Proceedings of the Stakeholder Workshop of Actors along the Sorghum, Pearl millet and Groundnut Value Chains in Nigeria

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Edited by

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2012

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Science with a human face
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Abbreviations and acronyms

TOR  Terms of Reference
ICRISAT  International Crops Research institute for the Semi-Arid Tropics
IAR  Institute for Agricultural Research
LCRI  Lake Chad Research Institute
HOPE  Harnessing Opportunities for Productivity Enhancement (HOPE) of Sorghum and Millets in Sub-Saharan Africa and South Asia
KNARDA  Kano Agricultural and Rural Development Authority
JIGAWA  Jigawa Agricultural and Rural Development Authority
KTARDA  Katsina Agricultural and Rural Development Authority
EATP
WOFAN  Women Farmers of Nigeria
IFAD/ CBADP
USAID
NOWAIDA
WDI  Women Development Initiative
IFDC  International Fertilizer Development Corporation
GSARDI-GUMEL  Green Sahel Agricultural and Rural Development Initiative
WASA  West Africa Seed Alliance
MD  Managing Directors
IMOD  Inclusive Market Oriented Development
MOA  Ministry of Agriculture
NAFDAC
ARCN  Agricultural Research Council of Nigeria
OPV  Open Pollinated Variety
NARI  National Agricultural Research Institutes
IITA  International Institute of Tropical Agriculture
ILRI  International Livestock Research Institute
WCA  West and Central Africa
NISPRI
NIHORT  National Institute of Horticulture
NACCGRAB  National Center for Genetic Resources and Biotechnology
SSV
MOU  Memorandum of Understanding
USG  Urea Super Granule
FAO  Food and Agricultural organization of the United Nations
NW  North-West
NE  North-East
FAOSTAT  Food and Agricultural Organization Statistics
USA  United States of America
IAR/ABU  Institute for Agricultural Research / Ahmadu Bello University
CSR  Company Social Responsibility
PPP  Public Private Partnership
NIRSAL  National Insurance etc..
HGSFP  Home Grown School Feeding Program
WFP  World Food Program
LG  Local Government
SME  Small and medium Enterprises
Executive Summary

The workshop assembled value chain actors among men and women for three days to interact, exchange ideas and forge linkages that could be further explored to develop sustainable value chains in the identified critical areas of the three commodity value chains namely sorghum, pearl millet and ground nut. The workshop deliberated on the current state of knowledge with regards to the three commodity value chains, identifying in the process strengths, weaknesses, opportunities and threats. It proceeded to analyze each of these aspects in respect to each actor along each value chain with specific remedial steps needed to bring about sustainable relationships among key actors. Major strength is the advantage enjoyed with suitable natural resource endowments, environment as well as the improved business climate. The major weakness, among others, were the poor communications among actors, lack of suitable equipment and technology to profitably operate particularly with threatening challenges of lack of energy to power the chain activities, policy inconsistencies and low level of skilled manpower. The major opportunities for the products of the crops are the overwhelming demand for their products in Nigeria and beyond particularly for industrial use arising from increasing population, export demands as well as rising domestic food import bills. This demand can be met if stakeholders work together to provide what each market requires in terms quantity and quality of intermediate and ultimate products along each value chain. The major threats include corruption, adulteration, transit products and above all sustainable, reasonable priced energy sources. The tasks ahead include better knowledge, training, empowerment, better sources of inputs, linkages, networking among chain actors.

For each of the value chains a critical assessment was made to determine points of intervention where maximum impact could be achieved among stakeholders.
Session 1: Opening Session
Opening speech and Welcome Address by Dr Hakeem A. Ajeigbe (ICRISAT Nigeria Country Representative)

Honorable Commissioner, Kano State Ministry of Agric. and Natural Resources Dr Baraka Sani
Permanent Secretary Kano State Ministry of Agric. and Natural Resources Alh Mohammed Badawi
Director Agric Services Kano State Ministry of Agric Alh Abba Datti
Director Commerce Kano State Ministry of Agric Alh Kabir
Director IAR Prof Balarabe Tanimu
Director LCRI Dr G O Olabanji
Team Leader Nigeria Sorghum Transformation Program Prof Baba Obilana
President NOWAIDA Alh Saidu Zakari Garin-Baba
HOPE Project Objective 5 Leader WCA, Dr Ndjeunga Jupiter
MD of various Agro-Allied Companies
Farmers, processors and marketers present
Members of the press
Ladies and gentle men

It is my pleasure to present the welcome address in this very important workshop organized by ICRISAT, LCRI, IAR and other partners as part of HOPE and WASA-Seed projects activities in Nigeria. This is in line with strategies of the Nigerian government for boosting the supply of coarse grains as essential tools to ensure food security and income of value chain actors. It is also in line with our host State Government (Kano State) led by his Excellency Eng. Dr. Rabiu Musa Kwankwaso, who has made agricultural development as a very important agenda of the Government.

Millet and sorghum are the main cereal crops and staple diets consumed by millions of people in Northern Nigeria. These crops account for more than 62% of the production of cereals and occupy over 66% of the area under cereals. Groundnut remains an important crop for resource-poor farmers, crucial for their economic prosperity and nutritional status. To the small and medium scale farmers in many States in Northern Nigeria, groundnut is a multipurpose crop and depending on time of the year or rainfall it could be a cash crop, food crop, fodder crop as well as its usefulness in soil improvement. For decades, governments, donors and non-governmental organizations and research institutions invested in the promotion of these crops. These efforts have not generated the expected results. Indeed, many investments focused more on enhancing productivity (production sub-sector) neglecting the sub-sectors of processing and marketing that are the essential pullers of the commodity chains. It is becoming increasingly clear that without lifting the constraints facing all players in the value chain, it is difficult to make the commodity chains efficient.

A value chain is the full range of activities that are necessary to bring a product or service from conception through the various phases of production (involving a combination of physical transformation and support services to various producers, delivery to final customers, and final disposal after use. The performance of the value chain can be limited by the policy and institutional environment and as well as the access and availability of services needed by value chain actors. In most efficient value chains, the actors who actually form the chain (those who trade on the main product) are supported by extension services and agro-dealers and other support agencies (eg seed suppliers and intermediaries). There is a continuing need for actors in the chain to access the services of various types, both commercial and technical. Services that can potentially add value and determine the adoption of technologies and innovations include:

Provision/supply of inputs (seeds, fertilizers, etc.).
Information on markets (prices, trends, buyers, suppliers)
the financial services (credit, savings, or insurance institutions)
Transportation services (such as the bulk purchase of cereals)
Quality assurance (monitoring and accreditation) etc…

The performance of market channels is based on three components mentioned above ie. actors in
the chain, the political and institutional environment and the business support services. Very often
there is little relationship between these three types of actors and players in the same component.
Thus, a meeting is needed to provide an opportunity for stakeholders to discuss the constraints and
opportunities of the sector and propose actions that will increase the efficiencies of the commodity
chains

ICRISAT in its new strategy focused on Inclusive Market Oriented Development (IMOD) as a
unifying conceptual framework. Strategic directions of ICRISAT are found in four areas of action
through its strategic programs:

- Reducing the vulnerability to drought and climate change while increasing the bio-diversity and
  value of crops
- The use of development paths for Global Prosperity
- Increasing and securing the production of pulses for health, income generation and
  sustainability
- Increase the productivity of dry cereals to end hunger.

In the second program, ICRISAT emphasizes the development of value chains of its mandate crops,
with the identification of constraints limiting the performance of the chains, identification of
investment options that could improve the performance of value chains and pilot test investment
options. This workshop aims at stimulating discussions between value chain actors so as to gather
information that can help improve the performance of the value chains:
Specifically these are:

- Reflection and sharing of information on the constraints and opportunities of actors in the
  sorghum, pearl millet and groundnut value chains;
- Brainstorm of existing forms of contracting and identify opportunities for linking and/or
  contracting between actors along the value chain (including credit contracts);
- Identification of themes from research and development of the main problems identified.
- Create a sorghum, pearl millet and groundnut partnerships that will lead to the development of
  sustainable supply and utilization of the commodities

Our expected outputs are:

- Increased knowledge by participants of the roles of different actors along the value chains,
  constraints they face and opportunities for expanding the demand for coarse grains
- Potential linkages between actors along the value chain identified
- Potential sources of funding identified with financial institutions

All the sectors of the value chain are attending this meeting. They include processors, financial
institutions, traders, those at the policy and institutional environment (MOA, NAFDAC), business
and extension services (ADPs of Kano, Katsina and Jigawa, GSARDI, LCRI, IAR, IFAD/CBADP,
Fabricators and Agricultural Researchers. There is no better gathering to address the **Challenges
and Opportunities in production, processing, marketing and general business development of
sorghum, millet and groundnut value chains** than the people gathered in this room.
ICRISAT re-open its office in Nigeria with the appointment of the Nigeria Country Representative since December 1, 2010. This is a follow up to the signing of a memorandum of understanding between ICRISAT and the Agricultural Research Council of Nigeria (ARCN) on 8th of September 2008. With this development, ICRISAT will be able to vigorously pursue her various research and development efforts aimed at contributing to boosting agricultural productivity for millions of farmers in the semi-arid tropical areas of Nigeria.

A number of research projects: sorghum (hybrid and OPV), millet (hybrid and OPV) and groundnut (rosette, aphid and leaf spot resistant lines) are currently being implemented in collaboration with relevant National Agricultural Research Institutes (NARIs) that have genetic improvement mandates for these crops in Nigeria. It is envisaged that a lot more programmes and projects will be initiated by ICRISAT with the assumption of office by the Country Representative.

Let me use this opportunity to acknowledge the significant contribution of the Kano Ministry of Agriculture and Natural Resources, right from the honorable Commissioner Dr Baraka Sani, The Permanent Secretary Alh Mohammed Badawi and the Director Agric Services Alh Abba Datti. I wish to also thank all the participants who despite your tight schedules have found it necessary to be here.

Finally, on behalf of the ICRISAT Director-General, Dr. William Daar and Regional Director West and Central Africa, Dr Farid Waliyar, I wish to welcome all of you and wish you a result oriented workshop whose results can form basis for further development of agriculture in Nigeria as a whole.
Opening Speech Honorable Commissioner Kano State Ministry of Agriculture and Natural Resources (Dr Baraka Sani)

Permanent Secretary Kano State Ministry of Agric. and Natural Resources Alh Mohammed Badawi
Director Commerce Kano State Ministry of Agric. Alh Kabir Jibrin
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Members of the press
Ladies and gentle men

It is a great privilege and honor for me to be the Chief Guest on the Stakeholder workshop of actors along the sorghum, pearl millet and groundnut value chains in Nigeria. Let me first welcome the ICRISAT delegates from outside Nigeria and thank them for assisting and catalyzing the reopening of ICRISAT in Kano Nigeria, this will play a vital role in their contribution to food security and income of small holder farmers in semi-arid tropics. Kano State is well known for its agricultural heritage. Millet and sorghum are the main cereal crops and cowpea and groundnut are the main legumes consumed by millions of people in Kano State. These crops remain important crops for resource-poor farmers, crucial for their economic prosperity and nutritional status however little value addition is involved.

The groundnut pyramids and truck loads of cowpeas were the pleasing sights and the mainstay of Kano State economy before the advent of petroleum in Nigeria. The past two decades have witnessed a gradual decline in productivity of these important protein crops as well as other cereal crops. This has been due to many factors. Kano State Government is fully familiar with the numerous difficulties that farmers are facing but the present government is committed not only to regain the past glory of agricultural excellence in Nigeria but also to push agriculture in Kano state from subsistence level to a profit making enterprise. The application of science and technology to agriculture will be the major focus of the government. We are fully aware that major breakthroughs in agriculture come from a combination of (1) research to develop new varieties and management practices, (2) good extension system and (3) assured input availability and marketing infrastructure. Kano State’s efforts are to bring this ‘tripod’ of Research, Extension and Infrastructure to all the local government areas so that a solid agricultural production system could rest on it.

We are indeed very pleased and feel confident at this important juncture that these would be achieved because of 3 reasons. Firstly, Kano state is blessed with the physical presence of several research Institutes (ICRISAT, IITA, ILRI, IAR, NISPRI, NIHORT) which are engaged in developing new technologies relevant to Kano farmers in particular and West African farmer in general. Secondly, we have a very strong extension organization through Kano Agricultural and Rural Development Authority (KNARDA), several large and medium scale irrigation facilities and Fadama lands. And thirdly, the Kano State government has made a major commitment to develop relevant infrastructure for provision of inputs and marketing of surplus produce. Also, farmers’ cooperatives are being encouraged. Kano is already well known for being a major trade center. I am sure that with the combined efforts of the national and international research institutes, the Kano State government and the farmers and people of Kano State, agricultural productivity will reach a new height in coming years. The Kano State government is making all the necessary efforts
possible to make sufficient fertilizers, seeds and chemicals available so that farmers may adopt and benefit from science and knowledge based agriculture.

The workshop will stimulate discussions among participants so as to identify the strengths, weaknesses, opportunities and threats along the sorghum, pearl millet and groundnut value chains from which to forge potential linkages between actors. I look forward to a concise report of the workshop. Before I close, I wish to thank the organizer and all the participants for their personal involvement in helping Kano State to move further and faster in agricultural development.

It is now my pleasure to declare this workshop open and pray for a fruitful deliberation in service to agricultural value chain actors.
**Opening remarks of the Director of the Institute for Agricultural Research, Ahmada Bello University, Zaria**

PROTOCOL
The Institute for Agricultural Research (IAR), Samaru was established in 1922. It is a crop-based research Institute with research mandate for the genetic improvement of nine major crop species, namely Sorghum, Groundnut, Cowpea, Cotton, Maize, Sunflower, Jatropha, Castor and Artemesia. The Institute has over the years placed research focus on priority areas comprising the following: – Early maturity, Drought tolerance/resistance, Pest and disease resistance, High yields, Quality enhancement, Development of prototypes of simple machinery and implements for drudgery reduction, Proximate analyses and value addition and Promotion of research results. The efforts of the Institute have yielded positive results over the years. It has developed improved agricultural technologies, which include:

1. 13 varieties of cotton
2. 23 varieties of groundnut
3. 11 varieties of cowpea
4. 44 machine proto-types
5. 41 sorghum varieties and
6. 31 maize varieties

SORGHUM RESEARCH AND ACHIEVEMENTS
1. Two very promising lines (SSV98001 and SSV98002) which yield over 3.5 tons/ha and with good management could give up to 4 tons/ha have been identified and are being proposed for recommendation to the National Varietal Release Committee for release and registration in 2011. Similarly one medium maturing variety for the Northern Guinea Savanna (SSV20043 White Kaura) which yields 3-4 tons/ha is being packaged for recommendation to the National Varietal Release Committee for eventual release and registration in 2011.
2. IAR is also developing some sorghum hybrids in collaborative effort with ICRISAT and the collaboration is already yielding very promising results. Twenty nine (29) hybrids which were developed and evaluated in two locations gave up to 5 tons/ha grain yield. The evaluation is being repeated in 2011 cropping season. We envisage that in the next two years, the Institute should be release 2-3 hybrid varieties with yield of 4 – 5 tons/ha.
3. The research on the biological control of *striga hermonthica* in sorghum using fusarium based mycoherbicide formulation is in progress. Promising results have been obtained.
4. The research on Urea Super Granule (USG) is in its final year and an interim report will be submitted at the end of the season.

COLLABORATIVE/PARTNERSHIP PROJECTS
1. **Crop Trust Project on Sorghum**
   - The Global Partnership Initiative for Plant Breeding Capacity Building Biodiversity International Trust is an FAO component project aimed at increasing access by breeding programmes to diversity for cowpea, pearl millet, sorghum and yam.
   - The Crop Trust Project on all crops was initiated in December 2010 at the National Centre for Genetic Resources and Biotechnology (NACGRAB) with the main objective of collecting and distributing germplasm of the various crops to other breeders and farmers to increase their access to more diverse germplasm lines.
   - The project is expected to last for only one year. It is anticipated that it will be extended in order to make more impact in the country.
2. **Global Biofuel Project**
   - The Institute has been involved in the collection of Sweet Sorghum germplasm and subsequent evaluation/characterization. IAR has succeeded in evaluating 15 Sweet Sorghum lines. IAR is to
sign an MOU with Global Biofuel Limited a subsidiary of NeGSt Global Integrated Company Limited in 2008 but the company run into some hitches and the MOU could not be signed. The Institute is still maintaining the materials awaiting any source of funding in order to go into full scale research on developing identified promising lines for biofuel.

3. Purdue/DuPont Collaborative Sorghum Project with Herbicide Treatment for Striga Control
   Three (3) new sorghum hybrids developed by Purdue/ DuPont treated with herbicide for the control striga were evaluated in striga infected plots in 2010. The hybrids were high yielding (3.5-3.7t/ha) even with striga infestation. In 2011, the hybrids have been planted both in the striga infested plots as well as non-infested plots in order to assess their potential yield without the striga infestation.

4. Sorghum Hybrid for the Improvement of Nigeria’s Economy (SHINE) Project
   The Project which is AGRA sponsored was borne out of concern about low productivity of sorghum in Nigeria compared to advanced countries where 5-7t/ha is common. Grain yield on farmers’ fields ranges from 0.9-2.5t/ha. The SHINE project is aimed at improving grain yield to at least 4.0t/ha.
   SHINE project took effect from 2011, although it came as an off-shoot of the 2-year project of ICRISAT-Mali funded by USAID MARKETS Nigeria which collaborated with IAR on hybrid sorghum development. The IAR/ICRISAT collaboration was a short-term intervention. Hybrids from Mali were evaluated in Nigeria and a few developed and were also evaluated. None of the hybrids brought to Nigeria were adaptable. Most were too early, too tall, very small, unacceptable grain size and colour and very susceptible to stem borer attack.
   Currently, a new set of A-lines were received from ICRISAT-India. With these new set of hybrids, nurseries were generated (>100) and are being evaluated at three locations (Zaria, Kadawa and Kano). New hybrid generation and evaluation shall be a continuous process until acceptable hybrids are identified with appropriate grain yield and adaption to the ecology.

5. Harnessing Opportunities for Productivity Enhancement (HOPE)
   It is a collaborative project with ICRISAT-Mali. The project started in 2009/10 with three objectives:
   a) Baseline survey on sorghum
   b) Discovery and development of strategies for improving market for sorghum to stimulate adoption of improved technologies for small holder farmers.
   c) Increase farmers’ access and use of knowhow about the use and benefits of profitable crop management technologies and improved cultivars.

Ladies and gentlemen, these are some of the sorghum researches that are currently going on in the Institute. The Institute is actively involved in the current Agricultural Transformation of Mr. President in all the crops that we have genetic improvement mandate. I wish you fruitful deliberations.
Speech by the Ag Director Lake Chad Research Institute
Chief Fajana thanked all participants to the conference and prayed for the peaceful conduct of the deliberations. Further the organizers hoped that all will safely return to their various destinations at the end of the conference. Special mentioned was made for the presence and special roles played by The Hon. Commissioner for Agriculture and Natural Resources, Kano State Dr Baraka Sani who declared the conference opened, the various Organizations and Institutions at State and National level that graced and fully participated in the deliberations. The list is attached to this report.
Session 2: Technical papers
WORKSHOP SUMMARY

ICRISAT NIGERIA and partners convene a workshop from 23rd-25th November, 2011 to improve knowledge of participants on the state of three commodity value chains in Nigeria as part of its West African initiative on target crops; identify critical requirements for developing a sustainable relationship among actors along the value chains and proffer solutions to identified constraints through linkages, investment and support needs by stakeholders. The workshop provided the forum for exchange of ideas, presentation of research findings, documenting problems and issues with respect to each actor along each crop value chain. After deliberations, the findings, recommendations as to the way forward were presented to stakeholders to discuss further and act accordingly, towards achieving the objectives of the workshop. The highlights of the major findings of the discussions are summarized below:

1. Mapping the pearl millet, sorghum and groundnut markets
   The workshop dwelt on the current situation with respect to the pre-production, production, processing, distribution and consumption activities taking place with respect to each of the three crops namely pearl millet, sorghum and groundnut. The actors and the activities carried by each as well as the different channels of commodity flow were identified. The presentations and the discussions that follow along with the outcomes of the deliberations are summarized under the following headings:

2. Policy and Institutional environment
   Policy and Institutional environment provide the foundation as well as the direction for various actors to do successful business in any country. The various actors take cue from the provisions made by Governments at Federal, State and local levels as well as the regulatory agencies to plan their business activities. An analysis of the various policies help to examine the powers and interests that are driving change. This knowledge can help determine avenues and opportunities for realistic action, lobbying, and policy entrepreneurship as well as the areas to be more cautious with.
   Three presentations were slated on policy. The first was by the Ministry of Commerce, Kano while the second was by NAFDAC. The third presentations was to be made by Ministry of Agriculture Kano State which was not available. The two Presentations are hereby reproduced along with discussions that followed:

   There are indications that:
   • In addition to enacting laws and regulations, providing avenues for settling disputes more infrastructural facilities like road networks, energy supplies and communications are going on in the areas where target commodities are produced, processed and distributed.
   • Research Institutes have turned out new varieties of sorghum and millet and are in the process of releasing higher yielding varieties and extending the knowledge and skills to farmers.
   • Lack of energy (electricity due erratic power supply), insecurity, dwindling and/or costly input supplies threaten opportunities to develop efficient and sustainable value chains. The situation might worsen for producers and processors with planned total withdrawal of subsidy on inputs and petroleum products. The highlights of the presentations point to the following:

   a. Trade Standard organizations: According to NAFDAC, regulating food and related products manufacture, importation, export, import, advertisement, sold or distributed in Nigeria can be done only if it has been registered in accordance with the provisions of ACT CAP F33 LFN 2004 (formerly degree 19 of 1993) and the accompanied guidelines. Quality control is also handled by them along with Standards Organisation of Nigeria.
b. Major role of Government include provision/facilitation of enabling environment for processors and marketers of agricultural produce, registration of agro and non agro- based cooperatives, provision of small soft loans to farmers, sensitization of farmers groups on improved farming practices. Recently, the ministry of Commerce in Kano established clusters for agro processors and marketers to enhance performance and standards. It has also partook in the establishment of groundnut village to promote export while the Groundnut Council has made substantial progress towards rehabilitating groundnut production and developing groundnut value chain in Kano.

c. Business regulations are in place to guide and monitor the establishment and regulation of all businesses in the country. The regulations need to be enforced.

d. Access to production inputs have been liberalized and purely in private hands. Land reforms have also facilitated improved access to land for production and other forms of business.

e. Central Bank of Nigeria along with its agencies like Agricultural Bank have a number of lending programs all category of value chain actors though lack of repayments has slowed down their ability to meet desired level of financial support.

1. Tax and Tariff regimes for the target commodities namely sorghum, millet and groundnut are likely to remain as in the previous years and no policy reversals are apparent even though vegetable oil stocks presently in the country is high and groundnut production was lower than last year.

2. Nigeria with a population of over 160 million people consumes most its production of the selected commodities and annually supplements the national requirements through imports to the tune of over 3 million metric tones of assorted food items at the cost of US $ 4.2billion. The Market demand for these products remain high.

3. Policy on enforcing agreements on farm gate pricing, contractual agreements for buy-back and payment of premium price for quality product delivery between producers, processors, marketers, and agro-dealers must be in place.

4. Corruption and fraud bedeviling the various operating environment need to given a final solution for sustainable value chain development.

5. Support policies to genetically enrich sorghum through biotechnology

1. Direct Value Chain Actors

For each of the value chains four main category of direct actors were identified and presentations were made by Producer Associations, Processors and Marketers.

a. Sorghum Value chain actors

Two key presentations from USAID BtMARKETS2, Sorghum Transformation agenda and one group discussions on sorghum value chain identified the following:

- Producers
  
  Major producers are small scale farmers with small size farms spread across the sorghum growing zones. They account for over 90% of the total sorghum output estimated at over 10 million metric tons in 2010. The industrial demand for sorghum is currently about 200,000mt mainly by malt production companies and confectionaries but has the potential to rise to 700mt by 2015. A few farmer cooperatives have been networked to produce for Aba Malting Plant and Guinness Nigeria ltd by assistance of linkage support provided by USAID MARKETS project. The transformation from subsistence to commercial production is on course.

  Inputs use by producers are mainly sourced from private suppliers (accredited agro dealers) and/or direct from Government agencies occasional at subsidized rates. The later source is relatively small.

- Processors
  
  Presently, the bulk of industrial use of sorghum is by malt drinks industries which source their raw material (sorghum) from the local markets and farmer associations in target states. Sorghum for local, household consumption constitutes over 90% of grain produced. It is processed manually or using Grains grinding machine at low capacity. The demand for sorghum is on the increase as more value addition by industrial users takes shape. Demand for malt,
maltvita and related products is very high and is on the increase. Unless ban on importation of barley is limited the demand for sorghum is expected to rise.

- **Marketers**
  Direct raw material purchases by agro-allied companies hardly occurs even for out grower schemes. Rather Production coordinators act as middlemen for consummating the transactions due the logistic support as well as heavy finance requirements. The production coordinators which are mainly agro dealers/ seed companies double up with provision of improved inputs to producers while they purchase the grains from networked farmer associations for delivery to end-user agribusiness. This model ensures effective flow of quality raw material and better value is received by producers

- **Consumers**
  Consumers are distributed all over the production zones while exporters form another potential market for the products. The opportunity for production according international standards is required and will involve research and development of suitable varieties for each production zone. The transformation agenda project with relevant stakeholders will be expected to lead this aspect of meeting customer demand.

a. **Pearl Millet Chain Actors**
  Demand for millet for industrial use is limited. The dominant use is for local drinks in forms of *fura, kunu and burabusco, biski and tuwo* dishes. With micro preparations of potential entrepreneurs which source the raw material( millet ) from the local market there is an opportunity of developing Millet-based Food Industries in states. Millet for local, household consumption constitutes over 95% of grain produced. It is processed manually or using Grains grinding machine with low capacity. The demand is on the increase due its high drought tolerance and low requirements for fertilization.

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<tr>
<th>Table 1. Main actors in sorghum and millet value chains along with business support services situation.</th>
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<td><strong>Crop</strong></td>
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<td><strong>Sorghum</strong></td>
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<td>Crop: Millet</td>
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<td>Producers :</td>
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<td>Marketers</td>
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<td>Consumers</td>
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<tr>
<th>Crop: Groundnut</th>
<th>Direct Actors</th>
<th>Business Services</th>
<th>Current status</th>
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</thead>
<tbody>
<tr>
<td>Producers :</td>
<td>Agro dealers –supply, fertilizers, seeds, agrochemicals. Prominent players are Golden Fertilizers, Notore; Farmers source finance from Agricultural Bank and Commercial banks</td>
<td>Needs more quality inputs especially seeds and fertilisers. Opportunities exist for: Linkage with Agribusiness for contractual supply. Raise Level of productivity</td>
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<tr>
<td>Marketers</td>
<td>Mainly require finance to facilitate collation, transportation and storage functions as well as distribution of the g’nut oil</td>
<td>Warehouse finance opportunity</td>
<td></td>
</tr>
<tr>
<td>Processors</td>
<td>Requires steady supply of quality raw materials, suitable storage and distribution networks. In addition requires finance to meet working Capital needs and acquisition of machinery and equipments</td>
<td>Needs more quality raw materials and sustainable supply. Out grower schemes with producer groups needed</td>
<td></td>
</tr>
<tr>
<td>Consumers</td>
<td>Wholesale and Retail</td>
<td></td>
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</tr>
</tbody>
</table>
business services needed to distribute products to various locations and in suitable forms and sizes
FINDINGS AND RECOMMENDATIONS

TOR1: Technical Guidance along Value Chains
- Identification of three (3) critical agricultural commodity value chains (sorghum, millet, and groundnut) which will maximise agricultural production, increase productivity and income as well as improve the living standards of the people employing friendly intervention strategies including sensitization of beneficiaries among small scale farmer groups, youth, women groups as well as small and medium enterprises is presented in Appendix II.

TOR2: DELIBERABLE NO. 2
At the end of the workshop, in collaboration with members of the project, discuss the strengths and weaknesses encountered that could be improved in future meetings of this kind.
The workshop recorded a broad representation of stakeholders ranging from Suppliers of inputs(goods and services) to primary producers of target commodities, processors, distributors and marketers across value chains. It was a unique opportunity provided to key actors to interact and bring out specific action steps required to move the individual value chains forward. Some of the elements of strength noted include:

- Enhanced knowledge of the current situation of individual actors
- Enhanced knowledge of the current constraints of individual actors
- Enhanced knowledge of the current policy regulations governing the operations of each activity.
- Specific coping mechanisms and strategies adopted by actors
- Future roles and expectations of participants
- Logistic support provided were very good and it encouraged many stakeholders to remain to the end of the workshop.
- Some agribusiness products were brought to the venue, this has enhanced the chances of contracting between parties and raised possibility of linkages.

Similarly, some weaknesses were observed with regards the workshop:
1. Planning of the workshop should have started a little earlier to give enough notice to some key stakeholders like the malting plants, confectionery companies and other agribusiness concerns. Perhaps some sensitization/ advocacy may be needed prior to the workshop.

TOR 3: Document Review with the Workshop working Committee
At the end of the workshop produce a consolidated report summarizing the results with particular emphasis:
- Mapping the sorghum, pearl millet and groundnut commodity chains in Nigeria
- Identifying the strengths, weaknesses, opportunities and risks of supply chain actors millet, sorghum and groundnut
- Identifying the potential for contracting between the chain actors (processors / producers, producers and traders and processors and traders under the umbrella of actors in the policy and institutional environment as well as actors in the business and development services).
To this end, a summary of the key actors, current status, business service needs are presented in Table 1 above.

The Workshop working Committee should review the draft document submitted by the facilitator and deliberate on it with a view to clarify grey areas and submit a revised version of the document for implementation.
Objectives and outcomes of the Consultative Workshop Between Actors along the Pearl Millet, Sorghum and Groundnut Value Chains in Nigeria (J Ndjeunga)

Mission statement:

Identification of strengths, weaknesses, opportunities and threats along the pearl millet and sorghum value chains and initiate potential linkages between actors along the chain

Problem Statement

- HOPE activities in Burkina Faso, Mali, Niger and Nigeria
- ICRISAT, LCRI and IAR organize the workshop
- Harness opportunities for enhancing the productivity of pearl millet and sorghum
- In line with strategies by the Nigerian government for increasing food security and incomes by boosting the supply of coarse grains 1980s and 1990s, ban on barley imports lifted in 1998.
- Millet and sorghum 62% and 63% of production and area respectively (FAO, 2010).
- Little focus on value chains (localized investments in the production sub-sector - little on the processing and marketing sub-sectors)

Mapping the markets

- Understanding the policy and institutional environment that governs the chain Identifying the actors in the value chains and the relationship between them.
- Assessing the business and development services that support value chain actors (eg. inputs, information, credit, and transport and quality assurance.

What is the value chain? A value chain is defined as “the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final customers, and final disposal after use” (Kaplinsky, R. and M. Morris, 2001).
Objectives

- Reflection and sharing of information on constraints and opportunities of actors along the value chain
- Brainstorming on existing forms of contracting and identifying opportunities for linking and/or contracting between actors along the value chain
- Identifying research and development themes from the identified problems

Outcomes / outputs

- Increased knowledge by participants on the role of actors along the value chain, constraints they face and opportunities for expanding the demand for coarse grains
- Potential linkages between actors identified
- Potential sources of funding identified with financial institutions
- Research and development themes identified
HOPE project in Nigeria (Prof. M.Y Yeye)

Department Of Plant Science IAR/ ABU, Zaria

The Institute for Agricultural Research (IAR) participates in 3 of the objectives; these are objectives 1, 5 and 6. Activities and the expected output and outcomes of each of the objectives are presented below:

Vision of the HOPE Project: To improve the productivity of sorghum and pearl millet by 35 – 40% through introduction of improved technologies and market innovations that increase adoption and profitability to 110,000 households in sub-Saharan Africa and 90,000 in South Asia

Objective 1: Targeting opportunities for technology development and delivery to maximize adoption and impact of innovations on livelihoods in West Central Africa, Eastern and Southern Africa and South Asia.

<table>
<thead>
<tr>
<th>Project Objective1:</th>
<th>Outputs</th>
<th>Outcomes (Short and Long – Term)</th>
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</thead>
<tbody>
<tr>
<td><strong>Activity 1.1</strong></td>
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</table>
| Targeting Innovations for up– scaling and for reaching resource poor farmers. | 1) Geographic Information System (GIS) database collated with crop statistics (year 1) 2) GIS maps for sorghum (and pearl millet) based on biophysical and socio – economic characteristics developed and available (Year 2) 3) Maps of recommendation domains for sorghum (and pearl millet) (year 3) 4) Regional situation and outlook reports developed for sorghum (and pearl millet) (year 4). | Short term: Project scientist and development planners use GIS maps to select and target technologies to disseminate in specific intervention areas. Project scientists make informed decisions Policy makers and development planners, better prioritize R and D interventions based on the policy briefs and situation and outlook reports.  
Long terms: Policy makers use the situation and outlook reports for research and development decision making. Policy makers and development planners better target R. D interventions to enhance future impacts. |
| **Activity 1.2**    |         |                                  |
| Analysis of investment opportunities for research and development in crop development in crop improvement, crop management and market access. | 1) A set of feasible R & D investment options. Identified for sorghum ( millet) and prepared for economic analysis (year 2). 2) Potential impact of the introduction of specific sorghum (or millet) technologies estimated (year 3) | Short term: Project scientists and partners visualize alternative investment opportunities that enhance impacts. Better targeting of research investments during future phases of the project.  
Long term: Policy makers and stakeholders use ex-ante analysis to target investment that offers highest impacts. Project scientists and policy makes prepare an out – scaling strategy with proven varieties and technologies. |
| **Activity 1.3**    |         |                                  |
| Conduct of baseline surveys for characterization of farmers, their trait preference, input – output levels and profitability of dry land cereals vis – a vis competing crops | 1) Household baseline data collected from target impact areas with proper counterfactuals for sorghum (year 3) 2) Report on socio- economic and poverty profiles, technology preferences, etc based on analysis of baseline household data for sorghum (Year 4). | Short-term: Project scientists thoroughly understand ground realities and are able to plan interventions of the desired impacts. Project scientists and partners meeting project targets. Constraints to activity implementation identified and timely corrective measures initiated through adaptive learning  
Long-term |
### Activity 1.4
Monitoring and evaluation of adoption and impact

1) Gender plan prepared for proactive involvement of women in the implementation of the project (year 1).
2) Monitoring framework developed for selected Indicators of project outcomes and impacts (productivity, production, income, vulnerability, food and nutrition security) (year 3)
3) Adoption surveys conducted and constraints and opportunities identified in selected project target area (year 4).

**Efficient and effective project implementation**
**Increased technology adoption and greater impact of the project.**

**Short-term**
Project scientists learn about what is working and what is not?
Policy makers invest on more effective interventions.

**Long-term:**
Project scientists and policy makers develop an out scaling strategy to reach more farmers.

### Activity 1.5
Human resource development and policy dialogue to enhance targeting, adoption and impact of sorghum (and millet) technologies

1) One NARS scientist will be trained in survey design, data collection methods and scientific writing (year 1).
2) Two scientists trained on impact assessment of technologies and innovations (year 4)
   *(NB: Total of 10 trained across WCA).*
3) Regional workshop to share findings form baseline surveys, adoption monitoring and impact studies (year 4)

**Short-term:**
Trainees from NARS, with their strengthened capacity, are able to undertake baseline and monitoring surveys effectively in order to gauge the adoption and impacts.
Policy makers made aware of the neglected potential of dry land cereals and constraints to technology adoption.

**Long term:**
NARS scientists use appropriate methods to assess impact of technologies and innovations in their institution.
Policy makers implement new programs to address adoption constraints.

### Project objective 5: Discover and develop strategies for improving markets for sorghum and pearl millet to stimulate adoption of improved technologies by smallholder farmers

#### Activity 5.1
Map marketing channels and measure transaction costs for selected value chains (food, feed fodder) including competing crops (maize)

1) Market and value chain surveys conducted for sorghum and millet (year 2).
2) Marketing channels for sorghum and pearl millet defined and value chains mapped (year 3).
3) Transaction costs and distribution of marketing margins estimated for selected value chains for sorghum and pearl millet (year 4).

**Outcomes (short – and long – term)**

**Short Term**
Project scientists, traders and other key stakeholders use databases to inform their work.
Market opportunities along the value chain identified and used by project partners to increase market access for farmers
Long term
Better market linkages to enhance the structure and performance of markets for day land cereals.
Better policies and institutional capacity to improve markets.

#### Activity 5.2
Establish existing seasonal demand, quality characteristics, prices and relative competitiveness of sorghum and millets in alternative uses (food, feed, fodder).

1) Potential demand for use of sorghum and pearl millet in the food processing and feed (poultry) industries estimated (year 2).
2) Product characteristics, quality requirements and price premiums for different end – users identified for sorghum and millet (year 3).

**Short term**
Farmers informed about available markets and product characteristics begin to supply desired products.
Feed processors realize the viability of sorghum and begin to formulate sorghum – based rations.
Seed companies disseminate seeds from existing varieties that meet end – user choices.

**Long term:**
Breeders will develop market preferred varieties to meet the needs of different end – users.

#### Activity 5.3
1) Consumer surveys in selected markets for

**Short term:**
<table>
<thead>
<tr>
<th>Identify consumer preferences, perceptions and price – and non-price factors that determine the demand for sorghum and millet in human diets.</th>
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<tbody>
<tr>
<td>sorghum and pearl millet conducted (year 2).</td>
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<tr>
<td>2) Drivers of consumer demand for sorghum and pearl millet as food identified (year 4).</td>
</tr>
<tr>
<td>3) Policy brief developed on strategies for improving consumer demand for sorghum and pearl millet as human foods in WCA and shared with partners (year 4).</td>
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<tr>
<td>Scientist and project partners informed about factors that limit consumption of sorghum and millet as food. Partners promote available varieties and products that meet consumer preferences.</td>
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<tr>
<td><strong>Long term:</strong> Breeders develop varieties that meet consumer preferences for taste, colour, nutrition, etc. Market actors and processors take steps to develop new products that meet consumer choice.</td>
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<thead>
<tr>
<th>Activity 5.4</th>
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<tbody>
<tr>
<td>Evaluate and identify effective grain and fodder marketing strategies for reducing transaction costs and develop strategies for introducing grades and standards.</td>
</tr>
<tr>
<td>1) Develop or strengthen farmers associations/organizations at collective marketing (e.g. agro-dealers and producer marketing groups) for sorghum and millet (year 2).</td>
</tr>
<tr>
<td>2) Grain collection points established, tested and evaluated for sorghum and millet (year 3).</td>
</tr>
<tr>
<td>3) Grades and standards associated to corresponding price premium for sorghum and pearl millet (year 4).</td>
</tr>
<tr>
<td><strong>Short term:</strong> Farmers adopt more profitable marketing channels and receive higher prices for their produce. Farmers increase participation in sorghum and millet markets as sellers. Farmers increase marketed surplus and adopt business practices.</td>
</tr>
<tr>
<td><strong>Long term:</strong> Farmers become more reliable business partners in the value chain. Increased demand and commercialization of sorghum and millet production.</td>
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<tr>
<th>Activity 5.5</th>
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<tr>
<td>Develop appropriate models for farmer-market linkages using determinative formal and informal arrangements with buyers to improve market access.</td>
</tr>
<tr>
<td>1) Alternative options (Radio, Mobile phones, other existing market information systems for delivering timely and relevant market information to farmers identified for sorghum and millet (year 2)</td>
</tr>
<tr>
<td><strong>Short term:</strong> Farmers benefit from market linkages and access to services. Processors and other buyers informed about available supplies and product characteristics.</td>
</tr>
<tr>
<td><strong>Long term:</strong> Farmers reduce transaction costs and benefit from higher and reliable prices. Increased trust and relationship between farmers and buyers that would strengthen value chains. Higher market demand for dry land cereals.</td>
</tr>
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<table>
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<tr>
<th>Activity 5.6</th>
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<tbody>
<tr>
<td>Conduct regional short – term training courses or research workshop for partners in the following areas: Value chain analyses methods (year 2) Strategies for linking farmers with buyers (year 2). Agribusiness skills and enterprise opportunities in sorghum (year 2).</td>
</tr>
<tr>
<td>2) Support 2M.Sc students from the target countries in the region for their research on improving markets for sorghum (1 student) and pearl millet (1 student) (year 4).</td>
</tr>
<tr>
<td>3) Policy briefs on improving market linkages and manual for processing and agribusiness development for women.</td>
</tr>
<tr>
<td><strong>Short term:</strong> Increased number of qualified researchers addressing market constraints for these orphan crops. NARS and private sector partners enhanced to analyze markets and propose policy options for dryland cereals. Improved availability of information on processing options and enterprise opportunities for women and farmer groups.</td>
</tr>
<tr>
<td><strong>Long term:</strong> Country build optical mass of market analysis to support market development. Better linkages between farmers and other value chain actors. Farmers have sustained access to markets, information and processing technology.</td>
</tr>
<tr>
<td>Project Objective 6: Enable technology adoption of sorghum, pearl millet, improving access to seed, markets, inputs, know-how and finance</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Activity 6.1</strong> Increase farmers’ access and use of knowhow about the use and benefits of profitable crop management technologies and improved cultivars</td>
</tr>
<tr>
<td>Training manuals in two languages on integrated <em>Striga</em> management for pearl millet based systems in the Saehlian zone of Nigeria published and distributed (year 2) Radio programs in two languages on variety characteristics, crop management options and market information broadcast (year 4).</td>
</tr>
<tr>
<td><strong>Short – term</strong> Increased grain productivity and improved quality. More farmers producing grain from improved cultivars. Fertilizer available and used appropriately. Seed treatments available and used appropriately. Farmers practicing integrated agronomic management including <em>Striga</em> and cropping systems. Effective linkages established with other organizations working to improve availability of inputs. Soil and water management practices applied to farmers’ fields.</td>
</tr>
<tr>
<td><strong>Activity 6.2</strong> Increase availability and use of quality seeds of improved varieties</td>
</tr>
<tr>
<td>4,500 farmer variety kits with pearl millet in the Sahelian zone distributed by farmer associations, private sector or extension services groups in Niger, Mali and Nigeria (year 4). 5,000 farmer variety kits with sorghum distributed by farmer associations, private sector extension services in Mali, Burkina Faso and Nigeria (year 4). Seed production training manuals for open-pollinated varieties of pearl millet and sorghum published in English and Hausa (year 4). 10 farmer associations, and individual members trained in seed marketing and business skills (year 4). Ten tons of certified and Quality Declared Seeds (QDS) of millet and sorghum seed disseminated through farmer organizations and agro-dealers in Mali, Niger, Burkina Faso and Nigeria (year 4). Profitability of seed sales and initial variety adoption of sorghum varieties as a result of commercialization of farmer variety kits assessed (year 3). Profitability of seed sales and initial increase of demand for quality seed of improved pearl millet varieties as a result of commercialization of Farmer Variety Kits in Nigeria assessed (year 3). Country reports on farmer-preferred varieties and new crop management options with potential for more wide spread adoption published online, on a yearly basis (year 2, Year 3 and year 4).</td>
</tr>
<tr>
<td><strong>Long – term</strong> Increased farmer income. <strong>Short term:</strong> One seed enterprise in each target area produces seed of open-pollinated varieties. Two seed enterprises in each region initiate hybrid seed production. 25% of farmers in pilot sites use improved seed. 10% of area of pilot sites sown to improved varieties. <strong>Long term:</strong> Wide-scale adoption of varieties. Sustainable seed production and seed dissemination arrangements. Farmer know-how increased. Increased productivity. More seed companies actively marketing improved quality seed.</td>
</tr>
<tr>
<td><strong>Activity 6.3:</strong> Increase availability and use of fertilizer and other crop management inputs.</td>
</tr>
<tr>
<td>Input providers linked to other projects, to facilitate access to training in appropriate use of specific types of fertilizers, seed treatments, herbicides, pest control products and business skills in Nigeria (year 3). Farmer filed schools for integrated <em>Striga</em> management for pearl millet based systems scaled up in Mali and Nigeria using a range of tools for farmer training (year 2).</td>
</tr>
<tr>
<td><strong>Short term:</strong> At least 5 agro-dealers in each target areas marketing fertilizer, seed treatments, herbicides and pest control product. Farmer field schools training in integrated <em>Striga</em>management. Policy brief on effectiveness of MHM biological control published. <strong>Long term:</strong> Wide-scale adoption of fertilizer.</td>
</tr>
</tbody>
</table>
**Activity 6.4**  
Improve access to output markets to increase technology adoption and cash incomes for farmers.

| Sustainable fertilizer dissemination arrangement  
Increased productivity.  
| Link at least two farmer organization to World Food Program (Year 2)  
Strengthen 10 farmer unions for collective marketing of sorghum and millets cereals in Nigeria (year 4).  
Improve availability of information of prices, supply and demand for actors along the value chain (producer, traders and processors). (Year4)  
| Short term:  
Increased grain sales by farmers  
Decreased drudgery of grain / food processing for women.  
Increased income generation opportunities for women.  
Number of food processing enterprises increased.  
Long term:  
Increased business activity along the value – chain by existing and new actors.  
Agro – processors producing a broader range of grain – derived products.  
Increased income and empowerment of rural and urban women.  
Improved marketing opportunities for cereal producers.  

**Activity 6.5**  
Improve access to finance to increase adoption of purchased inputs and increase demand for sorghum and millets cereal based products.

| Farmer organizations strengthened at book keeping, (cash flow, profit and loss account) (year 3).  
Linkages established between financial institutions and farmer organization to access finance for input supply and output marketing (year 2)  
Warranty and credit guarantees promoted /strengthened with partners to increase farmer access to input finance for sorghum and millet cereals (year 4).  
| Short term:  
Increased use of purchased inputs by farmers  
New approaches to farmer learning used for building farmers' capacity to produce and market grain surplus.  
Long – term  
Increased consumption of sorghum and millet-based products by human consumers.  
Increased consumption of sorghum and millet-based products by the livestock industry.  
Policy reform to support sorghum and millet sub-sector enacted by policy makers.  
Increased incomes for cereal producers and small scale and industrial processors.  
Increased access to processed sorghum and pearl millet products in urban markets.  

**Activity 6.6**  
Enhance capacity of partners (e.g., NGOs, private-sector, extension) to deliver appropriate cereal technology options to farmers and increase alternative use of sorghum and millets cereals

| ICRISAT and NARS scientists trained in participatory approaches (year 1)  
Experiences with integrating delivery of seed, crop management techniques, inputs, and market linkages exchanged among project partners in WCA (year 4).  
One M.Sc student trained in technology change, (year 3).  
| Short term:  
Enhanced capacity of NARs and ICRISAT to engage with NGOs, farmer organization, private-sector, and extension.  
Project partners choose appropriate methodologies for development oriented crop improvement research.  
Partners make better choices for appropriate technologies.  
Enhanced collaboration between stakeholders/development investors  
Increased private – sector investment along the sorghum and ,millets cereal value chain.  
Long term:  
|
Sorghum and millets cereal research more effective and efficient. Farmers have more technology options available to increase productivity, quality and sustainability of sorghum and millets cereal cultivation.
An overview of activities conducted on millet in Nigeria in collaboration with HOPE project (K W Gwadi)

K. W. Gwadi
Lake Chad Research Institute, Km 5, Gamboru Ngala Road, P. M. B. 1293, Maiduguri, Borno State, Nigeria

Preamble

LCRI/HOPE Project Collaboration
Lake Chad Research Institute (LCRI) collaboration with the International Crops Research Institute for the Semi –Arid Tropics (ICRISAT) HOPE (Harnessing Opportunities for Productivity Enhancement of sorghum and millet) Project started in 2009.
Groundnut value chain development in Nigeria: Challenges and opportunities in production, processing, marketing and general business development of groundnut value chain (Mukhtar, A. A and Tanimu, B.)

Department of Agronomy, Faculty of Agriculture/Institute for Agricultural Research, Ahmadu Bello University, Zaria

Introduction
Groundnut occupies a very important place in the agricultural system and national economy of Nigeria. It plays a dual role as a food and cash crop due to the diverse uses and roles which it may be put. Groundnut may be consumed raw without any form of processing. It provides a significant source of cash through sale of seeds, cakes, oil and haulms (Olorunju et al., 1999). The crop serves the economy as source of employment, income and raw material for manufacturing industries for production of a host of products including cooking oil, groundnut snacks, groundnut candy and as component of chocolates etc.

Groundnut production is greatly affected by the cost of production inputs as well as demand for the groundnut itself. High and favorable prices encourage producers to engage in the crop’s production while high inputs cost reduce production volume. Lower producer prices and limited marketing opportunities reduce incentives for producers to invest in productivity enhancing technologies such as improved seed, fertilizer and pesticides. (Tanimu 2001). Value chain approaches are a vehicle for linking small businesses to markets and thus are essential for improving rural economies and reducing poverty.

Production of groundnut in Nigeria stands at 2.9 million tons from 2.6 million hectares, (FAO, 2009). The crop is presently grown throughout the country with the exception of riverine and swampy areas. Leading groundnut-producing states in Nigeria are Bauchi, Benue, Nasarawa, Yobe, Zamfara, Adamawa, Kebbi, Kano, Katsina, Sokoto Niger and Taraba. (Anonymous, 2004). Over the years, there has been development and adoption of programmes that tended to generally support only increased production of commodities without much towards adding value towards the market. Table 1 shows groundnut production within the last 10 years in Nigeria. Figures show increases during the earlier part of the decade with high productivity in the years between 2003 to 2006; thereafter a decline was observed.

Table 1. Groundnut production within the last 10 years in Nigeria

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area planted tons/ha</td>
<td>1.9</td>
<td>1.7</td>
<td>1.8</td>
<td>1.9</td>
<td>2.0</td>
<td>2.1</td>
<td>2.2</td>
<td>2.2</td>
<td>2.3</td>
<td>2.6</td>
</tr>
<tr>
<td>Total production 1000 tons</td>
<td>2.9</td>
<td>2.6</td>
<td>2.8</td>
<td>3.0</td>
<td>3.2</td>
<td>3.4</td>
<td>3.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Groundnut value chain
The flow of groundnut seed from production through processing to the market occurs along chains. These can be referred to as value chains because as the product moves from chain actor to chain actor, such as from producer to intermediary to consumer, it gains value. A value chain
is the full range of activities which are required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final customers, and final disposal after use (Kaplinsky and Morris, 2000).

Value chain actors are those individuals or institutions that conduct transactions in a particular product as it moves through the value chain. These may include seed suppliers, farmers, traders, processors, transporters, wholesalers, retailers, and final consumers. In many cases, there is more than one type of source actor, as well as multiple channels that supply more than one final market.

The agricultural share of Nigeria: total exports has declined sharply in the last forty years, but remains the major contributor to the national GDP. Without further improvement to Nigeria’s business environments and increased competitiveness of our exports, Nigeria risks being trapped by continuing to produce low skill, low value products and services and will fail to secure a niche in competitive world markets (Miko, 2011).

Development of the value chain requires a conducive and enabling environment and other service providers.

**Enabling environment**
The enabling environment consists of the critical factors and trends that are shaping the value chain environment and operating conditions, but that may be amenable to change. These “enabling environment” factors are generated by structures (national and local authorities, research agencies, etc.) and institutions (policies, regulations, and practices) that are beyond the direct control of economic actors in the value chain. The purpose of charting this enabling environment is not simply to map the *status quo*, but to understand the trends that are affecting the entire value chain and to examine the powers and interests that are driving change. This knowledge can help determine avenues and opportunities for realistic action, lobbying, and policy entrepreneurship.

**Service providers**
In most effective value chains, the actors who actually form the chain (those who conduct transactions in the main product) are supported by business and extension services from other enterprises and support organizations (e.g. seed suppliers and intermediaries). There is an ongoing need for chain actors to access services of different types, both market and technical.

**Challenges in production, processing and marketing of groundnut value chain**
**Production**
Groundnut production is constrained by a number of biotic and abiotic stresses such as insects, diseases, drought and low soil fertility (Tanimu 2001). Groundnut production is labor intensive and additional labor is required especially for stripping, shelling and even grading. Results from a gross margin experiment (Ngulube et al. 2001) reported that stripping and shelling were the major labor demanding activities in groundnut production and contributed to about 40% of the total production cost. Availability of seed is another major drawback because seed supply is seasonal and production is dependent on weather and price fluctuations. The private sector does
not readily invest in seed production for a number of reasons; low multiplication factor, the recycling of seed planted by farmers as well as issuance of free seed by some institutions from time to time. Seed production is mainly in the hands of smallholder farmers. When a crisis arises, farmers often sell or consume what they would have originally put aside as seed.

Processing
Agro-processing industries refer to those activities that transform agricultural commodities into different forms that add value to the product. Agro-processing activities comprise two major categories; primary and secondary operations. Primary processing operations involve activities such as crop drying, shelling/threshing, cleaning, grading, and packaging. These activities are mainly carried out at the farm and only transform the commodity into a slightly different form prior to storage, marketing or further processing. Secondary processing operations entail increasing nutritional or market value of the commodity and the physical form or appearance of the commodity is often totally changed from the original. Some examples of secondary processing for groundnut are grinding groundnuts into groundnut butter, pressing oil out of the seeds. Agro-processors face numerous challenges including:

- Poor equipment back-up service rendered by dealers, shortages and high cost of equipment and spares;
- Limited access to information from extension service;
- Limited access to appropriate packaging material for processed products, lack of marketing skills;
- Inadequate support services from training institutions, private sector consultants, small enterprise advisors, research institutions and engineering workshops;
- Erratic supply and increased cost of fuel coupled with frequent power cuts;
- Unreliable supply of raw materials, reduced demand for processed food products;
- Poor cash flow emanating from low volumes of raw materials hence low income is realized from processing;
- Failure to meet food processing regulations pertaining to food safety and hygiene practices which need to be adhered to in the industry. Attention to hygiene and basic food safety procedures is found, at times, to be limited among informal enterprises. Knowledge of specific regulations and legislation governing food safety and hygiene issues is only evident among those processors who market their product through formal outlets.
- High cost of processing equipment; and limited capacity to mobilize capital for equipment purchase and working capital.

Marketing
A major marketing limitation facing smallholder farmers is low producer prices. Grain prices tend to rise near planting time; farmers who sell at that time are able to get a higher price than if they sell at harvest. The ability to store grain rather than producing superior quality grain earns a premium. Other challenges include: lack of information on high-value crops, difficulty in accessing finances for exporting, poor support and advisory services, and lack of expertise on marketing skills. Access to markets due to poor road networks in the rural areas was also identified as one of the problems. The dominance of smallholder farmers in groundnut production poses a great challenge to buyers in the sense that it is costly to assemble the
commodity at one point if the trader is buying large quantities. This increases handling and transport costs as well as product losses. Small traders have not, however, the financial means or storage capacity and thus are committed to a continuous cycle of buying and selling.

Opportunities in production, processing and marketing of groundnut value chain

Production
New breeding technologies have produced a range of improved varieties adopted to particular end users or to specific growing conditions. At the IAR several high-yielding varieties have been developed to address constraints such as pests, diseases, and drought. Notable among these varieties are SAMNUT 10, 11, 21, 22 and 23. Other opportunities are seed production for commercial purposes as out growers or seed companies.

Processing
Agro-processing opportunities in Nigeria currently tend to favour growth and development of medium-scale processing industries that match the current production levels. Market forces and the prevailing economic environment favour more down-sizing of large-scale processing systems and upgrading small-scale processing industries. This is mainly due to the fact that the demand for raw materials by large-scale manufacturers is currently not being met due to low national production levels hence the enterprises are operating below capacity. This has resulted in scaling down of business, massive staff retrenchments and/or closure of factories. Small-scale food processing activities represent a potential source of livelihood for many poor people and rural dwellers. The overall potential of agro-processing is huge as it can:

- Increase the value of crops of poor farmers and thus yield higher returns;
- Expand marketing opportunities;
- Improve livelihoods of people;
- Extend shelf-life of commodities;
- Improve palatability of commodities;
- Enhance food security;
- Overcome seasonality and perishability constraints; and
- Empower women who are often involved in agro-processing.

The agro-processing industry in Nigeria has potential to meet the local needs and export requirements. Medium-scale enterprises have potential to create employment opportunities especially if the enterprises are nurtured to produce for both domestic and export markets.

Marketing
Groundnuts are a high value crop that can be marketed with little processing but are extremely versatile and can be used in a wide range of products. Oil extracted from the groundnut can be used as raw material for manufacturing of soap; massage oil for polio patients; body, shaving and hair creams; and fluid diet which is used to physically strengthen patients and to sharpen their appetites before and after operations. The oil cake which is by-product of oil extraction process is used to make glue for wood; animal feed; fertilizers and antibiotics. Groundnut oil contains high amounts of energy and fat-soluble vitamins (A, D, E, and K) and essential fatty acids. The oil content of the kernels is between 45% and 55%.
Marketing of groundnuts is constrained and is done through different channels without an organized marketing structure. Farmers sell their produce to fellow farmers, local traders, or to middlemen either individually, through farmer groups and farmer cooperatives. Opportunities exist for increasing the role of groundnuts in the economy and therefore contributing toward food security and nutrition security, and increased incomes to smallholder farmers.

At every stage of the value chain solid business and employment opportunities exist that can provide gainful jobs to different actors. From seed production up to consumption, there are opportunities for businesses that can provide livelihoods. For example seed production requires expertise from breeders; secondary processing requires the technical knowhow of the Agricultural engineers and fabricators alike while sale of the groundnut seed and its byproducts involves small and medium scale entrepreneurs.

Innovations such as the groundnut Sheller fabricated by IAR can promote the marketing of groundnuts in rural areas. With the use of the machine, most farmers will be able to process the nuts to oil thereby increasing their marketing opportunities.

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O.Alabi and S.G. Mohammed eds. Proceedings of training workshop techniques and variety maintenance
Sorghum and pearl millet marketing in the north-eastern Nigeria: challenges and opportunities (Bashir Alhaji Baba)

Lake Chad Research Institute, Maiduguri

SORGHUM AND PEARL MILLET MARKETING IN THE NORTH-EASTERN NIGERIA: CHALLENGES AND OPPORTUNITIES
Implementing sorghum transformation value chain in Nigeria (Professor A Babatunde Obilana)

Team Leader, Sorghum Transformation Value Chain Initiative
Federal Ministry of Agriculture and Rural Development, Abuja Nigeria

EXECUTIVE SUMMARY
Sorghum production in Nigeria is increasing at a very rapid rate as a result, probably of availability of other opportunities due to climate change and export potential in countries of the Sahel in the West Africa region. The country produces 8.5million tons in 2008, 9.32million tons in 2009 and by 2010 it is approaching 10.0million tons with projection for 2011 rising to 11.50 million tons/annum, becoming the largest producer in the world. To fully exploit this immense opportunity and potential, processing and product development for existing products and new and novel products must be escalated, for enhancing better nutrition, food and feed options and as an export commodity. There is a need to change how sorghum is grown and traded in the country using a value-chain development approach and a business-oriented agriculture environment.

A new sorghum transformation has been embarked upon under the Agricultural Transformation Program of Nigeria’s President Goodluck Jonathan and implementation by the Honorable Minister of Agriculture, Dr Akin Adesina. The sorghum transformation seeks to create a new generation of sorghum farmers, oriented towards commercial production and farming as a business, and to link them up to reliable demand and markets, from agro-processors through a well-managed value chain with farm-gate pricing, buy-back guaranty and assistance/facilitation from zonal production coordinators. The overarching strategy of the sorghum transformation is to turn the sorghum sector in Nigeria into a major player in local and international fortified foods, malt products, packaged meal and fine flour composited for non-gluten (gluten-free) breads, biscuits, cookies and extruded foods like noodles, macaroni, roasted sorghum, and weaning foods industries by adopting improved production and processing technologies, and organizing producers and processors into efficient value-added chains.

Implementation of the value-added chain activities will be driven by the private sector with support from the public sector. A very strong Sorghum Growers, Processors, Marketers, Consumers and Developers Association will ensure activities in market development, including advocacy with potential users of sorghum-based products and policy makers, to ensure reliable demand. From the public sector, the Federal, State, Local governments, and NGOs will organize and train farmers in modern production methods, and disseminate to them improved varieties and inputs required to grow them.

Experience from around the world has shown that crop campaigns to raise productivity require a close partnership with research and development of enabling technologies. The transformation plan will invest significantly in the development of improved production methods, new hybrids and improved varieties, diagnostic and market surveys, and the development of novel sorghum products and, instant convenient better-presented and packaged indigenous foods. The transformation plan will support the production of high productive hybrids with increased nutrition to enhance health status, especially children, encourage increased school enrolment in the target areas of NW and NE zones, through efficient school feeding scheme.
Expected impact includes the creation of just over one million jobs in the two zones targeted initially, both on-farm and of-farm, and increase the income of 1.8 million sorghum farmers from an increase in average productivity of of 800 kg/ha to 3000 tons/ha and the creation of strong supply chains to the market and industry.

Our Strategy for the effective execution of the transformation value chain and to achieve its expected goals, the transformation team will visit the cluster states in the target zones (three out of six in the North East –NE, and three out of seven in the North West –NW). The objectives of these visits is to present the program to the stakeholders of sorghum in the states for their buy-in and committed support, farmers conscientization and initiation of a PPP approach to the value chains in the transformation. During these visits, Stakeholder Forum Workshops are held where actors and movers for the transformation are identified in each value chain, and Time-Lines for activities are developed with all stakeholders at least for the first year activities. With this all-encompassing approach, grassroots are responded to and linked with nutritious products and lucrative markets.

Three value chains identified for focus include:

i. FORTIFIED FOODS mostly in form of Soy-Akamu for lactating mothers, convalescing adults and especially for the SCHOOL FEEDING PROGRAMS in the States to increase primary school enrollment and decrease dropout rates

ii. MALT Beverages and Drinks like; Bournvita, Milo, Ovaltine, DAWAMALT (a new breakfast beverage like Maltabela); and Maltina, Vita Malt etc. through establishment of manufacturing plants and factories in the NW and NE Zones

iii. HIGH QUALITY SORGHUM FLOUR – packaged as instant, convenient “Tuwo Meal”, blended with wheat (upto 20%) to bake bread, biscuits, pancakes; and use in extruded foods for Noodles, Macaroni, Indomie-type foods; steamed foods like Couscous, Brabusko etc.

Both value chains i and ii are geared towards more nutritious foods for healthy growth and alleviation of malnutrition which are endemic in the target zones; while value chain iii is mainly for food and health security.
PROGRAM PROFILE

TITLE: ACTION PLAN FOR SORGHUM TRANSFORMATION IN NIGERIA

GOAL: To achieve accelerated impact with increased production and productivity of sorghum from present 9.32 million MT to 13.4 million MT, increasing income to N2.8 Billion in 533,000 farm households, creating 1.8 million new jobs by using sorghum hybrids (with at least 3-fold yields) and improved o.p varieties (with 2-fold yields) for producing malt, fortified foods, and packaged plain flour in the North West and North East Zones over a period of four years.

OBJECTIVES:

- Drive research and development efforts to increase and produce good quality and appropriate quantities of seed for the new sorghum hybrids and improved open pollinated (o.p) varieties in collaboration with the private seed companies, seed growers, research institutions and agro-processing industries for use in end products.
- Raise productivity levels by promoting small, medium and large scale commercial production by promoting increased use of improved production technologies of hybrids, agro-inputs, farm machinery and equipments, through training (via demonstration plots) of clusters of farmers in three selected high volume centers/clusters from the NW and NE geopolitical zones that produce 80% of Nigeria’s sorghum
- Develop strong linkages and synergies between the cluster producers, public institutions, private-sector agro-processors (millers, maltsters), food/feed industries, foods scientists/nutritionists and consumers of sorghum products and by-products
- Sustain the existence of present foods/beverages in new packaged formats and increase efforts in developing new foods and products for local and export markets through building incentives into private sector-led industries
- Implement government financing policies to enhance soft and bridging loans to private and public sector food/feed end-use product operators, product and haulage markets and awareness programs incorporating end-user perspectives
- Strengthen capacities of key players along the value chain and continually monitor and evaluate progress to identify the most promising and acceptable interventions for continuous improvement of strategies to achieve impact
- Encourage and support growth of large commercial sweet sorghum farming for manufacture of industrial non-foods (biofuel industry) to realize large and quick job creation in the agricultural-manufacturing private sector.

TARGET AREAS

Two geo-political zones which cut across the four agro-ecologic zones of the country (derived savanna, guinea savanna, sudan savanna and the sahel) were selected. These are:

- North West Zone: comprising seven states (Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto and Zamfara)
North East Zone: comprising six states (Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe).

These two zones combined, produce 80% of total sorghum in the country, and is home to malnourished children and pregnant women (accounting for 49-53% of their population), increase in wasting (thinness) and stunting (shortness), and needing urgent food and nutrition intervention.

The included fig.1, table1, fig.2, fig3, fig4, and table2, are self explanatory.

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**Sorghum: Area Planted (Thousand Hectares) and Production (Thousand Metric Tons) by Zone, by Year (Through Limited Survey)**

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<tr>
<th>S/n</th>
<th>Zones</th>
<th>2006/07 State</th>
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<th>2007/08 Production</th>
<th></th>
<th>2008/09 Production</th>
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<th>2009/10 Production</th>
<th></th>
<th>Total</th>
<th>Production Average</th>
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Series1, North West, 1067.5... Series1, North East, 1784.0...

Regional Contribution to Sorghum Production, 2009/10 Through Limited Survey
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<th>Taraba</th>
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<td><strong>5</strong></td>
<td><strong>Total South East</strong></td>
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<td><strong>6</strong></td>
<td><strong>Total-South West</strong></td>
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**Map showing Ecological zones in Nigeria**
1. Sorghum is cultivated in regions II to IV above covering 8.0 million hectares
2. North-West (Seven States) and North-East (Six States) Geopolitical zones are shown in following map
Stunting and wasting do not occur uniformly.

Emergency feeding is needed when the wasting rate is over 10% and there are causal factors.

1. Reason for focus on NW & NE Geo-political Zones - due to malnutrition (stunting, underweight, & wasting).
2. School feeding and institutional feeding is mandatory using fortified / malted sorghum food & beverages.
Malnutrition trends in Nigeria

- 2008 data indicate increase in wasting (thinness)
- Stunting (shortness) levels still high—above 40%
- National averages do not show regional disparities
The sorghum transformation value chain will be responding to the scenario shown in the table on nutritional problems in Nigeria by linking with the NABDA for genetic biofortification of sorghum through the ABS (African Biofortification of Sorghum) Project. The project seeks to improve bioavailability of major micronutrients –Iron and Zinc which are dangerously deficient in diets of consumers of sorghum, increase vitamin A and develop elite genotypes with overall better nutritious and beneficial, healthwise, sorghum.

**EXPECTED OUTPUTS**

- Robust value chains of malt (for use in beverage industry), nutritious fortified foods typically blended with soybean (for home grown school feeding programs – HGSF and the World Food Program – WFP food aid, weaning foods, and Flour (conveniently packaged for preparing solid foods, porridges, bread, biscuits, cookies).
- A tripling of average sorghum yields and productivity from 0.80 metric tons/ha to 3.00 metric tons/ha by 2015 using hybrids in the target clusters of NW and NE zones.
- Generation of 1.8 million jobs in the rural areas of the country and across the five value chains, with spillovers to related retail markets, over the next four years of the transformation program.
- Strong seed institutions, companies and growers established and developed for long-term sustainability of the sorghum sub-sector.
- Existing localized/clustered sorghum markets strengthened and institutionalized, and generate N 92,000 - N 156,000 cash income annually from N46,000 presently earned by individual farmers in the target zones starting from end of season 2012.
INTRODUCTION

Background
There is no shortage of indigenous varieties of Sorghum in Nigeria. Nigeria produces 9.32 million tons of sorghum annually (2nd only to the USA and higher than India; however, Nigeria is the largest producer of Food Grain Sorghum Globally, the first –USA and third –India producers using the crop mostly for animal feed and fodder). However, there is a severe shortage of improved released varieties and no hybrids that are commercialized in the country; main reason being the absence of Seed Industry in the Country to produce Breeder Seed, Foundation Seed and Certified Seed. The main constraint to industrial seed production is the absence of sorghum hybrids and lack of high productivity in available improved varieties. In the past four years (2008 till date), a private sector-led PPP research and development sorghum hybrid initiative (through a consultancy with the Institute for Agricultural Research (IAR/ABU, Samaru Zaria and Premier Seeds Nigeria Ltd.) has progressed significantly and developed, through breeding and selection, two sorghum hybrids that will be released in 2012 and seeds available for farmers’ production from 2013 main cropping season. Since the 2010/2011 irrigated offseason, seeds of these hybrids are being increased and bulking up is continuing so that adequate quantities with excellent qualities are available. Presently, the commercialization and industrial utilization of sorghum is increasing with the target production (by selected out-growers and regional crop coordinators) marketing and supply of good quality grains of two new improved varieties (CSR 01 and CSR 02 released in 2007). There is now a gradual and systematic industrial use of sorghum in producing MALT, MALT BEVERAGES and MALT FOODS. This beginning success story of commercialization of sorghum (a lucrative business that is still growing) involving four improved varieties (SK5912, KSV 8, CSR-01, CSR-02 which are higher yielding than the farmer local varieties) must continue at higher levels with production of the new hybrid sorghum. In this strategic PPP (including the USAID/MARKETS and Consultancies for breeding and production), by 2008, the participating company gives out 200 metric tons of high-yield sorghum seeds to farmers each year; while the Regional Production Coordinators manage about 6000 farmers, and targeting 18,000 – 20,000 for 2010.

Nigeria’s total production of sorghum is 8.5million metric tons from 7.3million ha in 2008 and as at 2010 increased to 9.32million metric tons (FAOSTAT 2009); about 80% of these are from the North-east and North-west geopolitical zones. Out of these 80%, about 60 – 70% is produced by small-scale farmers who are using manual labor and hand tools. If we are to transform, increase and commercialize sorghum production in these areas therefore, we have to mechanize our production systems and this should be a gradual process.

Apart from mechanization, provision of inputs (fertilizer, seeds, agro-chemicals, etc), timely and with affordable prices to the low-income farmers must be addressed. And these calls for the establishment of agro-dealers centers, one-stop shops clustered around high volume and major local government areas where these inputs will be made available by government (Local, State and Federal) supported by the financing policies enshrined
in NIRSAL initiative. Three clusters from each zone, i.e total six clusters to begin with, will be identified for immediate intervention; scaling up follows on generation of positive progress and outcomes.

To address these issues, there should be contributions of funds from statutory allocations from local, state and federal government accounts. Tractorization, farm machinery and equipment from land preparation to harvest and cleaning grain for bagging and market are major aspects of this scheme.

For example: Assuming, a tractor cost N7 – 8 Million Naira, and a complete animal traction equipment cost N1 million. Then N10 million Naira = 1 tractor with complete implements and 2 animal traction units with complete implements. This gives a total initial inlay expenses of 3 tractor animal traction complement x 3 clusters in the 2 zones x N10million = N180 million, to encourage cultivation of the new hybrids and improved o.p varieties. This excludes the costs of agri-inputs such as fertilizer, herbicides, insecticides, seed treatment chemical and labor!

In the summary report of ‘World Agriculture towards 2015/2030 (FAO Rome, 2002), it was found that ‘if no corrective action is taken, the target set by the World Food Summit of 1996—that of halving the number of undernourished people by 2015— is not going to be met.Nothing short of a massive effort at improving the overall development performance will free the developing world of its most pressing food insecurity problems. The progress made towards this target depends on many factors, not least of which is political will and the mobilization of additional resources. Past experience underlines the crucial role of agriculture in the development process, particularly where the majority of the population relies on this sector for employment and income.

Presently in Nigeria, there is the political will exhibited by the President, Dr Goodluck Ebele Jonathan; his Hon. Minister of Agriculture, Dr Akinwunmi Adesina; and the Finance Minister Dr Okonjo Uweala; agriculture has now been put in the front burner as one of top priority government action by the promulgation of the ‘Presidential Agricultural Transformation Agenda’. The new sorghum transformation program will drive strategic development around the sorghum sub-sector through value chain addition to realize opportunities that exist in the indigenous foods, industrial food, non-food and export sectors for processed sorghum. However, while the plan builds production and market support around the farmers and processors, adequate resources, especially funding must be mobilized; the process must be private sector-led (by agro-processors, marketers and investors) with close linkages and collaboration of development partners. The significant support, and partnership with the industries need to be recognized as their corporate social responsibilities to Nigeria. This is where the Sorghum Transformation Value Chain becomes significant in the drought-prone and nutrition-deficient zones of the country, for food, beverages and feed, job creation and income generation especially for the youth and women.
Sorghum Crop Description and The Opportunities
Sorghum (*Sorghum bicolor (L) Moench*) called ‘Dawa’, ‘Oka baba’ in Nigerian languages and Guinea corn in English is the most widely cultivated staple cereal crop in Nigeria, covering 8.5 million ha in the three savanna agro-ecologic zones (guinea savanna, sudan savanna and sahel) and extending southwards to the derived savanna down to latitude 7.5 degrees north of the Equator. It is genetically drought resistant growing in hot dry agro-ecologies, with relative advantage where other food crops like rice and maize find it difficult to grow successfully or risky to cultivate. In these difficult environments, sorghum is truly a dual-purpose crop; both grain and stover are highly valued outputs. There are four types of sorghum cultivated in Nigeria that have different end-use products:

- **grain sorghum ---** which makes up 99.90% of all the types cultivated types and is used mainly for food; then feed, crop residue and construction.
- **sweet sorghum ---** which makes up 0.01% of sorghum cultivated area, whose stalks are sweet (like sugar cane) and used for fuel (biofuel in ethanol production), snack and food, fodder and animal feed. It is called ‘Takanda’ in Hausa language.
- **Forage sorghum ---** covers a minute area of 0.005% and used for fodder and feed
- **Broom corn ---** covers 0.085% and used for household cleaning and as fuel wood

Sorghum in its processed form is food to more than 65 million Nigerians daily, indigenously consumed as solid foods (Tuwo), thin porridges (Kamu, Ogi) and gruels (Kunu) as breakfast food and drinks, boiled grain (pate) etc. The leaves are economically important as cash income when sold and used for crop residue and silage/forage feeding to cattle, sheep and goats, while broken grains and left over grains are fed to poultry. There is no presently organized use of sorghum as poultry feed. However, a significant demand for sorghum in the malt and fortified food industries exist and is growing. Opportunities for industrial processing and use in poultry feed, flour for bread, cakes and cookies; and in extruded products like noodles, macaroni, and Indomie-type convenience foods have been researched and need up-scaling for commercialization.

In Nigeria milling of sorghum is still carried out with a mixture of traditional methods (decortication and pounding in a mortar into a meal, after hand winnowing) and modern milling using Hammer Mills after decortication (to produce flour with the chaff blown off by fan built into the machine). To get fine quality meal and flour, the resulting initial product is sieved manually before final food preparation.

Malting in sorghum simply involves germination of the grain in moist air under controlled conditions, followed by drying and removal of shoot and roots. Both traditional and industrial malting exist in the country, but the industrial malting is gaining ground for production of malt-based beverages and fortified foods. The processes of malting and fermentation (anaerobic procedure for producing wet flour for Ogi) improve the nutritional value of sorghum significantly. They result in an overall improvement of essential amino acids composition (especially lysine, tryptophan and methionine) and content. The processes of malting also improves sorghum protein and starch digestibility. With malting also, is significant increase in vitamins riboflavin, niacin, pyridoxine and
ascorbic acid, and in some of the minerals like calcium (Ca), magnesium (Mg) and phosphorous (P), by significantly decreasing the anti-nutritional factor ‘phytate’ present in the testa and endosperm of the grain by about 75%. However, the micro-nutrient minerals iron (Fe) and zinc (Zn) are still not bioavalable, together with pro-vitamin A. These drawbacks could be removed with bio-fortification through sorghum-legume (soybean) compositing of flour, and/or biotechnological interventions.

It is therefore very obvious and in line with the objective of the transformation program that the sorghum plan is focused on malt and fortified flour/composite flour products for food and beverages as impact areas.

The Challenges

Some major constraints to sorghum utilization have been identified as:

- lack of consistent, uniform quality grain supplies
- logistics and markets
- subsidized imported cereals
- extension of existing processing technology unavailable; lack of knowledge of wholistic utilization of sorghum from within and outside Nigeria
- changing and inconsistent government policies –both financial and infrastructural
- poor image of sorghum and food presentation in spite of its wide cultivation
- poor quality grains for defined end product
- lack of awareness or promotion of malt-based and fortified food products

Overview of a Plan to Develop the Nigerian Sorghum Sub-sector

The strategy of the sorghum transformation executing team is to upgrade the image and awareness of sorghum and its products for local and regional markets, and turn Nigeria into continued leader in the utilization, consumer and exporter of sorghum malt, malt-based foods and beverages, and fortified composite flour for school feeding programs and World Food Program food aid to neighboring countries. Internally, the plan will turn around the image of sorghum indigenous foods into well-packaged, ready to cook, convenience and nutritious products. The major focus of the transformation is to drive economic development in the North East and North West.

Key areas in the transformation plan are:

- Utilize and put into practice existing findings and applicable results from research and development projects of Nigerian institutions (like IAR, Samaru and FIIRO, Lagos) in collaboration with the private sector industries on food science and technology for FORTIFIED FOODS (like soy-ogi), composite flour (sorghum-wheat flour for baking) and malt beverages. Also introduce and adapt processes and machinery for Fortified Food Products from other parts of Africa beneficial to our sorghum products enhancement course; like Nutrimix, Tsabana and Nutro (all from southern and eastern Africa)
• Improve Milling Process for quality grain and flour supply
  • using more mechanical threshers to reduce post-harvest losses and remove stones and other extraneous matter. The threshers are being fabricated locally and would require funding assistance to upgrade, produce and market the prototypes lying fallow in workshops.
  • using more hammer mills to give MEAL of 500-800 micro granulation; more roller mills to give FINE MEAL of 300-500 micro granulations; and wet roller milling to produce <250 micro-granulation of FINE FLOUR for compositing and fortification with legumes and wheat, for baking bread, biscuits and in extruded products. Cardboard PACKAGING of these meals and flour (for indigenous popular foods like Tuwo and Kuru Mix) will add more value to the products for markets (especially urban and peri-urban markets that are increasing in size and numbers by the thousands monthly)
  • local fabricators will need to be identified and facilitated with funding; while in the meantime, the mills can be imported and provided to small and medium scale processors by identified investors and development partners. Meanwhile, large scale millers will be partnered with and encouraged with incentives to start producing pure sorghum flour and composite sorghum/wheat flour

ii. The few medium and one large scale MALTING companies, together with interested new comers in the malting business will be partnered with and facilitated to establish more malting plants in the country. For focus of this strategy, at least one small and one medium scale malting plants will be established in each of the NW and NE zones around defined clusters (making a total of 2 + 2 =4 NEW MALTING PLANTS). A technologically advanced and state-of-the-art sorghum malting plant exists in Aba, and the experience gained over the few years it has been established will be requested for use in this transformation strategy.

Technology transfer from the ancillary medium scale malting plants around Ibadan, Ota and Lagos (five in number) will be facilitated and funded through a PPP approach for expansion and movement of malting technology, plant management through training, and infrastructure to the NW and NE target areas.

iii. Capacity development will be put in place for improving packaging and presentation, improving grades and standards for quality products, test marketing and consumer acceptability exercises, with government incentives and private sector-led interventions

iv. Concentrate on developing clusters around high volume areas which will be monitored and coordinated by zonal contacts (zonal production coordinators) for efficient production and use of agri-inputs by farmers in the clusters. Three clusters will be established in each zone (total of six clusters in the two target zones) to facilitate progress in production, productivity of the sorghum hybrids and improved o.p varieties, processing, product development, marketing and promotion of the transformation agenda on malt-based products, fortified foods and flour/meals in packaged form available in supermarkets. The roles and responsibilities of the two zonal contacts (zonal crop coordinators) include:
To produce sorghum for commercial purposes
- To facilitate collection of farming inputs like fertilizers and farming equipment
- To supervise the operation of farmers from planning to harvest towards ensuring that farmers optimize their yields from the hybrids and varieties
- To provide basic training to farmers
  - To ensure quality, and that harvests, handling, threshing, and bagging of grain uniformly to achieve desired weights are properly done, for best marketing and supply to processors
  - To buy back produce from farmers, under the financing policy of government
  - To provide extension supervisors to farmers

v. Policy interventions to support the sorghum industry include: laws to enforce agreed contracts and buy-back agreements, premium payment rule which allows highest payment for industry agreed end-use qualities and lower payment for poor quality grains or grains that do not meet stipulated standards; enactment to induce millers to blend (upto 20%) sorghum flour with wheat for baking bread; regulations for school and institutional feeding programs; inducement for export of fortified foods and malt-based products for export after satisfying local requirements; support for a strong sorghum breeders, food scientists/nutritionists, producers and processors association; organized and institutionalized sorghum marketing.

vi. Strategic applied research will continue to develop more of higher productive hybrids, improved seeds system to produce marketable high quality seeds, and new novel foods and snacks (like ‘Dawamalt’ porridge, pop sorghum) and non-foods (to create more jobs and cash income like in large scale commercial cultivation of sweet sorghum for manufacture of Biofuel as ethanol for clean environment running of vehicles, ethanol can be blended with petrol upto 10% =E10 Kyoto Agreement which Nigeria is a signatory)

VISION OF SUCCESS AND OBJECTIVES

In the next four years, an increase in sorghum production by 4 million tons through the cultivation of sorghum hybrids with yield increase from 800kg/ha to at least 2500kg/ha on 1.6 million ha clustered around six high volume areas of NW and NE where small and medium malting plants and several more mills and millers are established will be achieved through the sorghum transformation. At the end of the four years we hope to generate upto N18 billion in income from 340,000 farmers and their households that produce sorghum.

OBJECTIVES

- Drive research and development efforts to increase and produce good quality and appropriate quantities of seed for the new sorghum hybrids and improved open pollinated (o.p) varieties in collaboration with the private seed companies, seed growers, research institutions and agro-processing industries for use in end products.
- Raise productivity levels by promoting small, medium and large scale commercial production by promoting increased use of improved production technologies of hybrids, agro-inputs, farm machinery and equipment, through training (via demonstration plots) of
clusters of farmers in three selected high volume centers/clusters from the NW and NE geopolitical zones that produce 80% of Nigeria’s sorghum

- Develop strong linkages and synergies between the cluster producers, public institutions, private-sector agro-processors (millers, maltsters), food/feed industries, foods scientists/nutritionists and consumers of sorghum products and by-products
- Sustain the existence of present foods/beverages in new packaged formats and increase efforts in developing new foods and products for local and export markets through building incentives into private sector-led industries
- Implement government financing policies to enhance soft and bridging loans to private and public sector food/feed end-use product operators, product and haulage markets and awareness programs incorporating end-user perspectives
- Strengthen capacities of key players along the value chain and continually monitor and evaluate progress to identify the most promising and acceptable interventions for continuous improvement of strategies to achieve impact
- Encourage and support growth of large commercial sweet sorghum farming for manufacture of industrial non-foods (biofuel industry) to realize large and quick job creation in the agricultural-manufacturing private sector.

**SORGHUM VALUE CHAINS**

In executing the sorghum transformation plan, and driving the economic development in the North West and North East zones of Nigeria, THREE value-added chains are considered. These are:

- Fortified Nutritious Foods typically blended with soybeans.
- Malt for use in the beverage (for Maltina, Malta, Amstel Malt, Ovaltine, Milo, Bournvita) and Malt-based (new ‘Dawamalt’ etc.) Food industries.
- Packaged Plain Flour for ready-to-cook solid foods, composite (10%-20%) with wheat for bread, noodles, pasta, macaroni, biscuits and cookies

*Fortified Nutritious Foods typically blended with soybeans*

High quality fortified food products made with sorghum blended with soybean are described as SOY-OGI or SOY-AKAMU.

The first product is Soy-Ogi. The traditional ‘Ogi’ or ‘Kamu’ is a fermented sorghum (or maize in South West Nigeria) breakfast cereal. It is low in protein content due to low protein content of the product. Soy-Ogi is Ogi fortified with soybeans to improve its protein content. The infant and the adult brands can be produced due to the different nutritional requirements of the two groups. The infant brand is good for meeting protein requirement of children and most especially for weaning babies. The adult brand is good for adults of all age categories.

Soy-ogi is produced in the following simple processing steps:

Sorghum is wet-milled after steeping in fresh water to produce a sorghum mash which is passed through a vibro-screen to remove the pomace. The resulting slurry is allowed to
ferment naturally at room temperature and allowed to sediment. The fermented slurry is dewatered to form a wet ogi cake. The cake is then broken into smaller pieces. Soybeans are weighed and cleaned to remove extraneous matters, roasted to facilitate cracking and dehulling. The roasted beans are dehulled, cooked to soften the beans. The cooked soybeans are milled to obtain a mash which is dewatered to form a cake and broken into smaller pieces. The cakes of both sorghum and soybeans are mixed thoroughly together and dried in a flash drier. The dried product is sieved to obtain desired particle size of 250 – 300 micro gram granulation. The dried product is blended with additives and packaged appropriately either in different sized cans or paper cardboard containers.

The sorghum transformation value chain plan for moving forward with the fortified foods initiative is to marry the demand side with that of supply for fortified foods –mainly Soy-Ogi or SOY-AKAMU. The demand for fortified foods are two-sided:

- Home Grown School Feeding Program (HGSFP)
- World Food Program (WFP)

1. The annual projected demand for sorghum component of fortified foods for HGSFP is represented as: for 2011 -0mt, 2012 -51,000 mt, 2013 -101,000 mt, 2014 -152,000 mt, 2015 -253,000mt. The annual projected supply of sorghum component in the program is: for 2011 0mt, 2012 -56,000 mt, 2013 -113,000 mt, 2014 -169,000mt, 2015 -281,000mt. There is therefore a shortfall in demand of 27,000 mt by 2015, which will be met by increasing production and processing capacity in the North West and North East. We note that 5-10% of the grains are lost during processing.

The program will need to be closely developed in partnership with Ministries of Education, Health, Finance, Trade and Investment, and State Governments in the target zones. The projected demand assumes we target 50% of Nigerian children in public primary schools by 2015, estimated at 12.5million children (i.e total of about 25.0million children by 2015). In 2009, the official primary school age children (ages 4-10) enrolled in primary schools was put at 16.48million with dropout and repeaters rate averaging 32%, highest for children in primary classes 4-6 (ref. 2009 NBS/CBN/NCC collaborative survey on socio-economic activities in Nigeria. pp 264-266). The Net Attendance Ratio (NAR) which is the percentage of primary school age population that is attending primary school, show lowest figures for North East (43.7%) and North West (43.4%) compared with high attendance ratios of 70.5% - 82.8% in the other zones of North Central, South West, South South and South East, (ref. 2008 NDHS –Nigeria Demographic and Health Survey) Abuja, Nigeria: National Population Commission and ICF Macro. Pp14-17). From consumption pattern, each child is expected to eat approximately 150g of processed fortified food daily of which sorghum constitutes about 70% of the content. The HGSFP is expected to run for 9 months each year, and facilitate increase in primary school enrollment in the under-privileged zones by reducing the drop out rates to <5-10% by 2015, as a result of the school feeding program.

2. For the WFP the annual projected demand for sorghum component of fortified foods is represented as: for 2011 -0mt, 2012 -26,000mt, 2013 -53,000mt, 2014 -53,000mt, and 2015 -53,000mt. The annual projected supply rises from 0mt in 2011 to 29,000mt in
2012, and levels out at 58,000mt for three years 2013 – 2015. The small shortfall of 3,000mt in demand will be met by increasing production and processing capacity in the NW and NE target zones. The World Food Program has historically provided significant volumes of food aid to our neighbors; and recently to Niger up to the tune of 140,000mt in 2010! The WFP fortified food provision include a soybean and maize blend in which the maize component could be substituted for sorghum, a preferred food taste (together with pearl millet) for the Nigeriannes.

**MALT For Beverage and Malt-based Food Industries**

The beverages considered in the value chain are: Maltina, Malta, Amstel Malt, Vita Malt, Milo and Bournvita all of which are already produced and marketed. The essence of our intervention is to increase production quantity by facilitating supply of larger quantities and better quality sorghum hybrid grains, thereby increasing demand and enlarging the market for industry. The malt-based food is new and we call it “DAWAMALT” which will be a nutritious breakfast cereal beneficial to the health of children, lactating mothers, convalescing adults and aged people of the consuming community.

When sorghum is malted, the nutritional qualities and nutrient contents are significantly enhanced. Malting in sorghum simply involves germination of the grain in moist air under controlled conditions, followed by drying and removal of shoot and roots. Both traditional and industrial malting exist in the country, but the industrial malting is gaining ground for production of malt-based beverages and fortified foods. The processes of malting and fermentation (anaerobic procedure for producing wet flour for Ogi) improve the nutritional value of sorghum significantly. They result in an overall improvement of essential amino acids composition (especially lysine, tryptophan and methionine) and content. The processes of malting also improves sorghum protein and starch digestibility. With malting also, is significant increase in vitamins riboflavin, niacin, pyridoxine and ascorbic acid, and in some of the minerals like calcium (Ca), magnesium (Mg) and phosphorous (P), by significantly decreasing the anti-nutritional factor ‘phytate’ present in the testa and endosperm of the grain by about 75%. However, the micro-nutrient minerals iron (Fe) and zinc (Zn) are still not bioavailable, together with pro-vitamin A. These drawbacks could be removed with bio-fortification through sorghum-legume (soybean) composting of flour, and/or biotechnological interventions.

The plan in the sorghum transformation program is to establish two malting plants, one each in the NW and NE zones, in the first instance by 2013. Two more can be built as scaling up for effective uptake of increased production due to farmers’ growing of sorghum hybrids for two years by 2015. The options for the developments, which will be private sector-led but facilitated by government policy via incentives provision, include:

- Two medium scale malting plants (output capacity of 5,000mt/annum) by 2013; followed by two more of medium scale by 2015
- Two small scale malting plants (output capacity of 1,000mt/annum) by 2013; followed by one small and one medium scale (in the better progressed and better run zonal plants) by 2015
Two small scale plants by 2013; followed by two more small scale types by 2015.

The Aba Malting is a private sector plant with present capacity of 60,000 tons/annum. It is the largest, most modern sorghum malting plant in the world with state-of-the-art high technological components. Together with five other small-medium scale sorghum malting plants in Lagos, Ota, Ibadan, the six plants plan upgrading of their combined capacities to 100,000 tons/annum. We project that this sorghum malting capacity would rise to 500,000 tons/annum by 2015. The demand for sorghum for malt is presently at 70,000 tons, and expected to reach 700,000 tons by 2015. The supply of sorghum grain to malt plants is expected to reach 778,000 tons (accounting for a 5-10% processing loss of grain).

Figure showing malt drink production process
Our plan for moving forward will be in the short term to ensure that excess capacity is appropriately utilized by developing output markets for malt and linking processors to cluster areas of production. Export outlets to countries in the ECOWAS Region (like Ghana, Gambia and Ivory Coast) will also be looked into. The team will begin to work with potential investors to bring on stream in 2013, 2014 and 2015 additional capacity for malt production for medium and large highly technological malting plants.
The following Table 2 provides description and costing for small (N210 million) and medium scale (N 500 million) Saladin-Box Type malting plants. Note that a large scale sorghum malting plant (like the high tech type in Aba would cost $50 million)!

Our plan in sorghum is also to involve the household and small cooperatives in micro-malting activities for the community market. A fraction of small scale equipment is required. i. a stainless steel steeping tank of a twin set of 6-10kg per batch, ii. 1 stand of germination bed of 3 or 4 beds, iii. De-rooting and de vegetation apparatus, iv. Stainless steel mesh, and v. a solar drier. A building 8x12 is desirable with cross ventilation and good aerating system.

Trainers for malting and milling techniques, economics of production, record and book keeping, product formulation and development; together with malt plant infrastructure setting up will need to be employed as consultants (from FIIRO, ABA Malting Plant, NGOs, Flour Mills, Dangote Flower, Sorghum transformation group heads, and related universities).

SCHOOL CHILDREN ENJOYING FORTIFIED FOOD BEVERAGE DURING A SCHOOL FEEDING SESSION

TRANSFORMATION STRATEGY

In designing the sorghum transformation strategy, past and present experiences of sorghum research and development efforts and outcomes were brought to use from
Nigeria and outside the country in Africa. Insights from one major private sector-led malt and malting company’s value chain approach, together with grain and product marketing and haulage systems developed with consultants and USAID Markets influenced some of decisions taken for this strategy.

Execution and management of the transformation strategy will be by a team of experienced scientists, businessmen, managers and administrators and other specialists from public and private sector in the following areas, coordinated by a Team Leader: Research and development with seeds dissemination, production, processing and products, markets and financing policy, and documentation with M&E. The Team Leader will have responsibility for overall programmatic direction of the strategy. All members of the team are members of the Agricultural Transformation Implementation Council (ATIC).

Research and Development, Seed Development and Dissemination

The transformation program will drive research and development effort and produce and increase improved seeds of sorghum hybrids and open pollinated varieties. Impact from this outcome is to increase sorghum production from present 9,320,000mt to 11,370,000mt by 2013 and 14,000,000mt by 2015, which translates to a target grain production increase of 2,050,000mt by 2013 and 4,680,000mt of Sorghum grains in two and four years, respectively. This increased grain production expectation will require commensurate large scale increase in seed multiplication and dissemination. The seed scenario is:

- by end of 2011 -500mt of certified seed of 4 improved o.p. varieties is available and will be purchased from four seed companies and growers (Premier Seeds, AAP, Savanna seeds, Da-Algreen Seeds, and provided to Farmers for growing in 2012.

- by end of 2012 -50mt of certified seed of one sorghum hybrid will be available to farmers for growing the 1st Commercial Sorghum Hybrid fields (in about 5,000ha) in 2013 by about 1,670 farmers.

- also 1000mt o.p variety seeds will be available for Farmers fields (about 100,000ha) in 2013

- by end of 2013 -hybrid sorghum seed production will reach 2,000mt using both main cropping season and Irrigated offseason.

- by 2014 -more seed companies and seed growers would have been trained to produce, handle and manage Large scale hybrid seed production.

Total 13,000mt seed (comprising 5,000mt hybrid seed and 8,000mt OPV seeds) will be available and required to plant 1,670,000ha in 2015. This means that 1,000,000ha will be planted to sorghum hybrids for commercial purposes by increased number of farmers
(about 340,000 more farmers) in 2015. At present in 2011, there are about 150,000 sorghum farm families in the North East and 67,000 sorghum farmers in the North West zones.

by 2015 Available certified seed of hybrid sorghum would have climbed to 10,000mt surpassing opv Seeds the production of which will be at a lower 6,700mt because of productivity preference

By farmers and the seed market Therefore by 2015, total certified seeds available to farmers is projected at 16,700mt enough to plant 1,670,000ha farmland yielding total of 4,005,000mt due to the sorghum transformation value chain.

Status of Research and development: this activity has been private sector led when the Aba Malting Plant company initiated development of new higher yielding varieties and productive hybrids in 2004 and 2008, respectively.

The Aba Malting plant company of the NBPLc. in a value chain project mode, had developed two improved op varieties of Sorghum (CSR-01 & CSR-02), and the IAR, Samaru had previously released improved op variety SK 5912, which are all higher yielding than the farmer local varieties. Further efforts of this, combined with aggressive research activities since 2004 has also selected two high yielding Sorghum hybrid varieties with yield potential between 4-5mt/ha which have been nominated for the National Sorghum Transformation Initiative in a bid to rapidly increase production. Parental lines of these are being multiplied by IAR (Breeder class) and Premier Seeds (foundation class) for Sorghum commercialization.

Other suitable and available sorghum OP varieties that could be used for sorghum transformation initiative are KSV8, ICSV 400, which are improved varieties developed by ICRISAT and IAR.

<table>
<thead>
<tr>
<th>SEED PROJECTION FOR FOUR YEARS</th>
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<tbody>
<tr>
<td>Year</td>
<td>Certified Seed Requirement (mt) (Area Under Cultivation-ha )</td>
<td>Yield Index</td>
<td>Expected Grain Output</td>
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<tr>
<td></td>
<td>Hybrid OPVs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>Total 0 500 500 (0) (50,000ha) (50,000ha)</td>
<td>0 1.5</td>
<td>0 75,000mt 75,000mt</td>
</tr>
<tr>
<td>2012</td>
<td>Total 50 1,000 1,050 (5,000ha) (100,000ha) (105,000ha)</td>
<td>3.0 1.5</td>
<td>15,000mt 150,000mt 165,000mt</td>
</tr>
<tr>
<td>2013</td>
<td>Total 2,000 10,000 12,000 (200,000ha) (1,000,000ha) (1,200,000ha)</td>
<td>3.0 1.5</td>
<td>600,000mt 1,500,000mt 2,100,000mt</td>
</tr>
<tr>
<td>2014</td>
<td>Total 5,000 8,000 13,000 (500,000ha) (800,000ha) (1,300,000ha)</td>
<td>3.0 1.5</td>
<td>1,500,000mt 1,200,000mt 2,700,000mt</td>
</tr>
<tr>
<td>2015</td>
<td>Hybrid 10,000 (1,000,000ha)</td>
<td>3.0</td>
<td>3,000,000mt</td>
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The sorghum transformation program will consider critically the inputs required to achieve sorghum projection targets in form of land, seeds, fertilizer and chemicals (herbicides, insecticides, seed treatment chemical, storage chemicals). For the transformation, 308,000ha will be cultivated in 2012, increasing annually to 500,000ha in 2014 and slightly lower hectarage in 2015 to 447,000 or remaining stable from 2014, due to cultivation of the higher yielding hybrids resulting in higher productivity. Annual requirement for seeds would be 5,000tons on the average. At a high rate of fertilization of the hybrids, a significant volume of fertilizer will be required to achieve best yields. Fertilizer will reach 201,000 metric tons by 2015 from 15,000mt in 2012. This is an expensive business reaching billions of naira. Here comes the need for financing policies to be put in place (the NIRSAL initiative) to facilitate purchase and access to this important input by farmers.

To coordinate and manage the large scale of sorghum production in the target zones of NW and NE, Zonal Coordinators have been identified to provide guidance, facilitation and linkages with agro-dealers, banks, seed companies, ADPs and development partners, to the farmers they will manage. They will link the farmers also to markets and work with grain buyers, processors and USAID MARKETS to put in place contracts and buy-back agreements by agro-processors during farm gate pricing negotiations.

The role of extension is critical as a liaison between the government and the farm population in delivering extension services to the sorghum farmers, with a view to promoting adoption of the new sorghum hybrids to be introduced from 2012 under the sorghum transformation program. The State ADPs and LG agricultural extension will need to be re-trained and facilitated to perform creditably. The zonal contacts in the transformation group will engage the grass roots through these State ADPs, LG extension and farmer cooperatives.

Our strategy for production in the two target geo-political zones is to create a working plan by dividing each zone into three CLUSTERS based on volume of sorghum cultivation, marketing and consumption. These clusters will be the bases for the value chain interventions concerning processing, product development, marketing, policy intervention, capacity development, data collection and management, and monitoring and evaluation. Each cluster will allow for effective transformation interventions in the major sorghum areas and management of the seven and six states (total 13 states) in the NE and NW zones, respectively. Total six Clusters have been identified in the two zones, thus: In the NW zone, the three Clusters cover –i. Northern Kaduna State, ii. Southern Kano State, iii. Southern Katsina State/Southern Zamfara States. In the NE zone, the three Clusters cover: i. Southern Adamawa (Guyuk LG circle)/Northern Taraba (Karim
Presently in 2011, there are approximately 220,000 sorghum farmers/farming families in the two target zones. It is expected that by 2015, approximately 800,000 new sorghum farmers/farming families will be created to ramp up the total numbers of farmers/farming families to 1,020,000, as a result of hybrid sorghum cultivation and increased sorghum yields leading to exciting increase in farm cash incomes.

PROCESSING AND PRODUCTS

Agro-industry is largely rudimentary (except for the malting industry) in Nigeria and dominated by small-scale enterprises, but SMEs are emerging. In Nigeria, losses were estimated at 25-35 percent of harvested Sorghum. Marketing of processed products is predominantly at local and national levels. Agro-industry – A developmental perspective

- The value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use.

- Importance of Processing in the sorghum transformation is appreciated in its following components and methods:
  - Fortification: Fortifying food improves households’ access to nutrients
  - Fermentation: Fermented foods have longer shelf life and are traditionally acceptable
  - Drying: This is used to preserve the quality of food through concentration process
  - Milling: Improves of bio-availability of nutrients in cereals
  - Germination: Breaks down the cell membrane and enhances bio-availability especially of vitamin B

Processing challenges include these factors constraining development of value-addition enterprises: High taxation and cost of production, Limited access to credit, Poor adaptation of technologies, Lack of management know-how and poor quality control, Poorly organized marketing information system, Unreliable supply of raw materials, Poor infrastructure, The sorghum transformation will intervene through: i. Finance, ii. Capacity building and information dissemination. We will adopt policies and design programmes inclusive for women and youths by bringing services physically closer to women and involve women in the formation and management of programmes affecting them, like making women (individually or group) the contact point in the delivery of services directly to the beneficiaries and to receive feedback.

Strong partnerships are required to move the processing and products development value chain area forward. First is need for close collaboration between the industrial Departments of FIIRO, including: Product Design & Development, Food & Analytical Department, Chemical & Environment Technology Department, and the Packaging Group Cross-Cutting Departments. This is necessary to lead and facilitate the FIIRO in
closer partnerships with the private sectors concerned with food fortification, malt and malting, milling and blending flour for extruded foods, baking for bread, biscuits, pancakes, and steaming for couscous.

The demand and supply side of malt value chain requires that the team begins to work with potential investors to bring on stream in 2013 – 2015 additional capacity for malt production. Our strategy will be in the short term to ensure that excess capacity is appropriately utilized by developing output markets for malt and linking processors to areas of production in the clusters of NE and NW zones. In Nigeria today we have approximately 200,000mt of processing capacity for malt, however, only about 70,000mt is utilized. Demand and shortfall will be met by increasing production, using more of hybrids, and processing capacity in the target zones of NE and NW.

MARKETS, POLICY AND ADVOCACY

Policy on enforcing agreements on farm gate pricing, contractual agreements for buy-back and payment of premium price for quality product delivery between producers, processors, marketers, and agro-dealers must be in place.

For strong effective support for sorghum products, raising the status of the crop, product promotion and awareness for its nutritional goodness, a viable and committed SORGHUM GROWERS, PRODUCERS, PROCESSORS AND MARKETERS ASSOCIATION need to be formed and supported by the government. It will incorporate the existing Sorghum Farmers Association.

There are several big indigenous markets for sorghum presently existing in Kano, Ikara, Bauchi, Gombe, Kaduna and Saminaka. There is need to look at monitoring and coordinating activities in these markets through some sort of Central Marketing System as an umbrella body, to act as buyer of last resort and operate a guaranteed minimum price and such regulatory functions in the sorghum value chain, driven by private sector.

Support policy to genetically enrich sorghum through biotechnology. It is expected that the Biosafety Bill passed by the NASS and now with the President will be quickly assented to and signed into Law.

The team recognizes the cardinal role of agricultural extension service and farm inputs policies in the promotion of sorghum value chains.

CAPACITY BUILDING AND M&E (including Data Management)

Reporting, documentation, data collection will be strengthened for sorghum value chains. There is need to synergize these activities with other commodity value chains to properly formulate the strategies for implementing the various policy recommendations subsequently. It is necessary to engage the private sector and CSOs in carrying out the technical backup for sorghum transformation including monitoring, evaluation and impact assessment.

Job Creation Strategy and figures
NEW JOBS TO BE CREATED BY 2015 ALONG 5 VALUE CHAIN AREAS

GROUP 1: Research & Development, Seeds, Dissemination, Breading (all Enabling Technologies)

R & D - 115
Seed and Seed Companies (seed multiplication, seed certification, capacity Development, seed categories’ field and plant management, seed Marketing and transportation) - 950
Sub-total = 1,065

GROUP 2: Production
Sorghum Hybrids and o.p sorghum varieties production
By farmers- 562,624 NW +320,233NE; skilled youths- 500NW + 320NE (including women and extension workers); semi-skilled youths and farm hands- 301,000NW + 181,600NE
Sub-total = 1,366,277

GROUP 3: Processing and Products
Artisans, semi-skilled technicians- 140,000, industrial jobs- 50,000; Engineers, plant managers- 50,000; factory workers trained-on-the-job -20,000; spill-over indirect jobs around factories- 52,000
Sub-total = 312,000

GROUP 4: Marketing and Advocacy

GROUP 5: Capacity Development and M&E

EXPECTED IMPACT
- Strong and virile value added chains of fortified foods, malt, and meal/flour from sorghum in Nigeria
- A tripling of sorghum yields and productivity from 0.800mt to 3.0mt/ha in target clusters of NW and NE by 2015
- Generation of 1.8 million jobs (150,000 direct jobs from primary production alone is a very low estimate) in four years of sorghum transformation
- Strong market institutions and linkages with strong sorghum growers, producers, processors, agri-dealers and consumer associations forged
  - Food Security achieved through driving economic development in the target zones
  - Malnutrition alleviated and primary school enrollment increased
Sorghum value chain: Slowly, but Surely (Aliyu Samaila)

BRIDGE to MARKETS 2, USAID PROJECT, KANO

BRIDGE to MARKETS 2
SORGHUM VALUE CHAIN:
SLOWLY, BUT SURELY

PRESENTER

Aliyu Samaila

ICRISAT’S SORGHUM, MILLET AND GROUNDNUTS VALUE CHAIN WORKSHOP, TAHIR GUEST PALACE HOTEL, KANO, 23RD -25TH NOVEMBER, 2011
Session 3: Group sessions
Session 1:
Chairman: Wamban Daura, Alhaji Abashe Saidu, KTARDA Rapporteurs: Jidda Umar, LCRI and Laure U. Shu’aibu, NOWAIDA

Questions and answers

Name: Saidu Zakari GB, President NOWAIDA, Northwest Agro Inputs Dealers Association:
Question: How will the issue of use of mineral fertilizer vis a vis organic fertilizer be blended for fertility?
Answer: the right quantity of organic fertilizer is a problem. There are recommended combination of organic and inorganic fertiliser use identified through research. However there are problems sourcing sufficient quantities of organic fertilisers.

Name: Abdullahi Umar from DFID/RAMP Project:
Question:
1. What is the available quantity of super sosat?
2. What are the improved millet, sorghum and g/nut varieties available and source?
3. How can we replicate the success found in other regions of Africa in terms of sorghum/millet usage?
4. How can the National seed council be helped to encourage fair market competition?
Answer: There are number of varieties; from IAR

Name: Dr Olabanji from LCRI
Question:
1. What is the performance level of the HOPE project so far?
2. When will adoption studies be conducted?
3. When will sufficient seed be available and what logistics are being put in place to achieve that?
Answer:
Evaluation will be conducted at the end of the project.
Adoption studies will be conducted at the end of the project.

Salim Sale Mohd from GROFAN

Comment: For quite a while farmers attended seminars and workshop, but amaning research conducted were not shared equitability with farmer to acquire not only the new tasted improve varieties but on how to handle and address the challenges most especially on post harvest handling processing.

Name: Talatu S. Bashiru: WDI Kano.

QUESTION:
1. Who certified market activity?
2. Do you involve processor in developing varieties?
3. The project duration is too short?
4. Finance is crucial but is missing link in the value chain, one workshop should be organized to address it?

**ANSWER:**
1. Most of market actors where not registered as a group.
2. Yes processors are involve in testing the varieties.
3. The duration of the projects is determined by the external donors.

Name: Hassan I. Girbobobo from JARDA Jigawa State.

**QUESTION:**
1. What are the special characteristics of super sosat?
2. How much do you have in store for sell to ADPs?

**ANSWER:**
1. The yield is higher than sosat
2. The panicle is longer
3. Early maturity
4. Panicle compactness
5. NARIs are not mandated to produce seeds for commercial purposes.

Name: Sabiu H. Adamu From Maina Seed Kano.

**QUESTION:**
1. Is there any project undertaken by IAR to reduce drudgery in groundnut harvesting?

**ANSWER:**
2. A number of labour saving devices were developed by IAR, -Dr Aisha Muktari, IAR, Zaria Kaduna state.

**QUESTION:** How do you track performance of the crop?

**ANSWER:**
The HOPE PROJECT is leveraging on a previous project where we had regional germplasm exchange. Farmer’s participatory selection was conducted and farmers indicated their preference: These preferred varieties with other released material were advance to farmers as mini packs. Information is available about the yield profiles of those varieties. The numbers of farmers who take to those varieties and the improvement on the sorghum yield in general will be indicators of the increase in production performance.

**Session 3: Direct Actors in the Sorghum, Millet And Groundnut Value Chains.**

The session constitutes presentations and discussion with the direct actors in the sorghum, millet and groundnut value chains.
Dr Hakeem presented a recap of the desired outcomes of the workshop and reminded the participants of the need to adhere to them to make the workshop fruitful.

Presentations:

**A. Sorghum Farmers’ Association** of Gumel by Alhaji Ahmed Baba Gumel, Deputy Chairman Sorghum & Millet Farmers’ Association of Gumel.
- The farmer association is registered with Jigawa State ADP with main aim of enhancing the production of sorghum and millet in Yautai emirate.
- Membership of the Association grew from 20 to over 500 members.
- They are supported by JARDA with extension service and limited fertilizer supplies from NOTORE.
- They receive assistance from a number of NGOs in forms capacity building and production technology.
- They finance the organisation from members contributions.

Activities: Buying farm inputs for use and sell to members either in cash or in grains payments.

Problems:
- Lack of adequate knowledge on improved farming techniques.
- Low market prices that lead some farmers to leave sorghum for sesame production.
- Lack of fertilizer. Government subsidised fertilizer do not reach the actual farmers.
- Lack of farm implements e.g. tractors and threshing machines.
- Poor infrastructure.
- Conflicts between farmers and pastoralists.

**B. Groundnut producers association** by Alhaji Ado Abdullahi Gumel, Secretary Groundnut producers association

Problems:
- Knowledge of farming techniques.
- Inputs especially fertilizers.
- They receive assistance from *Green Sahel* (a project sponsored by an NGO) in training for use of improved seeds and farming techniques.
- Constraints to production:
- Require farm implements, capital and good quality fertilizer.
- Require Extension education, training for their leaders and good quality organic fertilizer.

**C. Millet farmers association, Bichi, Kano** Alh. Aminu Abdul, Millet farmers association of Kano

He highlighted the importance of millet both as food and source of income to both rural and urban dwellers.

Problems:
• Poor market prices of millet compared to other crops like maize and sesame
• Low demand: so pose difficulty in marketing
• Birds infestation leading to high post harvest losses
• Require improved varieties resistant to birds attack and sensitisation to encourage more production

D. **Groundnut Association of Bichi, Kano** (Alh. Hamza Ali Bichi) from **Groundnut Association of Bichi, Kano**
They receive assistance from KNARDA and AFAN in input supply and new farming techniques.
Require more improved seeds especially one with high oil content and suitable machinery/equipment for oil extraction.

E. **Sorghum producers association**, Bichi, Kano State  Alh. Umar Mohammed Bichi
from
They grow different varieties of sorghum Kaura and farfara .
They like a local variety call ‘achi kai achi kara’ due to high yield and early maturity as against others. It is planted at about same time with maize crop but harvested much earlier. Urged for more prayers

*Overall* the farmers groups emphasized the need for provision of good improved seeds fertilisers both organic and inorganic, poor market access, low industrial demand for sorghum and millet in their localities. *These lead to low prices compared with other crops in the area they operate. Lack of essential intermediate technology and inadequate extension service could lower the rate of adoption of new technology. Development Agencies have played a key role in supporting farmers production and marketing activities.*

**BUSINESS AND DEVELOPMENT SERVICES presentations**

**COMMODITY TRADERS**
F. **Groundnut and other oil seeds sellers association**  Alh. Haruna Hassan Mshelia
, Tafawa Balewa market Kano
Problems:
High prices of g/nut
Availability is low, quality due impurities still high
Producers do not get loans to enhance production leading to high prices.
Traders at Tafawa Balewa market are involved in the sourcing, trading

**COMMERCIAL BANKs:**
A. Bashir Sani Shaibu from Union Bank plc
They give loans to farmers through the agric loan section of the Bank
Millions of Naira were given out to farmers.
Through the CBN’s program tagged TFM farmers can access loans without collaterals.
Associations are encouraged to come and receive loans.
B. Ado Ali Tafida from Bank of Agriculture, Kano
   There are branches all over Nigeria
   They give loans to farmers without collateral
   The problem they encounter is on loan defaulters.
   Farmers do not save their money in Banks. They should be encourage to save in Banks.
1. Hajiya Halima Titi Bello: Baby food production from KNARDA, Kano
   They use groundnut, soy beans and other grains to produce a recipe for a nutritious baby food.
   Problems:
   The small group they formed could not get registration from NAFDAC.
   They achieved improved nutrition through the use of the recipe.
2. Prof. Sani Miko Country representative, Sassakawa Global 2000
   Activities:
   1. Crop enhancement through the promotion of seed production
   2. Post harvest activities adding value to the sorghum
   3. Public private partnership and market actors where actors were brought together and linked with farmers
   4. Capacity building where collaborations were made with Universities knowledge.
   5. Monitoring and evaluation of activities
   Women are being trained in groundnut processing using developed machines
   They work in collaboration with State Governments or Independent financiers. Seeking counterpart funding from State Governments is slowing their activities in many sates of operation. Adamawa and Zamfara States with a philanthropist from Kano/Jigawa paid for some projects to be executed in their areas.
   He suggested that the Government should encourage seed production and that individuals should finance activities.

PROCESSORS
3. Celsian mills ltd Gumel
   They deal in sorghum and maize processing to flour
   Major problem is power supply
   The product is in high demand.

MICROFINANCE BANKS
4. Hajiya Talatu Bashir from Women Development Initiative now a microfinance bank.
   Has developed microfinance Bank to provide loans to women for various farm activities including groundnut and sorghum.
   She Highlighted that for value chain development, finance is a very important issue and need to be given special attention because all the real actors require finance support.
   Finance houses should be developed.

Session 7.
Report of working Group A on Millet value chain: Presenter Umar Jidda From LCRI.
Hasan I. Girboba From JARDA:
Comment:
1. Among the opportunities for millet value change development is its ability to thrive under harsh climatic conditions where maize and rice cannot perform.
2. There is a need for research and development to industrial use of millet, which will increase economic value, apart from its current domestic crop.
3. Need for the inclusion of intervention guarantee price maps for the excess g/nut product, though the provision guarantee prices through commodity boards.
4. We need to acknowledge the fact we are organized global era, therefore issues of globalization are not a threat. We also need to recommend that NAFDAC make registration easier by way of elimination agents in the course of registration.

Mr Lawrence O. Falana: From WASA:
QUESTION:
How can smuggling be regarded as threat?
Answer: Smuggling operations are threats to marketing via smuggling of the raw material out of the country and even the finished product imported to in lower prices of locally made product.

Working Group C on Groundnut value Chain:
Chris Akpotor From ICRISAT – WASA.
QUESTION:
1. How do we increase g/nut hectares and stop decline in g/nut production?
ANSWER:
1. Deliberate intervention on g/nut production by government.
Abubakar S.I. Birma From IFADCBARDP.
Comment:
1. Groundnut being a legume has the strength of nitrogen fixing thereby requiring no fertilizer for its production. This is an important strength for its production under the farmers subsistence production perspective.

Jupiter Ndjeunga From ICRISAT Niamey:
QUESTION:
1. Can one consider aflatoxin as a threat for international trade and consumers and animal health?
ANSWER:
Very critical, should be considered as one of research themes.

Dr. D.A. Anojie From LCRI.
QUESTION:
1. I don’t know how non-regulated import of edible oils as opportunity?
ANSWER:
1. Mix up, but appropriately to be threats.

Dr. Makarfi From BUK.
Comment:
Inconsistency of policy was blamed for low scale oil extraction business, this tend to be ignored from your presentation, any reason? Answer: It is not.
Jupiter Ndjeunga From: ICRISAT
QUESTION:
1. What are three most important product from sorghum?
ANSWER:
1. Malt confectioneries flour direct food for home consumption.

Dr. Ahmed Makarfi From: BUK

QUESTION:
1. We have not include potential sorghum feeds and additives?

ANSWER:
1. Animal feed are made from sorghum as well as fortifications with flour for confectionery and beverages and baking.

Atiku M. Yola From: MLG Kano:

COMMENT:
1. Trading are informal not smuggling among ECOWAS. It a multi lateral agreement.
2. USAID fews-net (Market and Trade) project monitor and evaluate producer movement, and data are available for references.
3. Company hides under CSR but not doing as expected in terms of funding R & D, and scholarships thus the need for monitoring and follow up.

BUSINESS & DEVELOPMENT SERVICES Q & A
Q Lawrence O. Fajana from: WASA

Can all varieties of sorghum be treated with the chemical being promoted by Du pont?
A: only ICRISAT lines but it has less residual effects only 90 days after usage.

Dr. K. W. Gwadi from: LCRI

Q why do you have to breed a crop variety for the purpose of using your herbicides?, can farmers afford to buy your variety because they want use your herbicides?

A: Herbicides stops the Ace-lactate synthesis pathway in plant, so it will kill any plant. the seed is dressed with the herbicides.

Jupiter Ndjeunga from: ICRISAT

Q: Is commodity exchange having linkages with commercial banks in kano?
A:Directly in ware house finance with CBN

Nura Lawal from: IFAD/CBARDP

Q: what is NISPR doing to check mate anti nutritional factors in storage?
A:
Second technical session: policy and institutional environment
Direct actors in the pearl millet, sorghum and groundnut value chains

The second session of the first day of the workshop kicked up at exactly 4:15pm. The first paper of the session titled ‘Guidelines for Food and Water Manufactured in Nigeria’ was presented by NAFDAC’ office Kano. Subsequent presentations from the Ministries as well as Direct actors in the value chains however were not in written/prepared papers forms. Notes and discussions served as coverage for those presentations.

Chairperson: Dr. Aisha Muktar (IAR, Zaria)
Rapporteurs: Bashir Alhaji Baba (LCRI M/guri) and Mr. Aliyu Adinoyi (ICRISAT-Kano)

The first paper of the session titled ’Guidelines for Food and Water Manufactured in Nigeria’ was presented by NAFDAC’ office Kan. The paper throws light on product development and registration in Nigeria. Procedure of registration involves:
• Inspection and assigning certificate of recognition before applying to register a product
• The paper emphasized that no food and related products shall be manufactured, imported, export, import, advertised, sold or distributed in Nigeria unless it has been registered in accordance with the provisions of ACT CAP F33 LFN 2004 (formerly degree 19 of 1993) and the accompanied guidelines.

Requirement for Food Product Registration Includes
• Certificate of recognition issued by NAFDAC
• Evidence of trade mark approval for brand name from federal ministry of commerce (where applicable)
• Certificate of incorporation of the company issued by the corporate affairs commission
• Comprehensive certificate of analysis of the hatch of the product submitted for registration from the manufacturer starting name and signature of the analyst.

For more information, NAFDAC website reads www.nafdac.gov.ng

The second paper to be presented by Kano State Ministry of Agriculture was not ready so the third presenter continued on schedule presentations’

The paper title:’ Contribution to Groundnut Value Chain’ by Rabiu Suleiman from ministry of Commerce, Industry, Cooperatives and Tourism, Kano.
The paper stressed that policy is fundamental in value chain development and the government of the day in Kano is committed to provide support for its role in this regard. This is evident in its recent relocation of Groundnut processors to Sharada industrial layout and another at Dawanau.
It further enunciates the role of the ministry of Commerce, Industry, Cooperatives and Tourism with respect to some of its activities which includes:
1. facilitation of enabling environment for processors and marketers of agricultural produce,
2. registration of agro and non agro-based cooperatives,
3. provision of small soft loans to farmers, sensitisation of farmers groups on improved farming practices etc.
A recent activity in the ministry that may be of interest to stakeholders is the clustering of agro processors and marketers to enhance performance and standards.

Questions and Comments from the Session
Dr Jupiter Ndjeunga of ICRISAT
From your very interesting presentation, it can be noted that some specific products value chains have been identified for sorghum is there studies on pearl millet, if not why?

Questions directed to NAFDAC:
Abubakar Birma from IFAD CBARDP Katsina
The food vendors who provide cheap, affordable and nearness to the consumers in markets, working places to mention a few, pose threat to health hazards to the public due to their mode of preparation or otherwise. What is NAFDAC doing to address this menace?

Najeeb Ado Gumel from CELSIAN MILLS LTD GUMEL
Why NAFDAC organisation is not organising seminars and workshops for the registered industries?
What are these requirements that NAFDAC needs before registering a small industry that process millet and sorghum in Grit and Flour form?

Responses from NAFDAC
1. Cost of registration for food products is 50,000.
2. The time of registration process begins from the day samples are drawn for considerations and laboratory analysis. In addition, results are expected after sixty (60) days.
3. NAFDAC is partnering with state government to form the local processors of G/nut oil into cooperative to make the process of registration and infrastructural installations possible and easier.
4. Not only NAFDAC, but also state and other regulatory agencies are involved in ensuring food safety, NAFDAC has been organizing training, workshop among others. Though funding is a major challenge.
5. NAFDAC is in collaboration with other task force in which Kano state has the best task force in checking the activities of drug hawkers. NAFDAC grant import permit to Agro chemicals companies and fertilizer importation, as well as certifying Agro dealers who are also major stakeholders in the value chain.

Questions directed to Prof. Obilana
Salim Sale Mohd from GROFAN/FACAN
Question;
Upon so many varieties of sorghum cultivated, which is the most preferable variety that is habitable and has weather resistance for farmers to plant, for consumption of malt and nestle industries

Response
The best varieties as of sorghum now are Short Kaura, CSRO 1, CSRO 2 and ICSV 400 is the fourth variety.

Abdullahi Umar from DFID/RAMP PROJECT
Questions;
• What is the role of the private sector in the sorghum transformation project (farmers and others)?
• What is the timeline for the define activities of the initiatives to encourage participation of other donors in achieving the objectives.
• What are the frame work for monitoring and evaluation and who will be accountable?

Dr. O.G. Olabanji from LCRI Maiduguri

Questions;
Inadequate funding may militate against the success of such project what are the logistic put places to solve such problems
The use of sorghum with wheat for composite bread rather than cassava is welcomed, but LCRI should be carried on board for wheat supply rather imported wheat.

Responses
• Action
• Funding of the project
• Role of private sector

• Transformation project is going to be private sector driven. What government will do is to facilitate not to give fund. Example, no more subsidies in fertiliser and tractor; example the private sector is funding 100 percent of all the malt work in Nigeria; they will be encouraged. Public Private Partnership (PPP), the locals and donors will work across the three value chains.
• Using sorghum with wheat as against cassava is cheaper if not for too much politics in the use of cassava. The processing of cassava had four steps viz harvesting, cutting into chips, fermenting, grinding before making into flour. It’s too long a process; compared to sorghum which is easy. Sorghum is a quality seed grain you will directly process into flour. Moreover, wheat and sorghum has some properties that can be married at ease.
• On the use of locally produce wheat for bread, Professor Obilana stressed that irrigation facilities in Nigeria were no more functional that’s why importation of wheat continues.
Priorities of sorghum transformation is on state visit for they own the land and engaging the farmers. These are important linkages when the people know what accrued to them, you will get result.

What we do in states stakeholder meetings is giving our request to Government to identify contacts in the three value chains and for Monitoring and Evaluation; we will use consultants for each of the value chain. The transformation projects have project heads in each of its units that is product, processing etc

Question
The study for soy ‘Akanmu’ blending is handled by FIIRO in Lagos; while for malting being is handled by Aba Malting Industries.

**Questions directed to Kano State Ministry of Commerce**

**Jupiter Ndjeunga from ICRISAT**

What are the motivation, incentives and initiatives for enhancing agric business ventures in Kano.

**Responses**

- Supply of pre session loans to farmers
- Provision of soft loans facilities with longer repayment time
- Subsidized fertiliser supply to farmers
- Provision of security for farmers and small and medium scale enterprises (SME)
- Provide land and serve as guarantors in case of loans to SME
Session 4: Strengths, Weaknesses, Opportunities and Threats
### GROUP PRESENTATIONS : SWOT ANALYSIS

#### SORGHUM : STAKEHOLDERS

<table>
<thead>
<tr>
<th>ACTORS : ENVIRONMENTAL ACTORS (Policy makers (Federal, states &amp; Local governments))</th>
<th>STRENGTH</th>
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<tbody>
<tr>
<td></td>
<td>Enabling environment and funding</td>
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<tr>
<td></td>
<td>WEAKNESS</td>
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<td></td>
<td>Policy inconsistencies , Fraud , Poor implementation, Poor enforcement, Lack of adequate awareness &amp; capacity building; Poor quality inputs like seeds a</td>
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<td></td>
<td>OPPORTUNITIES</td>
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<tr>
<td></td>
<td>Foreign exchange through export, Food security, Employment, Political instability, Social security</td>
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<td></td>
<td>THREATS</td>
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<td></td>
<td>Globalization impact, Wrong appointment, Smuggling, Climate change, Corruption</td>
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<tr>
<th>MAIN ACTORS</th>
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<tr>
<td>Farmers</td>
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<tr>
<td>Inputs &amp; agro allied companies (dealers and producers)</td>
</tr>
<tr>
<td>Traders (collectors, wholesalers, retailers)</td>
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<tr>
<td>Processors (confectionaries, malt companies, millers &amp; tender millers)</td>
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<tr>
<td>Consumers</td>
</tr>
<tr>
<td>STRENGTH</td>
</tr>
<tr>
<td>Huge demand for products , Population , Arable land (large)</td>
</tr>
<tr>
<td>WEAKNESS</td>
</tr>
<tr>
<td>Poor energy, Inadequate finance, Lack of technical know how, pest and disease, Transportation, volatility of the markets prices, Poor infrastructures, poor road networks, poor storage and processing facilities, Poor dissimulation of metrological information, Use of rudimentary tools, Poor quality of seeds, poor soil fertility</td>
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<tr>
<td>OPPORTUNITIES</td>
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<tr>
<td>Improving livelihood, Available market, Capacity building, International and regional trades</td>
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<tr>
<td>THREATS</td>
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<tr>
<td>Drought, flood and other natural disasters, pests and diseases, unstable government policies, Importation and smuggle, Adulteration of inputs and impurities of output, Poor markets linkages and prices</td>
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<th>SERVICE PROVIDERS</th>
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<td>Transporters</td>
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<td>NGOs</td>
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<td>Research Institutions (R&amp;D)</td>
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<td>Extension services</td>
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<td>Banks</td>
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<td>Warehouse operators</td>
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<td>Brokers &amp; Commodities exchange</td>
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<td>Media</td>
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<tr>
<td>Health workers</td>
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<tr>
<td>Regulatory agencies (NAFDAC, SON, Seed councils)</td>
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<tr>
<td>STRENGTH</td>
</tr>
<tr>
<td>Agrarian community. Huge demand for services all year round.</td>
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<tr>
<td>WEAKNESS</td>
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<tr>
<td>Poor technical knowledge of the products they are selling, Fake products and adulterated products, Lack of organized markets ant its information</td>
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<tr>
<td>OPPORTUNITIES</td>
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<tr>
<td>Large agrarian community</td>
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<td>THREATS</td>
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<tr>
<td>Importation of products from Asia, Importation of seeds, Advance weather conditions, Finance Energy, Inconsistent government policy, Lack of adequate regulation and information</td>
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<tr>
<th>SERVICE PROVIDERS (TRADERS)</th>
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<tr>
<td>STRENGTH</td>
</tr>
<tr>
<td>Nigeria is second largest sorghum producer and biggest grain consumer nation in the world; Commodity exchange markets, Skills and organized market association, International produce market (Dawanau), Goods trans border trade</td>
</tr>
<tr>
<td>WEAKNESS</td>
</tr>
<tr>
<td>Lack of organized market, Too many middlemen adding little value, Price of farm produce not based on quality, No standard unified measurement system</td>
</tr>
<tr>
<td>OPPORTUNITIES</td>
</tr>
<tr>
<td>Market organization</td>
</tr>
<tr>
<td>THREATS</td>
</tr>
<tr>
<td>Traders from neighbouring countries, Smuggling</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SERVICE PROVIDERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRENGTH</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

80
<table>
<thead>
<tr>
<th>PROCESSORS</th>
<th>Processors strengths, Large international market for sorghum</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEAKNESS</td>
<td>Unreachable supply of raw material, Fluctuating of raw material, Technical knowhow and efficiency, Unorganized small operators, None compliance with quality norms, Lack of skilled manpower</td>
</tr>
<tr>
<td>OPPORTUNITIES</td>
<td>Availability of research</td>
</tr>
<tr>
<td>THREATS</td>
<td>Finance, Energy, Inconsistency supply of raw, Political instability, Security, Climate change, Inconsistent government policy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONSUMERS Malt, Beverages, Tuwo, Sorghum flour, Fura, macaroni, Spagetti, drinks and confectioneries</th>
<th>STRENGTH utilization:</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEAKNESS</td>
<td>No consumer protection, Low purchasing power</td>
</tr>
<tr>
<td>OPPORTUNITIES</td>
<td>Access to different products, Access to markets</td>
</tr>
<tr>
<td>THREATS</td>
<td>No consumer protection, Lack of quality products, Poor regulatory and enforcement framework, Packaging products</td>
</tr>
</tbody>
</table>

**4.0 Needs Farmers**
# SWOT Analysis of Pearl Millet Stakeholders

## ACTORS: ENVIRONMENTAL ACTORS (Policy makers (Federal, states & Local governments))

<table>
<thead>
<tr>
<th>STRENGTH</th>
<th>WEAKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabling environment and funding</td>
<td>Policy inconsistencies, Fraud, Poor implementation, Poor enforcement, Lack of adequate awareness &amp; capacity building</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign exchange through export, Food security, Employment, Political stability &amp; Social security</td>
<td>Globalization impact, Wrong appointment, Smuggling, Climate change, Corruption</td>
</tr>
</tbody>
</table>

## MAIN ACTORS

<table>
<thead>
<tr>
<th>STRENGTH</th>
<th>WEAKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population, Arable land (large) Large size of family labor</td>
<td>Poor energy supply, Inadequate finance, Lack of technical know how, pest and disease, Transportation, volatility of the markets prices, Poor infrastructures like poor road networks, poor storage and processing facilities, Poor dissimulation of metrological information, Use of rudimentary tools, Poor quality of seeds, poor soil fertility</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of new and high yielding varieties</td>
<td>Drought, flood and other natural disasters, pests and diseases, unstable government policies, Importation and smuggle, Adulteration, Poor markets linkages and prices</td>
</tr>
</tbody>
</table>

## SERVICE PROVIDERS

<table>
<thead>
<tr>
<th>STRENGTH</th>
<th>WEAKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agrarian community; Demand for products increasing; Institutions enjoy Government support.</td>
<td>Poor technical knowledge of the products they are selling, Fake products and adulterated products, Lack of organized markets ant its information</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large agrarian community</td>
<td>Importation of products from Asia, Importation of seeds, Advance weather conditions, Finance Energy, Inconsistent government policy, Lack of adequate regulation and information</td>
</tr>
</tbody>
</table>

## SERVICE PROVIDERS (TRADERS)

<table>
<thead>
<tr>
<th>STRENGTH</th>
<th>WEAKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria is second largest millet producer and big demand for the grain. Commodity exchange markets, Skills and organized market association, International produce market (Dawanau), Good trans border trade</td>
<td>Lack of organized market, Too many middlemen adding little value, Price of farm produce not based on quality, No standard unified measurement system</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPPORTUNITIES</th>
<th>THREATS</th>
</tr>
</thead>
<tbody>
<tr>
<td>High demand for the commodity Market organization; value added activities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor storage facilities, increased transaction cost. Traders from neighbouring countries, Smuggling; poor access to finance.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>SERVICE PROVIDERS</strong></td>
<td><strong>PROCESSORS</strong></td>
</tr>
<tr>
<td><strong>STRENGTH</strong></td>
<td>Processors strengths – high demand, Large international market for millet</td>
</tr>
<tr>
<td><strong>WEAKNESS</strong></td>
<td>Unreachable supply of raw material, Fluctuating of raw material, Technical knowhow and efficiency, Availability of local processing equipments, Unorganized small operators, None compliance with quality norms, Lack of skilled manpower</td>
</tr>
<tr>
<td><strong>OPPORTUNITIES</strong></td>
<td>Potentials to increase production and quality Availability of research</td>
</tr>
<tr>
<td><strong>THREATS</strong></td>
<td>Smugglers, price fluctuations Finance, Energy, Inconsistency supply of raw, Political instability, Security, Climate change Inconsistent government policy</td>
</tr>
<tr>
<td><strong>Distributors and retailers</strong></td>
<td><strong>Main products:</strong> Fura, tuwo, grits, kunu, waina, livestock feeds</td>
</tr>
<tr>
<td><strong>STRENGTH</strong></td>
<td>Utilization: large outlets for the product</td>
</tr>
<tr>
<td><strong>WEAKNESS</strong></td>
<td>No consumer protection, Low purchasing power</td>
</tr>
<tr>
<td><strong>OPPORTUNITIES</strong></td>
<td>Access to different products, Access to markets</td>
</tr>
<tr>
<td><strong>THREATS</strong></td>
<td>Access to finance for retailers No consumer protection, Lack of quality products, Poor regulatory and enforcement framework, Changes in govt policies, Packaging products, Insecurity</td>
</tr>
<tr>
<td><strong>Exporters</strong></td>
<td><strong>Low external demand,, Medicinal value for millet is an opp for exporters</strong></td>
</tr>
<tr>
<td>GROUND NUT: STAKEHOLDERS ANALYSIS</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>ACTORS:</strong> ENVIRONMENTAL ACTORS (Policy makers (Federal, states &amp; Local governments))</td>
<td><strong>STRENGTH</strong></td>
</tr>
<tr>
<td></td>
<td>Enabling environment and funding</td>
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<tr>
<td></td>
<td><strong>WEAKNESS</strong></td>
</tr>
<tr>
<td></td>
<td>Policy inconsistencies, Fraud, Poor implementation, Poor enforcement, Lack of adequate awareness &amp; capacity building; uncompetitive product</td>
</tr>
<tr>
<td></td>
<td><strong>OPPORTUNITIES</strong></td>
</tr>
<tr>
<td></td>
<td>Foreign exchange through export, Food security, Employment, Political stability &amp; Social security</td>
</tr>
<tr>
<td></td>
<td><strong>THREATS</strong></td>
</tr>
<tr>
<td></td>
<td>Globalization impact, Wrong appointment, Smuggling, Climate change, Corruption, high costs of production and processing</td>
</tr>
<tr>
<td></td>
<td><strong>MAIN ACTORS</strong></td>
</tr>
<tr>
<td></td>
<td>Farmers</td>
</tr>
<tr>
<td></td>
<td>Inputs &amp; agro allied companies (dealers and producers)</td>
</tr>
<tr>
<td></td>
<td>Traders (collectors, wholesalers, retailers)</td>
</tr>
<tr>
<td></td>
<td>Processors (confectionaries, malt companies, millers &amp; tender millers)</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
</tr>
<tr>
<td></td>
<td><strong>STRENGTH</strong></td>
</tr>
<tr>
<td></td>
<td>Population, Arable land (large); an international crop.</td>
</tr>
<tr>
<td></td>
<td><strong>WEAKNESS</strong></td>
</tr>
<tr>
<td></td>
<td>Poor energy supply, Inadequate finance, Lack of technical know how, pest and disease, Transportation, volatility of the markets prices, Poor infrastructures, Poor market information</td>
</tr>
<tr>
<td></td>
<td>Transportation and poor road networks, poor storage and processing facilities, Poor dissemination of metrological information, Use of rudimentary tools, Poor quality of seeds, poor soil fertility</td>
</tr>
<tr>
<td></td>
<td><strong>OPPORTUNITIES</strong></td>
</tr>
<tr>
<td></td>
<td>Improving livelihood, Available market, Capacity building, International and regional trades, A developing economy</td>
</tr>
<tr>
<td></td>
<td><strong>THREATS</strong></td>
</tr>
<tr>
<td></td>
<td>Drought, flood and other natural disasters; pests and diseases; unstable government policies, Importation and smuggling, Adulteration of inputs and output, Poor markets linkages and prices</td>
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<td></td>
<td><strong>SERVICE PROVIDERS</strong></td>
</tr>
<tr>
<td></td>
<td>Transporters</td>
</tr>
<tr>
<td></td>
<td>NGOs</td>
</tr>
<tr>
<td></td>
<td>Research Institutions (R &amp; D)</td>
</tr>
<tr>
<td></td>
<td>Extension services</td>
</tr>
<tr>
<td></td>
<td>Banks</td>
</tr>
<tr>
<td></td>
<td>Warehouse operators</td>
</tr>
<tr>
<td></td>
<td>Brokers &amp; Commodities exchange</td>
</tr>
<tr>
<td></td>
<td>Media</td>
</tr>
<tr>
<td></td>
<td>Health workers</td>
</tr>
<tr>
<td></td>
<td>Regulatory agencies (NAFDAC, SON, Seed councils)</td>
</tr>
<tr>
<td></td>
<td><strong>STRENGTH</strong></td>
</tr>
<tr>
<td></td>
<td>Agrarian community</td>
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<td></td>
<td><strong>SERVICE PROVIDERS (TRADERS)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>STRENGTH</strong></td>
</tr>
<tr>
<td></td>
<td>Second largest ground nut producer in the world, Commodity exchange markets, Skills and organized market association, International produce market (Dawanau), Goods trans border trade</td>
</tr>
<tr>
<td></td>
<td><strong>WEAKNESS</strong></td>
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<td></td>
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<td>Market organization</td>
</tr>
<tr>
<td></td>
<td><strong>THREATS</strong></td>
</tr>
<tr>
<td></td>
<td>Traders from neighbouring countries, Smuggling, high cost of handling</td>
</tr>
<tr>
<td>SERVICE PROVIDERS PROCESSORS</td>
<td>STRENGTH</td>
</tr>
<tr>
<td>-----------------------------</td>
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</tr>
<tr>
<td></td>
<td>WEAKNESS</td>
</tr>
<tr>
<td></td>
<td>OPPORTUNITIES</td>
</tr>
<tr>
<td></td>
<td>THREATS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONSUMERS</th>
<th>STRENGTH utilization:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Main products: Fura, tuwo, grits, kunu, waina, livestock feeds</td>
<td>WEAKNESS</td>
<td>No consumer protection, Low purchasing power</td>
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<td>OPPORTUNITIES</td>
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<td>THREATS</td>
<td>No consumer protection, Lack of quality products, Poor regulatory and enforcement framework, Packaging products</td>
</tr>
</tbody>
</table>
## Table 1: Technical Guide on the Selection of Interventions Along the Selected Value Chain

<table>
<thead>
<tr>
<th>VALUE CHAIN</th>
<th>CRITICAL ISSUES</th>
<th>PROBLEM</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SORGHUM</td>
<td>Improved seed</td>
<td>availability of Quality seed</td>
<td>Provide Quality seed</td>
</tr>
<tr>
<td></td>
<td>Fertilizer</td>
<td>Lack of fertilizer</td>
<td>Provision of Fertilizer</td>
</tr>
<tr>
<td></td>
<td>Pesticide</td>
<td>Lack of Pesticide</td>
<td>Provision of Pesticide</td>
</tr>
<tr>
<td></td>
<td>Land Preparation</td>
<td>Tractor</td>
<td>Tractor Acquisition</td>
</tr>
<tr>
<td>INPUTS</td>
<td>technology</td>
<td>Technology application</td>
<td>Capacity building</td>
</tr>
<tr>
<td>PRODUCTION</td>
<td>high cost of processing</td>
<td>Energy, working capital</td>
<td>Generator Acquisition</td>
</tr>
<tr>
<td></td>
<td>Working Capital</td>
<td>Provision of Working Capital</td>
<td></td>
</tr>
<tr>
<td>TRADING</td>
<td>Problem of Infrastructure</td>
<td>Poor Storage Structures</td>
<td>building stores</td>
</tr>
<tr>
<td></td>
<td>Transportation</td>
<td>Acquire appropriate Vehicles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Information Flow</td>
<td>Lack of reliable information</td>
<td>Provision of Reliable information</td>
</tr>
<tr>
<td>MARKETING</td>
<td>Lack of awareness of affordable processed product</td>
<td>Create awareness about processed product</td>
<td>Provision of Reliable information</td>
</tr>
</tbody>
</table>

**VALUE CHAIN**
<table>
<thead>
<tr>
<th>VALUE CHAIN</th>
<th>CRITICAL ISSUES</th>
<th>PROBLEM</th>
<th>ACTION</th>
<th>Stakeholder responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEARL MILLET</td>
<td>Improved seed availability of Quality seed</td>
<td>Provide Quality seed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INPUTS</td>
<td></td>
<td>Community seed production</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fertilizer</td>
<td>Lack of fertilizer</td>
<td>Provision of Fertilizer</td>
<td></td>
</tr>
<tr>
<td>PRODUCT</td>
<td>Technology</td>
<td>Technology application</td>
<td>Capacity building</td>
<td></td>
</tr>
<tr>
<td>ION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRADING</td>
<td>high cost of processing</td>
<td>Energy, working capital</td>
<td>Generator Acquisition</td>
<td></td>
</tr>
<tr>
<td>PROCESSING</td>
<td></td>
<td>Working Capital</td>
<td>Provision of Working Capital</td>
<td></td>
</tr>
<tr>
<td>MARKETING</td>
<td>Problem of Infrastructure</td>
<td>Poor Storage Structures</td>
<td>building stores</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transportation</td>
<td></td>
<td>Acquire appropriate Vehicles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Information Flow</td>
<td>Lack of reliable information</td>
<td>Provision of Reliable information</td>
<td></td>
</tr>
<tr>
<td>CONSUMPTION</td>
<td>Lack of awareness of affordable processed product</td>
<td>Create awareness about processed product</td>
<td>Provision of Reliable information</td>
<td></td>
</tr>
<tr>
<td>GROUNDNUT</td>
<td>CRITICAL</td>
<td>ISSUES/ PROBLEM</td>
<td>ACTION</td>
<td>Stakeholder responsible</td>
</tr>
<tr>
<td>-----------</td>
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<td>-------------------------</td>
<td>-------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>INPUTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGRO DEALERS</td>
<td></td>
<td>Improved seed</td>
<td>Availability of Quality seed</td>
<td>Provide Quality seed</td>
</tr>
<tr>
<td></td>
<td>Fertilizer</td>
<td>Problem Quantity and Quality</td>
<td>Provision of Fertilizer</td>
<td>Associations &amp; WASA</td>
</tr>
<tr>
<td></td>
<td>Pesticide</td>
<td>Problem Quantity and Quality</td>
<td>Provision of Pesticides</td>
<td>Inputs Dealers &amp; Extension Services</td>
</tr>
<tr>
<td></td>
<td>Land Preparation</td>
<td>Lack of suitable tech</td>
<td>Provision of Ox ploughs &amp; Tractors</td>
<td>Inputs Dealers &amp; Extension Services</td>
</tr>
<tr>
<td>PRODUCTION (FARMERS)</td>
<td></td>
<td>technology</td>
<td>Technology application</td>
<td>Capacity Building</td>
</tr>
<tr>
<td>TRADING</td>
<td></td>
<td>Finance</td>
<td>Working capital</td>
<td>Banks &amp; Extension Services</td>
</tr>
<tr>
<td>PROCESSING OIL MILLERS</td>
<td></td>
<td>high cost of processing</td>
<td>Energy, TECHNOLOGY</td>
<td>Generator, Precision Equipments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>working Capital</td>
<td>working Capital</td>
<td>Banks &amp; Extension Services</td>
</tr>
<tr>
<td>MARKETING</td>
<td></td>
<td>Infrastructure</td>
<td>Inadequate storage structure</td>
<td>Construction of Store</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transportation</td>
<td>Acquisition of Vehicles</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of reliable information</td>
<td>Provision of information</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Policy changes (import of vegetable oil)</td>
<td>Advocacy and competitive processing</td>
<td>Oil millers to mount sensitizations and advocacy for members and legislators</td>
</tr>
<tr>
<td>CONSUMPTION</td>
<td></td>
<td>Lack of awareness of affordable processed product</td>
<td>Create awareness about processed products</td>
<td>Provision of information</td>
</tr>
</tbody>
</table>
ANNEXES
Group Presentations: SORGHUM
Who are the main actors in sorghum value chain
Main Actors- Govt at the three levels
Annex 1. Terms of Reference (TOR)

The workshop facilitator Dr Ahmad M. Makarfi was given specific duties with regards to the assignment. The Specific duties were:

With the support of members of the organizing team, the facilitator will lead the workshop and assign tasks to team members on mutual consultation. He will be responsible for the formation of working groups consistent with achievements of the desired objectives of the workshop and always summarize the main results as a reminder during the plenary sessions.

- At the end of the workshop, in collaboration with members of the project, discuss the strengths and weaknesses encountered that could be improved in future meetings of this kind

  Produce a consolidated report summarizing the results with particular emphasis:
  - Mapping the sorghum, pearl millet and ground nut commodity chains in Nigeria
  - Identifying the strengths, weaknesses, opportunities and risks of supply chain actors millet, sorghum and groundnut
  - Identifying the potential for contracting between the chain actors (processors / producers, producers and traders and processors and traders under the umbrella of actors in the policy and institutional environment as well as actors in the business and development services).

- Work in a special session with the workshop organising Committee to review and ensure the quality and completeness of the document produced.

1.3 Modus Operandi

The Facilitator and stakeholders (Appendix 1) held their inaugural meeting on 22nd November 2011 and deliberated on the modus operandi of the assignment. The terms of references were extensively deliberated upon and the modus operandi for the assignment was agreed. Meetings and extensive discussions were held with the stakeholders from 23-25th November 2011 while the facilitator continued on November 26-27th, 2011 with report
Annex 2. Program of the Meeting

1.1 BACKGROUND
1.2 Introduction
1.3 Specific duties of the Facilitator
1.4 Modus Operandi
1.5 Executive Summary
1.6 Opening speech of ICRISAT country Representative
1.7 Opening Address by the Honorable Commissioner of Agriculture and Natural Resources, Kano State
1.8 Remarks by Director IAR
1.9 Remarks by Director LCRI
1.10 Remarks by Team Leader Sorghum Transformation Project
1.11 Vote of thanks

2.0 TECHNICAL PAPERS ON GENERAL PERSPECTIVE
2.1 Objectives and outcomes of the Consultative Workshop Between Actors along the Pearl Millet, Sorghum and Groundnut Value Chains in Nigeria by Jupiter Ndjeunga ICRISAT
2.2 Hope Project In Nigeria . M. Y. Yeye
2.3 An Overview Of Activities Conducted On Millet In Nigeria In Collaboration With Hope Project , K. W. Gwadi
2.4 Groundnut value chain development in Nigeria: Challenges and opportunities in production, processing, marketing and general business development of groundnut value chain Mukhtar, A. A and Tanimu, B.
2.5 Sorghum And Pearl Millet Marketing In The North-Eastern Nigeria : Challenges And Opportunities Bashir Alhaji Baba,
2.6 Implementing Sorghum Transformation Value Chain In Nigeria Prof. A Babatunde Obilana, Team Leader, Sorghum Transformation Value Chain Initiative
2.7 Sorghum Value Chain: Slowly, But Surely Aliyu Samaila

Discussions

3.0 TECHNICAL PAPERS ON DIRECT ACTORS IN THE SORGHUM, MILLET AND GROUNDNUT VALUE CHAINS.
3.1 PRODUCERS
1. Presentation by Sorghum Farmers’ Association Of GUMEL
2. Presentation by Pearl Millet Farmers’ Associations Of GUMEL
3. Presentation by Sorghum Farmers’ Associations Of KANO
4. Presentation by Groundnut Farmers Association
5. Presentation by Groundnut Producers Kudai
6. Presentation by Dawanu Market Association

Discussions

3.2 PROCESSORS
1. • Presentation by Dala Foods Nigeria Ltd
2. • Presentation by Celsian Mills Ltd GUMEL
3. • Presentation by GUINNESS Malting industry
4. • Presentation by Dala Foods Nigeria Ltd
5. • Presentation by Flour processors (Convenient foods)
6. • Presentation by Small-scale FURA processor of GUMEL
7. • Presentation by KNARDA women associations (baby food)
8. • Presentation by Supermarkets
9. • Presentation by Traders

Discussions

3.3 Business and development services: Research Institutions, Agro Input Dealers, Banks

- Presentation by LCRI
- Presentation by IAR
- Presentation by ADPs (KNARDA, JIGAWA, KATSINA)
- Presentation by DuPont (Olumide)
- • Presentation by EATP (Kola Kuku)
- • Presentation by WOFAN Haji Salamatu Garba
- • Presentation by IFDC
- • Presentation by Agricultural Bank
- • Presentation by UNION BANK
- • Presentation by Bank of Industry
- • Presentation by IFAD/CBADP

Business and development services cont.:
- Fabricator Farm Center
- USAID Markets
- NOWAIDA
- Seed Companies (Maina Seeds, Seed project)
- Fertilizer companies (Notore, Golden)
- GSARDI – GUMEL
- Women Development Initiative (WDI)

Discussions

3.4 Report Of Working Group 2: Sorghum
Report Of Working Group 3: Millet
Report Of Working Group 1: Ground Nut
General Discussions
Workshop Synthesis
Workshop Evaluation

4.0 FINDINGS AND RECOMMENDATIONS

APPENDICES
Appendix I List of Stakeholders and Facilitators
Appendix II Value chain for the three Agro-enterprises
Appendix VIII Executive Summary
Appendix XII Assumptions
Annex 3. List of participants

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