* Areas most affected Magoro, Kapujan, Ongino, Malera, Kapelebyong and Abim distict
* Declining soil fertility
* Erratic weather condition (floods and drought)
* Population pressure on land resulting into land fragmentation and overcropping/monoculture

* Pest and disease out breaks
* Limited availability of the newly released varieties
* No organized marketing system

Opportunities
* Sorghum now being used in breweries
* Emergence of bakeries making use of sorghum and other legumes
* Job opportunity for breeders to develop new varieties that are tolerant to weather, pests and diseases, and varieties for factories

Lessons learnt
* Farmers willingness to participate in sorghum and legume production/project by providing land and participating in all the activities of the project
* Sorghum can be major sources of household income and as well as food security crops
* Legumes can be used for soil improvement

What the District Agricultural Offices can do:
* Identify farmer groups to promote the production of sorghum and legumes especially new varieties
* Link farmers to research and market
* Monitoring the adoption and sustainability of the project outputs
* Provide technical backstopping for the projects

15. Presentation from the traders' representative (Asayo Sarah)

Ms. Asayo Sarah started by presenting the current prices of sorghum, cow peas and green grams as indicated below:

Commodity	Selling price	Buying price
Cow peas	1,100/=/kg	1,000/=/kg
Sorghum	550/=/kg	500/=/kg
Green grams	1,550/=/kg	1,500/=/kg

She further proceeded to mention the common problems encountered by the traders were:
* Mixing of varieties/ with soil by farmers' that leads to low quality
* High taxes by districts
* Price fluctuations of produce
* Lack of market linkages between farmers and traders (information)
* Over supply that leads to price drop
* Low supply
* Limited storage facilities

She also cited the available markets:
* Malaba
* Busia
* Kigali
* Sudan
* Western Uganda

Opportunities
* Linkage of farmers and traders
* Information sharing
* Ready market
* Available market especially in dry season

Recommendations
* Training farmers on post harvest handling
* Group marketing to reduce transport costs

Issues raised in the general discussion
* How can we improve on accessibility of the available outputs (technologies) of the project and information sharing?
* How do we operationalize/collaborating the platforms started (for improving sorghum, cowpea, green gram and lablab production and marketing)?
* How do we improve on profitability of sorghum, cowpea and green gram as enterprises for raising households' income? Production of legumes seem to be more costly
* How do we handle or reduce challenges in sorghum, cowpea and green gram and livestock value chain?: Production, processing/value addition, marketing
* How do we operationalize the platforms started (for improving sorghum, cowpea, green gram and lablab production and marketing)?
Responses
* How can we improve on accessibility of the available outputs (technologies) of the project and information sharing?
* Develop model farmers per parish
* Use NAADS revolving technology approach of giving the technologies and pass on to the next beneficiary
* Have farmer demonstration sites developed
* Facilitate technical staff to disseminate information to the farmers
* Use different means to disseminate he information like radio talk shows
* Disseminate information to districts and sub county councils (call for sensitization workshops for political leaders)
* Make slots in the council meetings by politicians making presentation of these technologies
* Provide regular consultative meetings i.e. points of reference at all levels
* Train seed multiplication at farm level
* Get seed banks with model farmers
* Mobilization of farmers and link themselves to extension staff for feedback and progress made
* Integrate crop production and livestock keeping
* Record keeping be emphasize to attract expansion of production at grass root level
* Promote contract farming with the aim to produce for commercial
* Train farmers on quality assurance and food safety
* Promote knowledge sharing and brokerage by association and individuals

* Bring the traders and farmers' together
* Farmers should set up market link centres to help traders get their produce
* Increase the size of demonstration plots which are located strategically for people to see and get enough seeds
* Avail market information on the products
* Traders association executives should provide market information to farmers and commercial officers
* NGOs should promote the project and avail seeds to farmers and build capacity of the farmers on post harvest handling and also increase awareness the technologies
* Politicians should mobilize farmer associations and encourage them to work as a team
* Link farmers to research and the available technologies
* NAADs should provide advisory services through help of leaders of the project (Training of trainers)
* NARO should provide the technologies plus related information for the production of the varieties
* Seed distribution to farmers early
* Provide production guides to stakeholders
* Train the extension workers at all levels (NGOs< NAADS) on the technologies
* Package the technologies/information and pass to districts that also will pass it to lower levels
* Involve ourselves in through documentation and field days
* Provide exposure visits/exchange visits
* Put centers of responsibilities e.g farmers link to extension staff at sub county level then to the district
* Farmers should intensify the production of sorghum and legumes
* Encourage other farmers in our villages to form groups
* Train on value addition of products (produce and milk)
* Have contract farming linked to processors
* Processors should train farmers on quality and storage of produce and introduce technologies on processing, keep records and share with other stakeholders.
* Poor post-harvest handling (over 40% of yield is lost during drying, threshing and storage)

Reasons why farmers don't get potential yields (why crop production may not be profitable)

* Poor land preparation. Planting in rough seed bed
* Untimely planting
* Not planting at the recommended spacing/population
* Untimely/poor weeding
* Not controlling pests/diseases
* Low soil fertility
* Poor weather conditions
* Untimely harvesting
* Poor post-harvest handling (over 40% of yield is lost during drying, threshing and storage)

16. Closure (Mr. Odeke Valdo DAO KUMI)

He thanked the organizers of the workshop. He said the workshop had generated a lot of information that the project required for achieving its outputs. The platform has begun so it should continue burning he added. He requested the participants to act as ambassadors to others so as to achieve the objectives of the project.

'We have identified the areas where each one of us is going to handle and this calls for commitment from ourselves', he further said. 'This calls for a sacrifice in terms of time and it requires us to be in touch with one another.'

For the challenges identified, let us turn them into opportunities. The linkages have already started with us, so let's continue and get feedback from each other and encourage the use of *3Ps*- Public, Private Partnership. The opportunities that we have identified should be exploited so as to get income. We should promote partnership which is very important and adhere to record keeping for good results. Farmers should cooperate with the technical people to help us on the challenges we have at household levels that help them in planning purposes.

He further thanked the organizers (NARO) and all the participants for participating actively.

The workshop ended at 4:32 pm