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VALUE CHAIN ASSESSMENT REPORT: MILLET AND SORGHUM VALUE CHAIN

Contact No.: AID-624-C-13-00002-00

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TRADE HUB AND AFRICAN PARTNERS NETWORK

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The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development (USAID) or the United States Government.

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ACRONYMS

CAADP	Comprehensive African Agriculture Development Program
CPC	Centrale des Producteurs de Céréales du Togo
CICB	Comité Interprofessionnel des Céréales du Burkina Faso
CILSS	Comité Permanent Inter-états de Lutte contre la Sécheresse dans le Sahel
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organisation
FUPRO	Fédération des Unions de Producteurs du Bénin
GAPTO	Ghana Agriculture Producers & Traders Organization
IFDC	International Center for Soil Fertility and Agricultural Development
MIR	Marketing Inputs Regionally
Mt	Metric Ton
NGO	Non-Governmental Organization
ROPPA	Réseau des Organisations Paysannes et des Producteurs de l'Afrique de l'Ouest
UEMOA	Union Économique et Monétaire Ouest Africaine
USAID	United States Agency for International Development

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1. INTRODUCTION AND BACKGROUND

1.1 MILLET AND SORGHUM VALUE CHAIN

This millet and sorghum value chain assessment aims to update information on current trends and challenges, and draw out new opportunities. The report provides an overview of the millet and sorghum value chain and a brief SWOT analysis, followed by a proposed vision and a strategy to improve competitiveness, increase regional trade, leverage investments in the sector, and create new jobs.

1.2 VALUE CHAIN ASSESSMENT

Millet and sorghum are part of the pre-selected cereals of Feed the Future (FTF). As one objective of Trade Hub Network is to strengthen FTF results, this value chain assessment is the second step in planning activities for the Trade Hub and African Partners Network.

The assessment phase took place during May 2014. Assessments were carried out for each value chain recommended for targeted partnership with and support from the Trade Hub.[1]

The Value Chain Selection Reports provide brief overviews of each value chain; the Assessment Reports offer deeper perspectives about the current status, structure, performance, and challenges of the value chain. They update previously available information where possible. Based on this information and analysis, they recommend a vision and upgrading strategy for each value chain, and outline possible support roles for the Trade Hub in helping value chain stakeholders achieve their strategy.

As the first opportunity for the Trade Hub team to resume interacting with industry stakeholders and begin identifying lead firms and areas where the project can have a positive impact, the value chain selection and assessment process also provides an initial basis for dialogue and brainstorming/planning with key sector and value chain stakeholders.

The phase, nonetheless, provides only a brief glimpse of each value chain and to commence discussion and share ideas with partners. The assessment is not a detailed value chain analysis.

1.3 ABOUT THE TRADE HUB AND AFRICAN PARTNERS NETWORK

USAID/West Africa's strategic goal is to support the emergence of a politically stable and economically prosperous West Africa. The Trade Hub's goals are to promote increased regional trade in key agricultural commodities (a goal of Feed the Future, or FTF) and to reduce poverty through value-added exports (a goal of the Africa Competitiveness and Trade Expansion Initiative, known as ACTE).

The overall objective of the Trade Hub and African Partners Network is to increase Africa's share of world trade by increasing exports at a faster rate than the rate of growth in overall trade, and by

improving West Africa's international private sector competitiveness in targeted value chains other than extractive industries.

The project will achieve two intermediate results: 1) improve the private sector capacity of the region's farmers and firms by addressing constraints to targeted value chains; and 2) improve the business enabling environment by addressing economy-wide constraints such as the transport and trade barriers that affect the efficiency of the region's ports, corridors, and borders.

At its heart, USAID/West Africa's Trade Hub and African Partners Network is a capacity-building effort that will entail working with several key groups of African partners. The project's focus will be on developing associations and regional alliances that can act independently from donor support and take on a greater leadership role in promoting reforms, attracting buyers and investors, and adopting improved practices. The project will also work with individual companies that have a regional scope and could serve as lead firms in targeted value chains.

The Trade Hub will achieve its objectives by improving the private sector competitiveness of certain value chains. Based on the initial assessments made in USAID/West Africa's Feed the Future Multi-Year Strategic Plan, five value chains were pre-selected for the project: rice, millet and sorghum, millet/sorghum, livestock (cattle), and livestock (sheep and goats). They were selected based on the following criteria: importance to intra-regional trade, high potential for value addition, production by a large number of stakeholders, and synergies with other supported value chains.

The Trade Hub team also examined the development potential of other value-added value chains and selected several for inclusion in the project's set of targeted value chains. This selection was based on six high-level criteria:

- Potential to increase trade
- Potential to create jobs
- Potential to attract investments (including from the U.S.)
- Number of households participating
- Extent of geographic dispersal in West Africa
- Current level of exports to global markets

The assessment phase thus focuses on the following short list of value chains:

FTF Regional Value Chains

- Maize
- Millet-Sorghum
- Rice
- Cattle
- Small ruminants

Value-added Global Value Chains[2]

- Apparel
- Cashew
- Honey
- Mango (and possibly other cut fruits/vegetables)
- Sesame
- Shea

West Africa is on the verge of a transformative change—if it can create a new dynamic for intra-regional and export trade. At present, intra-regional trade is inefficient, characterized by unpredictable

[2] The home décor value and fashion chain was handled differently. A limited Trade Hub initiative is recommended for home décor and fashion. An assessment was not conducted for this value chain as it was no longer considered for a core Trade Hub focus.

distortions and uncompetitive practices, and subject to overly restrictive regulatory regimes. West African exports have limited success in the global marketplace due to poor quality, inconsistent supply, and high delivery prices, which can be traced back to the absence of economies of scale, high transaction costs, and a poor enabling environment.

The Trade Hub and African Partners Network aims to promote broader, more sustainable growth by improving both private sector capacity and the policies, rules, and practices that govern regional and external trade. This will achieve sustainable and measurable increases in regional and international exports, jobs, and investment by strengthening vertical and horizontal integration within value chains, assisting representative associations to become more effective and inclusive, and improving the enabling environment for trade. The project will also mount a cross-cutting effort to increase the professionalism of all major participants by providing role-specific competency training, facilitating access to modern technologies, and improving market linkages.

The Trade Hub will:

- **Leverage and strengthen already-identified or new private sector and public sector partnerships for commercial and development activities.**
- **Target the highest-impact opportunities in the value chains and policy regimes, to alleviate specific constraints hindering private sector growth.** The cornerstone of our structured approach to value chain development is identifying, in collaboration with our for-profit value chain partners and our public and nongovernmental organization (NGO) partners, where high-impact change can be achieved to maximize the return on project resources. Our trade and transport enabling environment staff will target specific policy and regulatory constraints which, once changed, will open up regional and external markets, reduce seasonal blockages, lower supply chain friction, and encourage trade-based investment and growth. They will work closely with stakeholders to advocate and enforce reforms.

The Trade Hub's higher level results targets are summarized in **Error! Reference source not found.** elow.

Table 1: Highest Outcome-Level Results

Results	Through Year 3	Through Year 5
Increase in the value of global and regional transactions, on average, in targeted sectors of livestock, grains, and value-added products in West Africa	30%	50%
Creation of new jobs in Trade Hub-assisted West African firms	15,000	23,000
Facilitation of new investment in targeted sectors	$62.5m	$102.5m

Because different partners have different needs and levels of maturity, the project will tailor upgrading activities to each partner. We have recommended and will select value chains that offer opportunities to substantially contribute to achieving these objectives. We will choose value chains that can benefit from Trade Hub-supported activities such as:

- Improved buyer-seller intermediation
- Expanded use of grades and standards
- Increased access to and use of market information
- Increased access to and use of financial services
- More competitive transport and logistics enabling environment
- Reduced legal and regulatory barriers to trade

2. METHODOLOGY

The value chain assessment is the second of three phases that will lead to agreement on THN's target value chains:

Phase I: Select (recommend) value-added value chains
Phase II: Assess selected value chains
Phase III: Vet and obtain feedback, leading to confirmed selection.

Eleven separate value chain reports present the findings of each value chain assessment.

As part of the research for the assessment reports, subject matter experts collected and updated data and trend information relevant to each of the value chains. The value chain assessments use a common set of criteria to describe the short-listed value chains and update information about them. In contrast to the selection process, which used subjective measures of only certain criteria based on expert opinion, the assessment utilizes the full set of criteria, quantifying them as much as possible. Based on this analysis, the report discusses strategic approaches that could be supported by the Trade Hub to achieve the "vision" for the value chain.

Existing value chain studies and their conclusions were strongly considered in the assessment, and we also held meetings and phone/internet discussions with knowledgeable stakeholders. (Given time constraints, we did not collect primary market data from the field, or conduct extensive interviews with a full roster of key informants.)

During the assessment, the team also began to analyze and discuss with stakeholders the opportunities and challenges with each value chain and make initial proposals for an upgrading strategy. If the stakeholders and the Trade Hub are able to identify a clear path for upgrading the value chain, it is more likely that the value chain will be ultimately included in the Trade Hub's set of focus value chains.

2.1 VALUE CHAIN ASSESSMENT PROCESS AND SUBSEQUENT STEPS

Table 2: Steps in Value Chain Assessment and Final Selection

Task	Method
Assess short-listed value chains	Assess the five preselected value chains and the other selected value chains against a full set of criteria through desk studies, review of existing value chains studies, and key informant interviews with partner network
Obtain USAID/West Africa's feedback on Value Chain Selection Report	Review Value Chain Selection Report; meet with value chain Development Specialist and value chain team
Submit Value Chain Assessment Report	Assess all VCs, obtaining data and information through value chain studies, desk research, and key informant interviews; include discussion of potential value chain visioon, upgrading strategy and Trade Hub intervention
Prepare facilitation guide for value chain stakeholder vetting	Based on the assessments, prepare summary presentation and process for vetting value chains

Vet value chain selection and assessment with stakeholders	Hold session within Project Partners Kick-off Workshop with Trade Hub stakeholders
Refine value chain selection and assessment, based on stakeholder feedback and suggestions	Continue interacting with key stakeholders and USAID as required

The final selection will only take place after the official project launch event, which will take place on or shortly after July 15, 2014. Immediately following the launch, the project will engage individual value chain partners to discuss and vet the assessments and come to a common vision of the value chain and how the project will work with them. The final action plans for each value chain will be set after the engagement meetings, and will take into account the stakeholder feedback.

2.2 SOURCES OF INFORMATION

The millet and sorghum value chain assessment team obtained data and information through:

- Desk research from value chain analyses, studies, reports and web-based material. (see Annex 1),
- Meetings and interviews with some board members of WAGN in Accra during WAGN and partners meeting,
- Meetings and interviews with stakeholders in Accra,
- Phone calls, emails, Skype conversations and interviews with WAGN members in Benin, Burkina Faso, Ghana, Senegal, and Togo.

2.3 DATA LIMITATIONS

The millet and sorghum value chain has been much studied, and therefore substantial information is available on the value chain's structure and operation, especially in terms of production at the household level. Specific data related to product flows, contribution to GDP and/or regional economic growth is fragmented or unavailable.

3. DESCRIPTION OF THE VALUE CHAIN

3.1 PRODUCTS INCLUDED IN THE VALUE CHAIN

Millet and sorghum are key staple crops for human consumption, with both grain and stalks providing multiple food products, especially in the Sahel countries. Throughout West Africa, the grain is used as a raw material for malt beverages, alcoholic beverages, malt extracts, and confectionary, other food items and animal feed. Nigeria is the largest producer of sorghum in the world with a production of nearly 7 million metric tons (Mt) recorded in 2012.

Products included in the millet and sorghum value chain are:

- Sorghum: white, red, and yellow
- Millet: white, green, and gray
- Millet and sorghum value-added products and by-products.

Use of sorghum: sorghum is used in three ways: traditional, industrial and for animal feed.

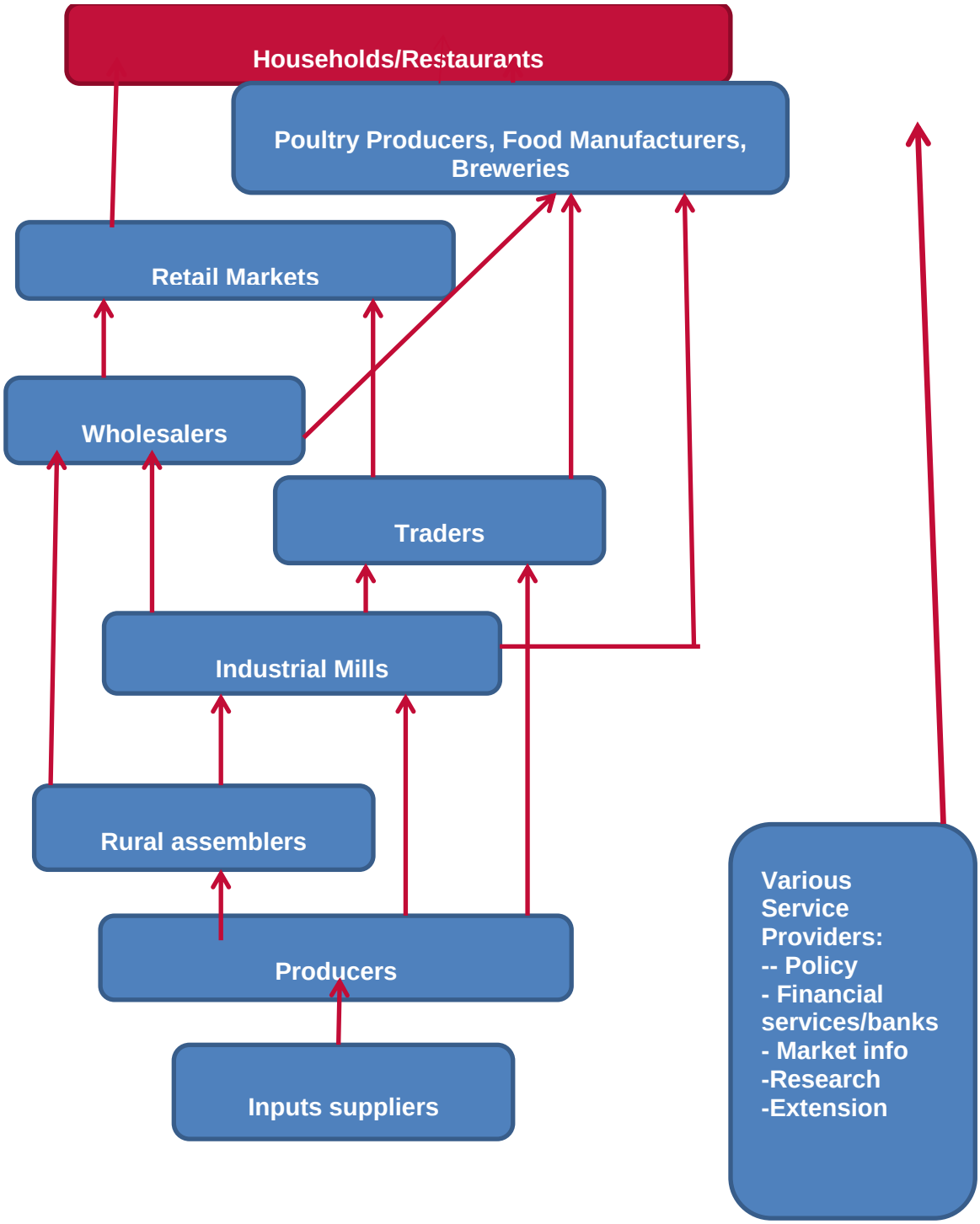
Traditional use: the traditional dishes of sorghum are numerous: (i) cooked grains, (ii) tick porridge from non-fermented flour called "tou", (iii) slight fermented porridge; (iii) cake and flat bread, (iv) couscous, (v) donut in Nigeria and Niger, (vi) local beer called "dolo" in West Africa.
Industrial use: there are industries present in the region that product some of the same goods listed above on a larger, more commercial basis. Specific examples are: (i) flour and semolina, (ii) breads and biscuits (sorghum is used 5 - 10% in proportion to wheat flour to create a special texture of bread that is popular locally), (iii) other manufactured food like Milo and Burvinta (iv) sorghum is used to replace rice and maize grits in beer production, (v) other products such as starch and syrup.

Animal feeds: the crop residues or all stems, leaves and panicles stalk is used by farmers as fodder for feeding their livestock. The importance of these residues varies according to type of sorghum planted (white is most common in the region). Sorghum is generally cheaper than maize, which has supported its increased use for animal feed.

Note that millet is essentially used for human consumption.

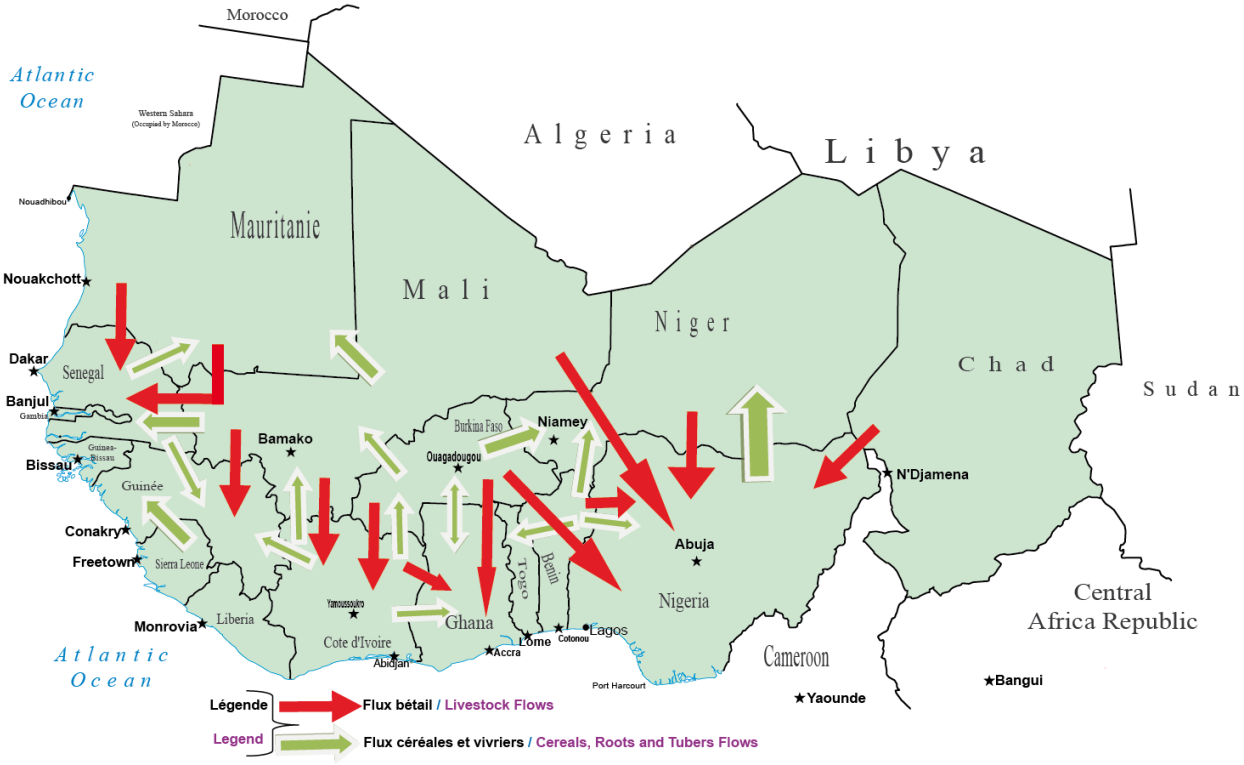
3.2 VALUE CHAIN MAP

Figure 1: Map of millet and sorghum value chain in West Africa (2013)



3.3 PRODUCT FLOW MAP

Figure 2: Main flows of millet and sorghum and other cereals in the West Africa region



Source; Annual Report CILSS 2013

3.4 MILLET AND SORGHUM DATA AND INFORMATION

3.4.1 THE MILLET AND SORGHUM VALUE CHAIN SITUATION IN 2013

The millet and sorghum value chains structure is characterized as follows:

Input supply

The region's farmers do not use yield-enhancing agro-inputs such as fertilizer, improved seeds, labor, and crop protection products on a large scale for these crops. This is due to: (i) lack of funds to purchase inputs on time, (ii) high cost of inputs, (iii) irregular supply of fertilizer and the distance for farmers to travel to supply points, (iv) limited understanding of the necessity to use improved (certified) seeds, (v) existence of counterfeit products, and (vi) lack of knowledge of how to use products. Some traders and processors enter into contracts with farmers for fertilizer credit, which are paid for at harvest with millet and sorghum.

The input supply chain in some countries is managed by governments, which offer subsidies to support food security objectives but distort market forces. In other countries, a private sector-friendly model is promoted, with agro dealers and their agents actively involved in input supply and marketing, reflecting true operating costs. These agro dealers are frequently unable to satisfy demand, because they lack working capital. Constraints to availability and proper use of agro-inputs reduces yields, compounded by applications below recommended rates, inappropriate timing of applications, and use of formulations not appropriate nor recommended for millet and sorghum (fertilizers are often those intended for cotton).

Use of certified seeds in West Africa is very low, about 20%. For the most part, farmers rely on saved seed or seed sourced through informal networks. These sources tend to be inconsistent in terms of quality, vulnerable to pests and diseases and, while cheap, take up valuable land due to extremely low productivity. Fertilizer or chemical inputs tend to be wasted on this seed.

Production

Millet and sorghum production is dominated by small-scale producers (more than 90% of the region's farmers cultivate these crops). Their farms sizes are less than 3 ha. Commercial millet and sorghum farmers are considered those who are cultivating more than 3 ha.

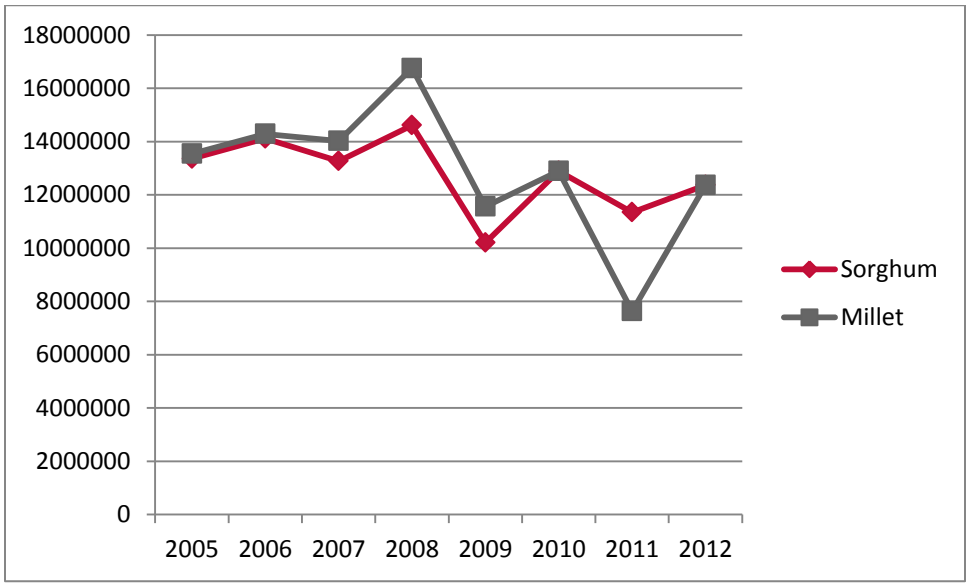
Millet and sorghum are subsistence crops grown mainly under rain-fed agriculture by traditional Sahelian farmers and in the northern zones of coastal countries. Sorghum cultivation is labor-intensive and most operations are done manually, using traditional agriculture practices, including some intercropping.

Millet and sorghum farmers in West Africa typically follow low-input, low-output production systems, characterized by limited access to agricultural credit, inefficient use of fertilizers, and no access to high-yielding millet and sorghum varieties or improved seed. Farm yields are typically 1-1.5 Mt/ha.

The majority of farmers sell soon after the harvest, when millet and sorghum prices are the lowest. Storage systems are traditional, with limited aeration and often not following technical recommendations for fumigation. This is due in part to a wide variety of norms and standards for storage within the region.

Post-harvest losses can be 35-50%. Millet and sorghum production in West Africa for the last eight years are shown in the table below. The detail on production by country is presented in Annex 4.

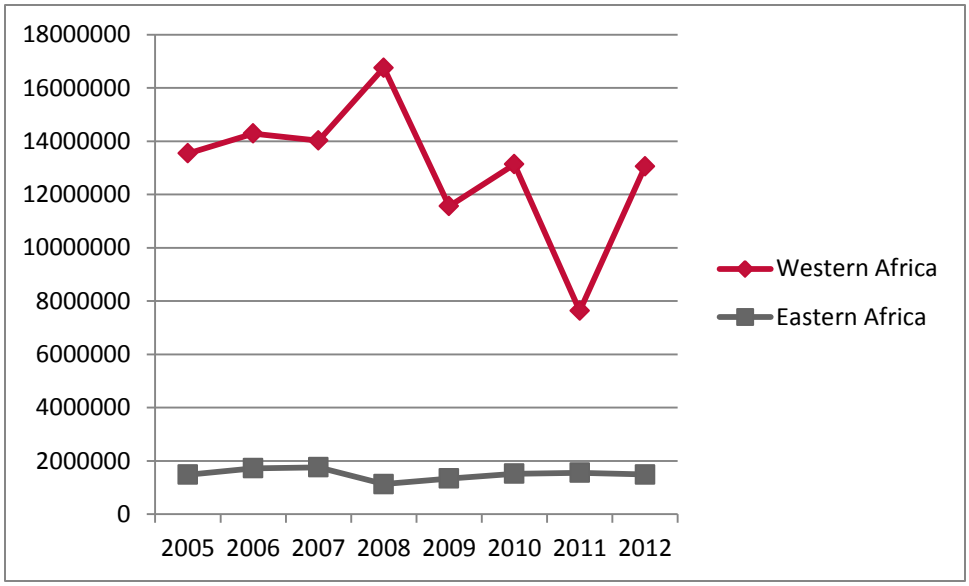
Figure 3: Millet and sorghum production in West Africa 2005-2012 (Mt)



Source: FAOSTAT

From 2005 to 2012, millet and sorghum production has fluctuated significantly. Both crops followed the same trend which reflects the degree to which their production is linked to annual rainfall patterns.

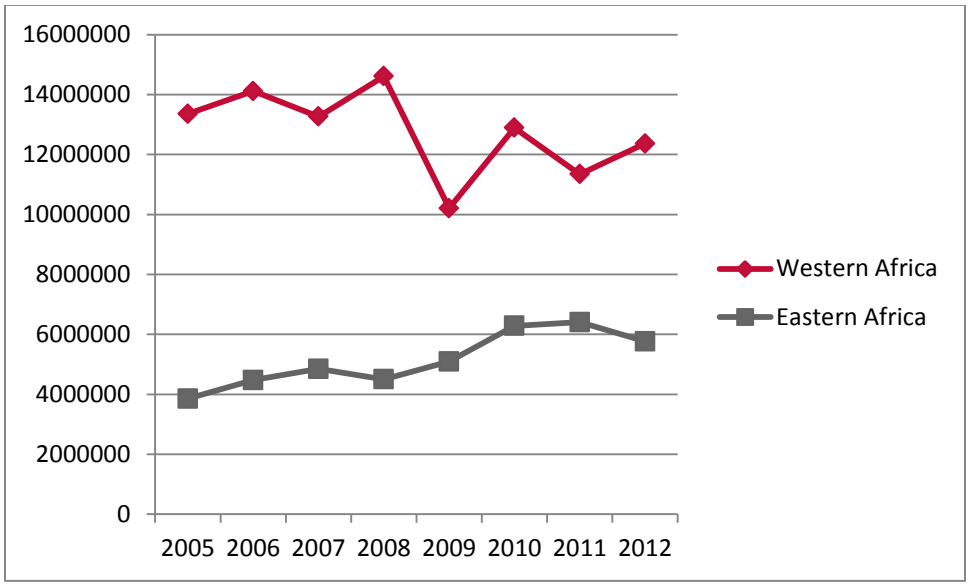
Figure 4: Millet production in West Africa compared to East Africa (Mt)



Source: FAOSTAT

The graph shows that West Africa produces double the amount of millet of East Africa. While production in East Africa is quite stable from 2005 to 2012, in West Africa, millet production fluctuates significantly.

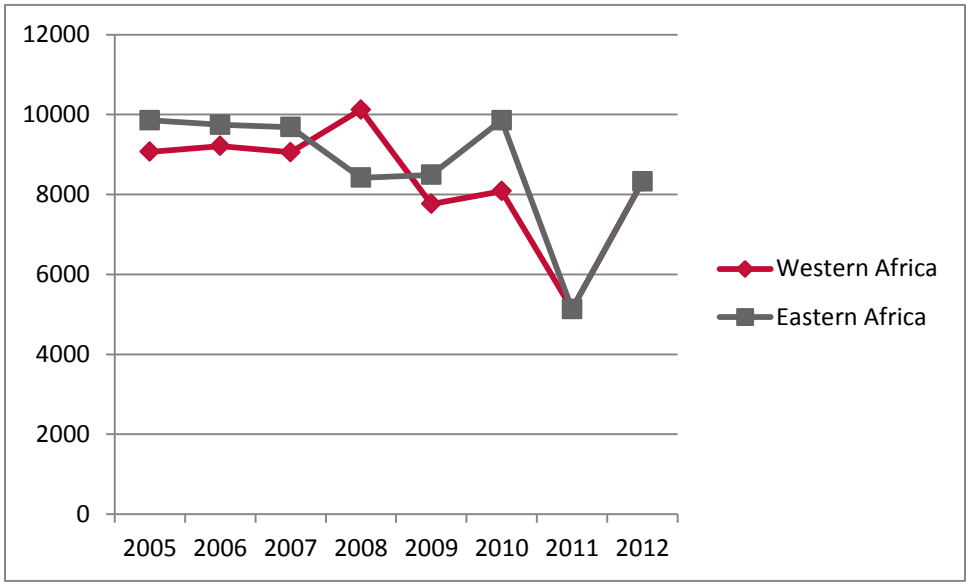
Figure 5: Sorghum production in West and East Africa (Mt)



Source: FAOSTAT

Sorghum production in West Africa is far higher than in East Africa.

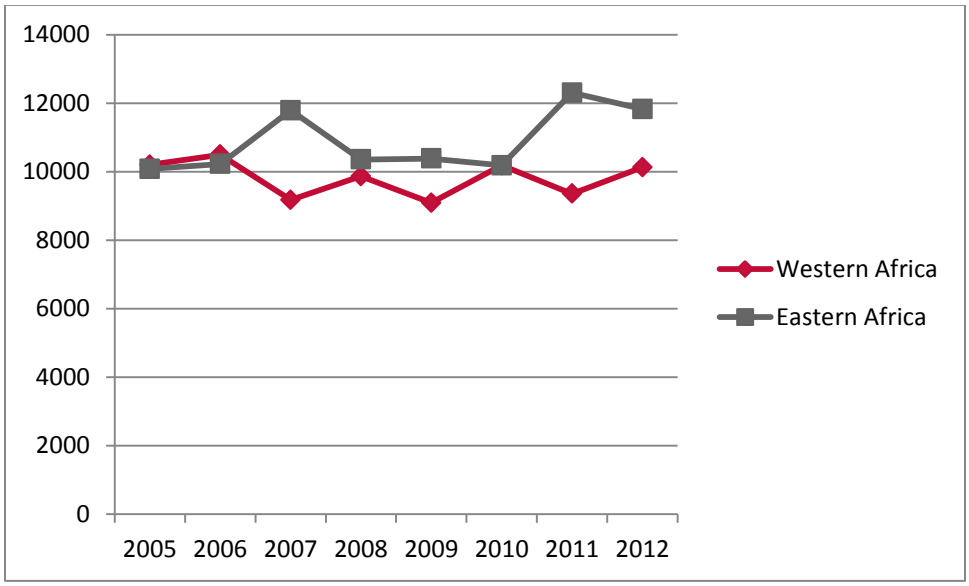
Figure 6: Millet yields in the two regions (Kg/Ha)



Source: Data from FAOSTAT

Millet yields in East Africa is higher, especially from 2010-2012. Part of the reason for this is that millet is not cultivated as a principal crop in East Africa (where maize is the key staple crop for small holders). Most millet produced in East Africa is specifically for processing by local breweries, i.e. for more commercial purposes. Millet in West Africa is produced in the semi-arid Sahel with lower rainfall levels than in similar parts of East Africa. It is the standard crop planted in subsistence agricultural systems, often with no inputs and on eroded and unfertile soil. A large part of the millet in West Africa is referred to as "dune millet", planted on sand dunes with very low yields.

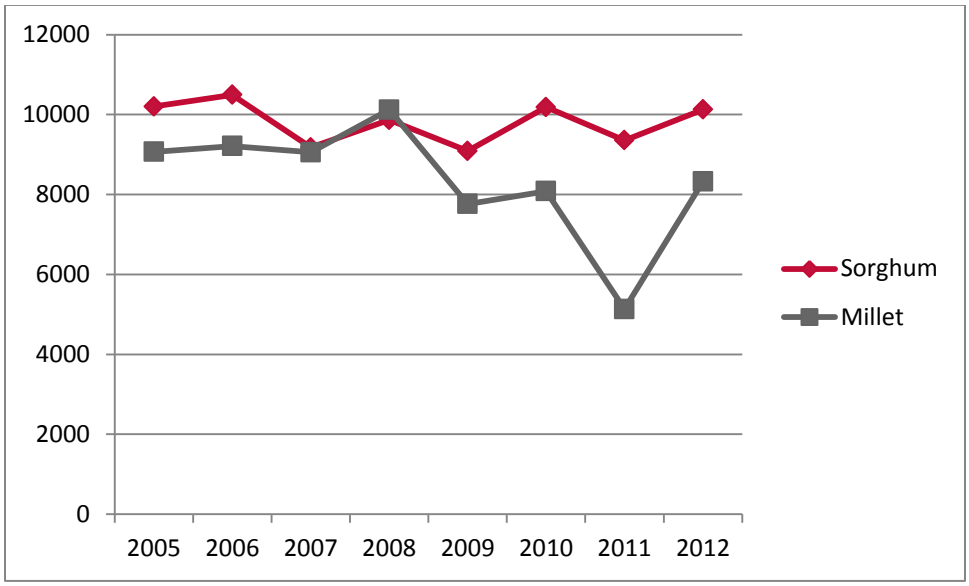
Figure 7: Sorghum yields in Western and in Eastern Africa (Kg/ha)



Source: Data from FAOSTAT

Sorghum yields in East Africa are higher but the difference between the two is smaller than the case of millet.

Figure 8: Sorghum yields compare to millet yields



Source: FAOSTAT

Trade

Collection and trading is characterized by a large number of small-scale traders. Only a small percentage (about 15%) of production is traded across borders. Data on regional trade are not well documented, as most of this trade is informal. Buyers of millet and sorghum for malting confirmed that quality of the products they purchase is often a problem due to high level of impurities present. Post-harvest losses are also visible due to problems of bagging, improper handling, and inefficient loading and unloading systems. The trading channel is composed of:

- Farmers-producers: Small subsistence farmers with less than 3 hectares comprise about 82% of the region's farmers and mostly operate as individual, unorganized producers. A limited number of farmer groups are organized as cooperatives in different production areas
- Aggregators: The closest marketing link to producers/farmers of the commodity value chains upstream, they are also known as village collectors, local buying agents or assemblers. Generally, they collect small quantities of produce from farmers, clean it if necessary and re-bag it. Some have limited storage facilities. They primarily resell non-processed sorghum to wholesale or semi-wholesale dealers in the local market, or directly to buying agents, suppliers of large processors or to urban cereal markets. They are located in the local market or travel to farms if farmers are willing to sell from the farm gate.
- Wholesale dealers: Operate at several market levels: local, urban wholesale, and national. Aggregators sell produce to wholesale dealers, who store large quantities until they identify buyers of larger quantities. These larger buyers are often agents of processing industries—malting, confectionary, animal feed, breweries, as well as suppliers to urban cereal markets.
- Large-scale maize wholesale dealers: Mostly located in larger urban cereal markets such as Davanau in Kano state, Nigeria, and Marche de Gros in Bouake, Cote d'Ivoire. Traders in these markets are members of market development associations and have their own or rented storage facilities in these localities. Wholesale dealers from local markets transport commodities directly to these markets and from there sell to larger suppliers to industry or directly to industry,
- Retailers: Mainly traders in markets and also cereals traders with sales outlets in different places,

who supply grains or processed products directly to consumers. They buy these from wholesale dealers, local buying agents, large urban markets or millers/

Processing

Millet and sorghum-consuming industries include beer, pasta, couscous, and fish, cattle/dairy and poultry production, which are expanding in the region. Household millet and sorghum consumption is also on the rise. Important millet and sorghum processors in the region include: Premium Foods (Ghana), Nestle (Cote d'Ivoire), Data Foods (Nigeria), breweries (in every country), and several small-scale processing firms.

- Small-scale millers: Nigeria has a large number of small mills (mostly hammer millers) that process maize, millet sorghum and other cereals. They use different levels of technology ranging from artisanal to modern mills. These mills process grains brought by clients in small quantities or grains bought from the market. A large quantity of grains is milled for the domestic market.
- Sorghum is a raw material used for malting, confectionary and beverage industries; Nestle and Cadburys are end users of sorghum-based products. The market for malt is expanding, and Nestle is expected to establish its own malting unit.
- Other processing industries include flour mills, animal feed manufacturers and those making small-scale sorghum-based products. Potential sorghum-based products include: bran for poultry feed, flour for bread, cookies, extracted products such as noodles, fortified and weaning foods.

3.4.2 DESCRIPTION OF THE VALUE CHAIN ACTORS

3.4.2.1 Lead Firms

Nestle and the breweries are the big players in the millet and sorghum processing industry.

Table 3: Examples of lead firms in West Africa

Company	Type of product	Country
Nestle	Human foods (Milo, Borvinta, etc.)	Cote d'Ivoire
Premium Foods	General food stuffs (flour, grits, baby foods, etc.)	Ghana
Breweries	Beers and soft drinks (malt, etc.)	Every country
AAFEX	General food stuffs	Senegal
La Vivriere	General food stuffs	Senegal
Free Word Services	General food stuffs	Senegal
SOCMEL	General food stuffs	Togo
Mamelles Jabot	General food stuffs	Senegal

IPRAVI / IVOGRAIN	Poultry feed	Cote d'Ivoire
MELS	General food stuffs (flour, grits, baby foods, etc.)	Burkina Faso
Data Foods	General food stuffs (flour, grits, baby foods, etc.)	Nigeria

3.4.2.2 Micro, Small and Medium Enterprises (MSMEs)

Most actors in the lower level of this value chain are micro, small, and medium, including the majority of the enterprises that collect, buy and transport millet and sorghum to the lead firms mentioned above.

3.4.3 OTHER ACTORS AND STAKEHOLDERS

1. **Input suppliers** come in two main categories: (i) seeds producers and dealers, (ii) fertilizer, machinery and chemicals suppliers
2. **Farmers' organizations, commercial producers, and professional traders** for imports and exports, who include farm-based collectors with few assets and no warehouse, aggregators, and whole traders
3. **Service providers**, including banks, financial institutions, policy makers, market information, research, and extension services
4. **End market**: consumers, supermarkets, school canteens, armies, hospitals, and mines.

The West Africa Grain Network (WAGN) is expected to become a key player in the millet and sorghum value chain. WAGN is a newly-established regional umbrella for the cereals sector, and is comprised of national associations of cereals including millet and sorghum. WAGN's mission is: "To facilitate the creation of a favorable environment for free trade of cereals in West Africa and promote structured trade of cereals for optimum benefits for the actors of the sector." WAGN's mandate is to support the growth of grains value chains, including millet and sorghum, maize and rice.

WAGN's general objective is to promote intraregional trade and enhance competitiveness of the grains value chains in order to create wealth, ensure food security, and foster economic growth in West Africa. Specific objectives are to:

1. Structure the cereals trade in West Africa on the basis of market principles, to encourage increased volumes and value addition of traded products, and increase investments in the grains sector.
2. Facilitate access by small and large producers, traders and processors to national and regional markets
3. Improve the availability of cereals of good quality and adequate quantity at the correct times, and at more stable prices
4. Influence policies and reforms at national and regional levels so that a favorable environment is created for cereals in sub-regional trade.

3.4.4 RELATIONSHIPS BETWEEN KEY ACTORS

The millet and sorghum value chain operates with a vertically connected channel of players comprising farmers, aggregators or local buying agents, wholesale dealers, suppliers, urban grain markets, processors and retail and wholesale end market. Technical assistance is provided by numerous partners and stakeholders from the public sector, private organizations and donor-supported projects. Relationships among value chain actors are mostly informal. Deals and transactions typically take place on a trust or confidence basis.

In some countries, inputs are subsidized by the government and distributed on a credit basis. In others, inputs are privately marketed and sold. The public sector is the main provider and producer of basic seed, which is sold to companies that multiply and certify the seed, then market it to farmers.

A large number of agro-input suppliers provide fertilizers, agro chemicals, seeds, and bags, while service providers lease out equipment like tractors for agriculture mechanization. At the beginning of each production season, associations conduct an evaluation of input needs, which are forwarded to government officials to procure; in some countries, the farmers' national organization will complete this procurement. Once inputs are procured, they are distributed to farmers' groups which dispatch them to individual producers. Some farmers own their tractors, but most hire tractors from the public sector or from private companies. Farmer cooperatives and private organizations also hire tractors for farmers.

A number of larger companies provide fertilizers and agrochemicals, and distribute through agents, wholesale and retail dealers throughout the country. Supply of mainly certified seeds is ensured by a few public sector entities that undertake limited distribution. The national Seed Service certifies seeds that are multiplied in different parts of each country. Seed distribution is generally done by approved private agro-dealers.

3.4.5 OPPORTUNITIES AND ISSUES

Key opportunities and issues for this value chain are summarized below:

- Millet and sorghum is the staple food of most West African countries, and demand is growing as the population increases.
- Big markets exist within the region (Dawono Market in Nigeria, Marche de Gros de Bouake in Cote d'Ivoire) for millet and sorghum-based animal feeds, yet animal food processors often buy from outside the region, because they do not find local millet/sorghum in required quality and quantity.
- Trade opportunities with WFP and breweries should be further explored.
- The ECOWAS regulation on free trade needs to be better enforced to increase trade across borders. Greater liberalization of cross-border trade will provide opportunities for increased regional marketing and trade.
- There are opportunities to boost productivity by increasing yield and reducing post-harvest losses.

4. DISCUSSION OF VALUE CHAIN ASSESSMENT CRITERIA

4.1 MARKET INFORMATION

Millet and sorghum are some of the most-consumed staple crops in the arid areas of West Africa, sold in rural and urban markets. Households and micro-foods processors are the main domestic buyers, and farmers are the key sellers in the markets. The market channel includes farmers, traders and intermediaries. Some commercial agro firms also trade production to local buyers. Seed firms and seed producers sell certified seeds to millet and sorghum growers as well as their organizations.

Aggregators are the closest marketing link to producers/farmers. They are also known as village collectors, local buying agents or assemblers. They collect small quantities of millet and sorghum from farmers, clean it if necessary, and re-bag it. Generally, they have limited storage facilities and primarily resell the non-processed millet and sorghum to wholesale or semi-wholesale dealers in the local market, or directly to buying agents or suppliers of large processors or to urban cereal markets.

The marketing channel from the farmer to marketplace is well-established. Farmers prefer to transport the production in 100 kg bags and sell in the market to aggregators, local buying agents or traders in the marketplace. In some cases, aggregators buy directly from farmers. The sales to the local market go to suppliers for industrial use or sold in main grain markets, which exist in most countries, such as Dawanau in Kano, Dandume in Katsina (Nigeria), and Bouake (Cote d'Ivoire).

The non-processed millet and sorghum market channels from farmer to processor follow a well-established chain. The farmer sells to the local buying agents, who will sell to a wholesale dealer, who then sells to a supplier for industrial processors. A small portion goes toward cross-border trade. No accurate or systematically collected comprehensive data is available to describe the flows of millet and sorghum along specific corridors within the region.

Most millet and sorghum traders now own and use mobile phones as a major tool to obtain market information (price, availability of millet and sorghum, type of millet and sorghum, buyers in the market, and key sellers). But access to market information needs to be improved. Every market day or every week, enumerators posted in markets note prices, type of millet and sorghum, and marketable stocks and send it to their patron by phone call or SMS.

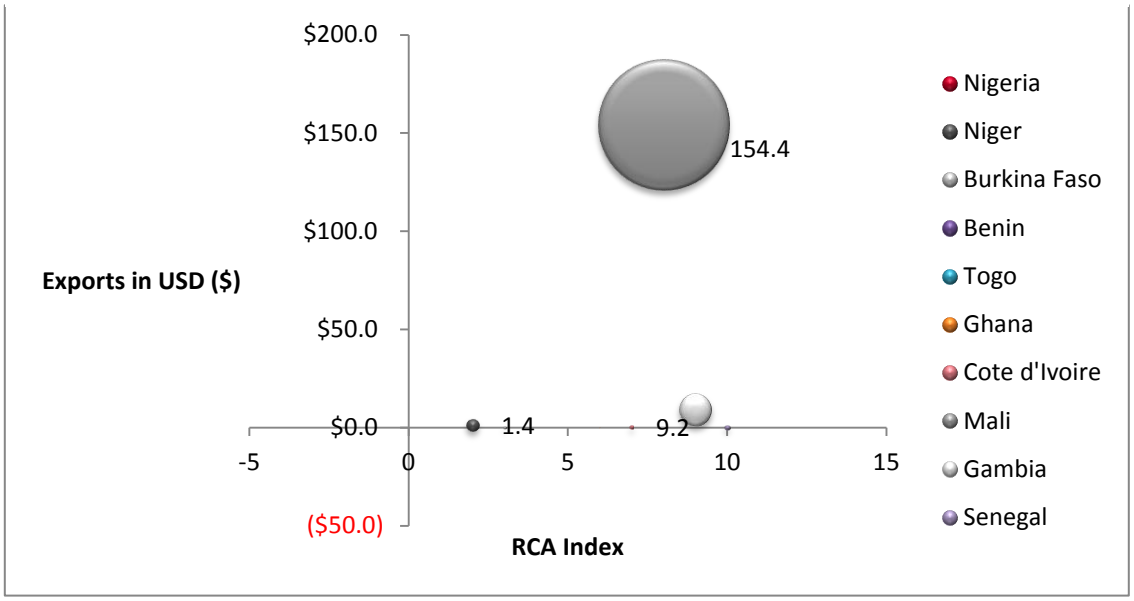
4.2 POTENTIAL TO INCREASE TRADE

Millet and sorghum contribute to the economic growth in the region through development of other value chains such as poultry (especially in small-scale farms), and animal fattening. Currently Nestle is seeking to develop regional supply channels of millet and sorghum, which breweries prefer to maize.

The lead processing companies, such Nestle and those represented by AAFEX of Senegal, buy millet and sorghum from outside the region. Breweries also import millet and sorghum from Argentina, Brazil, and elsewhere. These large players buy millet and sorghum from outside because they need large quantities not readily available from the region at comparable cost, of proper quality, and with regular and predictable supply.

Annex 3 is a Revealed Comparative Advantage analysis for the millet sector in West Africa, based on data from 2011. The RCA index ranges from 0 to infinity with 1 as the break-even point. That is, a RCA value of less than 1 means that the product does not have export comparative advantage, while a value above 1 indicates that the product has a "revealed" comparative advantage. A graphic presentation of this data for the region is presented below:

Figure 9: RCA Millet 2011



Niger is the first country in the sample to show an RCA of 1.4. Gambia shows a larger RCA, with an index of 9.2, and Mali takes the lead for millet exports with an RCA of 154.4. This means Mali has a substantial revealed comparative advantage in exporting millet compared to the other countries in the sample.

4.2.1 POTENTIAL TO CREATE JOBS

The millet and sorghum value chain has great potential to create both permanent and seasonal jobs. However, current jobs created in related agro-industries are limited. Investment needs exist at all levels especially when it comes to agribusiness and commercial agriculture, processing and marketing.

4.2.2 POTENTIAL TO ATTRACT INVESTMENTS

A growing millet and sorghum sector, with greater productivity and better structured trading relationships, offers opportunities for private investment—in downstream processing and marketing certainly, but also throughout the value chain, including at the producer level. Investment in specialized services will also become increasingly attractive.

4.2.3 POTENTIAL TO GENERATE VALUE ADDITION

Potential to generate value addition is related to the following: (i) enabling environment for value chain development, (ii) productive facilities such as irrigated areas and small dams for water control management, (iii) upgrading on each link of the value chain, especially in production and processing, (iv) warehouse receipt system, which will resolve several problem at once (respect of norms and standards,

access to good/certified seeds and other inputs, access to finances and to structured markets), (v) structured market with possibility of establishing contract-farming, development of out-growers channels and pre-financing of inputs by traders or processors.

4.2.4 POTENTIAL TO GENERATE MARKET-BASED IMPROVEMENTS IN PRODUCTION YIELDS

With technical training in best practices for applying fertilizers, seeds, and other husbandry techniques, yields can be increased substantially, to at least 1-2 Mt /ha. Improved post-harvest storage and use of a warehouse receipt system are two examples of how increased production could be used for producers to better participate in local marketing.

4.3 IMPACT ON FOOD SECURITY

All West African countries produce millet and sorghum. However the crops' importance varies from one country to another. Millet and sorghum has a great potential for economic growth, income generation, and a potential source of job creation. More than 200 million farm households make their living from millet and sorghum.

ECOWAP's document emphasizes millet and sorghum as one of the core strategic commodities in the sub-region for food security. (Cf. PAU). Moreover, several coastal countries strive to improve their food security by selecting millet and sorghum as a key staple crop for domestic consumption.

4.4 SOCIAL IMPACT

Women participate fully in the millet and sorghum value chain operations at every level: production, processing and trading, and are more active in processing and trading than men. However, women do not have men's access to lands and finance. In most African countries, only men inherit land from their father, and women are excluded. Some countries (e.g.: Senegal, Mali) have modified national law to expand women's access to lands, as that they play an important role in agricultural value chains, but full application of these laws at the rural level has not been attained. This reality has also limited the ability of women to participate more fully with local financial organizations.

Supporting women producers offers a new branding and marketing angle for companies that target premium markets, where a company or product's perceived ethical credentials have a significant impact on consumer purchasing decisions.

Experience has shown that women smallholders pay greater attention to crop quality and application of best practices, and deliver better quality products. Therefore ensuring that women as well as men receive technical training can be a key strategy to improve productivity, because women typically provide a substantial proportion, often the majority, of the work on smallholder farms in Africa.

4.5 COMPETITIVENESS

The West African millet and sorghum value chain compares poorly when analyzed in terms of important measures of competitiveness, such as quality, productivity, percentage of production reaching the market, prices, and delivery conditions.

The ability of the upgraded value chain to respond reliably to market requirements with competitive quality and cost would require: (i) restructuring value chain relationships, information and incentives; (ii) use of best practices at the production level, and (iii) access to inputs, to finance, and to markets in an enabling commercial environment.

West Africa possesses important comparative advantages, in terms of large areas of available land, and major water resources. The region has a large market with 300 million inhabitants for whom millet and sorghum is an important staple.

The value chain will benefit from vibrant and effective national and regional apex organizations, such as WAGN and ROPPA that are committed to advocating for and working with regional institutions UEMOA and ECOWAS to create a positive enabling environment for regional trade. Several constraints and comparative weaknesses inhibit improved competitiveness of the value chain, including (i) high cost of agricultural inputs or difficulty in accessing inputs, (ii) limited access to credit, (iii) limited market information, (iv) inadequate market infrastructure (warehousing, docks, and phyto-sanitary facilities), (v) lack of norms and standards as well as lack of regional harmonization.

4.6 FACTORS THAT WOULD SUPPORT UPGRADING

4.6.1 CHAMPIONS FOR CHANGE

The millet and sorghum value chain will benefit from champions—individuals, companies and other organizations— who seek to expand and improve its competitiveness. Several have participated in the creation of WAGN, which could emerge as a champion and as a partner to the Trade Hub and other millet and sorghum value chain stakeholders. Several national associations are also actively promoting an improved value chain, such as FIPRO (Benin), CPC (Togo) and UCOVISA (Cote d'Ivoire).

The development of a warehouse receipt system (WRS) is a key strategy to structure and build competitiveness within the value chain by upgrading the quality of marketed millet and sorghum, facilitating access to finance, improving prices, and reducing post-harvest losses. Firms like Premium Foods (Ghana) and organizations such as the Ghana Grains Council are strongly promoting this approach. Promoting warehouse receipts is a key element of WAGN's core strategy.

Lead firms are willing to serve or engage the needs of the value chain's production and market system. Several firms are investing in and developing out-grower arrangements (e.g. NAFASO), while others are involved in contract farming (e.g. members of the Ghana Grains Council).

4.6.2 ACCESS TO FINANCE

Access to finance is a problem for most upstream actors in the value chain. Currently the millet and sorghum value chain is not attractive for lending and other forms of finance, because it is not well structured and lacks defined business models, operations at commercial scale, and enforceable buyer/seller contracts. Finance institutions are more comfortable in funding value-added downstream activities because there is less risk and often collateral for loans can be easily identified. The introduction of agricultural insurance could be crucial to attract banks to fund the sector.

4.6.3 PRODUCTIVE INFRASTRUCTURE

The following physical infrastructure should be developed: (i) irrigated zones, (ii) machinery including tractors, rippers, threshers, and millers, (iii) small dams for agricultural use, (iv) storage facilities, and (v) roads. In addition to directly increasing production, these improvements would allow different actors in the value chain to become more competitive and benefit from value added further upstream.

4.6.4 SYNERGIES WITH EXISTING PROGRAMS

Collaboration will be especially important with the USAID FTF programs in the region (such as the Cereals Value Chain program in Mali and the REGIS ER program in Niger and Burkina Faso), the IFDC millet and sorghum program, and ECOWAS PAU.

4.6.5 POLICY ENVIRONMENT

Political decisions, such as seasonal ban for cereals export obstruct regional trade. However, regional institutions are striving to create an enabling environment for agricultural products trade in the region. Some of these successes include:

- Harmonization of taxes—UEMOA adopted the Common External Tariff in 1990, and expansion of CET to all ECOWAS countries is ongoing.
- UEMOA has exempted agricultural products, including staple crops, from taxes.
- Resolutions to some commercial conflicts between traders and ECOWAS member states.

Three important regulatory and legal challenges must be addressed for the millet/sorghum value chain to achieve an improved level of competitiveness:

1. Certificates of origin document a commodity's country of origin and help customs officials determine applicable tariffs. To promote free trade and make food more readily available to all citizens, ECOWAS has eliminated tariffs on food and, in 2003, eliminated all requirements for certificates of origin on food products. Unfortunately, requests are often made for certificates during border crossings.
2. Countries routinely issue sanitary and phytosanitary (SPS) certificates to show animals and plants have been inspected and are free of diseases that could affect public health. To facilitate regional trade, ECOWAS countries have signed bilateral technical agreements establishing recognition of mutual equivalence of SPS certificates, which means each country agrees to accept the certificates issued by its neighbors. Thus, SPS certificates issued by the country of origin are officially valid throughout the region. Periodic requests for more specific information by border officials, beyond the standard certificates, have created unexpected delays.
3. In principle, ECOWAS countries agreed to exempt basic staple foods from VAT on intra-regional trade through the Additional Act on VAT in 2009, which exempts all agricultural and livestock staple foods and inputs from VAT. However, the Act has not come into effect, as the countries have not yet agreed on the annex with the specific list of products. The UEMOA countries have had a common VAT policy since 1998, with most countries applying an 18% rate (Niger at 19%), exempting most basic staple foods. Furthermore, UEMOA's "common policy" permits countries to apply VAT on agricultural products if the national government chooses, although the tax has to be applied uniformly on all commercial products, whether imported or domestically traded. This situation has created uneven application of the CET and on transport of staple crops in the region. More clarity about application of VAT and the CET mentioned above would contribute to a more positive enabling environment for the free movement of agricultural goods in the region.

4.7 CLIMATE RESILIENCE AND ENVIRONMENTAL SUSTAINABILITY

Few environmental issues are raised by millet and sorghum, which are produced all over the region. Traditional varieties of both crops are able to grow well even in the dry environment found in the Sahel.

Improved varieties take advantage of their inherent drought-resistant characteristics while increasing yields, even in years of reduced rainfall.

4.8 OTHER HURDLES TO SUCCESS

Input supply is critical for growth of the millet and sorghum value chains though farmers are not well-experienced with the application of fertilizers on those crops. Constraints to success include:

- High costs of inputs, mainly agrochemicals and mechanization of crop production
- Limited knowledge of farmers to produce more efficiently by improving yields
- Availability of quality inputs
- Limited access to finance
- Inadequacies of advisory and extension services

SWOT Analysis

Strengths

- Millet and sorghum are strategic commodities for regional food security (ECOWAP and PAU).
- The region has a large amount of fertile land to cultivate for increased millet and sorghum production. Although yields are lower compared to maize and rice, millet and sorghum have great potential for economic growth and income generation, and are an important potential source of employment throughout the region.

Weaknesses

- Lower yields due to inappropriate practices (use of seeds, fertilizers and post-harvest losses)
- High cost of agricultural inputs or difficulty in accessing inputs
- Inadequate market infrastructure (warehousing, docks, and phyto-sanitary facilities)
- Limited access to credit (farmers, storage, traders, and millers)
- Lack of norms and standards and little regional harmonization of such, leading to weak quality of grains. Farmers and buyers make no differentiation on the basis of grade.
- Limited market information without a comprehensive regional MIS in place.

Opportunities

- Most West Africa countries consume millet and sorghum as staple foods, especially in rural areas
- There is a large market for millet and sorghum both for human consumption and for animal feeds
- Real trade opportunities exist with Nestle, WFP and breweries, but stocks are often limited
- The ECOWAS regulation on free trade exists, but must be better enforced

Threats

- Seasonal bans on grain exports
- Tariff and non-tariff barriers
- Unexpected road and cross-border harassments

5. VISION AND UPGRADING STRATEGY

5.1 VISION

The millet and sorghum value chain could provide an increased amount of production into the local market that is stored and processed at the local and intermediate levels of the value chain, providing a higher-quality product for the large firms to use in their own processing industries within the region.

5.2 UPGRADING STRATEGY

Below is a strategy for upgrading the West Africa regional millet and sorghum value chain, which presents significant opportunities for improving efficiency and effectiveness.

Figure 10: Upgrading the millet and sorghum value chain for West Africa

Production	Storage	Trading	Processing	Retailer
Improved inputs supply chains	Respect of norms and standards	Improved cross-border trade	More large milling plants with adequate equipment	Increased food security in the region
Improve farming technics (4-5 Mt/ha)	Efficient warehouses	Reduce barriers to regional trade	Increase investments in milling plants	Reduce people's dependence on relief food
Increased access to credit	Warehouse receipt system	Operational and sustainable MIS		
	Reduction of post-harvest loses	Structured millet and sorghum market		
		Improved transport and logistics		

5.3 ROLE OF TRADE HUB

It is recommended that the Trade Hub play three key roles in developing the millet/sorghum value chain:

- **Increase sustainable production** by: (i) improving competitiveness of millet and sorghum value chain, (ii)developing post-harvest infrastructure,
- **Upgrade the quality and marketing channels** through (i) dissemination of appropriate technologies in processing industries, (ii) contracts between processors and producers, (iii) awareness and training actors to respect norms and standards
- **Contribute to an enabling environment to increase regional trade** by (i) promoting an operational information system in favor of millet and sorghum value chains actors, (ii) encouraging establishment of commercial infrastructure in major production areas and lead markets, (iii) developing a warehouse receipt system, and contract farming, (v) facilitating access to finance and promoting investments to create jobs.

5.4 RISKS AND MITIGATION

Increased awareness and collaboration to improve the functionality of the value chain requires agreement among all actors that this is a reasonable and achievable goal. More importantly, the perceived benefits for all stakeholders must outweigh any risks, which require clear communication of the advantages and support to maintain a productive enabling environment at the regional level.

6. ADDITIONAL INFORMATION NEEDED

- Much more information is needed regarding buying price of imported millet and sorghum by the processing plants and big players.
- Existing corridor data is not representative for the region, and efforts to collect more of this data in a more comprehensive fashion should be pursued.

ANNEX 1: BIBLIOGRAPHY

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6. "Competitiveness in Africa's Agriculture: A Guide to Value Chain Concepts and Applications," Webber, Martin and Labaste, Patrick. World Bank, 2010.
7. Final report of USAID ATP and EATP projects, May 2013.

ANNEX 2: PERSONS AND ORGANIZATIONS INTERVIEWED

1. Sanou Soumaila, Chairman of WAGN, and president of CIC-B Burkina Faso, a farmer
2. Tom Gambrah, Vice President WAGN, Chairman of GGC-Ghana, and owners cereals processing firm
3. Lionel Guezodje, General secretary of WAGN, Chairman of FUPRO-Benin
4. Aissatou Deme, Treasure of WAGN, Owner of a processing firm
5. Paa Kwesi Florentin, Former Executive secretary of GRIB

ANNEX 3: REVEALED COMPARATIVE ADVANTAGE

The Revealed Comparative Advantage (RCA) for Millet and its supporting data is shown below:

Figure 11: RCA Millet 2011

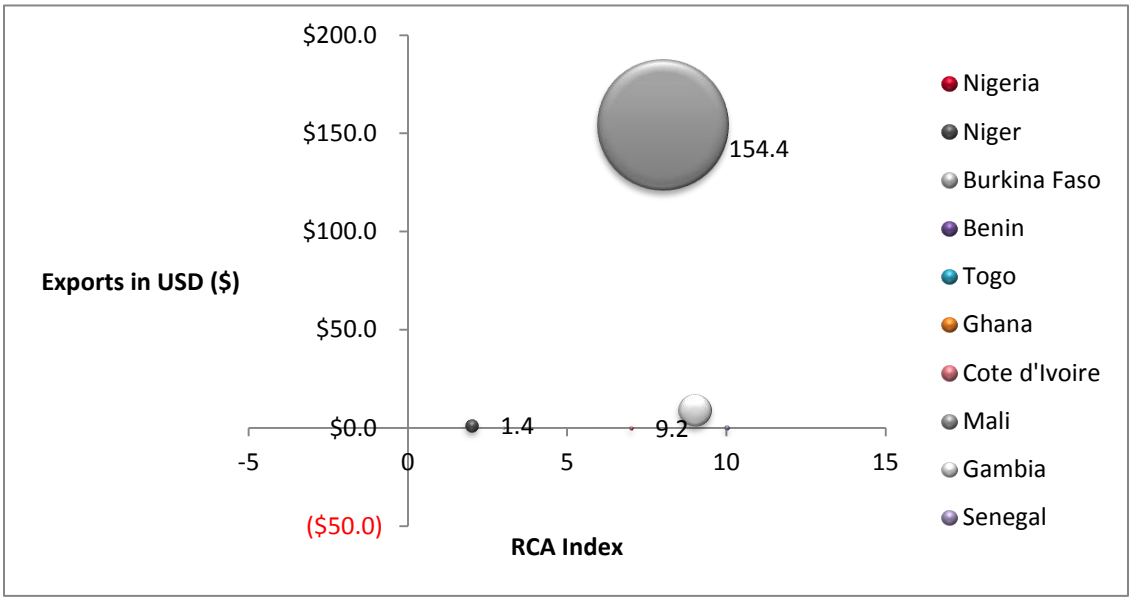

Table 4: Export data for 2011 except Nigeria (2009), Niger (2013), Burkina Faso and Mali (2010)

	A	B	C	D	G	H	I	J	K	L
1	Product	Nigeria	Niger	Burkina Faso	Ghana	Cote d'Ivoire	Mali	Gambia	Senegal	World
2	Millet	$750	$12,181	$366	$636	$17,237	$1,427,835	$9,917	$6,026	146,122,000
3	Country Total Exports	220,998,000,000	1,098,000,000	768,000,000	23,731,000,000	19,500,000,000	1,139,000,000	$133,000,000	$4,251,000,000	
4	World Total Exports	17,999,547,615,000								
5	RCA Millet	$0.0	$1.4	$0.1	$0.0	$0.1	$154.4	$9.2	$0.2	

Export data from UN Comtrade, country totals from WTO.org, and world totals from FAOSTAT 2011

Explanation of Revealed Comparative Advantage

The idea to determine a country's 'strong' sectors by analyzing the actual export flows was pioneered by Liesner (1958).

The procedure was refined and popularized by Bela Balassa (1965, 1989) it is popularly known as the Balassa Index. Alternatively, as the actual export flows 'reveal' the country's strong sectors it is also known as Revealed Comparative Advantage.

Balassa defined the export performance of a specific product/industry from a country – as measured by revealed comparative advantage index – as the relative share of the country's export of the product in the world export of the same product, divided by the overall share of the country in world exports. More specifically, the revealed comparative advantage index of product j exported from country i (RCAji) can be expressed as follows:

RCAji = (Xji/Xjw) / (Xi/Xw), where:

Xji = exports of product j from country i Xjw = world exports of the product j Xi = exports of country i Xw = world exports

The RCA index ranges from 0 to infinity with 1 as the break-even point. That is, a RCA value of less than 1 means that the product does not have export comparative advantage, while a value above 1 indicates that the product has a "revealed" comparative advantage.

For the case of millet:

Export data (Xji) for each country are shown in the row 2 under their respective country names; so the formula can be written as X (millet, Nigeria); X (millet, Burkino Faso), etc.

Xjw or X (millet, World) is in the cell L2 = $146 Mil (rounded)

Xi, exports of the countries, are shown in the row 3

Xw, world total exports, Cell B4 = $18Trillion

Niger is the first country in the sample to show an RCA, where (B2/L2)/(B3/B4) = 1.4. Gambia shows a larger RCA, with an index of 9.2, and Mali again takes the lead in this sample for millet exports with an RCA of 154.4. This means Mali has a substantial revealed comparative advantage in exporting Millet compared to the other countries in the sample.

These calculations are limited to some degree by the availability of export data.

ANNEX 4: MILLET/SORGHUM PRODUCTION

Table 5: Sorghum production per country (Mt/Ha)

country		item	2005		2006		2007		2008		2009		2010		2011		2012	
	Burundi	Sorghum	67947		82249		85565		79818		81176		83023		86854		31527	
	Comoros	Sorghum																
	Djibouti	Sorghum																
	Eritrea	Sorghum	183906		221613		302515		67980		59188		63651	Im	75000	F	80000	F
	Ethiopia	Sorghum	1715954		2173599		2316041		2659129		2971266		3959897		3951294		3604262	
	Ethiopia PDR	Sorghum																
	Kenya	Sorghum	149656		131188		147365		54316		99000		164066		159877		166627	
	Madagascar	Sorghum	1331	Im	1400	Im	1200	F	1000	P	1143	Im	1185	Im	1509	Im	1350	F
	Malawi	Sorghum	18175		54309		63698		61999		60025		53932		73330		66497	
	Mauritius	Sorghum																
	Mayotte	Sorghum																
	Mozambique	Sorghum	115000		204986		169543		378000		384000	*	388596		409745		239000	*
	Réunion	Sorghum																
	Rwanda	Sorghum	227927		187380		164000		144000		174553		161229		151754		138695	
	Seychelles	Sorghum																
	Somalia	Sorghum	140000	F	145000	*	80000	F	75046	Im	84017	Im	115000	F	142000	*	184000	*
	South Sudan	Sorghum																

	Uganda	Sorghum	449000		440000		457578		342286		374309		390779		437000		336000	
	United Republic of Tanzania	Sorghum	729740		711631		971198		551270		709310		798540		806575		838717	
	Zambia	Sorghum	18714		21047		12800		9982		21829		27732		15379		14971	
	Zimbabwe	Sorghum	38087		101248		76200		75000		70000	F	73675		95000	*	65000	

Table 6: Millet production per country (Mt/Ha)

country	year																			
		item	2005		2006		2007		2008		2009		2010		2011		2012	
	Burundi	Millet	7754		10756		11500	F	11000	F	11200	F	11700	F	12000	F	11000	F
	Comoros	Millet																
	Djibouti	Millet																
	Eritrea	Millet	40571		33092		63254		12239		17217		17200	F	19708	Im	20000	F
	Ethiopia	Millet	397390		500171		397002		484409		524191		634826		651851		742297	
	Ethiopia PDR	Millet																
	Kenya	Millet	53101		79207		119599		38462		54000		53881		73396		74917	
	Madagascar	Millet																
	Malawi	Millet	15970		27037		32251		31869		26866		24495		32911		34543	
	Mauritius	Millet																
	Mayotte	Millet																
	Mozambique	Millet	15000		22721		25213		48000		49000	*	48699		51602		47000	*
	Réunion	Millet																
	Rwanda	Millet	4000	*	4000	*	3900	Im	5097	Im	6802	Im	7500	F	8624	Im	9000	F
	Seychelles	Millet																
	Somalia	Mill																

		et																
	South Sudan	Millet																
	Uganda	Millet	672000		687000		732000		274857		249510		267973		292000		244000	
	United Republic of Tanzania	Millet	218760		246665		307906		149520		312420		350870		312035		213746	
	Zambia	Millet	29583		48159		21707		33934		48967		47997		41602		28445	
	Zimbabwe	Millet	27710		62612		43800		37000		40000	P	50999		60000	F	62000	F

* = Unofficial figure | [ ] = Official data | F = FAO estimate | Im = FAO data based on imputation methodology | P = Provisional official data