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“Accelerating Sustainable Economic Development for Africa”

« Accélérer le développement économique durable pour l’Afrique »
Abstract: The ARSO Harmonised African standards in Transforming Africa’s Agriculture

On July 25 2013, World Bank Groups Vice President for Africa Makhtar Diop expressed concern over the low productivity in Africa, noting that, Africa with 202 million hectares or half of the world’s total holdings of arable/usable uncultivated fertile land has extremely low agricultural productivity only 25% of potential and called for revolutionizing Agriculture, land ownership and productivity.

To feed the 2 billion African population in 2050, food production will have to increase 70 percent. Helping the Africa’s farmers and fishers to achieve this target is challenging in itself, but beyond providing food, agriculture sustains the economies of most African countries in significant way. Across Sub-Saharan Africa, for example, agriculture accounts for three-quarters of employment and one third of GDP. For very poor households, agricultural development not only is a defence against hunger but also can raise incomes nearly four times more effectively than growth in any other sector. These circumstances help to explain why agricultural development is such a powerful tool for reducing poverty in Africa and eliciting economic development.

The Food and Agricultural Organisation (FAO) estimates that close to 1 billion people suffer from hunger and food security, which is defined as not having enough food to live a healthy life (FAO 2010). Although these numbers are staggering, the problem of poor access to nutritious foods and to diets of adequate quality is even more daunting (World Bank 2007a).

In Africa, many poor households subsist on monotonous staple-based diet and lack access to nutritious foods such as fruits, vegetables, animal-source foods (such as fish, meat, eggs, and dairy products), or wild foods of high nutrient content. Lack of diversity in the diet is strongly associated with inadequate intake and risks of deficiencies of essential micronutrients such as vitamin A, iron, and zinc (Ruel 2003; Arimond, Wiesmann, et al. 2010; Arimond, Hawkes, et al. 2010). The grave nature of the food and nutrition security of the continent is captured in the Monrovia Declaration where the Heads of State and Government, noting that Africa is endowed with natural resources to sustain self-reliance, committed themselves individually and collectively on behalf of their governments and peoples to mobilize the creative initiatives of the African people using science and technology in order to achieve self-sufficiency in food production and supply (OAU, 1979).

Empirical evidence from agriculture-based development programs suggests that, Africa with largely agriculture-based economy, actions in the agricultural sector can lead to improved nutritional outcomes at a local level (see World Bank 2007b; Leroy et al. 2008). There is need for a greater focus on what happens between production and consumption. This new focus will require the engagement of not only the agriculture sector, but also the other sectors involved, and approaches are needed to help overcome inter-sectoral barriers, which create disincentives to closer cooperation (Benson 2006).

The Lagos Plan of Action for the Economic Development of Africa (LPA) had identified the need for improved seeds, fertilisers, pesticides and other agrochemicals suitable for African conditions as being key drivers for the continent to achieve food and nutrition security (OAU, 1980). The LPA also recognized that Africa’s agriculture suffered from low production and productivity, and rudimentary agricultural techniques which led to insufficient agricultural growth, especially of food production, in the face of the rapid population growth, resulting in serious...
Abstract: The ARSO Harmonised African standards in Transforming Africa's Agriculture

Food shortages and malnutrition in the continent.

In July 2012, the 22nd AU Summit of the African Union (AU) Assembly of Heads of State and Government, declared the year 2014 to be the Year of Agriculture and Food Security in Africa, marking the 10th Anniversary of the adoption of the Comprehensive Africa Agriculture Development Programme (CAADP). The theme for the year is "Transforming Africa's Agriculture: harnessing opportunities for inclusive growth and sustainable development".

The Year of Agriculture intends to consolidate active commitments toward new priorities, strategies and targets for achieving results and impacts, with special focus on sustained, all Africa agriculture-led growth, propelled by stronger, private sector investment and public-private partnerships. The new approach emphasises on the changing from an industry dominated by family-based, small-scale, relatively independent firms to one of larger firms that are more tightly aligned across the production and distribution chain. With standardisation the input supply and product processing sectors are becoming more consolidated, more concentrated, more integrated.

ARSO’s contribution in this regard has been the harmonization of 27 standards for fertilizers and agrochemicals as well as 12 standards for agricultural processes, farm implements and machinery. Under ARSO THC 02, Agriculture and Food Products ARSO targets to help African countries revolutionise agriculture and adopt new technologies and move away from reliance on food imports, to securing their food supplies through rapid, sustainable increases in food production. The standards address issues of handling, packaging, labelling, storage and processing and intrinsically fulfil many of the broader requirements for producers to participate in global supply chains or compete in high-value products.

This ARSO special Newsletter is based on the perspective of nutrition, food supply chain approach to production and distribution, with a focus on standardisation and increasing the supply of and demand for Agricultural products that are rich in essential micronutrients and bio fortified staple foods and grains for Africa.
1. Introduction

A review of literature from the Food and Agriculture Organization of the United Nations (FAO) indicates that Africa and Latin America were net exporters of agricultural and food commodities in the 1940s till early 1950s while Europe and Asia had food production deficits and hence were net importers. In particular FAO (1947) noted that both Africa and Latin America were sparsely populated, with great undeveloped or partially developed land resources, enabling them to potentially produce food far in excess of their own needs. After the Second World War (WWII), countries in the Far East gained independence and the new leaders expressed impatience with poor living standards and embarked on improving them (FAO, 1948). Increasing urbanization in Africa and South America and the increasing purchasing power of city populations meant that South America and Africa were reducing their food exports, hence the quest by Asian countries to increase food production.

FAO (1948) explains that the public became food and nutrition conscious during the WWII, realizing for the first time that enough food of the right kinds could effect a major improvement in health and that food production and distribution should be organized to this end, leading to among other things, the establishment of FAO. It appears that prior to 1900, food was only quantitatively considered as fuel, and its value expressed in calories. Qualitative factors such as proteins, different types of vitamins and minerals began to be understood from 1900 onwards. Only gradually was it understood that a relatively small scarcity of each of these factors decreases the evolution, growth, and health of the body and its resistance against stress (physical or psychological) and against infection. Finally it was realized that malnutrition, even in a degree far from actual hunger, tends to make people inefficient and irrational in their activities, and that the converse is also true: a people cannot be a healthy and benevolent people without adequate amounts of the right kinds of food (FAO, 1948).

Throughout the early 1950s to the 1960s, Africa’s food production registered a decline in the face of a rapidly growing population. By 1960, African food production seems to have remained at the same levels as those just after WWII and even indicated signs of decline (FAO, 1960). FAO (1978) reports the disquieting situation of Africa’s food production having completely failed to match population growth with an equally disquieting deteriorating nutritional condition. The vicious poverty-inducing nature of this situation is captured in the FAO report which states that “In many developing countries, rising food import requirements, especially of cereals, have progressively reduced their ability to import capital goods, fertilizers and other production requisites” (FAO, 1978).

The grave nature of the food and nutrition security of the continent is captured in the Monrovia Declaration where the Heads of State and Government, noting that Africa is endowed with natural resources to sustain self-reliance, committed themselves individually and collectively on behalf of their governments and peoples to mobilize the creative initiatives of the African people using science and technology in order to achieve self-sufficiency in food production and supply (OAU, 1979).

A very distressed Extra-Ordinary Session of the OAU Summit was convened in Lagos, Nigeria from 28th – 29th in which concrete measures for the implementation of the Monrovia Declaration were established under the Lagos Plan of Action for the Economic Development of Africa (OAU, 1980). In the Lagos OAU Summit, the leaders agreed that “The structural weaknesses of African agriculture in agricultural globality are well known: low production and productivity, and rudimentary agricultural techniques. This situation obviously gives rise to insufficient agricultural growth, especially of food production, in the face of the rapid population growth and has resulted in serious food shortages and malnutrition in the continent” (OAU, 1980).

The Lagos Plan of Action (LPA) remains one of the most outstanding documents which analysed the problems facing Africa and proposed in a rather comprehensive manner the requisite solutions that would see Africa attain self-sufficiency and international equality among continents. Although the LPA did not categorically link agricultural and food production to standards, the language of the LPA provided sufficient details to guide technical experts to
provide standards-based solutions to the agriculture and food sector and lead to Africa’s improved food production. It should also be recalled that in 1967 African leaders had approved the Phytosanitary Convention for Africa which in a most significant manner established Africa as one geographical area within which there should be free movement of biological materials and only extra-African imports required SPS clearance (OAU, 1967). The Convention established a Panel of Scientific Consultants to advise the OAU on matters related to plant health and protection. As a largely rural and agriculture-oriented continent, this convention was set to unlock the tremendous agricultural growth in the continent by facilitating intra-African trade in crop-based products.

2. **Priority areas**

The LPA comprehensively addressed the dimensions of food security in Africa by laying emphasis on the following:

(a) **Under-nutrition and malnutrition**: Food self-sufficiency should take into consideration the nutritional values of foodstuffs and should solve simultaneously the problems of under-nutrition and malnutrition. The LPA noted with concern that there was a trend of neglecting indigenous crops which were known to have rich nutritional values and urged that this trend must be stopped. The LPA also urged for biological innovation to improve crop and animal nutrition values in addition to enhancing pest and disease resistance and productivity of crops and animals.

(b) **Food crops**: The LPA urged for quantitative and qualitative improvements in food-crop production (cereals, sugar, legumes, soya beans, fruits, root and tuber crops, oil seeds, vegetables, etc.), with a view to replacing a sizeable proportion of the presently imported products. Besides, the production of these food products should be encouraged in countries which have the potential for these crops. Special attention should be given to the cultivation of cereals such as millet, maize and sorghum, so as to replace the increasing demand for wheat and barley.

Urgent action was to be accorded to good agricultural practices, better incentives to smallholder farmers, sustainable agriculture, construction of dams, better irrigation technologies, intensification of the use of improved hand tools and draught animals and promotion of mechanized farming, physical infrastructure for market access, agricultural education and using a strengthened extension service to diffuse new agricultural technologies.

(c) **Livestock**: The LPA prioritised good livestock production processes for all livestock including poultry and small stock development, good hygiene practices in animal product handling, increased intra-African trade in livestock products such as meat, better breeding practices, prevention and control of animal diseases and pests, development of animal feeds and development of market linkage infrastructure.

(d) **Fisheries**: The LPA targeted to increase annual fish production from African waters by 1 million tons by 1985 and an increase in per capita consumption of 1 kg between 1980 and 1985. Measures included development of industrialized off-shore fleets, expansion of aquaculture, better processing industrial and indigenous technologies, better storage facilities, sustainable fisheries, improved market linkage infrastructure and expansion of intra-African trade in fishery products.

(e) **Incomes and price policy**: The LPA urged Member States to formulate and apply effective and coherent policies to ensure that prices of farm inputs and farm produce provide an adequate incentive for increasing food production, particularly by small farmers, while safeguarding the interests of the poorer consumers at the same time.

(f) **Forest production**: The LPA urged Member States to integrate forestry more closely with agriculture in order to ensure adequate supplies of fuelwood and to increase the contribution of forest resources to industrialisation. Other actions included sustainable forestry, value addition to wood products and leveraging forestry as a means of controlling soil erosion and improving agricultural productivity.
4. **ARSO’s contribution to the LPA**

The LPA urged all Member States to accede to ARSO membership by the end of 1982 and entrusted ARSO the task of establishing African regional standards for all products of interest to intra-African trade. ARSO was also tasked with operating a certification scheme with a view to certifying the quality of and promoting African products.

In line with its responsibility as an African standardization body, ARSO’s priorities have always been to respond to the continent’s strategic political and socio-economic integration agenda. Accordingly, ARSO harmonized standards reflecting the African priorities as follows:

<table>
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<th>Product Group</th>
<th>Number of standards</th>
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<tr>
<td>Cereals and Legumes / Pulses</td>
<td>28</td>
</tr>
<tr>
<td>Sugar and honey</td>
<td>2</td>
</tr>
<tr>
<td>Fruits and Vegetables</td>
<td>39</td>
</tr>
<tr>
<td>Oilseeds, animal oils and fats, related products</td>
<td>32</td>
</tr>
<tr>
<td>Fisheries and Meat</td>
<td>6</td>
</tr>
<tr>
<td>Coffee, cocoa and tea</td>
<td>23</td>
</tr>
<tr>
<td>Tobacco</td>
<td>6</td>
</tr>
<tr>
<td>Food technology</td>
<td>15</td>
</tr>
<tr>
<td>Fertilizers and agrochemicals</td>
<td>27</td>
</tr>
<tr>
<td>Agriculture, farm implements and machinery</td>
<td>12</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>190</strong></td>
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It is clear from the list that ARSO made a deliberate effort to address the continental agriculture and food security agenda by harmonizing standards in priority sectors identified by the leaders of the continent. Despite the harmonization of these standards, there was a marked low uptake by Member States due in part to the varying orientations of the Member States with regard to their chosen paths of development, variability of approaches adopted by development partners who chose to convince technical people on adopting unstandardized transplanted technologies, weakening of institutional memory regarding the collective goal of continental agriculture and food self-sufficiency and other externalities working in detraction of the continental integration agenda.

5. **Renewing ARSO’s commitment to Africa’s food and nutrition security**

Following ARSO’s re-engineering in the years after 2000, there is a renewed focus on harmonizing standards which respond to the requirements of the various declarations, resolutions and decisions of the AU organs as well as the development programmes of the AU. The following are among the declarations, resolutions and decisions of the AU organs as well as the development programmes on which the harmonization of Agriculture and Food Standards are premised:

(i) **Articles 46 and 49 of the Treaty Establishing the African Economic Community (AEC) of 1991** (The Abuja Treaty (AUC, 1991) which constitute the broad basis for agriculture, food and nutrition security in Africa;
Cont... Agriculture and food security in Africa: Contribution of Standardization

(ii) **Assembly/AU/Decl.7 (II): the Maputo Declaration on Agriculture and Food Security** (AUC, 2003) endorsing the establishment of the Comprehensive Africa Agriculture Development Programme (CAADP), its flagship projects and evolving action plans for agricultural development, at the national, regional and continental levels; and consequently agreeing to adopt sound policies for agricultural and rural development, and committing Member States to allocating at least 10% of national budgetary resources for their implementation within five years;

(iii) **Ex/Assembly/AU/Decl. 1 (II): the Sirte Declaration on Agriculture and Water** (AUC, 2004), geared toward addressing the challenges in implementing integrated and sustainable development on agriculture and water in Africa;

(iv) **FS/Decl (I): Declaration of the Abuja Food Security Summit** (AUC, 2006b);

(v) **FS/Res (I): Resolution of the Abuja Food Security Summit** (AUC, 2006c);

(vi) **Abuja Declaration on Fertilizer for an African Green Revolution**: Africa Fertilizer Summit: African Union Special Summit of the Heads of State and Government (AUC, 2006a). The declaration notes the importance of developing quality control standards for both organic and inorganic fertilizers. The declaration advocates for the increase in the use of fertilizers from 8 kilograms per hectare in 2006 to at least 50 kilograms per hectare by 2015.

(vii) **AU/MIN/CAMI/3(XVIII): Strategy for the Implementation of the Plan of Action for the Accelerated Industrial Development of Africa (AIDA)**: Eighteenth Ordinary Session of the Conference of African Ministers of Industry (CAMI) (AUC, 2008b). Under AIDA, the CAMI Bureau and UNIDO have identified agro-food processing as one of the priority sectors with good prospects for successful growth alongside other sectors such as: chemicals and pharmaceuticals, minerals, textiles/garments, leather/leather products, forestry, fisheries, and equipment/machinery and related services.

(viii) Assembly/AU/Decl.2 (XI): **Sharm El-Sheik Declaration on Responding to the Challenges of High Food Prices and Agriculture Development** by among other things committing to reduce by half the number of undernourished people in Africa by 2015, eradicate hunger and malnutrition in Africa and take all necessary measures to increase agricultural production and ensure food security in Africa, in particular through the implementation of AU-NEPAD CAADP and the 2003 AU Maputo Declaration (AUC, 2008a).

(vii) Assembly/AU/Decl.2(XIII) Rev.1: **Sirte Declaration on Investing in Agriculture for Economic Growth and Food Security** where the Member States undertook to support relevant policy and institutional reforms that will stimulate and facilitate accelerated expansion of agriculture related market opportunities by modernizing domestic and regional trading systems, removing obstacles to trans-border trades, and increasing access by smallholder farmers to inputs and the necessary commercial infrastructure and technical skills to fully integrate them into the growing value chains (AUC, 2009).

(ix) **Assembly/AU/Decl.2 (2010): Abuja Declaration on Development of Agribusiness and Agro-industries in Africa**: High-level Conference on Agribusiness and Agro-industries (A3DI) which, among other things, undertakes to promote the building and harmonization of standards as a quality tool in the production, processing, storage and marketing of agro-products and urges Member States to promote and support the African Regional Standards Organization (ARSO) in the harmonization of industrial standards, grades and metrology for the promotion of regional and international trade (AUC, 2010).

(x) Joint Declaration of Ministers of Agriculture and Ministers of Trade on endorsing the Boosting of Intra-Africa Trade as a Key to Agricultural Transformation and ensuring Food and Nutrition Security (AUC, 2012).
6. The state of hunger and malnutrition in Africa

The Framework for African Food Security (FAFS) under Pillar III of CAADP reports that while the rates of hunger and malnutrition have fallen significantly in most parts of the world, those in Africa have shown little improvement, with over one-third (about 300 million) suffering from chronic hunger (NEPAD, 2009).

While the above facts call for urgent action, NEPAD through CAADP provides the Africa vision for agriculture that the continent should, by 2015:

(i) Attain food security (in terms of both availability and affordability and ensuring access of the poor to adequate food and nutrition);
(ii) Improve the productivity of agriculture to attain an average annual growth rate of 6 percent, with particular attention to small-scale farmers, especially focusing on women;
(iii) Have dynamic agricultural markets between nations and regions;
(iv) Have integrated farmers into the market economy, including better access to markets, with Africa to become a net exporter of agricultural products;
(v) Achieve the more equitable distribution of wealth;
(vi) Be a strategic player in agricultural science and technology development; and
(vii) Practice environmentally sound production methods and have a culture of sustainable management of the natural resource base (including biological resources for food and agriculture) to avoid their degradation.(NEPAD, 2003)

CAADP aims to achieve the above strategies using four mutually reinforcing pillars:

(i) Pillar I: Extending the area under sustainable land management and reliable water control systems;
(ii) Pillar II: Improving rural infrastructure and trade-related capacities for market access;
(iii) Pillar III: Increasing food supply, reducing hunger and improving responses to food emergency crises; and
(iv) Pillar IV: Improving agriculture research, technology dissemination and adoption.

Pillar III of CAADP holistically addresses the food and nutrition security by incorporating options for resolving micronutrient deficiency in Africa through micronutrient supplementation and increased fortification of staple foods with micronutrients (NEPAD, 2009). The debilitating effects of micronutrient deficiency include: low immune system function, learning and cognitive development disabilities, mental retardation, stunted growth, poor general health (such as anaemia, goitre, and eye problems), low work capacity due to high rates of illness and disability and tragic loss of human potential, blindness and reproductive performance and premature births (Bain et al., 2013; WHO, 1998; FAO & CABI, 2011; and Kawarazuka, 2010). For children, the effects can be particularly devastating. Without adequate nutrients, a child’s bone and muscle growth may not be adequate to gain in height/length, immune system performance may be undermined making the child more susceptible to disease, and brain development may be particularly affected (WFP, 2012). Furthermore, undernourished children are more likely to get sick, have trouble concentrating in school, and may often earn less as adults – in effect, serving a life sentence of poverty and misery in an inextricable vicious cycle (WFP, 2013). This dire situation in Africa is captured by Kofi Annan’s statement that Africa is the only continent where child malnutrition is getting worse, rather than better, accounting for about 50% of deaths of young children. Diets poor in crucial nutrients result in a weakened immune system and impaired capacity to recover from the effects of diseases, which are not normally life-threatening for well-nourished children; these diseases include diarrhoea, measles, respiratory infections and malaria (Hillocks, 2011).
ARSO’s role in the four pillars of CAADP is quite evident from the organizations mandate. There is added impetus for ARSO to offer standards-based solutions to the continent’s malnutrition problems by providing a platform to harmonize standards for food products which have the capacity to provide the requisite macronutrients as well as micronutrients. In addition to the possibility of harmonizing standards for food supplements, ARSO has proposed the harmonization of standards for fortified foods which form the common dietary intake of the continent’s population including salt, sugar, cooking fats and oils, wheat flour and milled maize products. ARSO also recognizes the importance and cost-effectiveness of the food-based approaches to combating micronutrient deficiencies in the continent, and for this reason has developed a business plan for the harmonization of standards for agriculture and food security aimed at comprehensively addressing the continents agenda for food and nutrition security.

7. Conclusion

As Africa’s premier standardization body, ARSO continues to focus on providing standards-based solutions to the continent’s challenges, development and integration aspirations. ARSO fully appreciates that standards will be useful in facilitating free movement of agricultural and food products from areas of surplus to areas of deficit and contribute to increasing the percentage of food products imported from within Africa from the current 5% (WB, 2012). The harmonized standards will remove trade barriers which are often justified on existing different standards ostensibly intended to safeguard national interests. The reality of free movement and trade can spur agricultural investments and bring into cultivation a substantive part of the 771 335 050 ha of cultivable land in Africa from the current 211 million ha (or 27%) (FAO, 2005). Increased trade facilitated by harmonized standards will make African farmers earn more rational incomes, keep them in the farming business and thus lead to sustainable food and nutrition security in Africa.
Challenges of Agriculture in Africa and the declaration of the year 2014 as the year of Agriculture and Food Security by the AU.
By Phillip Okungu, Documentation and Information Manager, ARSO

Background Information.
In Africa, the vast majority (up to 80%) of the population live in rural areas, and 70% of this rural population are dependent for a large part of their livelihood on food production through farming or livestock keeping; the majority of them are women. Agriculture provides 60% of all employment, and constitutes the backbone of most African economies – in most countries it is still the largest contributor to GNI, the biggest source of foreign exchange, and the main generator of savings and tax revenues (3 NEPAD, Comprehensive Africa Agriculture Development Programme (CAADP), November 2002, p. 9).

It is also the dominant provider of industrial raw materials. For very poor households, agricultural development not only is a defence against hunger but also acts as an income generation venture. (Isabelle, 2002).

These circumstances help to explain why agricultural development is such a powerful tool for economic development, and reducing poverty in Africa.

Challenges of Agriculture in the 21st Century.
Agriculture is increasingly following the manufacturing industries in the formation of more tightly aligned value or supply chains. The 21st Century Agriculture is likely to be characterized by: 1) adoption of manufacturing processes in production as well as processing, 2) a systems or food supply chain approach to production and distribution, 3) negotiated coordination replacing market coordination of the system, 4) a more important role for information, knowledge and other soft assets (in contrast to hard assets of machinery, equipment, facilities) in reducing cost and increasing responsiveness, and 5) increasing consolidation at all levels raising issues of market power and control.

On current projections, it is in Africa where some countries will fail to meet the international community’s targets to reduce poverty, hunger and disease – the Millennium Development Goals (MDGs) – by 2015. Indeed the World Bank estimates that, on current trends some countries in sub-Saharan Africa will meet them in 2147. (PELUM 2005 at www.africanvoices.org.uk). These presents challenges of poverty, hunger and malnutrition. Currently, close to 1 billion people suffer from hunger and food insecurity, which is defined as not having enough food to live a healthy life (FAO 2010). Although these numbers are staggering, the problem of poor access to nutri-
Challenges of Agriculture in Africa and the declaration of the year 2014 as the year of Agriculture and Food Security by the AU.

Typically, poor households subsist on monotonous staple-based diets and lack access to nutritious foods such as fruits, vegetables, animal-source foods (such as fish, meat, eggs, and dairy products), or wild foods of high nutrient content. Lack of diversity in the diet is strongly associated with inadequate intake and risks of deficiencies of essential micronutrients such as vitamin A, iron, and zinc (Ruel 2003; Arimond, Wiesmann, et al. 2010; Arimond, Hawkes, et al. 2010). Micronutrient deficiencies have far-reaching health and nutrition consequences in both the short and the long term (UNICEF and Micronutrient Initiative 2004; Black et al. 2008; Micronutrient Initiative 2009). These deficiencies affect the survival, health, development, and well-being of those afflicted. Children and women of reproductive age are especially vulnerable because they have particularly high micronutrient requirements (Black et al. 2008; Micronutrient Initiative 2009; UNSCN 2010a). Poor diet quality is a problem that affects not only the poorest of the poor, but also marginal populations in developing, transition, and developed countries. These populations rely on cheap sources of energy and consume excessive amounts of energy-dense, nutrient-poor foods, a situation that leads to increased risk of overweight, obesity, and related chronic diseases (see, for example, Eckhardt et al. 2008; Tussing-Humphreys et al. 2009).

Low investment in research and poor dissemination of research findings to the farmer, adverse market conditions and poor access to markets, climate change (unpredictable pattern of rainfalls and drought) and disease are major problems for farmers in Africa. (Eckhardt et al. 2008).

Value chains and the constrains in African Agricultural Trade

In terms of Trade, despite the persistently strong agricultural component of its external trade, sub-Saharan Africa's presence in world agricultural markets has tended to lose significance since the early 1970s. The emergence of global value chains has reshaped the structure of international trade. Producing for consumption in the home or for local markets remains important in many places, but the more market-oriented nature of agricultural policies today means that more farmers are net food buyers and are affected by commercial markets. Agricultural markets thus play a more important role in determining food availability and access a shift reinforced by the role of urbanization in increasing the ratio of market consumers to market producers (Hawkes and Ruel 2006; von Braun and Diaz-Bonilla 2008).

Low level marketability of agro-products arise ranging from selection of seed variety to farming methods/management, lack of advanced preservation and storage equipment's/technology, low level of processing and packaging skills. These factors are
Cont... Challenges of Agriculture in Africa and the declaration of the year 2014 as the year of Agriculture and Food Security by the AU.

important requirements for trade in agriculture and food products as they address perishability problem and ensure quality. SMEs and many African farmers are excluded from new production and trade patterns due to many structural impediments and supply-side obstacles they are facing in achieving production efficiency and competitiveness (Corinna Hawkes and Marie T. Ruel 2011). Raising the output of small and marginal farmers is therefore a necessary condition for eradicating rural poverty in Africa. It also has a larger multiplier effect in the rural economy than increasing productivity in commercial farming (CAADP p. 51).

Transforming Africa's Agriculture : harnessing opportunities for inclusive growth and sustainable development”. 2014 Year of Agriculture and Food Security

In July 2012, The 22nd AU Summit of the African Union (AU) Assembly of Heads of State and Government, declared the year 2014 to be the Year of Agriculture and Food Security in Africa, marking the 10th Anniversary of the adoption of the Comprehensive Africa Agriculture Development Programme (CAADP). The 10th Anniversary of CAADP is an important milestone and an opportunity to continue to prioritise agriculture and food security in policy and implementation to generate concrete results and impacts (http://pages.au.int/caadpyoa). The theme for the year is "Transforming Africa's Agriculture : harnessing opportunities for inclusive growth and sustainable development".

The Year of Agriculture intends to consolidate active commitments toward new priorities, strategies and targets for achieving results and impacts, with special focus on sustained, all Africa agriculture-led growth, propelled by stronger, private sector investment and public-private partnerships. The Year of Agriculture and Food Security will be commemorated across Africa, in Member States, Regional Economic Communities, Continental organisations, and of course at the AU Headquarters. It will be a year that gives opportunities to communities, state and non-state actors to interact, express their voices on what works and chart the focus and targets for the next decade. This engagement and dialogue will contribute towards setting the agenda for sustaining the CAADP momentum, which forms the basis for African leaders to recommit themselves to realizing the original vision set out in 2003. Sustaining the CAADP momentum.

Targeted activities will serve to facilitate Broad-based and inclusive consultations, and dialogue among all relevant stakeholders (parliamentarians, women groups, youth groups, farmer organisations, CSOs, private sector, etc.) on CAADP and African Agriculture and food and nutrition security; Mutual learning and experience sharing among countries with a view to strengthening and deepening country engagements and ownership to advance the agriculture and food and nutrition security agenda; High level political dialogue on collective actions and seek demonstrable commitment by the Heads of State and Government for a sustained support and engagement on agriculture through the CAADP framework; and Dialogue with Africa’s strategic partners – for demonstrable commitment to programme alignment, harmonization, coordination and mutual accountability for results.
Enhanced level of awareness and engagement among a broad spectrum of African citizenry (legislators, farmers organisations, CSOs, women and youth groups, private sector, etc.);
Active platforms and improved coordination of multi-sectoral actions at country, regional and continental levels;
Renewed demonstrable political commitment by African leaders through adoption of an AU Declaration to sustain the CAADP momentum to deliver on a set of measurable indicators and targets; and Renewed demonstrable commitment by Africa’s partners to alignment, harmonization and coordination of programmes and support, and mutual accountability for results.

The Contributions of ARSO Harmonised African Standards
Under ARSO THC 02, Agriculture and Food Products ARSO targets to help African countries revolutionise agriculture and adopt new technologies and move away from reliance on food imports, to securing their food supplies through rapid, sustainable increases in food production and establish mechanisms to ensure that breadbasket countries are able to send food surpluses to deficit areas in order to enable Africa to feed itself and allow more food aid to be purchased within Africa while at the same time maintaining focus on smallholder farmers, who form the overwhelming majority of the farming population. The ARSO standards address issues of handling, packaging, labeling, storage and processing and intrinsically fulfil many of the broader requirements for producers to participate in global supply chains.

Whoever controls your food production controls you.
1. Introduction
The Lagos Plan of Action for the Economic Development of Africa (LPA) had identified the need for improved seeds, fertilisers, pesticides and other agrochemicals suitable for African conditions as being key drivers for the continent to achieve food and nutrition security (OAU, 1980). The LPA also recognized that Africa’s agriculture suffered from low production and productivity, and rudimentary agricultural techniques which led to insufficient agricultural growth, especially of food production, in the face of the rapid population growth, resulting in serious food shortages and malnutrition in the continent.
To underscore the importance of fertilizers for Africa’s agricultural production and productivity, African leaders approved the Convention for the Establishment of the African Centre for Fertilizer Development on 1st July 1985 with the headquarters designated as Harare, Zimbabwe (OAU, 1985). Recognizing the strategic importance of fertilizer in achieving the African Green Revolution to end hunger, the African Union Member States in 2006 resolved to increase the level of use of fertilizer from the current average of 8 kilograms per hectare to an average of at least 50 kilograms per hectare by 2015 through the Abuja Declaration on Fertilizer for an African Green Revolution (AUC, 2006).

With regard to farm implements and machinery, the LPA urged for urgent action to intensify the use of improved hand tools and draught animals and promotion of mechanized farming.
ARSO’s contribution in this regard was the harmonization of 27 standards for fertilizers and agrochemicals as well as 12 standards for agricultural processes, farm implements and machinery.

2. Fertilizers and agrochemicals
The bulk of the standards for fertilizers were aimed at testing the levels of the crucial components such as nitrate nitrogen content, ammoniacal nitrogen content, water-soluble phosphates, total nitrogen content, potassium content, phosphorous content, bulk density as well as classification of fertilizers and soil conditioners. A number of standards covered the sampling techniques for purposes of conformity assessment as well as requirements for labelling. Two product standards were harmonized for the specifications of compound fertilizers and ammonium sulphate fertilizers.

The standard on pesticides and other agrochemicals was adopted from ISO to provide common names for certain pest control chemicals and plant growth regulators of international importance. Such compounds include those grouped as acaricide, bactericide, fungicide, herbicide, insecticide, molluscicide, nematicide, plant growth regulator, rodenticide and avicide.

3. Agriculture, farm implements and machinery
The various standards harmonized in this respect include the following:

3.1 Hoes and wooden handles for hoes
ARS 547, the harmonized standard for hoes specifies the requirements for forged hoes of both plain and forked types used for digging and weeding. The standard provides the size designations of the hoes including the relevant dimension rations. Both forked and plain hoes can be designed with a hammer head or without it. The standard specifies that the eye through which the handle will be fixed should be tapered and symmetrical and of the right depth in order to make afford hoe to be affixed, comfortable and efficient to use.

The standard requires plains hoes to be designated according to the shape of the eye and hammer head and the nominal mass. In addition, the fork hoes shall be designated by the size number and type of tines.
The material used for making both the plain and fork hoes shall be from carbon steel complying with the following composition by weight: carbon 0.550 % - 0.650 %; manganese 0.600 % - 0.900 %; sulphur 0.040 %; silicon 0.25 % and phosphorus 0.0050 %.

The blade of plain hoes and tines of fork hoes shall undergo suitable heat treatment so as to have Rockwell Hardness (HRC) values between 40HRC to 53HRC or the equivalent in other scales.

Hoes shall be forged, shaped and hardened. Forging shall be even and all fins and flashes produced during forging shall be dressed to a smooth finish. Hoes shall be suitably preserved against corrosion during storage.

The standard provides methods of test for the strength of both the plain and forked hoes and their acceptance criteria. Finally, the standard provides guidance on the packing and marking of hoes which also includes clear indication on the manufacturer’s name, designated mass and country of origin.

ARS 549 gives the requirements for wooden handles for hoes including the hardness, strength, moisture content, length and diameter of the handle. The intention of the standard is to ensure that the hoes specified by ARS 547 can be affixed to the handle in a manner that ensures that ergonomic perspectives are taken into account to avoid risks associated with excessive back bending and wrist bending.

The fully assembled hoe using the specifications of the ARS 547 for the hoes and ARS 549 for the wooden handles represents an ergonomic improvement of the farm hoe which is widely used in Africa. As a result of the improvement, the hoe would be easier to use and reduce risk factors, such as wrist bending, body bending and awkward posture which may causes serious injuries such as carpal tunnel syndrome, musculoskeletal disorder and lower back injuries. The new design would also reduce energy expenditure and increase the efficiency of performing farm work (Jiang, 2013).

The harmonized standards are intended to cover the improved plain and forked hoes and their handles illustrated in Figures 1 to 4. Figures 5 to 7 represent the unimproved hand held farm tools to be replaced by the improved tools.
Cont... Standardization of farm inputs, implements and machinery to support agriculture and food security in Africa

Figure 5: Examples of unimproved farm hoes (Source: Leendertz, 2010; Marcin, 2009)

Figure 6: Examples of unimproved farm hoes (IFAD, FAO, & FARMESA, 1998)

Figure 7: Fake (substandard) imported hoes reported in Uganda (IFAD et al., 1998)
3.2 Picks and beater picks and their wooden handles

The African Standard ARS 548 was harmonized to specify requirements for picks and beater picks for general use. The beater pick with a chisel and fish tail end is also referred to as a mattock and is commonly used for opening up new land, the cutting edge being used to cut roots and the digging edge for primary tillage on very hard ground. The chisel and point end pick usually referred to as a pickaxe is primarily used for digging and building works. The picks covered by this standard include (a) chisel and point ends and (b) double point ends. The beater picks include (a) point and fish tail ends and (b) point and tee ends. These are illustrated in Figures 8 and 9. The standard requires the carbon steel used to comply with the following composition: carbon 0.40-0.65 %; manganese 0.50-0.80 %; silicon 0.30 % max; phosphorus 0.06 % max; and sulphur 0.06 % max. The hardness on the Rockwell Hardness (HRC) scale shall be between 40HRC to 55HRC or the equivalent in other scales.

The standard provides a drop test and striking test for purposes of establishing the conformity of the picks and beater picks.

Figure 8: Picks and beater picks

Figure 9: Picks and beater picks affixed to wooden handles
3.3 Machetes

Machetes are used to cut down grasses, trees, bushes etc., before tilling. Wearing out and breaking of the machete is expected any time when it is in use. The African standard was harmonized to address this problem among others by specifying the materials which would minimize the breaking characteristics of machetes.

The standard requires the carbon steel used to comply with the following composition: carbon 0.40 \(-\) 0.65 \%; manganese 0.50 \(-\) 0.90 \%; silicon 0.35 \% max; phosphorus 0.06 \% max; and sulphur 0.06 \% max. The hardness on the Rockwell Hardness (HRC) scale shall be between 38HRC to 46HRC or the equivalent in other scales.

The standard specifies that a machete shall be considered complete only when fitted with handles. The handles shall be made from suitable hard wood, well-seasoned to not more than 20 \% moisture content, or other comparable materials, and free from any defects rendering the handle unreliable.

In addition to the hardness test, machetes shall be subjected to a bend and tensile test. A bend test shall constitute a forward and backward cycle after which the machete under test shall not show any permanent deformation, rupture or any sign of failure. With regard to the tensile strength, the machete shall demonstrate an ultimate strength of not less than 1200 MPa \((1.2\times10^9 \text{ N/m}^2)\).

Machetes shall be legibly, clearly and permanently stamped with the manufacturer’s name or trade mark as near as possible to the handle and the nominal length of the blade in millimeters. Machetes shall be suitably protected from corrosion during storage.

3.4 Shovels

This standard specifies the general requirements for carbon steel shovels used for building works, farming, earth moving, household and for other similar purposes. This group of implements includes spades which are primarily...
used as digging implements. Most shovels are used to move loose or unconsolidated materials over short distances.

The standard requires the carbon steel used to comply with the following composition: carbon 0.38-0.65%; manganese 0.50-0.80%; silicon 0.15-0.35% max; phosphorus 0.06% max; and sulphur 0.06% max. The edges of the blades of carbon steel shovels shall be hardened to produce a hardness reading within the range of 26 to 44 RC: 343 to 426 HV or 326 to 405 HB.

Three basic types of shovels are covered in the standard as illustrated in Figure 11.
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3.5 Animal-drawn mouldboard plough — Fixed type

This African Standard specifies requirements for animal-drawn long-beam and short-beam mouldboard ploughs of fixed type, used for tilling land. The standard was harmonized to provide technical guidelines for the animal drawn plough which is an affordable farm implement for smallholder farmers in Africa’s rural communities. As the plough does not feature rotating parts, its maintenance is considered to be low and fitting the target population.

The mouldboard plough is used for primary and secondary tillage. The plough is used for a number of different field operations that include ploughing, row-marking (for crop establishment), ridging and weeding. During ploughing, the plough cuts, breaks, loosens, inverts the soil and buries weeds, crop residues and manure.

The size of the plough shall be measured as the shortest distance between the outermost edge point of the share wing and a straight edge placed along the landslide covering the entire length of the plough bottom. The standard designates four nominal sizes, on the assumption that plough size is proportional with the weight of the plough, namely: (i) Extra light – up to 100 mm; (ii) Light – over 100 mm but below 150 mm; (iii) Medium – 150 mm and above, but below 200 mm; and (iv) Heavy – 200 mm and above.

The standard illustrates the various parts of the mouldboard plough and indicates their strengths and the type of materials they are made of.

![Figure 13: Illustration of parts of the mouldboard plough](image)

Figure 13: Illustration of parts of the mouldboard plough

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![Figure 14: Mouldboard ox plough on sale in Zambia (Saro Agro, 2011)](image)

Figure 14: Mouldboard ox plough on sale in Zambia (Saro Agro, 2011)

![Figure 15: Example of animal drawn mouldboard plough covered by ARS 553](image)

Figure 15: Example of animal drawn mouldboard plough covered by ARS 553
The harmonized African standard requires the plough to be permanently marked on the beam with (i) the year of manufacture; (ii) the manufacturer’s name and/or trade mark; and (iii) the size of the plough.

3.6 Specification for knapsack sprayers

This African standard specifies the requirements for construction and performance of lever-operated knapsack sprayer (LOKS) in which hydraulic nozzles are used for the application of liquid chemicals in agriculture. It contains requirements on tank, pump and lever, filter assembly, filling hole, hose and lance, cut-off valve assembly, nozzle assembly, strap, connectors and fasteners, pressure regulator, pressure gauge, and fluid level indicator. It also includes requirements on warranty for construction and durability; maintenance and operation; and packaging, marking and labelling.

This standard also specifies the methods of test for lever-operated knapsack sprayer. The verification and test of knapsack sprayers shall consist of verification of specifications, laboratory test (i.e. tests on volumetric efficiency; leak; tilt and inversion; nozzle performance; cut-off valve; pressure chamber fatigue; continuous running; strap; and drop) and actual field test (i.e. tests on rate of work; ease of operation; and operator’s safety).

The standard provides an illustration with the description of the various parts of the knapsack sprayer as indicated in Figure 16 below. For purposes of worker safety, the standard specifies that when fully loaded with water, the knapsack sprayer shall not exceed 25 kg.
3.7 Wheelbarrows

This African Standard gives specifications for steel wheelbarrows of single wheel construction for use in engineering industry and agriculture (see Figure 18). The standard specifies the dimensions of the various parts of the wheelbarrow and the right materials to be used in their construction.

The nominal sizes of wheelbarrows shall be either (a) small size with capacity ranging from 70 to 85 litres of filled water or (b) large size with capacity over 85 litres.

![Figure 18: Example of wheelbarrow covered by ARS 554](image-url)

The main frame shall be constructed from tubing suitably bent to form a support for the wheel and tray. The legs shall be formed either as part of the main frame or of separate lengths of tubing bent to form a bow and welded to the main frame. No frame member which can be formed from one length shall be jointed and not more than two members of the frame shall intersect at any welded joint.

The main frame shall have at least two reinforcing bars or tubes that span the tubes of the main frame to form supports for the tray. The reinforcing bars shall have at least four bolt holes for securing the tray to the frame. Wearing strips shall be welded to the underside of each leg and if specified by the purchaser, to the front of the nose of the main frame.

Each tray shall be constructed from a single sheet of steel and galvanized if so required by the purchaser. The tray shall be formed by cutting and folding, the joints being seam welded, or alternatively it may be a solid drawn pressing. The top edge of the tray shall be reinforced around the full perimeter either by: (a) welding a mild steel band to the outside of the top edge of the tray; or (b) rolling the rim of the tray over a mild steel rod to form a bend. The inside of the tray shall be reasonably smooth and free from projections. The tray shall be attached to the main frame by at least four bolts.

The wheels shall be of three types: Type A wheel shall be of welded construction, mild steel sections being used throughout. The rim shall be attached to a tubular hub by six equi-spaced spokes and mounted with the longer side of the section parallel to the axis of the hub. Types B and C wheels size and profile contour of the rim of disc...
wheels shall in each case match that of the tyre specified. The wheel shall be of such construction as to make for easy fitting of the tyre. If tyres fitted with inner tubes are specified, a hole of adequate size and having smooth edges shall be provided in the rim to house the inner tube valve stem.

The standard requires the wheelbarrows to undergo capacity testing and proof testing. For marketing purposes, the wheelbarrows shall be marked so as to indicate the size, country of origin and any other market requirements.

3.8 Agricultural discs: Ploughing, sowing and planting

The two standards provide requirements for agricultural discs used as working parts of tractor ploughs and harrows for agricultural tillage. The main purpose of this standard is to ensure interchangeability for a minimum number of types and sizes of discs to meet a wide range of conditions of work and to assist local disc designers and manufacturers.

The standard classifies discs as follows:

a) Type A — Flat discs
b) Type B — Concave discs which may vary as follows:
   i. Discs with square centre hole
   ii. Discs with round centre hole
   iii. Discs with several fixing holes with or without centre hole
c) Type C — Concave discs with a flat area around the centre hole square

The standards specify the use of carbon steel with a minimum carbon content of 0.7% as well as silicon manganese steel and alloy steel.

Plain carbon steel discs shall be hardened within the range of 35.7 to 46.7 HRC. Silicon manganese and alloy steel shall have a minimum hardness as indicated in this clause and maximum hardness appropriate to the steel used without diminishing resistance to breakage.

Disc shall be legibly marked with the (a) manufacturer’s name or trade mark; and (ii) the type of disc.

Figure 19: Range of agricultural discs covered by ARS 545
Cont... Standardization of farm inputs, implements and machinery to support agriculture and food security in Africa

3.9 Organic products — Code of practice

Organic agriculture is especially suited to African conditions where minimum agrochemicals and veterinary drugs are used in the course of crop and animal production.

The details of this type of agriculture are covered under a different article in this newsletter.
Dry beans (Phaseolus vulgaris L.) are the most important food legumes for direct consumption in Africa. It provides protein, complex carbohydrates, and valuable micronutrients for more than 300 million people in the tropics. In many areas, common bean is the second most important source of calories after maize. Over 200 million people in sub-Saharan Africa depend on the crop as a primary staple.

Dry beans have been characterized as a nearly perfect food because of their high protein, fibre, probiotic, vitamin B, and diverse micronutrient content. Dry beans are used throughout the world representing 50% of the grain legumes consumed as a human food source. In Africa it is used as a meat substitute due to the high protein and health benefits it has in comparison to meat.

Consumption of dry beans has also increased over the past few years due to the potential link of bean rich diets to lower risks of multiple diseases.

In addition, millions of small-scale farmers in Africa rely on the production and sale of beans as an important source of household income.

**Origin and use**

The common bean appeared about 5,500 to 7,000 years ago in central Mexico where wild populations of it abound. [www.cgiar.org](http://www.cgiar.org)

Common bean is grown for its green leaves, green pods, and immature and/or dry seeds. The dry seeds are the ultimate economic part of the bean plant. They are appreciated throughout the developing world because of their long storage life, good nutritional properties and ease of storage and preparation. Annual consumption can reach 66 kg per person.

Dry beans are mostly eaten whole in cooked dishes. Some manufactured products use bean flour. Dry leaves, threshed pods, and stalks are fed to animals and used as fuel for cooking, especially in Africa. Dry beans are also...
distributed in a variety of forms, such as whole unprocessed seeds, as part of mixes, canned products, or as a wheat flour substitute depending on the bean variety.

The long cooking time and its associated fuel costs can cause problems for many consumers. Undesirable changes in the product during post-harvest storage can damage the grain and affect its acceptability. In addition, anti-nutrients such as protease inhibitors and lectins can block the digestion process. Factors promoting flatulence are another undesirable effect. Breeding research aims to minimize these factors.

**Production and Harvesting**

Dry beans are harvested mature and dry. The common bean is grown for its green leaves, green pods, and immature and/or dry seeds. The dry seeds of *P. vulgaris* are the ultimate economic part of the bean plant. They are appreciated throughout the developing world because they have a long storage life, good nutritional properties and can be easily stored and prepared for eating.

The Image below displays Dry beans that are of good quality meeting the minimum requirements provided in ARSO Standard - ARS 864-2013.

The dried mature grains of *Phaseolus vulgaris* Linn are well-filled, clean, wholesome, uniform in size, and shape; free from substances which render them unfit for human or animal consumption or processing into or utilisation thereof as food or feed; free from abnormal flavours, musty, sour or other undesirable odour, obnoxious smell and discolouration; and finally free from micro-organisms and substances originating from micro-organisms, fungi or other poisonous or deleterious substances in amounts that may constitute a hazard to human health.

Globally, about 12 million metric tons of common beans are produced annually. Latin America is the largest producer, with some 5.5 million metric tons, with Brazil and Mexico being by far the major producers. Africa is the second most important region, producing about 2.5 million metric tons, with Uganda, Kenya, Rwanda, Burundi, Tanzania, and Congo playing major roles.
Cont... Standardisation of Dry Beans

**Storage and Packaging**
Dry beans should be packed in suitable packages which are clean, sound, and free from insect, fungal infestation and the packing material shall be of food grade quality and shall be securely closed and sealed.
Dry beans should be packed in containers which will safeguard the hygienic, nutritional, technological and organoleptic qualities of the products.
Like most stored foods, beans are best stored in the absence of oxygen and light.
The pack should be labeled according to the elements above but the design or location might vary with the design developed by the Producer or packer.

**Conclusion**
Beans are a staple food for Africans and the Quality requirements should be met in order not to endanger the health of the Consumers, increase cross border trade among countries from the use of African harmonized standards provided by ARSO. In this case it can be achieved by using and utilizing the ARSO Standard on Beans – ARSO 846-2013.
Introduction

Maize is a major food security crop in Africa, and most important a staple food crop - feeding more than 300 million of the continent and it is one of the four grains that are particularly important in Africa and international food market.

The global production of maize averaged 869 million tons in 2010-2012 and Africa produces 51.025 million tons, whereas the World production of white maize is currently estimated at around 65-70 million tons, representing 12-13 % of the annual world output of all maize. In Africa it is about one-third of the global white maize crop. The largest African producer is Nigeria with nearly 8 million tons, followed by South Africa. Others include Kenya, Malawi, Tanzania, Zambia and Zimbabwe, countries in which white maize represents between two-thirds and 90 percent of total cereals production. Other important producers of the region include Egypt and Ethiopia where white maize constitutes from 15-35 percent of total cereals production. Africa imports 28% of the required maize from countries outside the continent. Most maize production in Africa is rain fed. Irregular rainfall can often triggers famines in vulnerable regions of the continent.

Introduced by the Portuguese into Africa in the 16th century, maize has become Africa's most important staple food crop; it can be used to prepare various African dishes such as: mealie pap in South Africa, sadza, nshima, kenkey, ogi and ugali in other parts of Africa. Maize consumption has shown constant increases over the past 10 years, as strong economic growth in the Africa, increases in direct demand for maize.

Africa’s food productivity is low, despite Africa having approximately 78 million acres (31 Million hectares) or about 20% of the world’s hectares currently being planted to maize. Average maize yields in Africa are below 2 tons per hectare –significantly below the U.S. (about 10 tons per hectare) and South Africa averages (4.2 tons per hectare)..

Maize is rich in vitamins A, C and E, essential minerals, and contains 9% protein. It is also rich in dietary fiber and carbohydrates which are a good source of energy. Maize is sometimes used as the starch source for beer. The crop feeds more than 300 million of the Africa’s most vulnerable people. A heavy reliance on maize in the diet, however, can lead to malnutrition and vitamin deficiency diseases such as night blindness and kwashiorkor.

Maize is a tropical plant, susceptible to frost in all stages of its growth; but being an annual; it has the ability to grow in diverse climates. The most favourable conditions are long humid summers, hot days and warm nights, comparatively heavy, intermittent rains, with abundance of clear, sunshiny weather. White maize is biologically and genetically very similar to yellow maize, although there is a difference in appearance due to the absence of carotin oil pigments in the kernel which otherwise cause the yellow colour of the grain. Production conditions and cultivation methods are largely identical.

Figure 1: Maize Variety (Source: climate-connections.org)
Issues of Maize challenges in Africa
Africa imports 28% of the required maize from countries outside the continent. Most maize production in Africa is rain fed. Irregular rainfall can often triggers famines in vulnerable regions of the continent. All the same, Maize has had its share of problems in Africa. Among the major factors affecting yields in Africa are the Climate change, declining soil fertility. pest and disease problems, Underdeveloped markets and low marketing prices, low investment in research and extension worsen maize production and trade barriers including variance in sanitary and phytosanitary SPS and TBTs across borders of trading countries.

Standards being part of the underlying factor that affects maize production, which explains the difficulty in cross border trade in Africa, ARSO unveils ARS 461 and ARS 466, which focuses on Maize Grains and Milled maize products as introduced below harmonized to facilitate intra African trade.

ARSO-ARS 461- standard on Maize Grains (Corn)
This standard, ARS 461 serves the purpose by specifying the requirements and methods of sampling and test for maize grains (corn) of varieties grown from common maize grains, intended for human consumption. There are about 50 species exist and consist of different colors, textures and grain shapes and sizes but the most common types are White, yellow and red.
As mentioned earlier, maize has tremendous nutritious value to the body of human beings. In this standard, some of the harmonised aspects include: the issues of checking moisture content in grain, quality, type of the grains, infection by disease like aflatoxin, hygiene, labelling among others.
As a consumer when purchasing the maize corn, it should be clean and per the quality and requirements you want. This entails the right variety, grade, packaging labelling and all the other aspects that matter in regard to standards. Hygiene of maize should be observed while it is being produced prepared and handled. Unhygienic maize is unsafe for human consumption.

Maize Safety
As a producer or consumer one should ensure the package is clean, free from insect, fungal infestation and the packing material shall be of food grade quality and be securely closed and sealed. The need for the plant protec-
tion authority to certify, through a simplified form, that the product is fit for cross-border and international trade without carrying plant disease vectors.

In maize grading, one should ensure the maize is either: Grade 1, Grade 2 or Grade 3. When talking of Grade 1, it is fine and more expensive compared to the others, thus as a producer one should ensure grading is done right and consumers get quality and value as per the money they part with. Also as a consumer one should only purchase the maize product that is well labeled as per the ARS 461 standard. This means consumers should look for: product name, name of producer, the grade, net weight, packing date, and code number etc. to ensure they buy Maize from credible and authorized producers. On the other hand, the producers have a benefit to create a sense of trust with their customers by proper labeling. The adoption and implementation of this standard is mainly aimed at promoting fair trade and enhance transparency among the traders for increased trade in staple foods.

ARSO ARS 466- Standard on Milled maize products
Milled Maize is a byproduct of processed maize grain. Milled maize products are classified into:
Whole maize meal-product obtained by grinding clean whole maize kernel by the use of mill or other grinding methods excluding roller milling.
Granulated maize meal- the product obtained by roller milling and sifting of shelled clean maize.
Sifted maize meal- the product obtained by roller milling and sifting shelled clear maize.
Maize Processing
The way in which maize is processed and consumed varies greatly from country to country maize flour and maize meal being two of the most popular products. For maize meal, the whole grain is ground into a granulated meal with a range of particle sizes from coarse to fine, while maize flour is obtained from milling the endosperm of the maize grain after the germ and outer layers are removed. These products have replaced whole maize as important...
components in the diet in many parts of Africa. As with all cereals, most micronutrients are concentrated in the outer layers of the grain; thus removing these layers in the milling process results in the loss of most vitamins and minerals. These losses, however, can be replaced through enrichment or fortification without affecting the quality or acceptability of foods made from maize flour or maize meal. Meal is a Product obtained by grinding clean whole maize seeds.

High moisture content

When the maize has a moisture content of 10 to 13 percent it is stable against microbial contamination. If the moisture content is over 12 percent it is easily attacked by moulds and yeast. Maize meal shall be of natural colour conforming to the colour of maize from which it was prepared.

Cleaned maize the shelled maize that shall have been subjected to a cleaning process for the removal of foreign and objectionable matter originally present.

Maize flour product obtained by removing the germ and bran followed by grinding, clean maize seeds using roller mills or other methods and sifting the resulting product to suitable degree of fineness.

Foreign matter all organic and inorganic material (such as plant parts, sand, soil, glass, filth) other than maize.

In conclusion by utilizing ARSO Standards on Maize, it is evident that maize products will be available in our continent. This will have tremendous benefit to mention but a few: an available market for the maize product and hence increase domestic, regional and international trade and prevent technical barriers to maize trade by establishing a common trading language for buyers and sellers of maize products. If this is done it will reduce the losses incurred by traders when their maize products are rejected at various borders since they don’t meet the required standards and will also give greater yields for farmers This also comes in handy for small-scale traders of maize since they will be involved and hence making maize farming a viable means of wealth creation; and the need to ensure a reliable production base of consistent and safe crops that meet customer requirements.
Rice is the seed of the monocot plants Oryza sativa (Asian rice) or Oryza glaberrima (African rice). As a cereal grain, it is the second most widely produced and consumed staple food after maize for a large part of the Africa’s population.

Rice is said to be a staple food to more than 50% of the world’s population. Rice is cultivated in water and it consumes over 50% of all fresh water resources. Rice is a staple food in many countries of Africa and constitutes a major part of the diet in many others. During the past three decades the crop has seen consistent increases in demand and its growing importance is evident in the strategic food security planning policies of many countries. With the exception of a few countries that have attained self-sufficiency in rice production, rice demand exceeds production and large quantities of rice are imported to meet demand at a huge cost in hard currency.

Rice originated at least 130 million years ago as wild grass. Cultivated rice, as we know it today, was first grown about 10,000 years ago in south-east Asia, probably in India.

On the African continent, rice is grown, from river deltas to mountainous regions and mainly uses rain fed systems. Predicted demands for rice remain strong. In Africa, where rice is the most rapidly growing as a food source, about 30 million tons more rice will be needed by 2035, representing an increase of 130% in rice consumption from 2010.

Rice from the field is harvested and threshed to produce what is most often called paddy rice or rough rice. Rice is usually harvested at about 18% to 24% moisture and must be dried down to about 12% to 14% so that it can be safely stored. In most African countries rice is somehow air-dried. The straw and rice can be dried in the field. It is sometimes stacked in a special manner to allow air to pass through it and cause rain run off quickly.

Rice is the most important grain with regard to human nutrition and caloric intake, providing more than one fifth of the calories consumed worldwide by humans.

Rice comes in a three main varieties;

**Rough rice**

Often referred to as "paddy rice", rough rice comes directly from the rice fields. The kernel of rice is still within the hull. Before taking on any other transformation, the outer hull or husk must be removed.

Africa produces an average of 14.6 million tonnes of rough rice per year on 7.3 million ha, equivalent to 2.6 and 4.6 percent of the world’s total production and rice area, respectively. West Africa has the greatest rice area in Africa (56.5 percent), i.e. about 3.7 million ha.

**Brown rice**

Brown rice is the whole, unpolished grain of rice. The light brown colour is a result of the presence of the bran layers, which are rich in minerals and vitamins, especially the B complex group. Brown rice is also a source of highly unsaturated oil, giving it an excellent reputation as a cholesterol fighter, and is the only rice that contains vitamin E.
Cont... Standardisation of Rice

Regular milled white rice
Regular milled white rice has had the hull, bran layers and germ removed through milling. It is sometimes called "polished white rice." Milled rice is obtained from rough or brown rice of sound quality, free from sand, having characteristic odour and flavour and complying with the relevant African Standards.

Africa consumes a total of 11.6 million tonnes of milled rice per year, of which 3.3 million tonnes (33.6 percent) is imported. Out of the 39 rice-producing countries in Africa, 21 depend on importing between 50 and 99 percent of rice required in Africa. The distribution of rice importation on a regional basis appears skewed, with the North and Central Africa regions setting the lower (1.7 percent) and upper (71.7 percent) limits, respectively.

Rice production
African rice imports represent a third of the total quantity traded on the global market, all the major rice exporters value the African market. However, it is Thailand which provides the lion’s share of rice shipped to Africa. Apart from Thailand, the continent’s main rice suppliers are China, Pakistan, the USA, Vietnam and India. In Africa, Madagascar leads with an astounding 4.3 tonnes of yearly rice production. Tanzania comes second with an estimate produce of over one million tonnes of rice per annum.

General Requirements
Rice shall meet the following general requirements/limits:

a) dried mature grains of edible Oryza spp;

b) clean, wholesome, uniform in size, colour and shape;

c) safe and suitable for human consumption;

d) Free from abnormal flavours, musty, sour or other undesirable odour, obnoxious smell and discolouration;

e) Free from micro-organisms and substances originating from micro-organisms, fungi or other poisonous or deleterious substances in amounts that may constitute a hazard to human health.

Rice potential in Africa
The potential arable land in Africa is 637 million, and about 68 percent of the total area is in reserves. Africa has great potential for expanding its agricultural production in general and rice in particular. Rice production is most extensive in rain fed (upland) ecosystems (which account for 60 percent of the total rice area) and, in these areas, rice competes with several other important staple crops, such as maize, sorghum, millet, cassava, yam, coco-yam, plantain and banana, as well as such cash crops as coffee, cocoa, citrus and cola.

Rice ecosystems
Rice is produced in Africa is mainly within five ecosystems:

- Dry land (rain fed upland);
- Hydromorphic (rain fed lowland);
Cont... Standardisation of Rice

- Mangrove swamp;
- Inland swamp;
- Irrigated ecology.

Rice development strategies
Government agricultural policies should be directed towards increased growth of the rice this will require the allocation of more government resources to rice sector and the implementation of policies aimed at solving the problems associated with technical, socio-economic, macro- and micro-economic constraints of rice production.

Conclusion
Among the 39 African countries that produce and consume rice, only ten have attained any appreciable levels of rice self-sufficiency, while the remaining 29 are heavy importers. The generally low production technology practised in Africa results in low yields. This shows how by utilizing ARSO standard FDARS 464 will brush the constraints to rice production Africa.
**A Peep into ARSO’s Calender of Events 2014**

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<tr>
<th><strong>January</strong></th>
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<tbody>
<tr>
<td><strong>January</strong></td>
<td>National Celebrations in member States - Awareness Activities 17th, 19th</td>
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<tr>
<td><strong>February</strong></td>
<td>ARSO THCs 2, 3, 5, 9, 13 Workshop Forum (17th – 19th Nairobi, Kenya)</td>
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<td><strong>February – June</strong></td>
<td>Continental Essay Competition on Standardisation</td>
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<td><strong>March</strong></td>
<td>ARSO DISNET Nominees Training Workshop</td>
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<td><strong>April</strong></td>
<td>ARSO THC 02, (14th – 16th), ARSO THC 13, (23rd – 25th), Nairobi Kenya</td>
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<td><strong>May</strong></td>
<td>ARSO Francophone Member State’s Standardisation Training, ARSO THC 09 (14th – 16th, Nairobi, Kenya)</td>
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<td><strong>June</strong></td>
<td>African Day of Standardisation Celebration, 20th ARSO General Assembly and 50th ARSO Council, 23 – 27 June 2014, Kigali Rwanda</td>
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<tr>
<td><strong>July – October</strong></td>
<td>ARSO CACO, ARSO COCO Nominees and Programmes Workshop</td>
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<tr>
<td><strong>November</strong></td>
<td>51st ARSO Council Meeting, Nairobi, Kenya.</td>
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<tr>
<td><strong>December</strong></td>
<td>51ème Conseil de l ARSO, Nairobi, Kenya.</td>
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**EDITORIAL TEAM:**
- Mr. Reuben Gisore - Technical Director
- Mr. Phillip Okungu - Documentation and Information Manager
- Mr. Dan Kithome
- Ms. Cecilia Wangare
- Mr. Peter Hinga

Offices: International House, 3rd Floor, Mama Ngina Street, Nairobi
Telephone: +254-20-2224561, +254-20-311641, +254-20-311608
E-mail: arso@arso-oran.com, info@arso-oran.org
Website: www.arso-oran.org

Find us on Facebook.

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