# SITUATION AND OUTLOOK FOR COWPEA AND SOYBEAN IN SUB-SAHARAN AFRICA

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**Under Review**

December 2009

## Section 1. Introduction

Like most food crops grown in Africa, the production of cowpea and soybean is mainly rain-fed. Both crops are generally grown by small-scale farmers on small land areas and in various mixed cropping systems, usually with little or no input. Cowpea, the main component of the cropping systems in West and Central Africa (WCA), requires rains from 900 mm, in a region located at roughly 10°N, to as low as 350 mm at the northern limit (15°N). Intercropping cowpea with grain crops (sorghum and millet) or cowpea-groundnut mixed is widely practiced especially in western Africa. In Eastern and Southern Africa (ESA), cowpea is mainly intercropped with sorghum, pearl millet, maize and cotton.

Soybean grows from sea level up to 2000 m from equator to latitudes 55$^{o}$N and 55$^{o}$S. The crop grows under a wide range of temperature, but the optimum for growth and development is 30$^{o}$C whilst for proper emergence of seedlings, a seedbed temperature of 25-33$^{o}$C is optimal. Soybean requires 500-850 mm water during the growing season and depending on the variety and growing conditions can mature in 65 to 150 days after planting.

Both cowpea and soybean are important legumes for the livelihoods of millions of rural and urban poor throughout the tropics in Africa and East Asia. Cowpea is now grown by millions of smallholder farmers throughout Africa where some two hundred million children, women, and men consume cowpea often even daily when it is available. Cowpea is widely known as the crop of the poor because its green pods and leaves are the earliest food available before cereals mature thereby serving as "insurance" against food shortages during the "hungry season". Cowpea and soybean provide majority of low-income populations the main nutritious source of high and inexpensive protein and combined with cereals, cowpea, for example, gives a balanced amino acid intake (Inaizumi et al., 1999). Soybean has an average 40% protein content and 20% of no-cholesterol oil content. In addition to providing food and cash, cowpeas as well as soybeans are source of animal feed in raw, processed or other form. Another but not least characteristic of tropical legume crops is their impact on soil improvement. The canopies of cowpea and soybean cover the soil and protect it from recurrent erosion, add nitrogen from the atmosphere and the in-situ decay of root residues enrich the soil with nutrients. The impact of legumes on soil is a major benefit in African farming systems where soils have become increasingly exhausted by the need to produce more food per unit of input and where fertilizers are either unavailable or unaffordable for the small-scale producers.
This report does not intend to inventory all the prominent varieties of cowpea and soybean that are cultivated and used in sub-Sahara Africa. Many varieties are available in the region. These may be local cultivars or improved ones developed by various NARS and IARCs research centers in sub-Sahara Africa. Whether improved or local, the varieties differ in their traits, nutrients, and other characteristics for which producers and consumers have adopted or rejected them. Many varieties have become so popular so that they have been given local (vernacular) names. The following are examples of local names that have been given to improved cowpea varieties in cultivation in 63 countries around the world: '***Vijaya***' (victory) and '***Varuni***' (breeze) in SriLanka; '***Akash***' (sky) and ***Prakash*** (light) in Nepal; '***Big Buff'*** in Australia; '***Fahari***' (hope) and '***Tumaini***' (pride) in Tanzania; '***Bubebe***' (fast growing) in Zambia; '***Umtilane***' in Swaziland; '***Dahab El goz'*** (gold from the sand) in Sudan; "***Dan ITA'***

(son of IITA) and 'Wake Rani' (dry season beans) in Nigeria; 'Asontem' and 'Bengpla' in Ghana; 'Korobalen' and 'Sangaraka' in Mali; 'Epace' in Brazil and 'Cubinata' and 'Mulatina' in Cuba.

The report presents an overview of the situation and outlook for cowpea and soybean as a basis for the Tropical Legumes II project in west (Mali, Niger, and Nigeria), east (Tanzania and Kenya), and southern (Malawi and Mozambique) Africa. The report is divided in seven sections. Section 1 is a short introduction that describes the general physical characteristics of the crops, including growing season, prominent varieties, and a brief history of their usage. Section two gives an overview of the distribution of the crops particularly the major growing areas in each of the regions. Section three discusses the trends in the area, yield, and production of each crop at national or regional level. Section four gives an overview of the utilization of cowpea and soybean for human consumption and animal feed, whereas the fifth section discusses international and regional trade, particularly exports and imports and international prices, domestic pricing, and marketing policies. The sixth section documents technological, institutional, and infrastructure issues affecting the production and marketing of the crops and the last section looks at the short and medium-term outlook for cowpea and soybean in sub-Sahara Africa.

## Section 2. Crop distribution

Cowpea is mainly cultivated in the low/middle altitude and dry areas of western and central zones of sub-Sahara Africa as depicted in Annex 1. Figure 1.

The major cowpea growing countries are Nigeria and Niger, which account for about 80% of the total area under cowpea in the world (Table 1). Other important cowpea producers in sub-Sahara Africa include Burkina Faso, Mali, Senegal, Tanzania, Kenya, Malawi, Uganda, Mauritania, Cameroon and South Africa (Table 1). In addition, several other countries of sub-Sahara Africa namely Angola, Benin, Botswana, Central African Republic, Chad, Congo Republic, Côte d'Ivoire, Ethiopia, Ghana, Mozambique, Namibia, Somalia, Sudan, Togo, Zambia and Zimbabwe have also been reported as cowpea producers but with insignificant cultivated areas and production. In other parts of the world, cowpea is produced in Myammar, Haiti, Sri Lanka, USA, etc (Table 1)

Table 1: Major cowpea growing countries in the world (1990-2007)

| Country | Area under cowpea (ha) * | Production (tons)* | Yield (kg/ha)* |
|---|---|---|---|
| Nigeria | 6,770,446 | 3,560,706 | 11212 |
| Niger | 6,503,081 | 862,455 | 2442 |
| Burkina Faso | 1,133,404 | 540,571 | 8979 |
| Mali | 556,945 | 161827 | 5842 |
| Senegal | 318,604 | 70,541 | 5685 |
| Tanzania | 277,684 | 85,526 | 5821 |
| Kenya | 240,757 | 102,295 | 8176 |
| Malawi | 148,105 | 100,353 | 12939 |
| Uganda | 114,210 | 104,526 | 17143 |
| Mauritania | 67330 | 24,671 | 6544 |
| Cameroon | 54,467 | 118,600 | 40735 |
| South Africa | 25,000 | 12,440 | 9446 |
| Myammar | 15,8167 | 119,062 | 12977 |
| Haiti | 91,532 | 63,319 | 13117 |
| Sri Lanka | 39,617 | 27,401 | 17244 |
| USA | 12,065 | 16,301 | 22669 |
| East and southern Africa (ESA) | 215 | | |
| West and Central Africa (WCA) | | | |
| Africa | | | |
| World | | | |

Source: FAOSTAT (1990-2007)
* Data are means from 1990-2007

Soybean

Unlike cowpea which mainly cultivated in WCA, soybean is much widely spread as it is found in nearly every country in SSA, though the production varies. Soybean is cultivated in central African region (e.g. Burundi, Cameroon, DR. Congo, Gabon, Rwanda), in the west zone (Benin, Burkina Faso, Côte d'Ivoire, Liberia, Mali, Nigeria) as well as in the eastern and southern zone (Ethiopia, Kenya, Madagascar, Malawi, South Africa, Tanzania, Uganda, Zambia and Zimbabwe) to cite only a few of these countries.

The leading soybean growing countries in sub-Sahara Africa in terms of areas cultivated are Nigeria (564,972 ha) and South Africa (111,905 ha) Other countries with sizeable areas are Zimbabwe (58,249 ha), Rwanda (26,153 ha), Congo, D.R. (22,971 ha), Zambia (16,327 ha), Uganda (11,063 ha), Soybean is also grown in small scale in more than 10 other African countries throughout SSA (e.g. Cameroon, Ethiopia, Liberia, Tanzania, Benin, Burkina Faso, Côte d'Ivoire, Kenya, Gabon, Mali).

In terms of production, the greatest soybean producers in SSA are Nigeria (376,772 t), South Africa (176,954 t), Uganda (111,497 t), Zimbabwe (99,821 t), Zambia (19,109 t), Ethiopia (16,994 t), Rwanda (15,805 t), Congo, D.R. (13,799 t). In all other countries above, production is below 6,000 tons over a period of nearly 20 years (1990-2007). Although Nigeria is the leading soybean producer in SSA in terms of areas and production, the countries with the greatest yield (kg/ha) are Ethiopia (30,947 kg/ha), Zimbabwe (17,308 kg/ha), Mali (16,613 kg/ha), South Africa (15,125 kg/ha), Côte d'Ivoire (13,283 kg/ha), Burkina Faso (12,079 kg/ha), Zambia (12,028 kg/ha), Madagascar (11,111 kg/ha), Uganda (11,063 kg/ha), Gabon (10,119 kg/ha), Burundi (8321 kg/ha), Kenya (8,037 kg/ha), Benin (7,298 kg/ha), Nigeria (6,658 kg/ha), Congo, D.R. (6,471 kg/ha), Rwanda (6,217 kg/ha), Tanzania (5,328 kg/ha) and Liberia (3,965 kg/ha).

The figures for soybean in many countries incline to suggest that soybean has not been given as much attention as cowpea in sub-Sahara Africa. The reasons for such little interest in soybean will be probably be enlightened in the utilization section below

## Section 3. Production trends

This section is sub-divided in two subsections which report on the area, production and yield trends of cowpea and soybean in SSA. Sub-regional (WCA and ESA) trends have been preferred to country trends as not all cowpea producing countries have statistical data for our purpose.

### Cowpea

Figures 2 a&b (Annex 2) show the trends of area and production of cowpea in Western and Central Africa (WCA) and East and Southern Africa (ESA)(Fig. 2a) and the yields, for over a period of about 20 consecutive years (1990- 2007), respectively. The figures show relatively similar trends for both the area and production in the two regions. However, when each sub-region is taken separately, , the area harvested in WCA-to which belong Nigeria and Niger-the greatest cowpea producers in Africa and the world accounting for 87% of the production), shows fluctuated trend throughout the period with several increases and decreases and the highest peak observed in 1999. The reasons for such fluctuations are not known but may be attributed to weather conditions. Indeed, the WCA region often experiences unpredicted dry periods which might have caused the decreases in the harvested areas while good seasons might have resulted in increases in the harvested areas (the ups). Unlike the area, the production trend in WCA shows a sustained increase throughout the years independently of the corresponding area fluctuations. This sustained increase in production in WCA may be attributed to corresponding increase in the yield (Figure 2b).

In ESA, the area and production show uniform trends throughout the years except during the last three years (2005-2007) when the area increased sharply while the production and the yield during the same period increased only moderately..

The trends in the two sub-regions (WCA-ESA) may suggest that the production of cowpea is related to increase in the area cultivated. However, when one examines the continuous increase in cowpea yield/ha (Fig.3), the increase in production may also be attributed to increase in yield throughout the years which in turn may be the result of the release, adoption and cultivation of improved cowpea varieties at the early stage of cowpea improvement programs initiated by IARCs and NARES. For instance, Ortiz (1998) reported that the production trend of cowpea in Nigeria shows a significant improvement with about 441% increase in area planted and 410% increase in yield from 1961 to 1995 and attributed this development within two decades to the significant advances made on cowpea variety improvement in the dry lands by IITA in collaboration with NARES.

**Soybean**

The area production and yield of soybean in WCA and ESA as depicted in Figure 3 a&b indicate that the area under soybean in WCA fluctuated during the first 5 years (1990-1995) before it increased steadily from 1996 to 2007. In ESA, no such fluctuation appeared, it is rather the area increased gradually starting from 1990 to the end in 2007. The trend of soybean production in WCA was a steady increase while the soybean production in ESA experienced some slight fluctuations between 1990 and 1993), increased to a peak in 2001, decreased sharply in 2004 before taking off again (2004-2007). When the two sub-regions are compared, it is evident that the area grown to soybean is greater in WCA than in ESA. However, this was not the case for the production which was in general the same throughout the years. This is the result in differences in yields which was obviously higher in ESA than in WCA as shown in Fig.3b. If the soybean production increase in ESA may be attributed to a combined effect of corresponding increased cultivated area and yield, the production increase in WCA seems to be more related to increased cultivated area than to yield per se as the latter was stable throughout.

Although the yield of soybean was higher throughout in Eastern compared to Western Africa, it however fluctuated much more than the steady increase in Western Africa as shown in (Fig.3b). Why this difference in the yield between Eastern and Western Africa is not known. Is that more improved yielding varieties are cultivated in Eastern than Western may be a subject for investigation.

In Nigeria the biggest soybean producer, the area harvested has increased by 16% reaching 543,000 ha between 1991 and 1998. Over the same period, the total production has increased from 145,000 to 361,000 tons or by a total of 149%. The increase is mostly the result of significant yield increase following the introduction of improved varieties and production techniques. Still in Nigeria, the International Institute of Tropical Agriculture (IITA) and Canada's International Development Research Center (IDRC) implemented a comprehensive and successful soybean project between 1987 and 1999. During that time, soybean production increased from about 150,000 to 405,000 tons, an increase of 166 percent (FAO 2001). Average yields more than doubled from about 340 to 740 kg per ha. Village surveys confirmed dramatic soybean production increases in Benue State. The annual production among 70 soybean farmers (a random sample) was less than 5 tons between 1982 and 1984, but increased to 30 tons by 1989 (Sanginga et al, 1999). Presently, Nigeria produces about 850,000 metric tons of soybeans annually.

## Section 4. Utilization

This section focuses mainly on the uses of cowpea and soybean as food and animal feed and other important uses such as soil improvement. The section treats each crop separately.

### Cowpea

Cowpea has been consumed by humans since the earliest practice of agriculture and has been ascribed medicinal and nutritional roles (Phillips and McWatters, 1991). A native to central Africa, cowpea is drought-tolerant forage and an edible pulse. It can be used as a green manure, cover crop, erosion control, and nitrogen fixation. The young leaves and young pods are edible vegetables, and can be used as fodder. Seeds can be eaten green or dried.

Cowpea is an important legume and inexpensive source of protein, is grown primarily for its edible seeds or grains. However, in not less than 18 countries in Africa and 7 countries in Asia and the Pacific, the tender young cowpea leaves are harvested and consumed as leafy vegetables. Leaves are among the top three or four leaf vegetables used in many parts of Africa and are sold in fresh and dry forms in many African markets. Direct consumption of tender green leaves from home gardens and fields is even more widespread as an important component of food prepared in various ways such as pot herb like spinach or served boiled to accompany a starchy porridge.

The grain, richer in amino acids, lysine than cereal grains, is valued for its flavor and short cooking time and can be used in a wide variety of ways principally as a nutritious component in human diets. All stages of the plant growth can be used as a vegetable. Immature snapped pods are often mixed with other foods. Green seeds are boiled as fresh vegetable, or may be canned or frozen. Dry mature seeds are also suitable for cooking and canning. In Nigeria, the largest producer's and consumer's country, cowpea as folk medicine is sacred to Hausa and Yoruba tribes, and prescribed for sacrifices to abate evil and pacify the spirits of sickly children. Seeds grounded and mixed with soil or oil can be used medicinally to treat stubborn bowels in some tribes (e.g. Hausa and Edo). West Africa is the main producer and consumer of cowpea and Nigeria has the highest consumption per capita in Africa and probably in the world as shown in the table below.

Table2.The production, consumption per capita per year, the population and surplus/deficit of cowpea in 4 countries in West Africa

| Countries | Production (tons) | Consumption/capita/year (kg) | Population (MI) | Consumption (tons) | Surplus/deficit (tons) |
|---|---|---|---|---|---|
| Burkina | 10,000 | 5.2 | 11.6 | 60,320 | -50,320 |
| Mali | 110,060 | 7.4 | 11.0 | 81,400 | 28,660 |
| Niger | 641,024 | 7.82 | 10.0 | 78,200 | 562,824 |
| Nigeria | 2,099,000 | 23.0 | 113.8 | 2,617,400 | -518,400 |

(Source: Coulibaly and Lowenberg-DeBoer, 2000).

Many researchers have reported on the nutritional quality of cowpeas but despite their excellent nutritional quality, cowpea contains a number of anti-nutritional factors that lower their potential utilization levels. The limited availability of diversified value added products (VAPs) in most households has also been identified as another constraint to cowpea utilization. Nutritional quality analyses done on cowpea have shown that 1) the amino acid profile is rich in lysine based amino acids but is limiting in sulfur amino acids, 2) the digestibility of cowpea starch is slower than that of cereals and tubers and it produces less abrupt changes in plasma glucose and insulin upon ingestion and there is lack of appropriate and practical technology to reduce the levels of flatulence-causing oligosaccharides. The nutritional quality of cowpea is also limited by the presence of both the labile and heat stable anti-nutritional factors or anti-nutrients. The most important of these are the trypsin inhibitor and flatulence causing indigestible oligosaccharides, raffinose, starchyose and verbascose. These sugars are not utilized by humans (being mono-gastric animals) because of the lack of specific α-galactosidase enzyme needed to digest them. This often leads to abdominal discomfort (flatulence) and as a result many African mothers are hesitant to utilize cowpea as a component of weaning food (Uwaegbut 2000). While there are technologies that reputedly reduce the level of oligosaccharides, they involve extra labor and in many cases are not practical.

Whereas in eastern and southern Africa, cowpea is grown for human consumption of its leaves and beans, in West and Central Africa and particularly in their drier areas, in addition to food use, cowpea fodder plays a major role in animal feed and in many areas of the world, cowpea is the only available high quality legume hay for livestock feed. In the semi-arid zones of Nigeria, all the above ground parts, except pods, are harvested for fodder and the take-off of the fodder contributes to feed supplies for large and small ruminants. Traditionally, farmers choose two main types of cowpea: early maturing varieties grown for grain and late maturing varieties grown for fodder production. However, because during the dry season, good quality fodder is scarce, there was a need to develop dual-purpose varieties that would give reasonable grain and fodder yields, thereby maximizing the output from land and labor. The use of dual-purpose cowpea is attractive in mixed crop/livestock systems where land and feed are becoming increasingly scarce (Tarawali et al. 1997) especially in the dry season. In many areas of the world, cowpea is the only available high quality legume hay for livestock feed. Digestibility and yield of certain cultivars have been shown to be comparable to alfalfa. (Davis et al. 1991). In Niger, the haulm (or halm) of the plant is consumed as dietary habits and traditions, and cowpea plants are widely used for animal fodder. In Southern Africa, cowpea is at present planted primarily for fodder, although it is also used for grain production, green manure, weed control in forestry plantations and cover or anti-erosion crop.

Cowpea is not only used for human consumption and animal feed, it has increasingly become a cash crop even for small-scale producers who sell the surplus of their product. To this respect, the knowledge of consumer preferences is essential to developing cowpea markets and breeders need to know what characteristics consumers want while IPM specialists need an threshold of damage consumers may tolerate. This aspect of consumer's preference and other related issues such as pricing will further be developed in the international trade section

**Soybean**

It appears from the history of soybean in Africa that the interest of soybean for food started only around 1973, paralleling the new interest worldwide (Soyinfo Center, 2007). The production from high yielding introduced varieties coupled with high sale prices in the world market was the main stimulant for soybean production and consumption. However, despite this, the use of soybean was slow and of little interest in many African countries because of a number of constraints such as: poor knowledge of cooking practices for home consumption, long cooking time and non-availability of processing equipment to decrease drudgery of manual processing

Soybean can be made into numerous fermented and unfermented dishes; and is a good oil source. Cooked vegetable soybean seeds are eaten like lima beans or peas. Vegetable soybean is used frequently as a rotated cash crop between second and first cereal crops such as rice; possesses good soil-improvement properties and tolerate continuous cropping

The direct use of soybeans as food, that is, without fermenting, sprouting, or extracting the oil, problems. Some elements in raw soybeans decrease the effective protein digestion. Other components cause flatulence (gas) which is undesirable, especially for infants. The grains may also contain anti-nutritional factors that inhibit the availability of protein.

Soybean main uses are flour, protein products and animal feed. It is well known that soybean is an important source of high quality but inexpensive protein (about 40%) and 20% of highly digestible and no cholesterol oil content and also a source of superior amino acid profile. Soybean protein has great potential as a major source of dietary protein. The utilization of the crop in Africa for food increased with the development and wide adoption by both small and medium-scale of various soybean-processing machines adapted for use in sub-Saharan Africa. Hence, over 100 food products with good nutritive value and consumer acceptability have been developed. Soybean products are also being used in hospitals for biofortified feeding of sick people and malnourished children.

Soybean remains the most important and preferred source of high quality vegetable protein for animal feed manufacture. Soybean meal, which is a by-product of oil extraction, has a high crude protein content of 44 to 50 percent and a balanced amino acid composition, complementary to maize meal for feed formulation. A high level of inclusion (30-40 percent) is used in high performance mono-gastric diets. Soybean cake, a by-product from the oil production is used as a high-protein animal feed in many countries

A study in Nigeria showed that soybean is rapidly becoming a major food and cash crop as a result of the adoption of newly developed varieties that can produce high yields, can be kept well in storages and do not require expensive additional production inputs, and which can be grown profitably by small holder farmers. This progress is largely attributed to the research focused-simultaneously on the development of new varieties and of appropriate utilization technologies.

Apart from its nutritive purposes, soybean oil is used industrially for paints, linoleum, printing inks, soaps, insecticides, and disinfectants. Soybean meal and soybean protein are used for synthetic fibre (artificial wool), adhesives, textiles, waterproofing, and fire fighting foam.

## Section 5. International trade

The section documents in as much as possible the status of exports and imports, international prices and domestic pricing and market policies of cowpea and soybean in SSA in general and in WCA and ESA in particular.

### Cowpea trade

FAO statistics (Table3) reveal the insignificance of cowpea trade at international level. The quantities and values of the cowpea imported or exported internationally have been very low over the last two decades. The data also reveal in the case of export that nearly all the quantity exported and values by Africa come from West Africa, the cowpea belt in the world. These figures further confirm the status of cowpea as "poor's man crop".

Table3. Import and export of cowpea

| Country/Region | Import | | Export | |
|---|---|---|---|---|
| | Quantity (tons) | Value (1,000$) | Quantity (tons) | Value (1,000$) |
| Niger | 138.5 | 18.6 | 11602.2 | 4366.4 |
| West Africa | 140.0 | 19.3 | 12551.6 | 4782.1 |
| Africa | 191.3 | 51.9 | 12585.3 | 4795.6 |
| World | 1022.0 | 563.8 | 20015.5 | 9097.7 |

Source: FAOSTAT (1990-2005)

However, cowpea trade has received considerable attention at local and regional levels. Coulibaly and Lowenberg-DeBoer (2000) reported that during the past 20 years, the Bean–Cowpea Collaborative Research Support Program (CRSP) and international and national research institutions have made substantial contributions to cowpea production and protection technology. Besides new varieties, improved methods for controlling pests in the field and in storage have been developed. These technologies could dramatically increase cowpea production and grain quality in West Africa. The questions now are: Who will buy those cowpeas? At what price will they be sold or purchased? And what kind of cowpea would consumers prefer?

In West Africa, cowpea markets are part of an ancient trade that links the humid coastal agro-ecological zones with the semiarid interior. This ancient trade is based on the comparative advantage in food production characteristics of each zone. While it is relatively easy to produce carbohydrates (e.g., cassava, yam, maize, rice) in the humid coastal areas due to favorable environmental conditions, it is difficult to produce animal or vegetable protein because of pests and diseases.

Lack of or insufficient rainfall limits grain production in the interior, but creates good conditions for livestock, cowpea, and groundnut. In the traditional cowpea growing countries of the Sudano-Sahelian zone, there is a well developed network of village buyers who assemble small quantities from farmers into 100 kg bags and merchants who transport and store the bags.

These trade linkages can be illustrated with Ghana which though a cowpea producer still imports about 10 000 MT annually (Langyintuo 1999) of which about 30% are from Burkina Faso and the rest from Niger (Table 4). According to Langyintuo (1999), in Accra, the large, rough coated Nigerien cowpea (cowpea from Niger) sells for a premium, but they need to be marketed quickly because they do not store well in the humid coastal climate (see Coulibaly and Lowenberg-DeBoer, 2000)

Table4. Official imports of cowpea into Ghana, 1992-1998

| Year | Total imports (MT) | Imports from Burkina Faso | | Imports from Niger | |
|---|---|---|---|---|---|
| | | (MT) | (% of total) | (MT) | (% of total) |
| 1992 | 2055.34 | 592.00 | 28.80 | 1463.34 | 71.20 |
| 1993 | 2460.80 | 637.92 | 24.16 | 2002.88 | 75.84 |
| 1994 | 11798.98 | 2898.95 | 24.57 | 8900.03 | 75.43 |
| 1995 | 13086.29 | 3295.95 | 25.19 | 9790.34 | 74.81 |
| 1996 | 6816.80 | 3077.79 | 45.15 | 3739.01 | 54.85 |
| 1997 | NA | N/A | N/A | N/A | N/A |
| 1998 | 10167.18 | 3050.15 | 30.00 | 7117.03 | 70.00 |

Source: Langyituo 1999,

It is well established that production and marketing are inseparably linked together as producers require information on where and when to sell their crop (cowpeas) at a profitable price while consumers want to buy cowpeas at the lowest cost without compromising specific desired grain characteristics. In order to understand this linkage better, there is a need to have information about the value chain of the crop (Mbene, 2005; Coulibaly and Lowenberg-DeBoer, 2000).

Throughout West Africa, the value chain of cowpea starts with the production of cowpeas by small scale farmers; and in the Sahelian countries of Niger, Burkina Faso and Mali, and in the inland areas of coastal countries, farmers typically sell their marketable surplus grains to rural assemblers, who in turn sell to urban wholesalers directly or through commission agents (Langyintuo et al., 2003). Commission agents sell grain on behalf of their clients (rural assemblers), and provide storage but do not take any price risk associated with the storage function as the commission fee paid to the commission agent by rural assemblers varies usually from country to country. It is often about 2% of the wholesale price depending on the country (Langyintuo, et. al., 2003).

Exports and imports of cowpea amongst the countries in West and Central Africa is substantial, with official sources recording regional cowpea grain trade of almost 300,000 metric tons annually in the late 1990s. These figures may have certainly increased today with the increase in production resulting from higher yield of improved varieties (Ortiz, 1998).

In some West African countries including Nigeria, Ghana, Togo, Benin and Burkina Faso, grain traders have organized themselves into commodity-based associations in order to promote marketing of grain and to put in place guidelines for grain pricing (Langyintuo et al. 2003). These commodity associations serve as a bridge between grain traders and government organizations.

In Senegal, for instance, Mbene et al. (2006) reporting on a hedonic pricing data analysis from six markets, found that although larger grain size was statistically significant and positive at all markets sampled, the premium price varied from 1% of average price in Dakar for a one gram increase to 16% in northern Senegal. The damage coefficient due to insects (e.g. bruchids) was negative and statistically significant for only one market in Dakar. The grain color, eye color and skin texture as preference trait varied from market to market.

Consumers in Cameroon and northern Ghana generally prefer large undamaged cowpea grains, except in two cases where consumers in the same areas prefer small-seeded traditional grains presumably because of the taste. In both counties, grain eye color was noted to be an important grain quality characteristic that consumers are willing to pay a premium for. In northern Ghana, markets, consumers prefer cowpeas with black eyes, but in northern Cameroon, consumers discount cowpea with black eyes (Langyintuo et al (2004). In Cameroon, northern Ghana, northern Nigeria and Senegal, consumers place value on large cowpeas grains and dislike damaged grains (Langyintuo et al, 2003, 2004).

As described above, market participants engage in moving, storing, grading and processing cowpeas for adding value and product diversification for consumers from different market segments. In West Africa, most of the cowpea production occurs between June and September mainly in the Sahelian zones while consumption occurs throughout the year. The fluctuations of cowpea prices are typical of a commodity where production occurs at one point in time and product is stored for use throughout the year. Typically, prices are lowest during harvest and rise steadily thereafter to a peak in the June, July, August period.

In addition to consumer preferences, there are also other factors which influence cowpea consumption and hence marketing in West Africa. Kormawa et al (2000) reported that in Nigeria, the level of consumption of cowpea is determined by four major factors, including income level of consumers, taste of the product, market price of cowpea and its close substitutes, and population density of cities which are the major markets. Kormawa et al (2000) further reported that cowpea prices are lower in December (harvesting season) in the Abuja, Kaduna, Kano and Ibadan markets and consumers in these markets generally prefer brown colored cowpeas grain over white colored grains.

We did not find sufficient consistent information to report on cowpea trade in Eastern and Southern Africa. This is probably because cowpea production in this sub-region dominated by common bean is still low and possibly most of it is used for home consumption. It is also not known whether the initiative by the Bean/Cowpea CRSP Eastern and Southern Africa economics and marketing team has already responded to intermediate term information demands by regularly updating USAID, NGOs and relevant government agencies on research results. A trip to Malawi and Mozambique by Lowenberg and Filipe revealed from the limited data collected that there is potential for cowpea marketing in these countries.

However, should cowpea production in the sub-region become important and that marketing/trade need arises, there exist the Common Market for Eastern and Southern Africa (COMESA) which is a regional economic cooperation group of 20 African countries with an estimated population of 367 million people. The overall objective of COMESA is to promote regional integration through development of trade, natural and human resources. COMESA is one of the more successful regional economic groups in Africa. It has financial specialized institutions to support its activities namely: a) The Trade and Development Bank for Eastern and Southern Africa (PTA), b) The Leather and Leather Product Institute (LLPI), c) The Clearing House, and d) The Re-insurance Company.

**Soybean trade**

Unlike cowpea, soybean is getting some relative attention in trade as shown in Table5. For instance, the data indicates that the import of soybean oil and soybean in Africa both in terms of quantities and values represent about 2 to 14% of the world's imports. .

Table5. Import and export (quantities and values) of soybean in SSA and world

| Regions | Import (tons soyoil | Import (tons) Soybean | Import (000$) soyoil | Import (000$) soybean | Export (tons) soyoil | Export (tons) soybean | Export (000$) soyoil | Export value (000 $) soybean |
|---|---|---|---|---|---|---|---|---|
| Eastern Africa | 130452.5 | 11967.5 | 92,038 | 3540.5 | 4515 | 11971 | N/A | N/A |
| Western Africa | 66459.0 | 15048.5 | 36,670 | 4112.5 | 130.5 | 5358 | 103 | 1384.5 |
| Southern Africa | 111844.0 | 8611.5 | 56,108 | 2030.5 | 1075 | 4409 | 648.5 | 1065 |
| Central Africa | 61978.5 | 61978.5 | 50,031 | 2531.5 | 0.5 | 1 | N/A | N/A |
| Africa | 898853.5 | 632042.0 | 517,710.5 | 197250.5 | 7933.5 | 21753 | 6176 | 9301.5 |
| World | 6559014.8 | 42478240.4 | 3630045 | 11038400.3 | 6914058.6 | 42048712.5 | 3510438.1 | 9684246.5 |

(Source: FAOSTAT 1990-2005)

In 1985, soybean oil imports in Nigeria were estimated at 60,000 MT compared to 1984's 70,000 MT. Domestic soybean crushing, virtually nonexistent in 1984 and 1985, was expected to total 25,000 MT in 1986, yielding about 4,000 MT of domestic soybean oil.

For South Africa, after three years of drought, with the change in weather the oilseed production increased up to 67% or more from drought levels of 1983. Total oilseed production in 1983 was about 355,000 metric tons (MT), but it rose to 593,000 MT for 1985 and was forecasted to reach 740,000 MT in 1986 as acreage increased.
This improved harvests meant that South Africa was again a net exporter of oilseed rather than a net importer. Total oil production which includes soybean oil for 1985 is estimated at 208,000 MT, up from 1984's 125,000 MT. The forecast for 1986 production was 243,000 MT. Vegetable oil imports for 1984, 1985 and 1986 are 128,000 MT, 60,000 MT and 43,000 MT, respectively.

Like stated above for the cowpea in Eastern and Southern Africa, although there is yet no organized trade for soybean in sub-Sahara Africa, should the production become important and need market development, it should be possible to use/adapt the already exiting market systems in each sub-region (COMESA for Eastern and Southern Africa) and the established cowpea markets in West (ECOWAS) and Central Africa (CEEAC).

**Domestic pricing and marketing policies**

Global challenges for agriculture in Sub-Saharan Africa include food security and sustainable livelihoods for an increasing population while protecting the environment. The decreasing per capita food supply and increasing rural poverty require a substantial increase in agricultural productivity and improvement in marketing, trade and policy. To meet these goals, scientists, rural development institutions, private sector and governments are challenged to develop and diffuse new technologies, make optimal institutional arrangements and policy decisions to increase agricultural productivity and incomes for sustainable livelihoods.

Legumes such as cowpea and soybean can make a substantial contribution to food security and poverty reduction (incomes). This requires the promotion and diffusion of certified high quality cowpea/soybean seeds, the development and diffusion of cost effective and sustainable integrated pest management technologies, the development of trade and marketing of high nutritious and value-added cowpea and soybean processed products, the empowerment through capacity building of public, private, NGO and various legumes related organizations. Increasing cowpea and soybean productivity requires also the strengthening of collaboration and linkages with all key stakeholders in the cowpea/soybean sub-sectors including the private sectors.

**Prices**

**Cowpea**

Like for most commodities, the prices of legumes (cowpea and soybean) fluctuate depending on various direct or indirect factors. In the case of cowpea, the trends in prices in a number of countries in WCA including Burkina Faso, Cameroon, Mali, Niger and Nigeria and in ESA namely Kenya and Malawi (Annex 4. Figure 4a show that the prices did not fluctuate much over the years (1990-2005) except especially for Nigeria and slightly for Mali. In Nigeria, the prices fluctuated tremendously with moderate and sharp increases and declines between 1991 and 1999 reaching the highest peak in 1996 and the sharpest decline in 1999 before stabilizing from 1999 to 2005. The fluctuations in Mali occurred during the same period than in Nigeria. However, the fluctuations were moderate.

In all other countries whether in WCA or ESA, the trends were uniform. In these countries, the prices never exceeded USD500 per ton whereas prices in Nigeria prices increased to about $3,000 per ton during the highest peak in 1996. In Mali, the highest price was $900 per ton in 1998. That prices fluctuated so much in Nigeria may be related to supply and demand. Nigeria is the greatest cowpea producer and consumer in Africa and the world and with its high population (about 120 mi) the demand may have increased at the expense of supply leading to undeniable high prices.

Cowpea markets link the semiarid production zones with the coastal consumption centers in West Africa. Niger is the largest cowpea exporter mainly to Nigeria and Côte d'Ivoire, followed by Burkina Faso. The urban consumption centers succeeded in absorbing incremental cowpea production without significant pressure on prices until today. In sub-urban farming systems, the market value of the fodder is often more important than that of the grains and an important source of income for poor women.

Close market monitoring for cowpea price registration carried out in Côte d'Ivoire and Nigeria in 1995/1996 season revealed that cowpea price would double within a year with a maximum in September and a minimum just after the harvesting period during November and December. These seasonal fluctuations reduced recently, probably as a result of the rapid increase in national cowpea production in Burkina Faso which is a natural cowpea supplier for Côte d'Ivoire. Cowpea price in November at wholesale level in Abidjan decreased from 250 FCFA/kg in 1995 to 180 FCFA/kg in 1999 (Lambot, 2000)

In Nigeria, cowpea price fluctuated in six different markets in 1999/2000 growing season. The average of delivery price to Lagos indicated that prices were lower during the harvest period (October–December) and higher from April to June in 1999. Prices steadily decreased from September 1999 until December 1999, and then increased in January and February 2000. Despite the existence of market institutions for cowpea in Maiduguru and Abeokuta in Nigeria, there are no government policies that regulate the marketing policy. What exist in these markets such as credits, inputs and else is rather locally organized by the stakeholders themselves (Adejobi and Ayinde, 2005). This situation of lack or inadequate policy for cowpea is likely similar to many other producers and consumers' countries in sub-Sahara Africa.

As stated by Mbene, 2005 for Senegal, many national statistic services do not record data on cowpea prices. Hence, Mbene used the set of prices collected by ISRA through the Bean Cowpea CRSP project from 1998 to 2003 to provide insight into price movements and marketing policies of cowpeas in Senegal. She conducted a survey through Senegal cowpea growing areas and found that the mean and median prices over the reported period were 321 FCFA per kg and 324 FCFA per kg, respectively, and the maximum and minimum prices were 700 FCFA per kg and 45 FCFA per kg. Cowpea prices show a relatively high level of deviation from the mean with a standard deviation of 185 FCFA. Statistical analysis showed clearly that there exists a significant negative correlation between production and prices (r= -90%). The price increased sharply when the production was at the lowest.

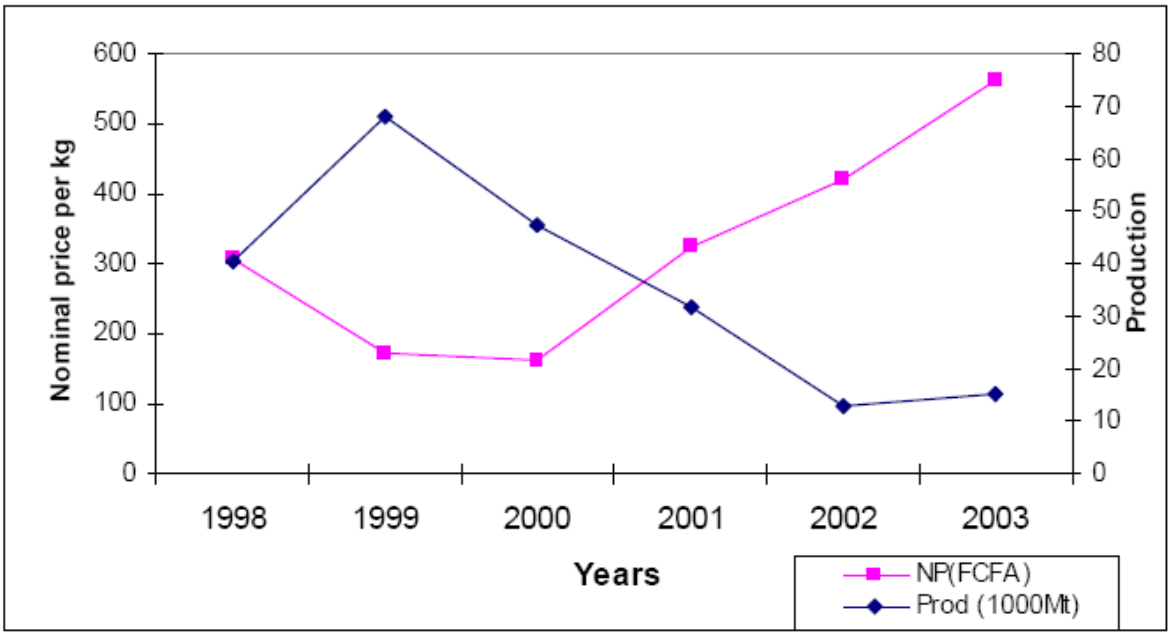


Figure5. Cowpea price and production variation

Source: Mbene (2005)

Soybean

The prices of soybean in five countries all in WCA (Burkina Faso, Cameroon, Côte d'Ivoire, Mali and Nigeria (no consistent data were found for any ESA countries) are depicted in Annex 4-Figure4b). The trends over the years show similar trends as those observed on cowpea. Of the five countries, the prices fluctuated only in Nigeria-the greatest soybean producer in SSA and in a similar manner as that of cowpea during the same period, but with the highest peak reaching $1300 per ton in 1998. The trends in the other countries were also similar to those of cowpea as the prices never exceeded $400 per ton.

## Section 6. Technological, institutional and infrastructure issues

### Cowpea

*Available technologies and their adoption*

Cowpea researchers at IITA and NARS collaborators have developed a sufficient number of technologies that are currently available to improve cowpea productivity in sub-Sahara Africa. Among them are the improved varieties and post-harvest technologies such as storage and processing technologies. The development of improved varieties has probably received the highest attention as compared to other issues.

Prior to 1987, IITA devoted most of its efforts towards developing cowpea varieties for sole cropping and since then the objectives have been diversified to include breeding for intercropping as an important component of the overall cowpea improvement program, considering that the bulk of cowpea in West and Central Africa is still grown as intercrop (Singh, 1993). IITA's cowpea breeding program later focused on developing the following types of varieties: (1) Extra-early maturing (60-70 days) non-photosensitive grain type for use as sole crop in multiple cropping systems and short rainy seasons, (2) Medium-maturing (75-90 days) non-photosensitive grain type, for use as sole crop and intercrop, (3) Late-maturing (85-120 days) non-photosensitive dual-purpose (grain + leaf) types for use as sole crop and intercrop, (4) Photosensitive early-maturing (70-80 days) grain types for intercropping, (5) Photosensitive medium-maturing (75-90 days) dual-purpose (grain + fodder) types, for intercropping, (6) Photosensitive late-maturing (85-120 days) fodder type, for intercropping, (7) High-yielding, bush-type vegetable varieties, (8) Desirable seed types and seed colors, with high protein content and low cooking time, (9) Resistance to major diseases, insect pests, and parasitic weeds, (10) Tolerance to drought, low pH, and adaptation to sandy soils and low fertility. In most of these types above, several varieties have been screened, and those promising have been tested and released at/to several locations in West Africa. Table6 shows the extra-early (60-70 days) cowpea varieties released in different countries, as of 1996.

It is not clearly documented whether the development of all improved varieties (Table 6) has taken into consideration the preferences and desires of rural and urban consumers which are essential to any technology adoption. As most legumes are consumed as cooked seeds, their integrity after cooking and their taste is important for consumer's preference. Food quality traits in legumes vary due to, e.g., genotype, environment and agronomics. Including consumer preferences at an earlier stage in the breeding process requires knowledge of food quality attributes preferred and methods to rapidly determine these attributes. These additional quality attributes will increase the likelihood of farmer and consumer adoption. Some quality traits i.e. size, shape, surface rough/smoothness, color, speckles, mottling, leaching of pigments, ease of cooking and others are known and are already part of legume improvement programs.

Breeders need assistance to monitor, select, and improve food quality and processing properties. Quick procedures that are already utilized, or that will be developed, will determine analytical and functional qualities that add value to the grain. These additional quality attributes will differentiate legumes into preferred and less preferred categories due to specific requirements of the food product and/or process.

In the early 1990s, IITA in collaboration with ILRI initiated a breeding program to develop dual-purpose cowpea varieties that produce both grain and fodder to suit the diverse needs of farmers in the semiarid region. A recent breakthrough in this breeding program was the development of dry-season dual-purpose cowpea varieties adapted to the conditions of the semiarid zone. Of the several dry-season varieties evaluated in irrigated and wetland areas in on-farm dry season trials, many have potential grain yields of over 1 t/ha with fodder yields of 4–10 t/ha when planted at the end of January to mid-February (Singh et al. 1997). They are harvested near the end of April to mid-May, when prices for cowpea grain and fodder are high.

Table 6 Extra-early (60-70 day) cowpea varieties released in different countries, as of 1996

| **Country** | **Varieties released/identified for cultivation** |
|---|---|
| Benin Republic | IT82E-32 |
| Bolivia | IT83D-442, IT82D-889 |
| Botswana | ER-7 |
| Colombia | IT83S-841 |
| Cuba | IT84D-449 (Titan), IT84D-666 (Cubinata-666), IT86D-314 (Mulatina-314), IT86D-386 (IITA-Peroz), IT86D-782 (Tropico-782), IT86D-792 (Yarey-792) IT88S-574-3 (OR574-3) |
| Ghana | IT82E-16, IT83S-728-13, IT83S-818 |
| Guinea | IT85F-867-5 |
| Guyana | ER-7 |
| Liberia | IT82D-889 |
| Mozambique | IT82E-18 |
| Nepal | IT82D-889, IT82D-752 |
| Nigeria | IT84E-124, IT82E-60, IT82D-716, IT84E-1-108, IT84S-2246-4, IT86D-721, IT86D-719, IT90K-76 |
| Philippines | IT82D-889 |
| Sri Lanka | IT82D-789, IT82D-889 |
| Suriname | IT82D-789, IT82D-789 |
| Swaziland | IT82E-18, IT-82E-32, IT82E-71 |
| Tanzania | IT82D-889 |
| Thailand | IT82D-889 |
| Uganda | IT82E-60 |
| Yemen | IT82D-789 |
| Zaire (=D.R. Congo) | IT82E-18, IT82E-32 |
| Zimbabwe | IT82D-889 |

Besides improved varieties, there exist post-harvest technologies particularly to reduce or limit insect pest attacks. These include the use of plant oils and extracts, hermetic drums, metal drums and triple plastic bagging and others such as co-storage with ash and other abiotic materials (Murdock et al, 1997). A proposal "Encouraging regional trade with hermetic storage for cowpea in West and Central Africa has been submitted to the Gates Foundation in response by J. Fulton, J. Lowenberg-DeBoer, L. Murdock & B. Pittendrigh, Purdue University, West Lafayette, IN, USA

*Constraints to large-scale adoption*

The constraints to cowpea production and utilization have been identified and reported in the report of small group meeting on constraints to cowpea production and utilization in sub-Sahara Africa, held on 11-12 July 2003 at AATF Headquarters, Nairobi, Kenya (Table 7) Although these constraints and related problems have been identified by scientists in the absence of the producers' and consumers, some of the problems in each constraint category may directly affect producers and/or consumers' decision to adopt while others are more researchable issues. For instance, producers may not adopt an improved variety for which seeds are inaccessible or unavailable or of poor quality (seed constraint). A variety that does not adapt to drought, heat stress or susceptible to insect pests or diseases, or parasitic weeds (field constraints) may be easily rejected by farmers/producers. Similarly, the nutrition quality and storage pests particularly bruchids (post-harvest constraints) are essential to consumers' decision to adopt or not. The magnitude of these problems varies with location, region, country etc and most importantly with the socio-culture of the people (producers and consumers). The socio-cultural and other socio-economic issues have long been ignored by scientists who focused more on increasing the yield of the crop.

Table 7 Increasing cowpea productivity and utilization- constraints

| **CONSTRAINT** | **PROBLEM** |
|---|---|
| 1. Seed constraint (productivity) | 1.1. Seed production and availability<br>1.2. Seed<br>1.3. Access/distribution/marketing<br>1.4. Quality |
| 2. Field constraints (productivity) | 2.1. Access to input (not prioritized)<br>2.2. Heat stress<br>2.3. Striga<br>2.4. Drought<br>2.5. Insect pests<br>2.6. Photoperiod<br>2.7. Viruses<br>2.8. Pathogens-Bacterial fungal and viruses<br>2.9. Soil fertility (nitrogen fixation) |
| 3. Post-harvest constraints (utilization) | 3.1. Limited availability of diversified value added products<br>3.2. Processing equipment<br>3.3. Nutritional quality<br>3.4. Storage pests/bruchids<br>3.5. Insufficient research and promotion of value added products<br>3.6. Reliable access to inputs |

| | |
|---|---|
| | 3.7. Reliable access to output markets<br>3.8. Lack of market information systems |
| 4. Marketing constraints (utilization) | 4.1. Reliable access to inputs<br>4.2. Reliable access to output markets<br>4.3. Lack of market information systems |

In a study by Inaizumi et al (1999) on adoption and impact of dry-season dual-purpose cowpea in the semiarid zone of Nigeria, the major constraints to the adoption of dry-season dual-purpose cowpea include insect attack in the field and in storage, insufficient water, nematodes, lack of land, and lack of seed (Table 7). Nematodes were a major constraint to 84% of farmers in Lautaye and about 62% in Dandagana, but were not mentioned in Gabar Da Gari. IT89KD-288 is resistant to nematodes whereas IAR-48 is susceptible. The lack of seed was mentioned as a major constraint only in Lautaye by 65% of farmers. This was indicative of the relatively low adoption rates recorded in this area compared to other villages. These results suggest that there is a need to develop varieties that are resistant to nematodes and storage insects. There is also a need for an efficient seed multiplication and distribution system to improve farmers' access to improved varieties.

The pricing of improved technologies may be a constraint to large-scale adoption if the technology is seen to be supplier-determined. This happens because the low level of profitability in technology dissemination business seriously discourages private-sector investors from getting into the sub-sector and turns end-users of these technologies into price-takers in spite of existing great potential demand for the technologies and their value-added products at local, regional, and global markets (Ikpi, unpublished report).

*Socio economic and institutional constraints*

There are number of studies that are being done in terms of characteristics of technologies in connection with the needs of the people, for example the color of cowpea seeds (Coulibaly, 2003; Kormawa, 2003) in AATF), only a few has analyzed or assessed the existing social and economic constraints that exist and hamper the adoption of the available cowpea technology.

A large percentage of bean production is not for the market and is highly integrated into primary food production. Traditionally, borrowing and in-kind transfer of seed or food crops to relatives and friends is practiced. Decisions are made to allocate some portion of the produce meant for food to be used as seed to sustain household production. One needs to understand how household decisions are made with regard to the utilization of seed from on-farm seed production plots. A major question is whether small-scale farmers are likely to specialize in seed production and marketing. In summary, the informal seed channel faces the following problems: poor quality, irregular supply, inability to use/adopt state-of-the-art technologies, limited market orientation beyond the local area; non-market means are the main factor for exchange, not self-enforcing due to limited response to market conditions

In a study on adoption and impact of dry-season dual-purpose cowpea in the semiarid zone of Nigeria by Inaizumi et al (1999), most households in the region were Muslim, and women generally did not participate in agricultural activities beyond threshing and food processing in the home. The majority of farmers were middle-aged and about 80% of respondents had fewer than five children. Educational levels were generally low. The majority of farmers in Dandagana and Gabar Da Gari had had more than 5 years of Koranic education, while a considerable number of farmers in Lautaye had had more than 6 years of western education. About 80% of farmers had had more than 20 years' experience in cowpea production. However, 40% of adopters in Gaba Da Gari had a relatively short experience of cowpea production, averaging less than 5 years, compared to 20 years for the majority of non-adopters.

The study concluded that the development of technologies that have a comparative advantage in farmers' agro-ecological and socioeconomic conditions and provide them with new opportunities for income generation and diversification is of crucial importance in adoption. In the case of soybean in this study, scientists at IITA were able to develop a dry-season dual-purpose variety that permits farmers to exploit ecological and socioeconomic niches in the dry season when grain and fodder prices are high. It is not therefore surprising that the rates of adoption of this variety increased so much in a few years.

Tukamuhabwa et al (2003) reported pod shattering in soybean as a major production constraint causing high field yield losses in the tropic and sub tropics. And with regard to pod shattering, breeders can categorize soybean varieties as tolerant, intermediate or susceptible

## Section 7. Short and medium-term outlook for cowpea and soybean in sub-Sahara Africa

## Summary of the major issues

This report documents the regional and situational outlook of cowpea and soybean, two tropical grain legumes grown in sub-Sahara Africa for the livelihoods of million of rural and urban poor. Specifically, the report brings together some key constraints, opportunities and prospective solutions from the current literature and on-going work on cowpea and soybean for the Tropical Legumes II project in West (Mali, Niger, Nigeria), East and Southern Africa (Ethiopia, Kenya, Malawi, Mozambique and Tanzania) African sub-regions. The main issues reviewed in each key issue are the following:

**1. Importance of cowpea and soybean in SSA**

The importance of tropical grain legumes namely cowpea and soybean to feed and provide income to millions of the rural and urban poor in sub-Sahara Africa cannot be overemphasized. The agro-ecological conditions are conducive to increase the production of the two legume crops. Cowpea even offers higher potentials for food security to poor as it can be grown in dry areas where most staples (particularly cereals and root and tubers) do not grow effectively. Both cowpea and soybean are sources of cheap protein and amino acids as compared to cereals. It is why cowpea for instance cowpea is called the meat of the poor. While on one hand cowpea has received significant attention by researchers during the last 2-3 decades and that sufficient literature is available for the crop about sub-Sahara Africa, on the other hand, soybean, despite its great worldwide known potentials, has not yet been fully exploited in sub-Sahara Africa due to its latter introduction to Africa (as compared to cowpea which center of diversity is believed to be in Africa) and shortages of appropriate processing facilities for use and hence less documentation in the literature.

## 2. Distribution of cowpea and soybean in SSA

The available literature clearly indicates that cowpea is widely grown and distributed in West and Central Africa compared to Eastern and Southern Africa. In the latter sub-region, though the growing conditions for cowpea are as good as in the West and Central Africa, focus is put on the common bean as the staple grain legume which is not the case for West and Central Africa. Soybean is rather evenly distributed as there is apparently no sub-region where the crop is dominant compared to another. Soybean is found in the West and Central as in the Eastern and Southern Africa

## 3. Production of cowpea and soybean in SSA

Many countries in sub-Sahara Africa do not have consistent and reliable data on the production and area under cultivation for cowpea and soybean probably because the crops have been considered of low-value and as such have relatively been under-reported. The statistics available are variable, and sometimes contradictory from one source to the other. However, despite all this, what is evident from the statistics available is the fact that the production of and area under cowpea are significantly higher in Western and Central Africa compared to Eastern and Southern Africa. The data also show that in both sub-regions, the trend in increased production has been related to increase in area cultivated. However, in West Africa in particular, a number of authors have, in addition to increased area, also attributed the production increase to higher yield from high yielding improved varieties. All statistics prove that West Africa with its two world's greatest producers (Nigeria and Niger) can be considered as the cowpea belt of Africa. Though the production statistics of soybean is not well documented, the available data show however that apparently the production is higher in Eastern and Southern Africa compared to Western and Central Africa and the increase in production is related to increased cultivated area in both sub-regions. Only one study has attributed increased soybean production to high yielding dual-purpose soybean varieties.

## 4. Utilization of cowpea and soybean in SSA

Although cowpea and soybean are primarily produced for human consumption, there are several other uses such as animal feed, raw materials for processing and green manure to improve soil fertility. As for the human consumption, cowpea offers a tremendous advantage compared to soybean in that the grains and the leaves are used in a variety of ways for food preparations. The human consumption of soybean grains is limited; however the flour is increasingly used for infant food and in hospitals. As animal feed, the development of dual-purpose varieties has revolutionized the use of cowpea and soybean for feed. This is particularly striking in the dry areas of West Africa where the cowpea fodder is the only available feed in the dry season. Even the benefits from trade of dual-purpose cowpea fodder per unit area have been found to be significantly higher than the trade of corresponding grains. The grains of cowpea and soybean have been processed into more diversified food and feed end-products which have added-consumption and trade values to the crops.

However, despite the numerous advantages of cowpea and soybean uses, there are a number of constraints which have restrained these uses. They include 1) seed constraints as availability, quality, accessibility etc; 2) field constraints as soil fertility, diseases, pests, parasitic weeds especially striga, poor access to input markets; 3) post-harvest and marketing constraints as limited availability of diversified value added products, processing equipment, nutritional quality, storage pests like bruchids, reliable access output markets, lack of marketing information systems etc. The constraints to soybean utilization have been principally the fact that many users did not know to prepare the g
rains, the relatively long time it takes to cook and hence requiring scarce firewood which in turn leads to the degradation of the environment. In terms of nutritional quality, both legumes contain anti-nutritional factors that inhibit the availability of protein and other components such as flatulence which causes undesirable formation of gas in the digestion tract, especially for infants.

**5. International trade of cowpea and soybean in SSA**

Cowpea and soybean produced in sub-Sahara Africa are not subject to international trade although some insignificant patchy information reports about export of soybean and imports of soybean oil by South Africa and Nigeria at world market level. However, in a number of countries especially in West Africa, local and cross-border country's trade for cowpea, but not yet for soybean, have been developed and relatively well organized through the marketing chain systems from the producer through intermediaries such as, collectors, wholesalers, exporters and retailers all identified as cowpea market role-players to the end-users. In Eastern and Southern Africa, the trade of cowpea is yet to be organized but there are established trade structures (e.g. COMESA) which can be used if increased production in the sub-region requires.

Studies have shown that trade is influenced by many factors and consumers' preferences, prices, quality of the produce, availability are known among others to be important in cowpea trade. What is important for cowpea is certainly also true for soybean although there is no data to support this.

**6. Technologies, institutions & infrastructure issues of cowpea and soybean in SSA**

The most evident technology for cowpea and soybean available so far include improved high yielding varieties, proven efficient storage techniques (e.g. triple plastic bagging for cowpea) and several small processing machines. If some technologies have been largely adopted (e.g. the dual-purpose improved varieties of cowpea and soybean in Nigeria), there is little or no information about large-scale adoption of the other technologies. The literature searched revealed that institutional and infrastructure issues have apparently not been or have been only slightly addressed

**Overall**, cowpea and soybean are two tropical grain legumes with great potentials to address food security and poverty for the livelihoods of millions of poor farmers and urban dwellers. Research on these crops has focused more to improve varieties in order to increase productivity and production. The other important issues of the chain such as nutrition, processing, trade, technology, institutional and policy have not yet received the needed attention to tap all the potentials of these legumes. Unless these constraints are addressed and opportunities used, the potentials of these crops to improve the livelihood of millions of poor in sub-Sahara Africa will remain low. The literature focuses more on cowpea than on soybean in Central and Western compared to Eastern and Southern Africa, and hence a suggestion may be to strengthen project activities in Eastern and Southern Africa.

## Acronyms

**CEEAC:** Communauté Economique des Etats de l'Afrique Centrale

**CIAT:** Centro Internacional de Agricultura Tropical

**COMESA:** Common Market for Eastern and Southern Africa

**ECOWAS**: Economic Community of West African States

**ICRISAT:** The International Crops Research Institute for the Semi-Arid Tropics

**IITA:** International Institute of Tropical Agriculture

**LLPI:** The Leather and Leather Product Institute

**PTA:** Trade and Development Bank for Eastern and Southern Africa

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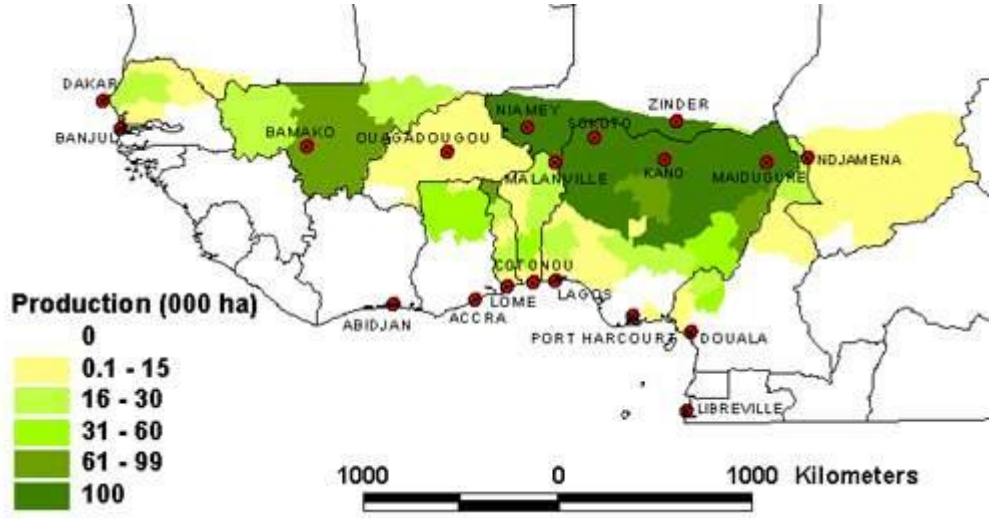
## Acknowledgements

I thank Dr. Muaka Toko consultant and the research associates Fabienne Adigoun, Theodore Nouhoheflin and Casimir Aitchedji who contributed to draft the report and provided statistics and literature search.

**Annex 1.**

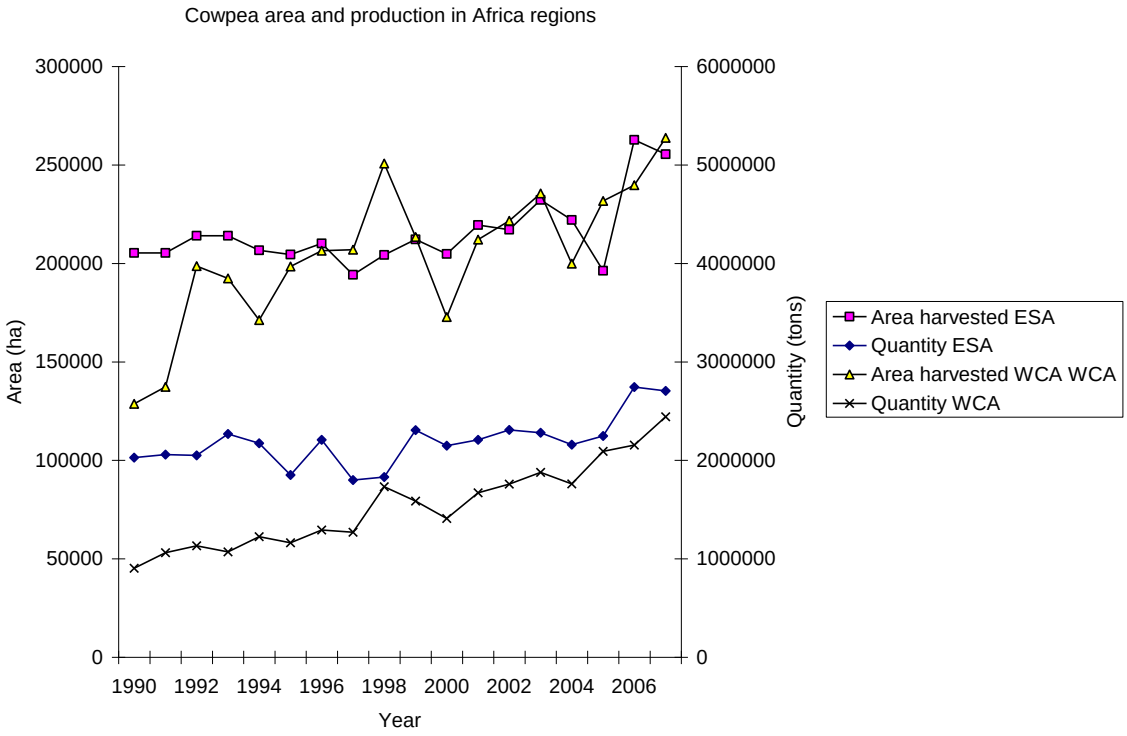
**Figure1. Cowpea zones in Western Africa**

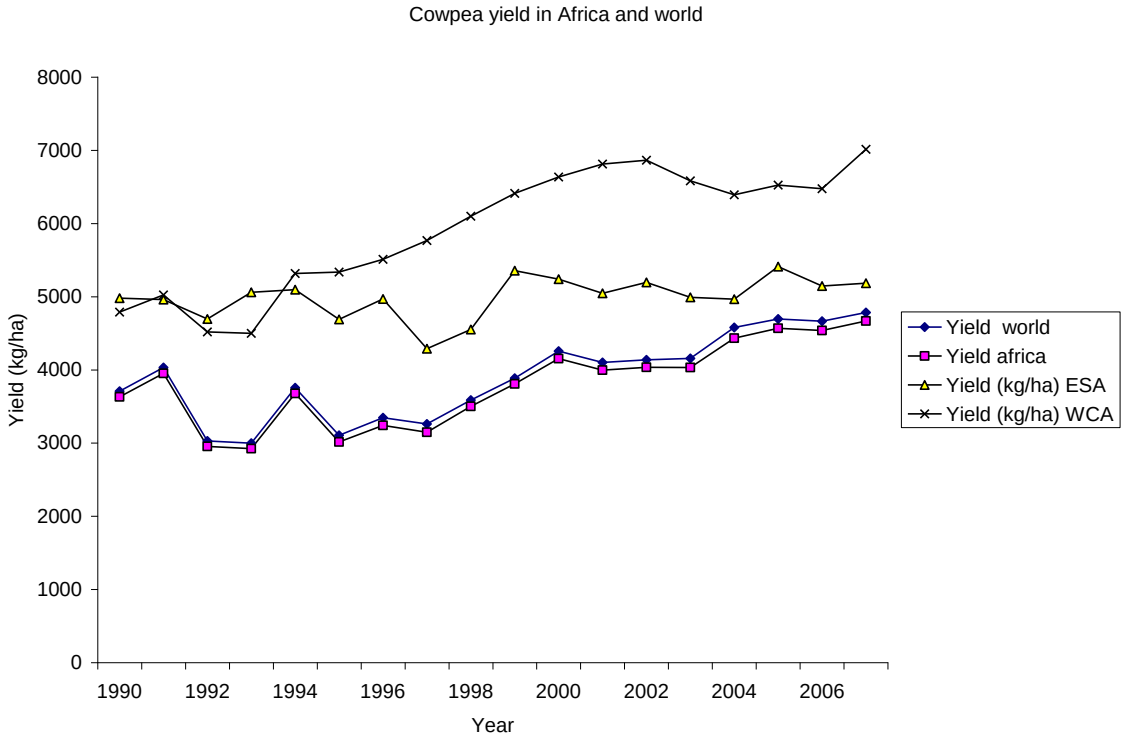



Source: Lowenberg-DeBoer (???)

## Annex 2.

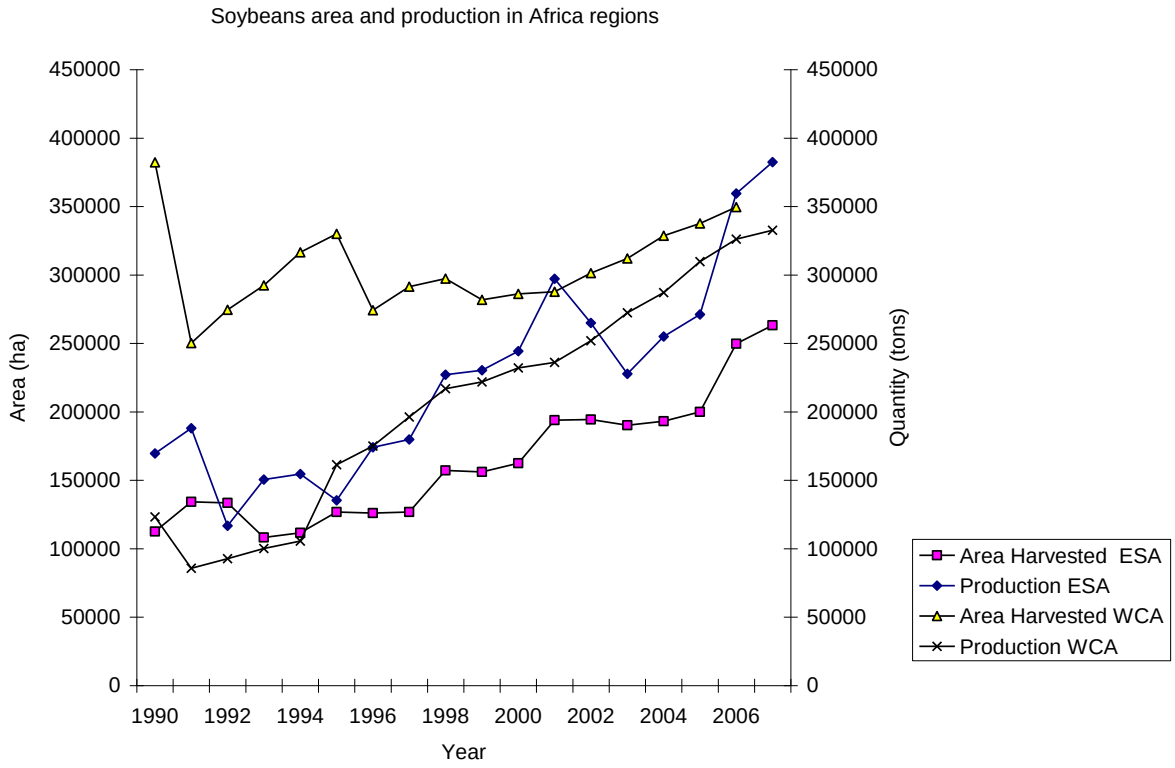
**Figure 2: Trends of area and production of cowpea in WCA and ESA (1990-1997)**

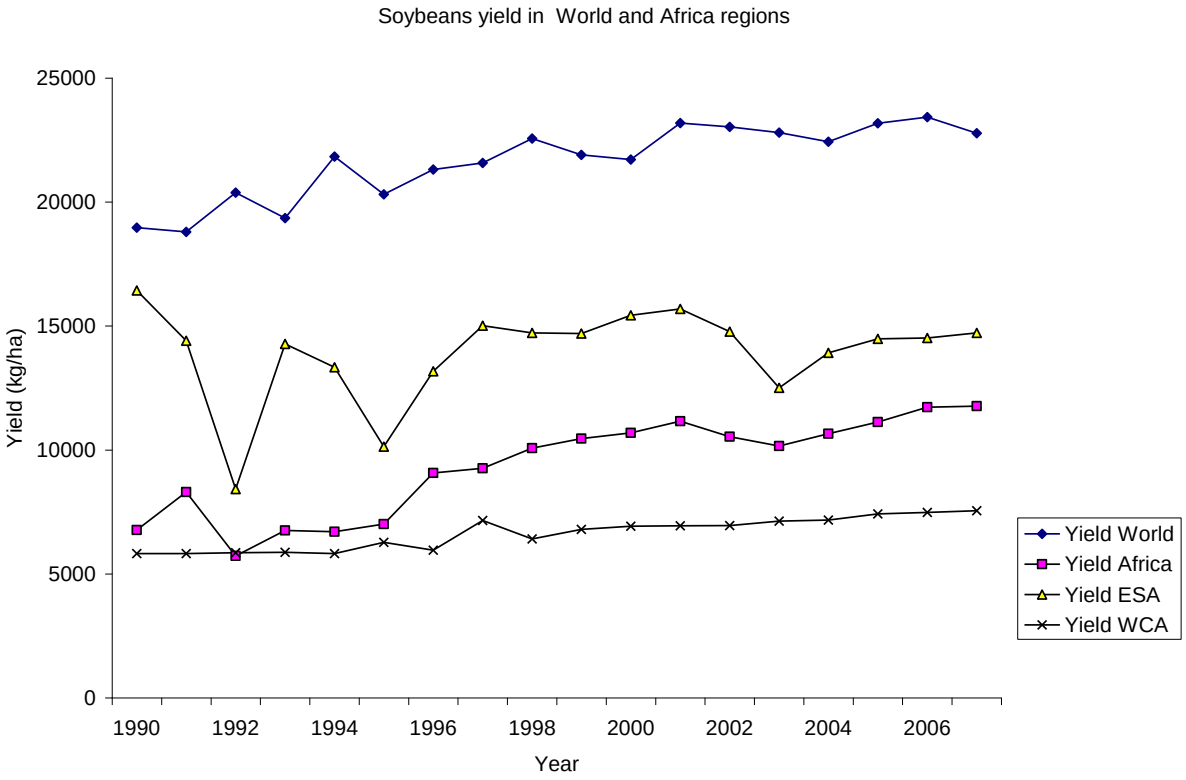


**Annex 3**

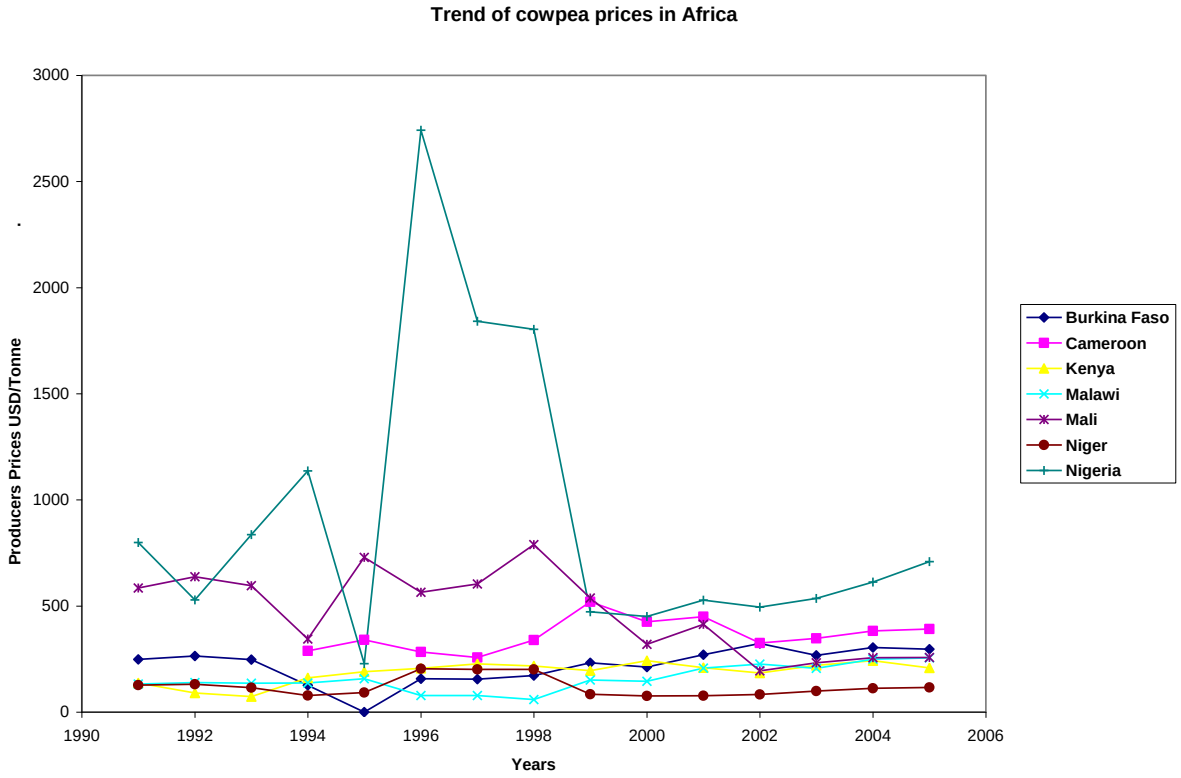
**Figure 3: Trends of area and production of soybean in WCA and ESA (1990-1997)**

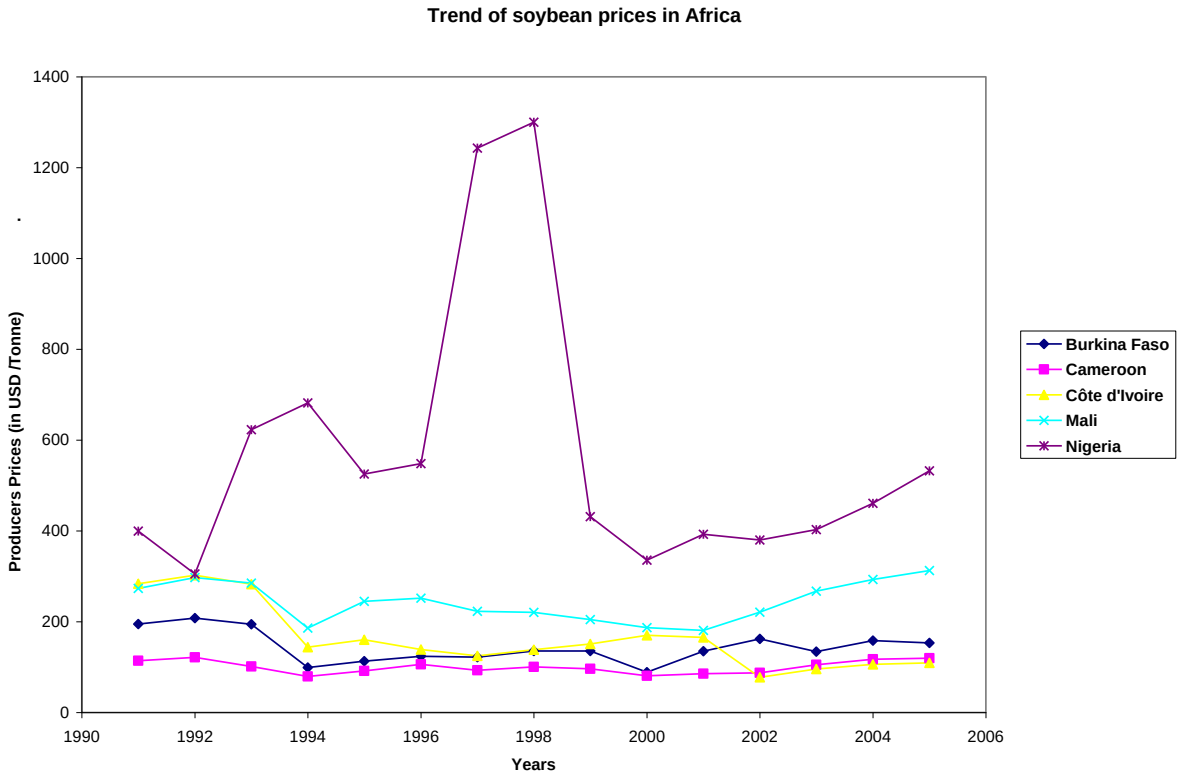



Soybeans yield in World and Africa regions
25000
20000
15000
10000
5000
0
Yield (kg/ha)
1990
1992
1994
1996
1998
2000
2002
2004
2006
Year
Yield World
Yield Africa
Yield ESA
Yield WCA

## Annex 4.

**Figure 4**. Trends of cowpea and soybean prices in selected countries in WCA and ESA




Trend of soybean prices in Africa
Producers Prices (in USD /Tonne)
1400
1200
1000
800
600
400
200
0
1990
1992
1994
1996
1998
2000
2002
2004
2006
Years
Burkina Faso
Cameroon
Côte d'Ivoire
Mali
Nigeria