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# TRENDS IN THE PRODUCTION, TRADE, AND CONSUMPTION OF FOOD-LEGUME CROPS IN SUB-SAHARAN AFRICA

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## ABSTRACT

**TRENDS IN THE PRODUCTION, TRADE, AND CONSUMPTION OF FOOD-LEGUME CROPS IN SUB-SAHARAN AFRICA**

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Food legumes in Sub-Saharan Africa play a vital role by being a source of livelihood for millions of people; and offer tremendous potential to contribute to the alleviation of malnutrition among resource-poor farmers. They contribute to the sustainability of cropping systems and soil fertility. Cowpea and dry beans are the two main food legume crops grown in Sub-Saharan Africa. Area harvested under all food legumes was more than 20 million ha in 2006-08, representing 28% of the global food legume area harvested. Yields are low compared to other developing and developed countries; however they have increased at an annual rate of 1.6% with an increase in production of 3.9% per year. The region has stayed a net importer over the period. Price has increased 5% in real terms from mid 1990s to 2006-08. Per capita availability for consumption has increased at an annual rate of 1.7% and is estimated to be 12.3 kg in 2006-08, which is about 35% higher than the average for developing countries. The future of the legume crop sector remains positive in Sub-Saharan Africa if these crops get the required policy attention in terms of research and institutional infrastructure. However, factors such as scientific breakthroughs and policies regarding competing crops for land use (such as biofuels) or protein sources are highly unpredictable and could rapidly change this positive outlook.

# DEDICATION

To all supportive hearts and minds who assisted me throughout the process of this thesis.

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## ABBREVIATIONS

| | |
|---|---|
| CA | Central Africa |
| C Asia | Central Asia |
| CGIAR | Consultative Group on International Agricultural Research |
| DC | Developed countries |
| DIIVA | 'Diffusion and Impact of Improved Varieties in Africa' project |
| D.R. CONGO | Democratic Republic of Congo |
| EA | Eastern Africa |
| E Asia | East Asia |
| FAO | United Nation's Food and Agriculture Organization |
| gm | gram |
| Ha | hectare |
| IITA | International Institute for Tropical Agriculture |
| Kcal | kilo calories |
| Kg | Kilogram |
| LAC | Latin America and Caribbean |
| LDC | Less Developed Countries |

| | |
|---|---|
| MENA | Middle East and North Africa |
| nes | not elsewhere specified |
| Ph. | Phaseolus |
| SA | Southern Africa |
| SAsia | South Asia |
| SEAsia | South East Asia |
| SSA | Sub-Saharan Africa |
| t | metric tons |
| WA | West Africa |

## I. Introduction

Food legume[1] crops represent an important component of agricultural food crops consumed in developing countries, especially in Sub-Saharan African countries. Food legume crops complement cereal crops as a source of protein and minerals. They also serve as rotation crops with cereals, reducing soil pathogens and supplying nitrogen to the cereal crop (Beebe, no date). Food legume crops are considered vital crops for achieving food and nutritional security for both poor producers and consumers. Food legumes also play an important role as a source of animal feed in small-holder livestock systems. Food legumes also have higher prices, compared to cereals, and are increasingly grown to supplement farmers' incomes (Gowda et al., 1997). The important and diverse role played by food legumes in the farming systems and in diets of poor people makes them ideal crops for achieving developmental goals of reducing poverty and hunger, improving human health and nutrition, and enhancing ecosystem resilience.

In Sub-Saharan Africa, the total area harvested to all food legume crops totaled 20 million ha in 2006-08, which represents about 28% of global pulse area harvested. Of these 20 million ha, 54% of the area harvested was under cowpea, 28% under dry beans and 18% under all other pulse crops. In the 1990s, West and Central Africa annually produced about 2.6 million tons[2] of cowpea on 7.8 million hectares, accounting for 69% of the world's production and 80% of global area harvested (Langyintuo et al, 2003).

Cowpea plays a vital role as a source of livelihood for millions of people in West and Central Africa. From its production, rural families derive food, animal feed, and cash income. It provides nutritious grain and an inexpensive source of protein for both rural poor and urban

[1] The terms food legume crops and pulse crops are used synonymously in this paper.

[2] 'Ton' as used in this paper refers to metric ton.

consumers. Cowpea grain contains about 25% protein and 64% carbohydrate (Bressani 1985). In terms of poverty effects, food legumes, especially cowpea in Sub-Saharan Africa offers tremendous potential to contribute to the alleviation of protein malnutrition among resource-poor farmers. In addition, cowpea contributes to the sustainability of cropping systems and soil fertility improvements in marginal lands by providing ground cover and plant residues, fixing nitrogen, and suppressing weeds. Some cowpea varieties also cause suicidal germination of *Striga hermonthica*, a devastating parasitic weed of cereals (Langyintuoa et al, 2003). However, climate change through low rainfall and high temperatures is said to decrease cowpea yield. Thus, to satisfy future human food demands, adaptive and strategic research of pulse crops remains necessary; especially to select the best suited varieties (Van Duivenbooden et al, 2002).

Comprehensive studies to assess trends on food legumes production, consumption, andtrade in Sub-Saharan Africa date back in the 1980s (Agostini and Khan (1986); Kelly, T.G, Rao Parthasarathy and Grisko-Kelly H. (2000)[3]). More recently, Akibode and Maredia (2011) studied the global and regional trends of food legume production, consumption, and trade. Their global analysis included Sub-Saharan Africa as one of the regions but without giving details on sub-regions. Given the importance of food legume crops in SSA, this study focuses only on Sub-Saharan Africa and presents detailed factual analysis on sub-regions of West Africa, East Africa, Southern Africa, and Central Africa

[3] These studies dealt with trends from 1980 to 1995

## II. Objectives

The objectives of this study are to:

- Provide a thorough factual assessment and contextual analysis of the food-legume economy in Sub-Saharan Africa at the regional level, as well as sub regional levels.
- Assess commodity-specific trends and developments in food-legume crop productivity, harvested area, price, trade and consumption since the mid-1990s.

The study focuses on common bean (*Phaseolus vulgaris*) and cowpea (*Vigna unguiculata*). These are the two most widely produced food legume crops in the region. Other food legumes included in FAO's definition of pulse crops (see Table 1), such as pigeonpea (*Cajanus cajan*), chickpea (*Cicer arietinum*), lentil (*Lens culinaris*), fababean (*Vicia faba*), lupin (*Lupinus*), vetches (*Vicia*), green peas (*Pisum sativum*), pulses, nes[4] (not elsewhere specified), and Bambara beans-(*Vigna* or *Voandzeia subterranea*) are categorized under "other pulses". While the analysis focuses on Sub-Saharan Africa, other regions or developing countries in other regions are mentioned as a mean of comparison to give an interregional picture. The analysis focuses on data from 1994 to 2008 (the last year for which comprehensive data across countries were available at the time of undertaking this study).

[4] These include pulses that are not else where specified in any FAO categories.

**Table 1: Definition of legume crops focused in this study and corresponding item name in FAOSTAT**

| Focused crop in this study | Scientific name | Corresponding FAO Item Name & Code | FAO Definition | Implications for this study |
|---|---|---|---|---|
| **Common beans** | *Phaseolus vulgaris* | None | -- | No one-to-one correspondence with data and analysis based on FAOSTAT data |
| **Cowpeas** | *Vigna Ungiculanta* | Cow peas, dry (195) | Cowpea, blackeye pea/bean (*Vigna sinensis; Dolichos sinensis*). | **Reported as cowpeas** |
| -- | | Beans, dry (176) | *Phaseolus* spp.: kidney, haricot bean (*Ph. vulgaris*); lima, butter bean (*Ph. lunatus*); adzuki bean (*Ph. angularis*); mungo bean, golden, green gram (Ph. aureus); black gram, urd (*Ph. mungo*); scarlet runner bean (*Ph. coccineus*); rice bean (*Ph. calcaratus*); moth bean (*Ph. aconitifolius*); tepary bean (*Ph. Acutifolius*). Several countries also include some types of beans commonly classified as *Vigna* (*angularis, mungo, radiata, aconitifolia*). | **Reported as dry beans.**<br>• Includes all species of *Phaseolus*. In some countries it corresponds to common beans where that is the only *Phaseolus* species grown.<br>• Because this Item includes so many major types of beans, the data are not strictly comparable across countries and regions |
| **Other Pulses** | | | | |
| Faba beans | *Vicia faba* | Broad beans, horse beans, dry (181) | *Vicia faba*: horse-bean (var. equina); broad bean (var. major); field bean (var. minor). | **Reported as faba beans under "other pulses"** |

**Table 1: (Cont'd)**

| | | | | |
|---|---|---|---|---|
| Chickpeas | *Cicer arietinum* | Chick peas (191) | Chickpea, Bengal gram, garbanzos (*Cicer arietinum*). | **Reported as chickpeas under "other pulses"** |
| Lentils | *Lens culinaris* | Lentils (201) | Lens esculenta; Ervum lens. | **Reported as lentils under "other pulses"** |
| Pigeon peas | *Cajanus Cajun* | Pigeon peas (197) | Pigeon pea, cajan pea, Congo bean (*Cajanus cajan*). | **Reported as pigeon peas under "other pulses"** |
| Peas | *Pisum sativum* | Peas, dry (187) | Garden pea (Pisum sativum); field pea (P. arvense). | **Reported as green peas under "other pulses"** |
| Bambara beans | *Vigna* or *Voandzeia subterranea* | Bambara beans (203) | Bambara groundnut, earth pea (Voandzeia subterranea). These beand are grown underground in a similar way to groundnuts. | **Reported as Bambara beans under "other pulses"** |
| Lupin | *Lupinus* | Lupin (210) | Lupinus spp.. Used primarily for feed, though in some parts of Africa and in Latin America some varieties are cultivated for human food. | **Reported as lupins under "other pulses"** |

**Table 1: (Cont'd)**

| | | | | |
|---|---|---|---|---|
| Vetches | *Vicia sativa* | Vetches (205) | Spring/common vetch (Vicia sativa). Used mainly for animal feed. | **Reported as vetches under "other pulses"** |
| --- | -- | Pulses, nes (211) | Including inter alia: lablab or hyacinth bean (Dolichos spp.); jack or sword bean (Canavalia spp.); winged bean (Psophocarpus tetragonolobus); guar bean (Cyamopsis tetragonoloba); velvet bean (Stizolobium spp.); yam bean (Pachyrrhizus erosus); *Vigna* spp. other than those included in 176 and 195 | **Reported as 'pulses, nes' under "other pulses"**<br>• This category includes other pulses that are not identified separately because of their minor relevance at the international level.<br>• Because of their limited local importance, some countries report pulses under this heading that are classified individually by FAO. |
| --- | | Pulses | As an aggregate category, it includes the following crops: Dry Beans, Broad beans, Chick peas, Cow peas, Lentils, Pigeon peas, Bambara beans, Lupins, Dry Peas, Pulses, nes, and Vetches | This aggregate category is not explicitly focused in this study—but included in some analysis as an aggregate category for comparison with cereal crops. |

It is my hope that the data and analysis on facts and trends on pulse crops in SSA presented in this paper will provide valuable background information and direction to researchers working on these crops. I also hope that this factual analysis will also help managers, stakeholders along the value chain, and policy makers in guiding their investment decisions to improve the overall efficiency of the pulse crop sector and to enhance the potential role of these crops in meeting the developmental goals that ultimately benefit the producers and end users of pulse crops globally, and especially in Sub-Saharan Africa.

## III. Data and limitations

The analysis is based on a review of secondary data, published research and analytical reports. FAO data accessed from FAOSTAT (http://faostat.fao.org) are the primary source of data used for the analysis. Akibode and Maredia (2011) point to the many weaknesses of FAO agricultural production data (which relies on data reported by the national agricultural statistical units). These limitations and weaknesses also apply to this study and are summarized as follow:

1. Lack of production, trade and consumption data for 'common beans' (*Phaseolus vulgaris*). FAO does not report data for 'common beans'. Instead it reports data for a category called 'dry beans' which includes all species of *Phaseolus* beans, including common beans, mung beans, black gram, lima beans and adzuki beans. Thus, there is not a one-to-one comparison of our focused commodity 'common beans' and what FAO reports as dry beans in SSA or other regions. To avoid any misinterpretation, the term 'common beans' is not used when reporting data from FAO. Data from FAO for 'Phaseolus' and other Vigna beans (except, *Vigna unguiculata*) are reported as 'dry bean'. In some countries and sub-regions, this may greatly overestimate the area and production of 'common bean' (*Phaseolus vulgaris*), but for some sub-regions it may be equivalent to common beans.

2. There are significant gaps in FAO data in terms of missing data for important legume producing countries and/or data miss-reported under an incorrect category of pulse crop. As a consequence, it is likely that some minor pulse crops may be lumped with a major pulse crop category in a given country. For example, common beans may be reported as cowpeas in West Africa or cowpeas may be reported as dry beans or other types of pulses in some countries in East, Central and Southern Africa.

3. FAO data does not take into account cropping practices. A caveat to note about food legume crops is that in many developing countries, legumes are inter-cropped with other food crops rather than grown as a sole crop. Thus, a one hectare of cowpea, for example, may have many other crops in the same field. This practice of inter-cropping which is common in legume crops in many parts of the developing world, including SSA, may overestimate the area and underestimate the average yield when the total production is divided by 'total area' reported under a legume crop.

4. There is tremendous genetic diversity in pulse crops which makes it difficult for the reporting personnel to classify legume crops in an appropriate FAO category. Many pulse crops (esp. cowpea and common bean) have similar visual appearance in terms of size, color and shape and are often referred by consumers simply as 'beans' or 'haricot'. Reporting agents in different countries may not be aware of all the scientific names of different pulse crops and may end up classifying them in an incorrect pulse category.

Despite these weaknesses and limitations, this study uses FAOSTAT as a primary source of secondary data for reporting time series, and global and regional analysis of food legume crops. The analysis is presented in aggregates for the following four sub-regions—East Africa, West Africa, Central Africa, and Southern Africa. The countries included in these regional groupings are as per the definition of sub-regions used by FAO and are indicated in Table 2. Some observations about the country composition of these sub-regional groups are worth noting.

**Table 2: List of countries included in Sub-regional analysis (composition is mainly defined by FAO)/a**

| CENTRAL AFRICA | EAST AFRICA | | SOUTHERN AFRICA | WEST AFRICA | |
|---|---|---|---|---|---|
| Angola | Burundi | Mozambique | Botswana | Benin | Mauritania |
| Cameroon | Comoros | Réunion | Lesotho | Burkina Faso | Niger |
| Central African Rep | Djibouti | Rwanda | Namibia | Cape Verde | Nigeria |
| Chad | Eritrea | Seychelles | South Africa | Côte d'Ivoire | Saint Helena |
| Congo | Ethiopia | Somalia | Swaziland | Gambia | Senegal |
| Dem Rep Congo | Kenya | Sudan\a | | Ghana | Sierra Leone |
| Equatorial Guinea | Madagascar | Uganda | | Guinea | Togo |
| Gabon | Malawi | Tanzania | | Guinea-Bissau | |
| Sao Tome and Principe | Mauritius | Zambia | | Liberia | |
| | Mayotte | Zimbabwe | | Mali | |

*a/ An exception is Sudan, which is included as part of SSA in this study (in East Africa sub-region). However, FAO includes Sudan in North Africa.*

This paper is organized as follows. In section 4, pulses in Sub-Saharan Africa are discussed in a global context with respect to its production, price, trade, and consumption. Section 5 focuses on trends in production for total pulses, cowpea, dry bean and "other pulses". Producer prices are analyzed in section 6, and trade and consumption data are presented in sections 7 and 8, respectively. Section 9 and 10 provide the future outlook and concluding thoughts, respectively. Pertinent data and information to supplement the analysis are reported in Annexes[5].

[5] Tables and Figures included in the Annex are referred in the text by numbers following the letter A (to denote its location in the Annex).

## IV. General setting: Pulses in Sub-Saharan Africa and global context

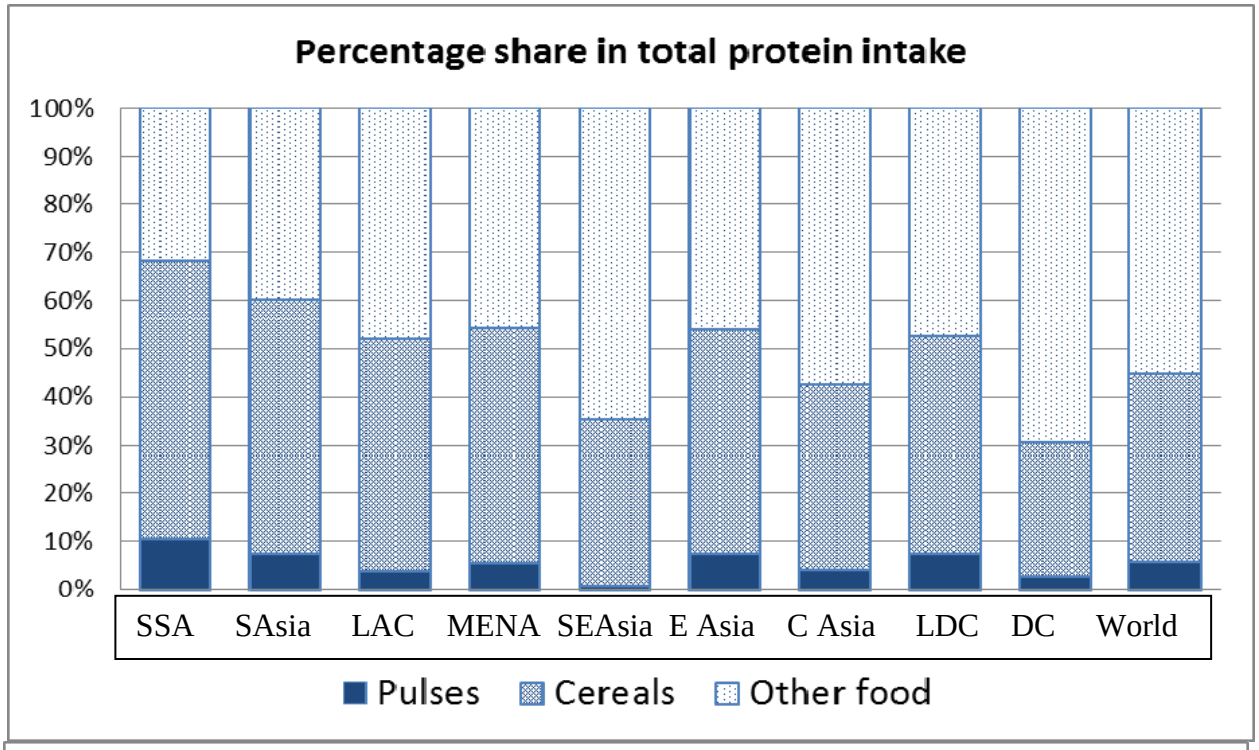
Pulses are important food crops due to their high protein and essential amino acid content. Compared to cereal crops, pulse grains have higher protein content than cereal crops. The grain of pulse crops typically have 20-25% protein compared to 6-10% protein in major cereal crops. Pulses are also rich in complex carbohydrates, dietary fiber and usually have only small amounts of oil.

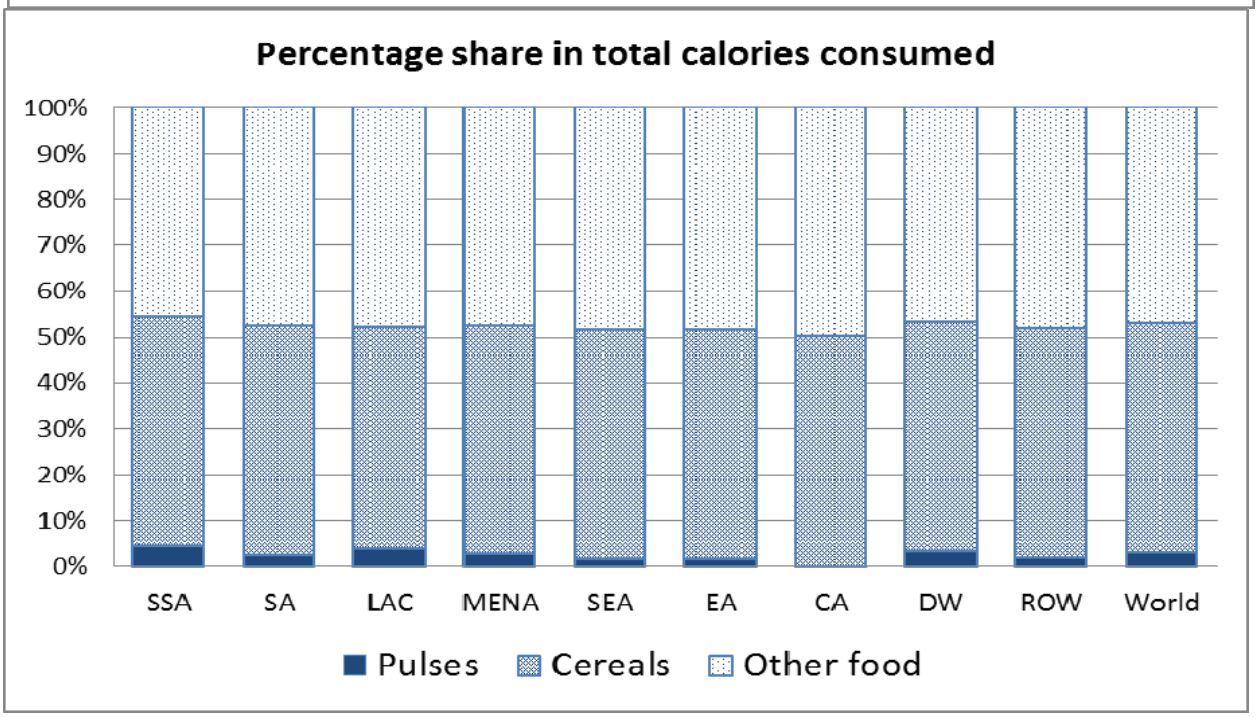
In terms of contribution to calories consumed, pulses -on an average basis (unweighted by population)- account for 4% of total calories consumed in SSA. For the developing world the average share is 3%, SSA has the highest rate compared to other regions of the world (Latin America and Caribbean' South Asia, South East Asia, East Asia, Central Asia). Many countries in SSA have very high rates of per capita calorie consumption from pulses. For example, the contribution of pulses, in terms of calories per day, is 19% in Niger, 14% in Burundi, 13% in Rwanda. However, pulses contribute more towards total protein intake than calorie consumption. In terms of contribution to total protein consumed, SSA ranks first among all regions in the world. Figure 1 shows the contribution of pulses in total protein consumed compared to cereals and other foods for different regions in the world, SSA accounts for the highest percent among regions of the world. Among the top 28 countries in developing world that have at least 10% of pulse contributions to protein intake, 16 are in SSA. In fact, all the top 5 (Burundi with 55%, Rwanda 38%, Uganda 20%, Kenya 20% and Comoros 18%) countries on this list are in Sub-Saharan Africa (Table 3)

Considering pulse production, in SSA, area under pulses is 17% of total area harvested; whereas globally it is 10%. (Akibode and Maredia, 2011). Eastern and Western Africa region have the highest pulse production in SSA (Figure A1 in annex). The conditions in which pulse

crops are grown in SSA are one of the least favorable in the world. In the developing world, on average, the pulse area harvested under rain-fed and low input, rain-fed high input, and irrigated are respectively about 70%, 12.5% and 12.5%; in contrast, in SSA they are about 85%, 15%, and 0%. That indicates that pulses are mainly grown under rain-fed and low input conditions and that no pulse production in SSA occurs under irrigated systems. Compared to cereal crops (i.e., wheat, maize, rice, barley, sorghum and millet), food legumes are primarily grown on poorer quality land. Also, compared to cereal crops, pulse are grown in marginal areas where water is a scarce resource. Moreover, in most countries, because, pulses are considered as secondary crops, they do not receive investment resources and policy attention from governments, as do cereal crops (e.g., maize, rice, wheat), which are often considered food security crops and thus receive priority attention from the research and policy making communities (Byerlee and White 2000). Consequently, the productivity of pulses is one of the lowest among staple crops. In SSA, the average yield of pulse crops was estimated to be just over 500 kg/ha as of 2008.

**Figure 1: Contribution of pulses relative to cereals and other food to total calorie and protein consumption in different regions of the Less Developed Countries (LDC), Developed (DC) and the World, 2005-07 (Source: FAO)**




*Source: FAOSTAT*

For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this thesis.

**Table 3: Developing countries where pulses contribute more than 10% of per capita total protein intake (listed in descending order of percentage protein contribution by pulse crops)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Burundi | 55% | Nicaragua | 16% | Mauritania | 13% | D. Rep. Korea | 11% |
| Rwanda | 38% | Cuba | 16% | Sierra Leone | 13% | Guatemala | 11% |
| Uganda | 20% | Niger | 15% | India | 13% | Mexico | 10% |
| Kenya | 20% | Ethiopia | 15% | Brazil | 13% | Togo | 10% |
| Comoros | 18% | Malawi | 15% | Trinidad and Tobago | 12% | Belize | 10% |
| Haiti | 18% | Angola | 15% | Mozambique | 12% | Paraguay | 10% |
| Eritrea | 18% | Tanzania | 14% | Cameroon | 12% | Botswana | 10% |

*Source: FAO (data for 2005-07)*

Having set the global context of the importance of pulse crops in SSA and conditions under which they are produced compared with cereal crops, we now turn to examine the regional and sub-regional trends in production, price, trade and consumption of food legume crops in SSA since mid-1990s.

## V. Trend Analysis of area, production and yield in SSA

Table 4 presents an overview of the pulses area, production, and yield in SSA in two time periods (1994-96 and 2006-08). In SSA total area cultivated to all pulse crops in SSA was 15 million ha in 1994-96 and 20 m ha in 2006-08. This represents an increase of about 36% at a growth rate of 2.2%/year. Interestingly, during the same period pulse production increased more than 70%, suggesting a positive gain in yields over time. Yields increased by 25% from 440 kg/ha in 1994-96 to 550 kg/ha in 2006-08 (Table 4). The composition of pulse crops grown in SSA shows that in 2006-08, 82% of total pulse area was planted to cowpea and dry bean, with

cowpea accounting for 54% and dry bean for 28%. The share of all "other pulses"[6] in 2006-08 was 18% (Figure 2). In terms of production, the share of cowpeas and dry beans relative to total pulse production was 75% (cowpea 44% and dry beans 31%).

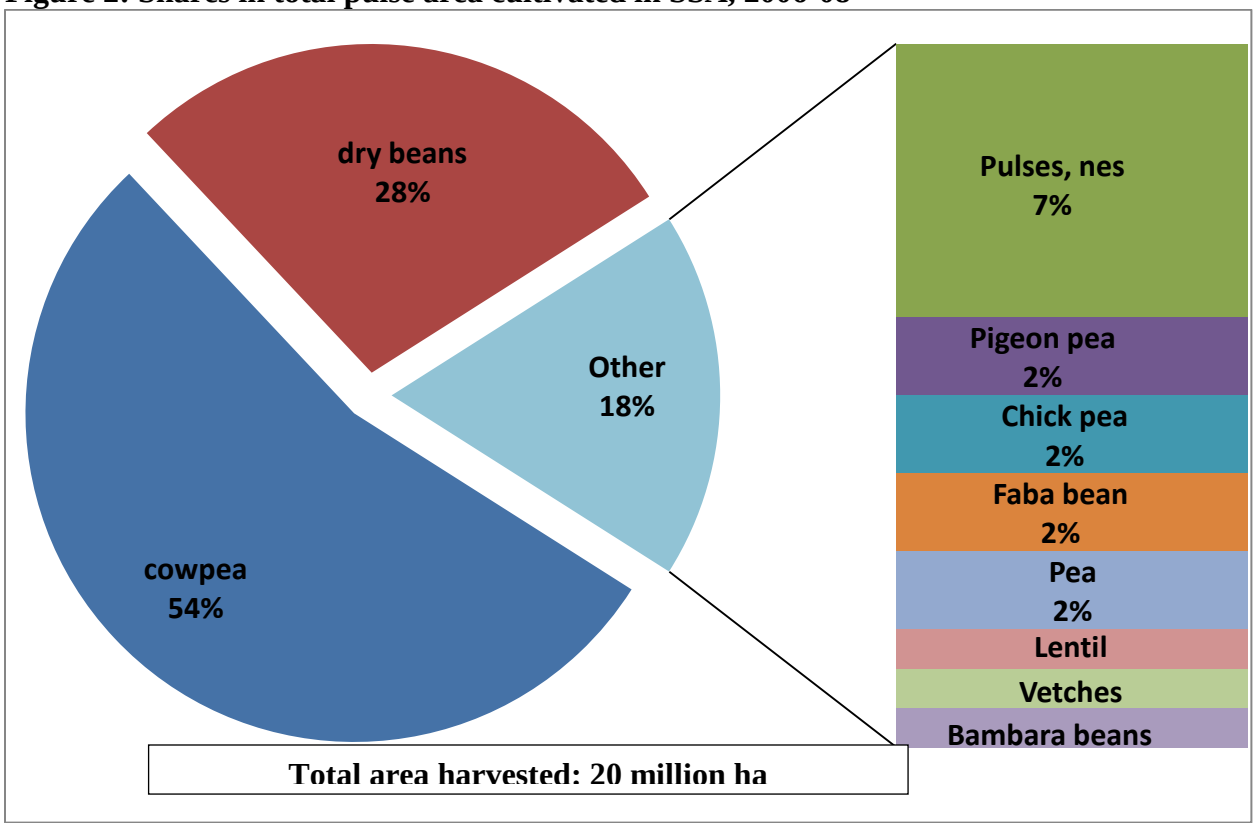
**Table 4: Total area, production and yield of cowpea, dry beans, and "others pulses" in SSA, 1994-06 and 2006-08**

| | Cowpea | Dry beans | Other pulses | Total |
|---|---|---|---|---|
| **Area (million ha)** | | | | |
| 1994-1996 | 8.10 | 3.54 | 3.37 | 15.01 |
| 2006-2008 | 11.03 | 5.69 | 3.72 | 20.43 |
| Change in area | 2.93 | 2.15 | 0.35 | 5.42 |
| % Change | 36.1 | 60.5 | 10.4 | 36.1 |
| Growth rate ( %/year) | 2.2 | 3.4 | 0.7 | 2.2 |
| **Production (million tons)** | | | | |
| 1994-1996 | 2.65 | 2.10 | 1.87 | 6.62 |
| 2006-2008 | 4.93 | 3.50 | 2.86 | 11.29 |
| Change in production | 2.28 | 1.40 | 0.99 | 4.67 |
| % Change | 85.8 | 66.3 | 53.2 | 70.4 |
| Growth rate ( %/year) | 4.5 | 3.7 | 3.1 | 3.9 |
| **Yield (tons/ha)** | | | | |
| 1994-1996 | 0.33 | 0.59 | 0.56 | 0.44 |
| 2006-2008 | 0.45 | 0.62 | 0.77 | 0.55 |
| Change in yield | 0.12 | 0.02 | 0.21 | 0.11 |
| % Change | 35.7 | 3.6 | 38.4 | 25.1 |
| Growth rate ( %/year) | 2.2 | 0.3 | 2.3 | 1.6 |

The top 5 pulse producing countries in 2006-08 are Niger (4.85 million ha), Nigeria (4.31), Tanzania (1.65), Ethiopia (1.38), Kenya (1.45)—Table A1 in the Annex shows 1994-06 and 2006-08 area harvested, production, yields and the corresponding growth rates for top 15 pulses producers in SSA.

[6] As a reminder, in the context of SSA, "other pulses" includes—pigeon pea, chickpea, lentils, faba beans, peas, vetches, pulses, nes, and bambara beans.

**Figure 2: Shares in total pulse area cultivated in SSA, 2006-08**




Lentil, Vetches and Bambara beans have 1% share each in other pulses area.

The dry bean area has increased the most (61%), followed by cowpea (36%) and other pulses (10%); resulting in an average increase in total pulse area of about 36%. In terms of production, cowpea production increased the most (86%) followed by dry beans (66%) and other pulses (53%)--Table 4.

**Cowpea**

In 2006-08, Sub-Saharan Africa accounted for 97% of the global cowpea harvested area and about 94% of global production. The cowpea yield in SSA averaged 0.45 t/ha compared to global average yield of 0.46 t/ha. With a share of 94% of total area and 91% of total production, West Africa dominates the cowpea sector in SSA. Compared to West Africa, cowpea is a 'minor' pulse crop in other regions of SSA, ranging from a regional share of 6% of total

continental production in East Africa, and the remaining 3% in Central Africa. The most significant increase in cowpea harvested area over the period 1994-08 has occurred in Central Africa (131%); however, the absolute increase in area and production is very low in Central Africa compared to West Africa (Table 5).

**Table 5: Cowpea area, production and yield by sub-regions, 1994-96 and 2006-08**

| | EA | CA | SA | WA | SSA |
|---|---|---|---|---|---|
| | | | Area (million ha) | | |
| 1994-1996 | 0.40 | 0.10 | 0.01 | 7.59 | 8.10 |
| 2006-2008 | 0.45 | 0.22 | 0.02 | 10.34 | 11.03 |
| Change in area | 0.05 | 0.13 | 0.00 | 2.75 | 2.93 |
| % Change | 13.4 | 131.9 | 5.1 | 36.2 | 36.1 |
| Growth rate ( %/year) | 0.9 | 6.2 | 0.4 | 2.2 | 2.2 |
| | | | **Production (million tons)** | | |
| 1994-1996 | 0.20 | 0.06 | 0.01 | 2.39 | 2.65 |
| 2006-2008 | 0.26 | 0.16 | 0.01 | 4.50 | 4.93 |
| Change in production | 0.06 | 0.10 | 0.00 | 2.12 | 2.28 |
| % Change | 32.6 | 157.1 | 10.5 | 88.6 | 85.8 |
| Growth rate ( %/year) | 2.0 | 7.0 | 0.7 | 4.6 | 4.5 |
| | | | **Yield (tons/ha)** | | |
| 1994-1996 | 0.50 | 0.64 | 0.48 | 0.32 | 0.33 |
| 2006-2008 | 0.58 | 0.72 | 0.51 | 0.44 | 0.45 |
| Change in yield | 0.08 | 0.07 | 0.02 | 0.12 | 0.12 |
| % Change | 17.0 | 11.2 | 5.2 | 37.5 | 35.7 |
| Growth rate ( %/year) | 1.1 | 0.8 | 0.4 | 2.3 | 2.2 |

While West Africa displays the largest amount of harvested area, yield in West Africa is the lowest among all sub-regions, averaging 0.44 tons/ha in 2006-08, compared to 0.72 t/ha in Central Africa, and 0.58 t/ha in East Africa (Table 5). In most countries, cowpea yields are low due to the use of low yielding traditional varieties, poor soil fertility, unfavorable weather, and insect pests and diseases (Sawadogo et al., 1985; Diehl and Sipkins,1985; Mortimore et al., 1997; Blade et al., 1997). However over the past 14 years cowpea yields have shown a positive

trend in all of the sub-regions of SSA. This may be due to adoption of improved varieties of cowpeas in major producing countries in Sub-Saharan Africa. In 2009, the adoption rate of improved cowpea varieties in some West African countries was estimated to be as high as 82% in Ghana, 70% in Cameroon, 60% in Niger, 38% in Nigeria, 27% in Senegal, and 10% in Burkina Faso (Arega Alena 2011, personal communications).[7] In Nigeria, one of the largest cowpea growing country in SSA, the production trend of cowpea shows a significant improvement with about 441% increase in area planted and 410% increase in yield from 1961 to 1995 (Ortiz 1998). According to Singh et al (1997), "…several factors account for these impressive increases. Over the last two decades, IITA has made significant advances in improving the productivity of cowpea in Sub-Saharan Africa. A number of varieties have been developed which combines diverse plant types, different maturity periods, and resistance to several diseases, insect pests, and parasitic weeds, and possessing other good agronomic traits". Overall, between 1994-1996 and 2006-2008, the highest increase in cowpea yield occurred in West Africa (37%) followed by Central Africa (17%), and East Africa (11%)—Table 5. Figure 3 shows cowpea yield by sub-regions. Table A14 in annex shows rates of adoption of cowpea modern varieties in some West Africa Countries and specific locations that data represents.

[7] These estimates are based on expert opinion surveys conducted by IITA under the DIIVA project funded by the Bill and Melinda Gates Foundation

**Figure 3: Cowpea yield by sub-region, 1994-96 and 2006-08**

Table 6 lists the top 15 cowpea producing countries in SSA. Not surprisingly, West Africa has the top 5 cowpea producing countries in the continent[8], covering 93% the total area harvested in SSA in 2006-2008. With more than 4 million ha of harvested. Burkina Faso, the third largest cowpea producing country has 700,000 ha of cowpeas while and other countries have less than 250,000 ha, (Table 6).

[8] According to FAO data the top five cowpea producing countries are in West Africa (with Niger and Nigeria being the top two cowpea growers in 2006-08). However, major cowpea producing countries such as Brazil and India are reported by FAO as having zero hectares of cowpeas. According to the analysis presented by Akibode and Maredia (2011), there are hundreds of thousands of hectares planted to cowpea but are mis-reported as other pulse category (either as 'dry beans' or 'pulses, nes'). If these unreported hectares are accounted for, that would put these two countries among the top five cowpea producing countries in the world.

**Table 6: Cowpea top producing countries ranked by area harvested, 2006-08[9]**

| | Country | Sub-regions | Average area harvested 2006-2008 (Million ha) | % share in total area harvested in SSA | Cumul-ative % | Average production 2006-2008 (Million tons) | Average yield 2006-2008 (tons/ha) |
|---|---|---|---|---|---|---|---|
| 1 | Niger | WA | 4.76 | 42.72 | 42.72 | 1.10 | 0.23 |
| 2 | Nigeria | WA | 4.40 | 39.47 | 82.19 | 2.92 | 0.66 |
| 3 | Burkina Faso | WA | 0.70 | 6.30 | 88.49 | 0.33 | 0.47 |
| 4 | Mali | WA | 0.25 | 2.20 | 90.70 | 0.07 | 0.29 |
| 5 | Senegal | WA | 0.21 | 1.90 | 92.60 | 0.08 | 0.36 |
| 6 | Tanzania | EA | 0.15 | 1.35 | 93.94 | 0.06 | 0.38 |
| 7 | Kenya | EA | 0.15 | 1.32 | 95.26 | 0.07 | 0.50 |
| 8 | DR Congo | CA | 0.12 | 1.04 | 96.30 | 0.06 | 0.48 |
| 9 | Sudan | EA | 0.11 | 0.98 | 97.29 | 0.03 | 0.26 |
| 10 | Cameroon | CA | 0.11 | 0.94 | 98.23 | 0.10 | 0.98 |
| 11 | Malawi | EA | 0.08 | 0.72 | 98.94 | 0.05 | 0.69 |
| 12 | Uganda | EA | 0.07 | 0.65 | 99.59 | 0.08 | 1.04 |
| 13 | Mauritania | WA | 0.02 | 0.21 | 99.80 | 0.01 | 0.35 |
| 14 | South Africa | SA | 0.01 | 0.12 | 99.92 | 0.01 | 0.52 |
| 15 | Madagascar | EA | 0.00 | 0.04 | 99.96 | 0.00 | 0.83 |

**Dry beans**

Dry beans are the second most widely cultivated pulse crop in Sub-Saharan Africa, representing about 28% of the total pulse harvested area (5.69 million ha) and 31% of total pulse production (3.50 million tons) in 2006-2008. Dry bean accounts for about 5.69 million ha of area cultivated and 3.50 million tons of quantity produced (Table 7). Dry bean area and production is concentrated in East Africa, which represents 74% of the total dry bean area and 76% of total production.

[9] Table A2 in the Annex includes 1994-06 figures and growth rates for top cowpea producing countries

**Table 6: Dry bean area, production and yield by sub-regions, 1994-06 and 2006-08**

| | EA | CA | SA | WA | SSA |
|---|---|---|---|---|---|
| | | Area (million ha) | | | |
| 1994-1996 | 2.54 | 0.68 | 0.08 | 0.24 | 3.54 |
| 2006-2008 | 4.21 | 1.01 | 0.07 | 0.39 | 5.69 |
| Change in area | 1.67 | 0.33 | 0.00 | 0.15 | 2.15 |
| % Change | 65.6 | 48.7 | -4.7 | 61.3 | 60.5 |
| Growth rate ( %/year) | 3.7 | 2.9 | -0.3 | 3.5 | 3.4 |
| | | **Production (million tons)** | | | |
| 1994-1996 | 1.54 | 0.39 | 0.07 | 0.10 | 2.10 |
| 2006-2008 | 2.67 | 0.54 | 0.06 | 0.23 | 3.50 |
| Change in production | 1.13 | 0.15 | -0.01 | 0.12 | 1.40 |
| % Change | 73.5 | 38.8 | -15.3 | 120.2 | 66.3 |
| Growth rate ( %/year) | 4.0 | 2.4 | -1.2 | 5.8 | 3.7 |
| | | **Yield (tons/ha)** | | | |
| 1994-1996 | 0.61 | 0.57 | 0.90 | 0.43 | 0.59 |
| 2006-2008 | 0.63 | 0.54 | 0.82 | 0.57 | 0.62 |
| Change in yield | 0.03 | -0.04 | -0.08 | 0.14 | 0.02 |
| % Change | 4.8 | -6.3 | -9.0 | 33.7 | 3.6 |
| Growth rate ( %/year) | 0.3 | -0.5 | -0.7 | 2.1 | 0.3 |

Central Africa is the next important dry bean-growing region with an 18% of total harvested area and 16% of total dry bean production. West Africa follows in the third position with 7% of total harvested area and 6% of total production (Figure 4). Over the past 14 years, the dry bean harvested area and production have increased in all sub-regions except Southern Africa[10] (Table 7). The greatest increase in the dry bean area has occurred in East Africa (66%), followed by West Africa (61%) and Central Africa (49%)-(Table 6). In 2006-08, dry bean yield was highest in Southern Africa (0.8 tons/ha), although average yields in that sub-region declined by 9% compared to yields in 1994-1996. Yields in East Africa and West Africa averaged 0.63 and 0.57 tons/ha respectively in 2006-08 (Table 7).

[10] As a reminder, Southern Africa only includes Botswana, Lesotho, Namibia, South Africa and Swaziland.

**Figure 4: Regional share in dry bean area and production, 2006-08**

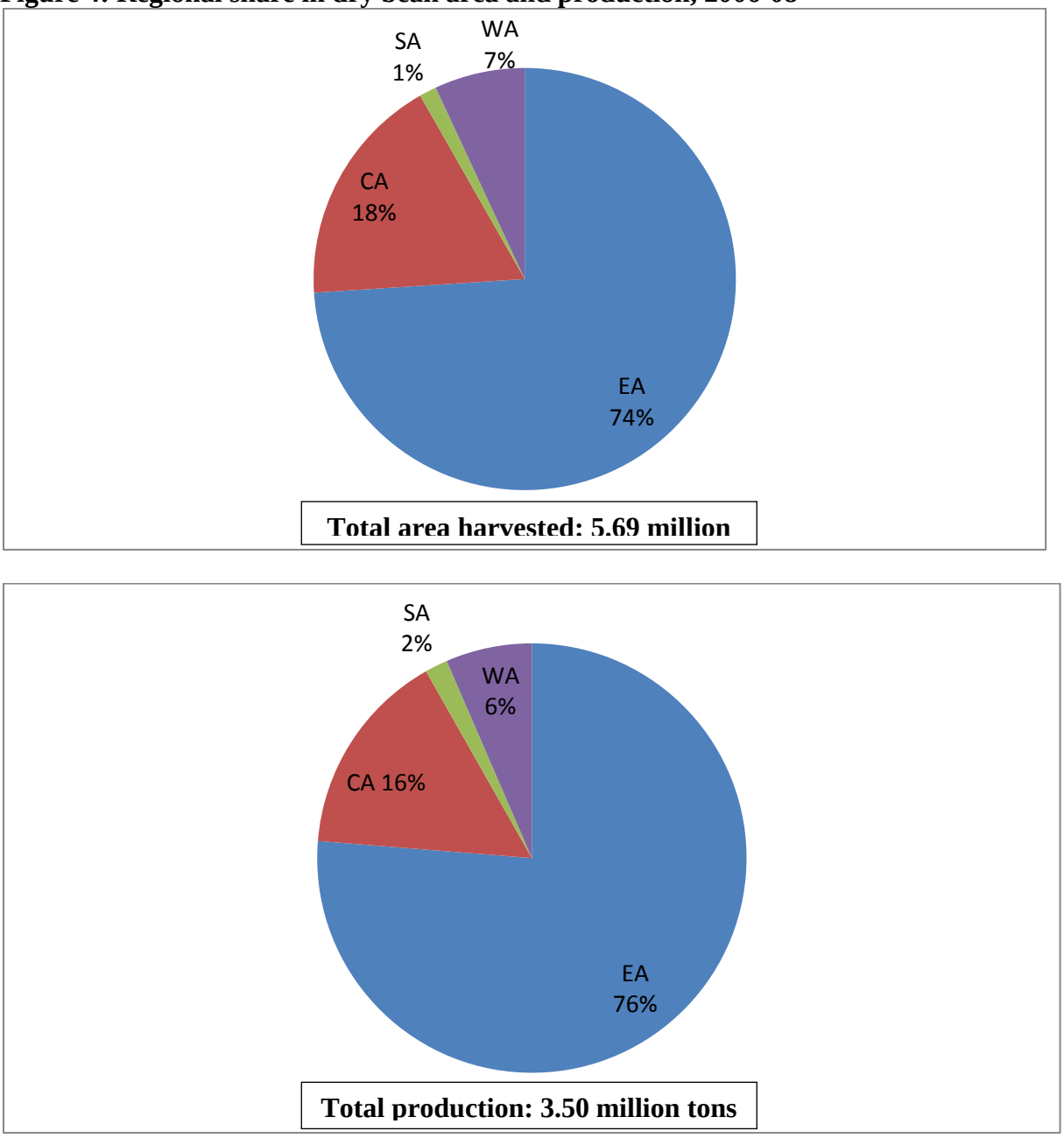
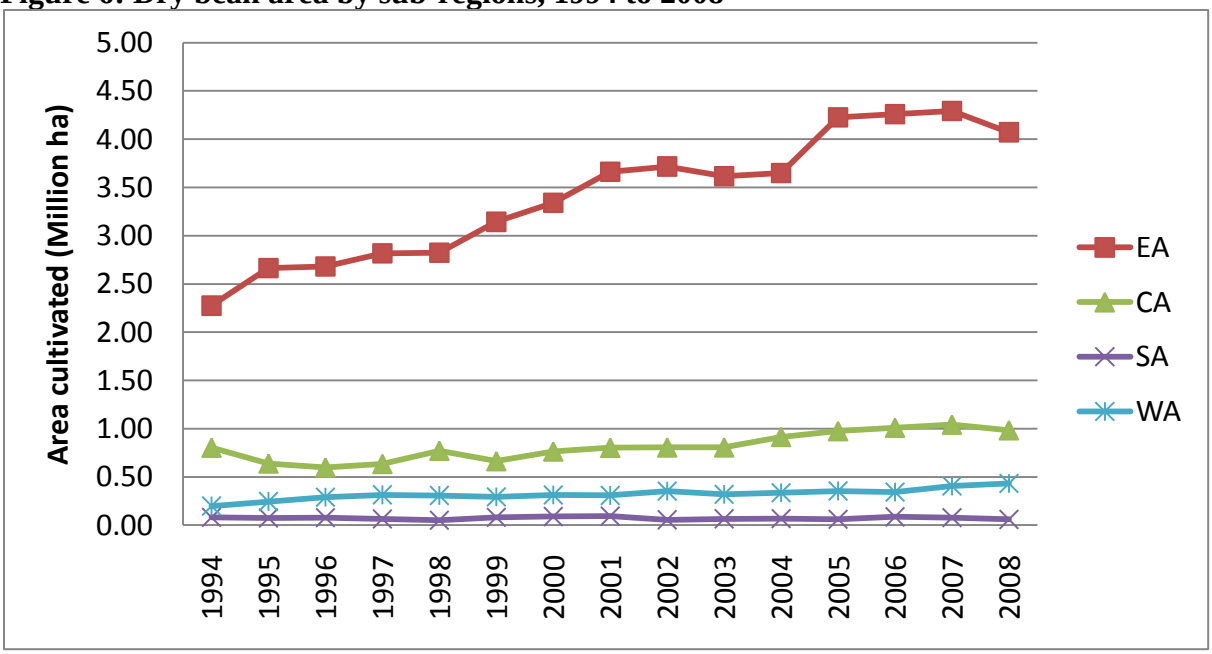



Figure 5 shows dry bean yields in all sub-regions in 1994-96 and 2006-08. Trend analysis shows that area cultivated and production are relatively stable and stagnant in all sub-regions except East Africa, where a clear increasing trend was observed from 1994 to 2008 (Figure 6 and 7).

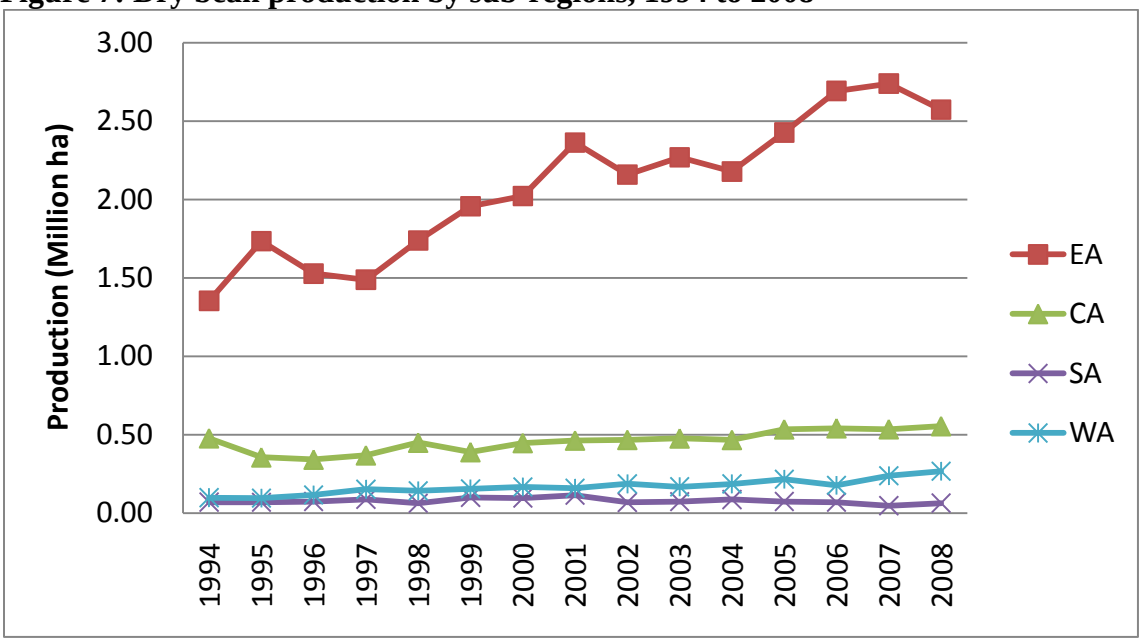
**Figure 5: Dry bean yield by sub-regions, 1994-96 and 2006-08**

**Figure 6: Dry bean area by sub-regions, 1994 to 2008**




Yields were stagnant in all sub-regions except Southern Africa, which experienced high variability in yield with a big decline in 2007 (Figure 7).

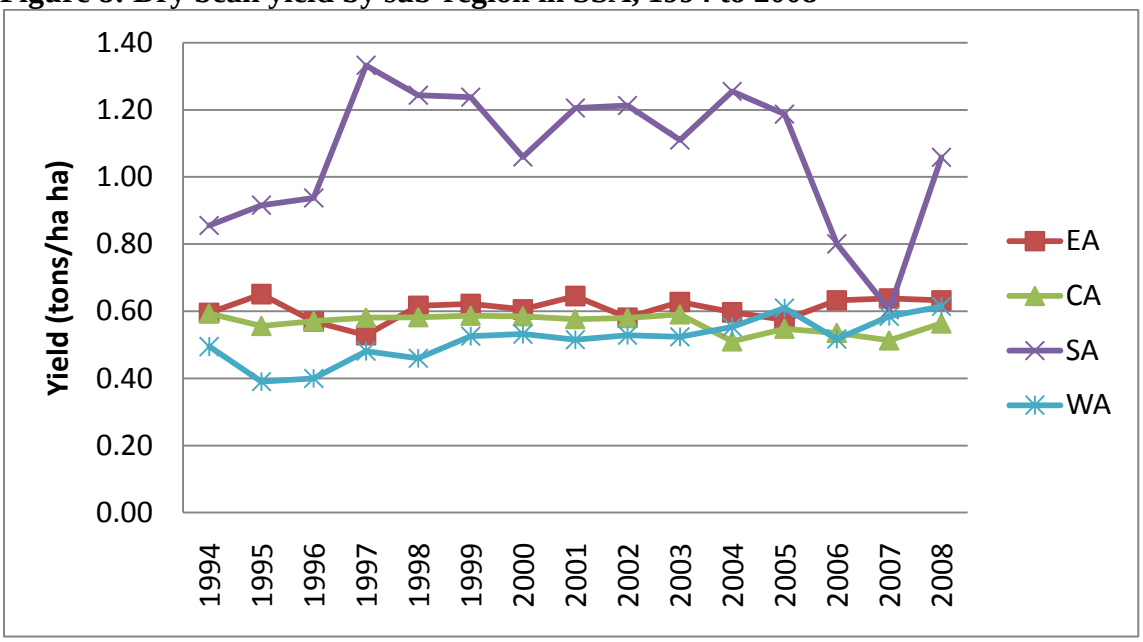
**Figure 7: Dry bean production by sub-regions, 1994 to 2008**




It is noticeable that yields have improved for cowpea. But there is no noticeable increase in yield of dry bean at an aggregate level. This is despite the evidence of increasing adoption of new improved varieties of common beans in many East African countries. According to the recent adoption survey conducted by CIAT through expert opinion,[11] the adoption of new improved varieties of common beans in many East African countries range from as high as 83% in Malawi, 77% in Ethiopia, 66% in Rwanda, 64% in Zimbabwe, 60% in Burundi, 50% in Zambia, 36% in Mozambique and 32% in Uganda (Muthoni et al. 2011). However, about half of the area under improved varieties is planted to varieties developed and released prior to 1998. In other words, farmers are not adopting newer varieties and replacing the older ones at a rate fast enough to take advantage of the increased genetic yield gains.

[11] This survey falls under the same DIIVA project mentioned earlier and is using the same methodology as used by IITA for estimating the adoption rates for cowpea varieties.

**Figure 8: Dry bean yield by sub-region in SSA, 1994 to 2008**




At the country level, not surprisingly, the top four dry bean-producing countries (in terms of area harvested) are in East Africa. Together, they represent 68% of the total dry bean area in SSA. In ranking, Tanzania, Uganda, Kenya, Rwanda and Angola are the top five 5 dry bean growers with respectively 21%, 15%, 15% and 7% of the total dry bean area in SSA (Table 8). Tanzania, which was third in rank behind Kenya and Uganda in 1994-96, became first in rank in 2006-08 after increasing its harvested area by 246% compared to Kenya (20%) and Uganda (46%), which were respectively first and second in 1994-96 (Table A3, Figure 9).

**Table 7: Dry bean area harvested and production in major dry bean producing countries in SSA, 2006-08**

| | Countries | Sub-Region | Average area harvested 2006-08 (million ha) | % share in area harvested 2006-08 (million tons) | Cumulative % share 2006-08 | Average production 2006-08 (million tons) | Average yield 2006-08 (tons/ha) |
|---|---|---|---|---|---|---|---|
| 1 | Tanzania | EA | 1.20 | 21.07 | 21.07 | 0.85 | 0.71 |
| 2 | Uganda | EA | 0.87 | 15.30 | 36.37 | 0.43 | 0.50 |
| 3 | Kenya | EA | 0.83 | 14.54 | 50.91 | 0.41 | 0.48 |
| 4 | Rwanda | EA | 0.40 | 7.06 | 57.97 | 0.31 | 0.77 |
| 5 | Angola | CA | 0.39 | 6.82 | 64.79 | 0.11 | 0.28 |
| 6 | Cameroon | CA | 0.28 | 4.92 | 69.70 | 0.25 | 0.89 |
| 7 | Malawi | EA | 0.25 | 4.47 | 74.17 | 0.12 | 0.49 |
| 8 | Burundi | EA | 0.23 | 4.04 | 78.21 | 0.21 | 0.90 |
| 9 | DR Congo | CA | 0.21 | 3.64 | 81.85 | 0.11 | 0.54 |
| 10 | Ethiopia | EA | 0.21 | 3.62 | 85.47 | 0.20 | 0.96 |
| 11 | Togo | WA | 0.19 | 3.31 | 88.78 | 0.06 | 0.33 |
| 12 | Benin | WA | 0.15 | 2.55 | 91.33 | 0.12 | 0.82 |
| 13 | Chad | CA | 0.13 | 2.31 | 93.64 | 0.07 | 0.52 |
| 14 | Madagascar | EA | 0.08 | 1.47 | 95.11 | 0.09 | 1.05 |
| 15 | Somalia | EA | 0.07 | 1.14 | 96.25 | 0.02 | 0.28 |

In all countries, production is highly correlated with area harvested, except in Uganda where production followed a linear trend while harvested area fluctuated year-to-year (Figure 9, 10, and 11). Yield has not significantly increased from 1994-96 to 2006-08. The increase was 6% in Tanzania and Rwanda and 15% in Kenya. However There is a decrease in yield in Uganda (-12%) and Angola (-33%)—Table A3[12], in the Annex and Figure 11.

[12] Table A3 in the Annex included 1994-06 figures and growth rates for top dry bean producing countries

**Figure 9: Dry bean harvested area in the top five producing countries in SSA, 1994 to 2008**

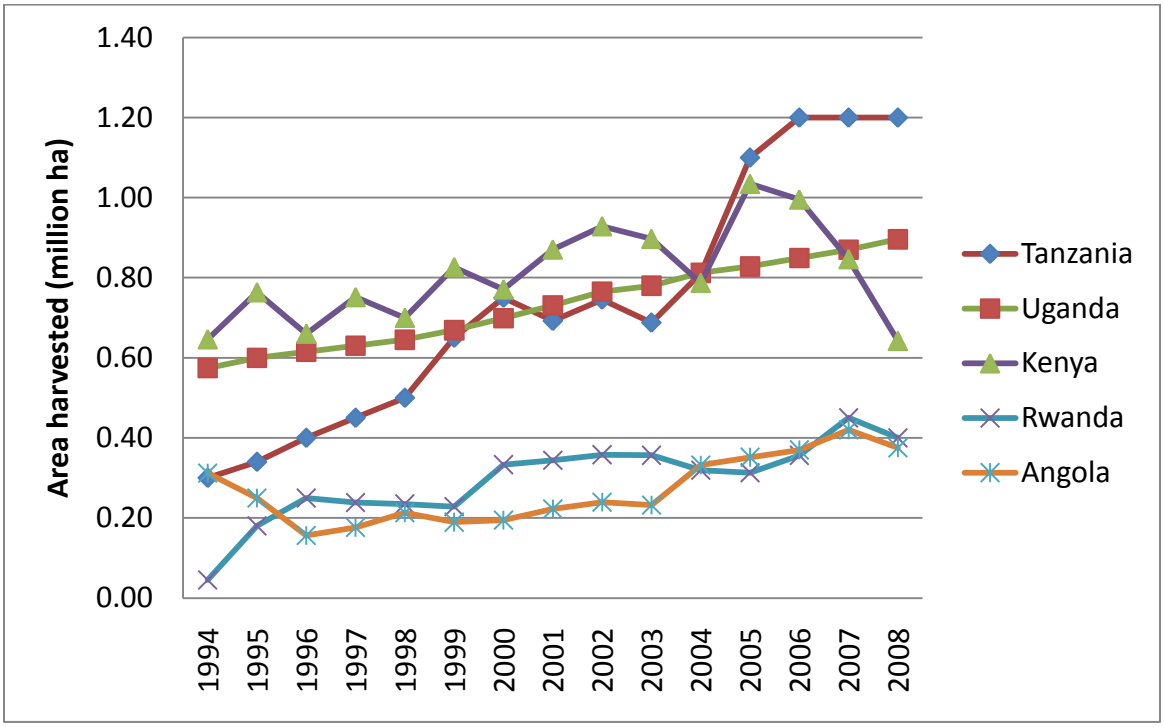



**Figure 10: Dry bean production in the top five dry bean producing countries in SSA, 1994 to 2008**

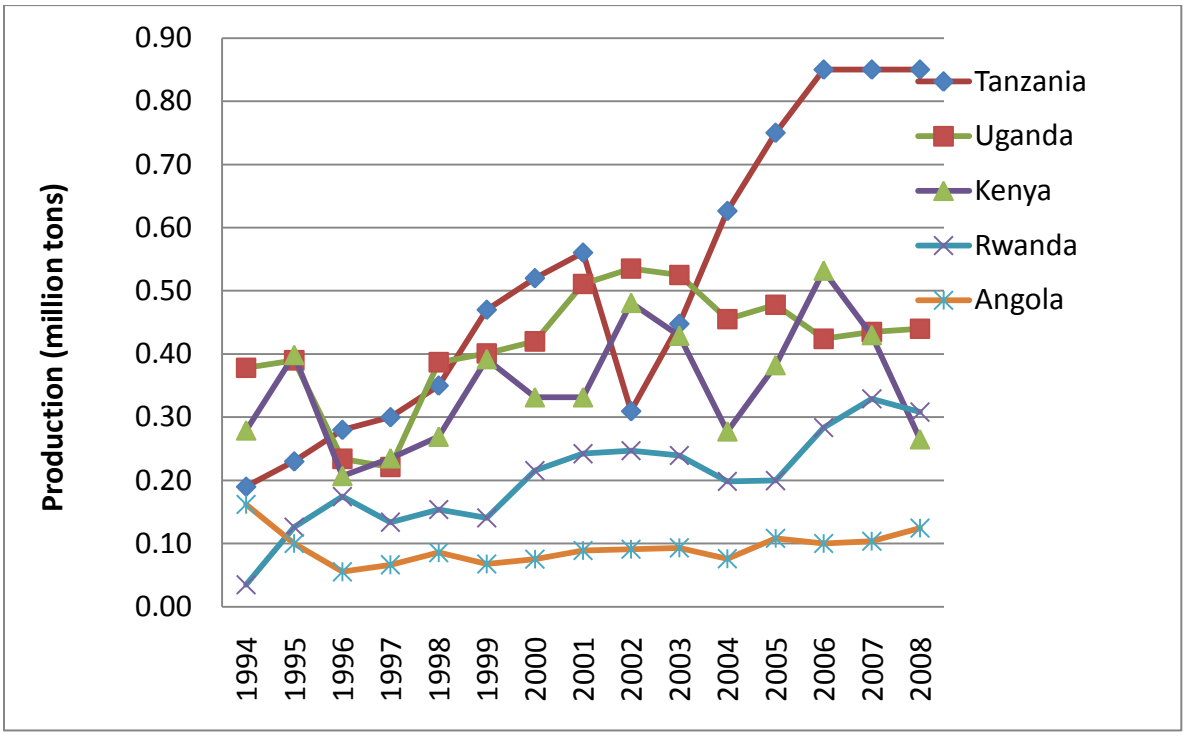
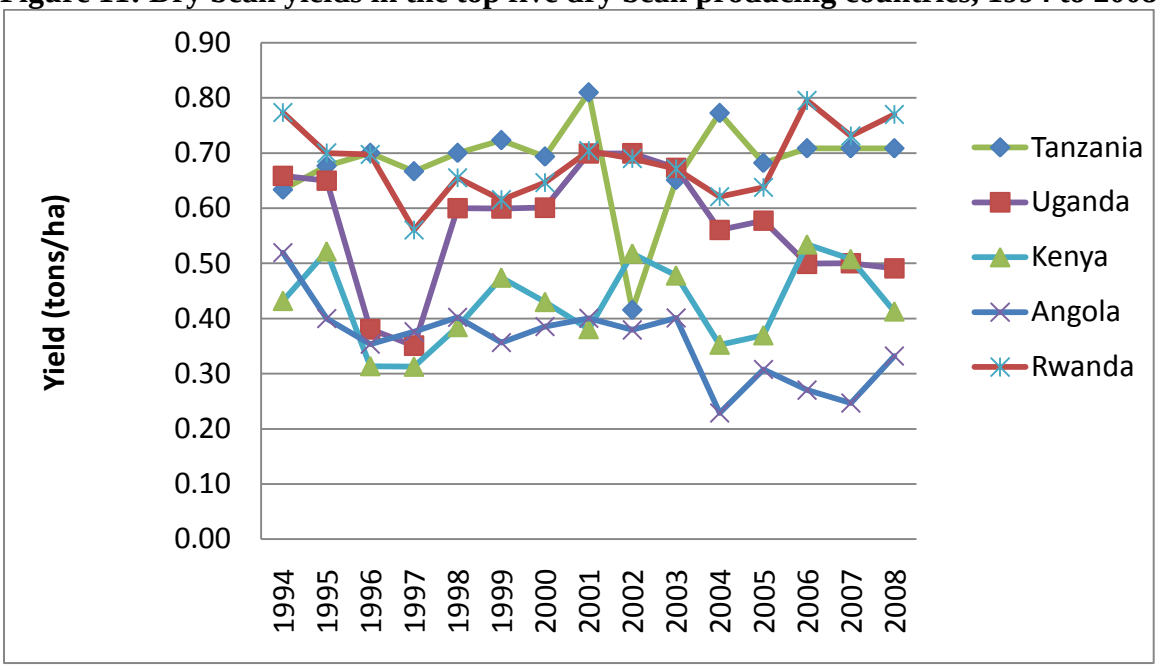


**Figure 11: Dry bean yields in the top five dry bean producing countries, 1994 to 2008**

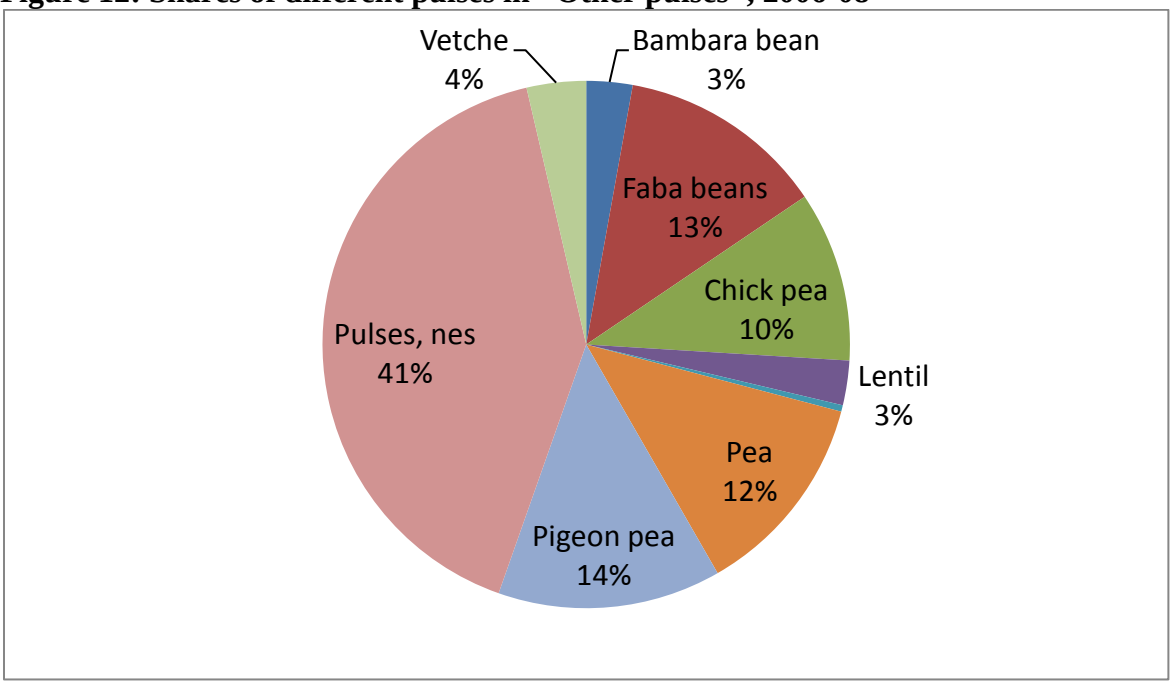



**Other pulses**

In addition to dry beans and cowpeas, there are many other pulse crops grown and consumed in SSA that are important in specific regions and countries. For the purpose of this study, they are put under the category of "other pulses". In the context of SSA, the category of "other pulses" includes pulses, nes[13], pigeon pea, chickpea, faba beans, pea, lentils, vetches, and bambara beans. They represent in total about 18% of area cultivated and 20% of total pulse crop production in SSA in 2006-08 (Figure 2). Pulse, nes has the highest (41%) share in total area under "others pulses", followed by pigeon pea (14%), fababean (13%), peas (12%), Chickpea (10%),Vetches (4%), bambara bean (3%), lentil (3%)--Figure 12.

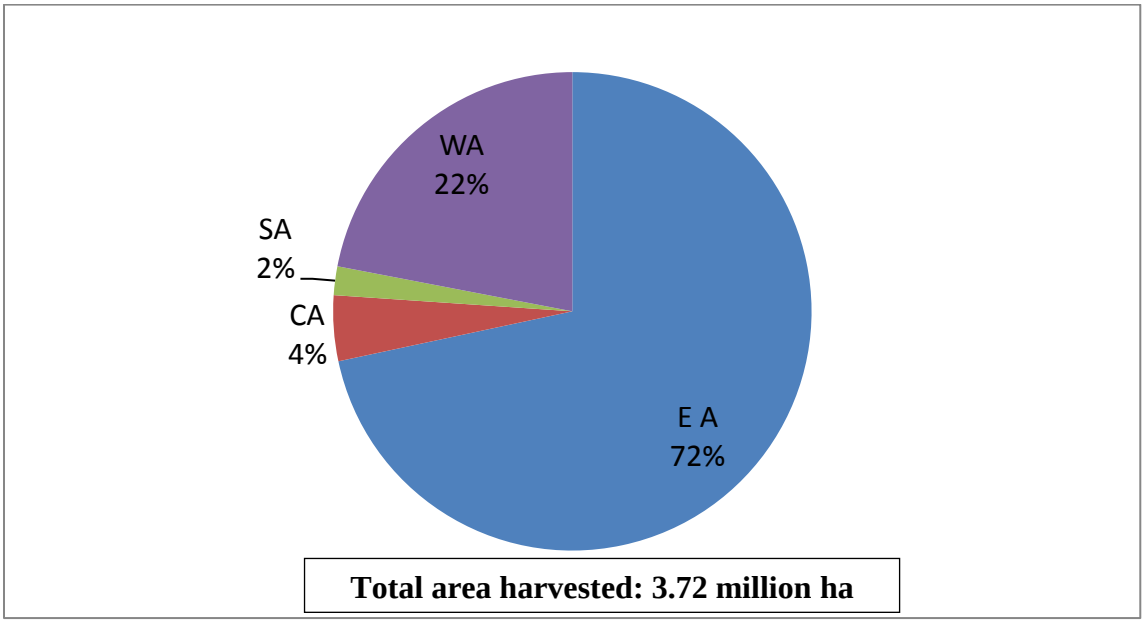
[13] This category includes other pulses that are not identified separately because of their minor relevance at the international level. Because of their limited local importance, some countries report pulses under this heading and are not classified individually by FAO.

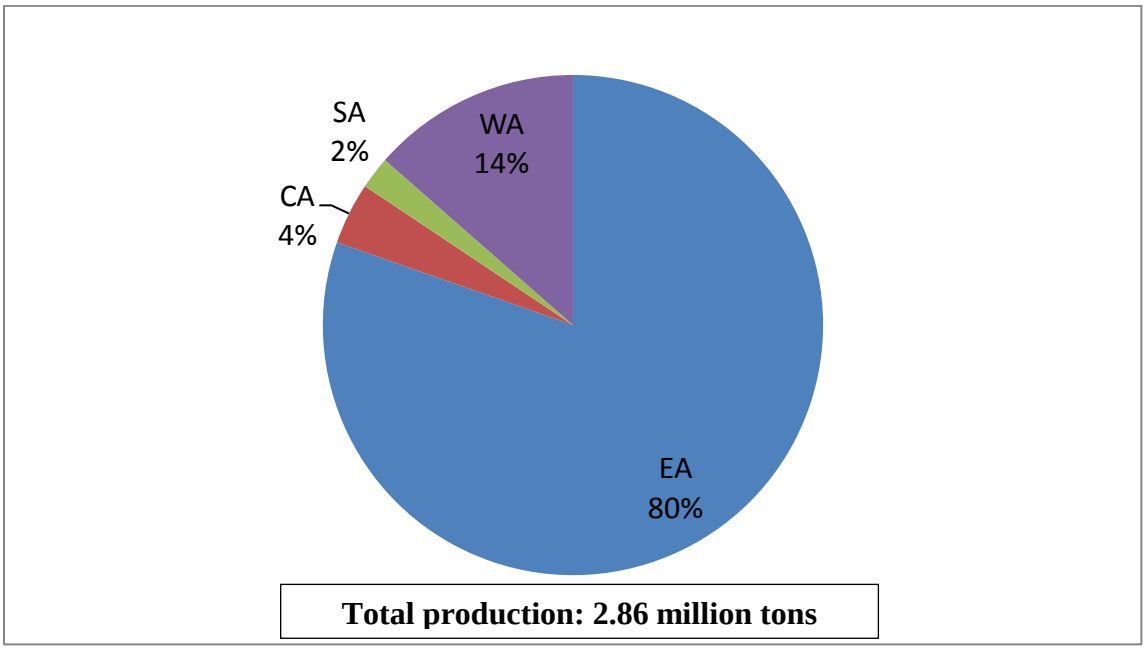
**Figure 12: Shares of different pulses in "Other pulses", 2006-08**




About 72% of the total harvested area and 80% of the total production of these other pulses are in East Africa. West Africa accounts for 22% of area and 14% of the production of these pulses followed by Central Africa (4% for both area and production) (Figure 13). Although, the sub-region of East Africa has seen a relatively small increase in area harvested under other pulses (4%), it has experienced a 58% increase in production (the highest among all sub-regions)—(Table 9, Figure 14 and 15).

**Figure 13: Share of sub-regions in other pulses total area cultivated and production, 2006-08**




From 1994-96 to 2006-08, area cultivated under these other pulses and their productions have increased in all sub-regions (Figures 14 and 15).

**Figure 14: "Other pulses" area cultivated by sub-region, 1994-96 and 2006-08**

**Figure 15: "Other pulses" production by sub-region, 1994-96 and 2006-08**

**Table 8: "Other pulses" area, production and yield by sub-regions, 1994-96 and 2006-08**

| | EA | CA | SA | WA | SSA |
|---|---|---|---|---|---|
| | | Area (1000 000 ha) | | | |
| 1994-1996 | 2.55 | 0.10 | 0.06 | 0.65 | 3.37 |
| 2006-2008 | 2.66 | 0.16 | 0.07 | 0.82 | 3.72 |
| Change in area | 0.11 | 0.07 | 0.01 | 0.16 | 0.35 |
| % Change | 4.4 | 65.4 | 13.8 | 25.2 | 10.4 |
| Growth rate ( %/year) | 0.3 | 3.7 | 0.9 | 1.6 | 0.7 |
| | | **Production (1000 000 tons)** | | | |
| 1994-1996 | 1.46 | 0.08 | 0.04 | 0.29 | 1.87 |
| 2006-2008 | 2.30 | 0.11 | 0.06 | 0.39 | 2.86 |
| Change in production | 0.84 | 0.04 | 0.02 | 0.09 | 0.99 |
| % Change | 57.9 | 45.1 | 55.0 | 31.8 | 53.2 |
| Growth rate ( %/year) | 3.3 | 2.7 | 3.2 | 2.0 | 3.1 |
| | | **Yield (tons/ha)** | | | |
| 1994-1996 | 0.57 | 0.79 | 0.61 | 0.45 | 0.56 |
| 2006-2008 | 0.86 | 0.69 | 0.83 | 0.47 | 0.77 |
| Change in yield | 0.29 | -0.10 | 0.22 | 0.02 | 0.21 |
| % Change | 50.6 | -12.3 | 36.4 | 5.3 | 38.4 |
| Growth rate ( %/year) | 3.0 | -0.9 | 2.2 | 0.4 | 2.3 |

A high increase in yield (about 50%) has played a major role in this high increase in production. Table 10 lists 15 major countries in SSA growing 'other pulses.' East African countries are top five on this list. Ethiopia a major producer of pulses such as lentils, faba beans and chickpeas, has more than 1 million ha of area harvested under these other pulse crops. In terms of area harvested to other pulses, Mozambique ranks second (with mainly by pulses, nes[14] at 0.31 m ha), closely followed by Tanzania (0.3 m ha under pigeon pea, chickpea, peas and pulses, nes), Malawi (with 0.27 m ha under pigeon pea mostly), and Kenya (0.25 m ha mostly under pigeon pea)—Table 10.

[14] As a reminder, 'pulses, nes' do not refer to any specific pulse crop. It is basically an FAO category, which means that the data reporting system did not record the pulse crop in any other category.

**Table 9: "Other pulses" top producing countries ranked by area harvested, 2006-08**

| Rank | Countries | Average area harvested 2006-2008 (million ha) | % share | Cumulative % | Average production 2006-2008 (million tons) | Average yield 2006-2008 |
|---|---|---|---|---|---|---|
| 1 | Ethiopia | 1.18 | 30.32 | 30.32 | 1.37 | 6.43 |
| 2 | Mozambique | 0.31 | 7.94 | 38.26 | 0.16 | 0.50 |
| 3 | Tanzania | 0.30 | 7.84 | 46.10 | 0.20 | 2.52 |
| 4 | Malawi | 0.27 | 7.07 | 53.17 | 0.20 | 2.71 |
| 5 | Kenya | 0.25 | 6.40 | 59.57 | 0.11 | 1.91 |
| 6 | Ghana | 0.21 | 5.41 | 64.98 | 0.02 | 0.09 |
| 7 | Sudan | 0.17 | 4.25 | 69.23 | 0.25 | 5.07 |
| 8 | Nigeria | 0.13 | 3.31 | 72.53 | 0.05 | 0.41 |
| 9 | Uganda | 0.12 | 3.07 | 75.61 | 0.11 | 2.16 |
| 10 | Sierra Leone | 0.10 | 2.57 | 78.18 | 0.07 | 3.04 |
| 11 | Mauritania | 0.07 | 1.87 | 80.04 | 0.03 | 0.73 |
| 12 | Guinea | 0.07 | 1.83 | 81.87 | 0.06 | 0.87 |
| 13 | Burkina Faso | 0.07 | 1.73 | 83.60 | 0.06 | 1.87 |
| 14 | DR Congo | 0.06 | 1.55 | 85.14 | 0.03 | 1.97 |
| 15 | Chad | 0.06 | 1.50 | 86.65 | 0.05 | 0.78 |

## VI. Producer price

The objectives of analyzing producer price are to see how prices have changed over time in major producing countries and how those changes compare with other major producing countries in the developing world (South and Central America and Asia). A comparison with other food crops especially cereals is also important since both types of food crops (pulses and cereals) contribute significantly to the food dietary baskets in developing countries in general and in sub-Saharan Africa in particular.

Producer prices are reported in nominal U.S. dollars as reported in FAO's PriceSTAT database. For trend analysis, it is important to express producer prices in real U.S. $ (net of inflation). Thus, the nominal prices (in U.S. $) are deflated using the U.S. Consumer Price Index to derive producer price series in real U.S. $. In general, producer price data are very sketchy for

pulse crops. Therefore the country coverage in any sub-regional or regional analysis is not comprehensive. It is also important to point out that the average producer prices reported in the analyses below are simple averages across countries (usually top producing countries for whom price data are available) and not a weighted by production.

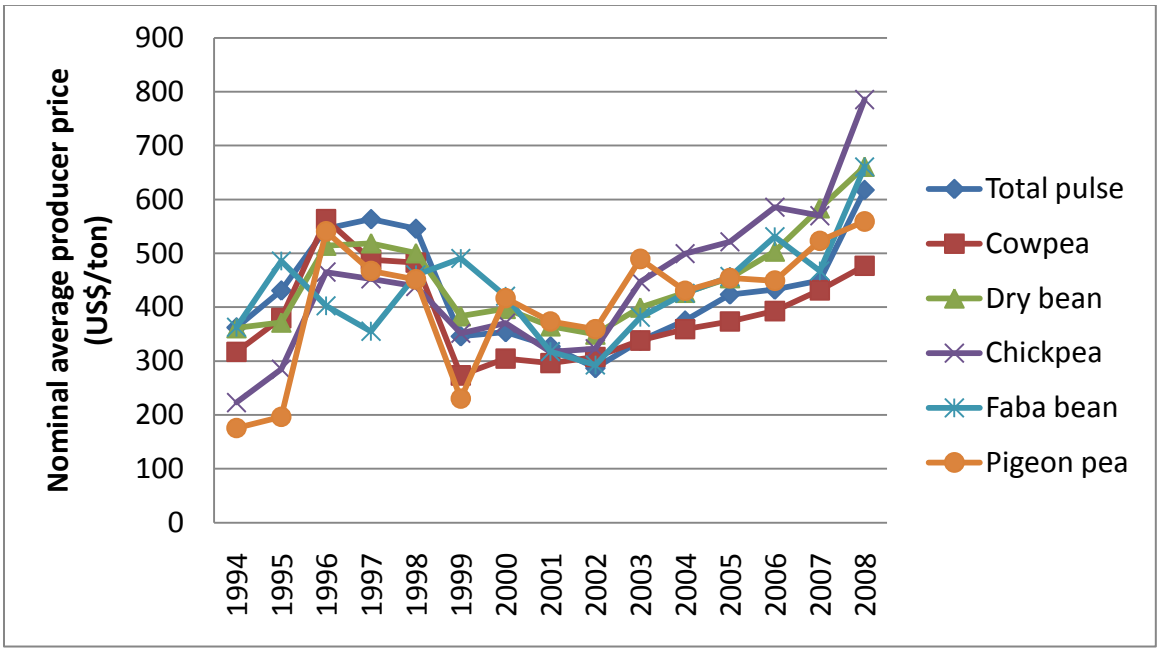
Average prices by pulse crops

Over the past 14 years, average producer price across the major 20 pulse producing developing countries increased from $524/ton in 1994-96 to $621/ton in 2006-2008 (in nominal U.S.$). This represents an increase of about 19% over the 14 year period. The increase is even more dramatic in the most important pulse producing developed countries (51%), where the price increased from $438 in 1994-96 to $662 in 2006-2008 (Akibode and Maredia, 2011). In Sub-Saharan Africa, the average producer price of all pulses in the most important producing countries increased from $428 in 1994-96 to $500 in 2006-08. This represents an increase of 17% in nominal terms (Table A4 in the Annex). Compared to other developing regions in the world, the producer prices of pulse crops were lower in Sub-Saharan Africa, but the general trend in price increase over the last 14 years has been similar to trends observed in other regions. Compared to cereal crops, the producer price of pulses is significantly higher than cereal prices in all developing regions, including SSA. In 2006-2008, the average cereal price in SSA was $277/ton compared to the average producer price of $500/ton for pulse crops (Akibode and Maredia, 2011). Figures 16 and 17 show that trends in nominal prices are similar to trends in real prices; however percent increase in real price over the 14 year period is only 5%, compared to 36% in nominal value (Table A4 in the Annex).

Prices for all pulse crops, except faba bean, increased significantly (even in real term) in 1995; this is followed by a comparable decrease in 1999. After 1999, prices were stagnant up to

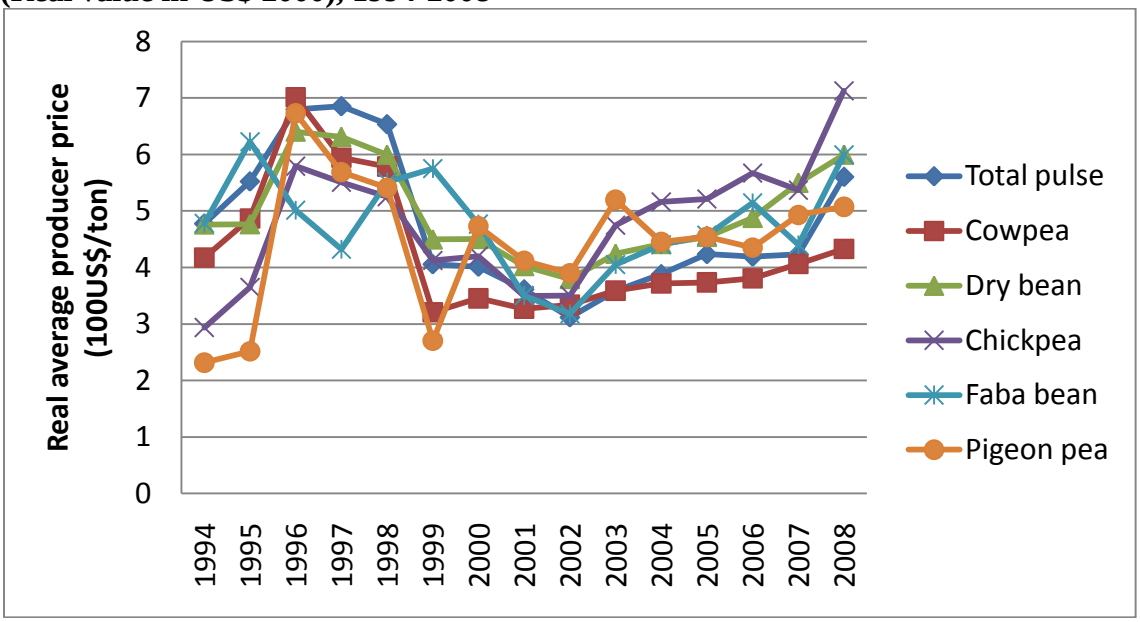
2002 before increasing steadily until 2007-08. Cowpea prices have been lower than dry bean prices over the period except in 1996 and 1997. Also both prices have followed the same trend over the entire period (Figure 16 and 17).

**Figure 16: Average15 producer price of major pulse crops in SSA (Nominal value), 1994 to 2008**




[15] Tables A4, A5, A6, A7, A8 and A9 in the Annex give nominal prices and average real prices for total pulses and each crop for top producers from 1994 to 2008. Average nominal price for each crop is the average of the top producing countries. Average real price is obtained by deflating the average nominal price by the consumer price index

**Figure 17: Real average producer price of major pulse crops in SSA (Real value in US$ 2000), 1994-2008**




**Cowpea**

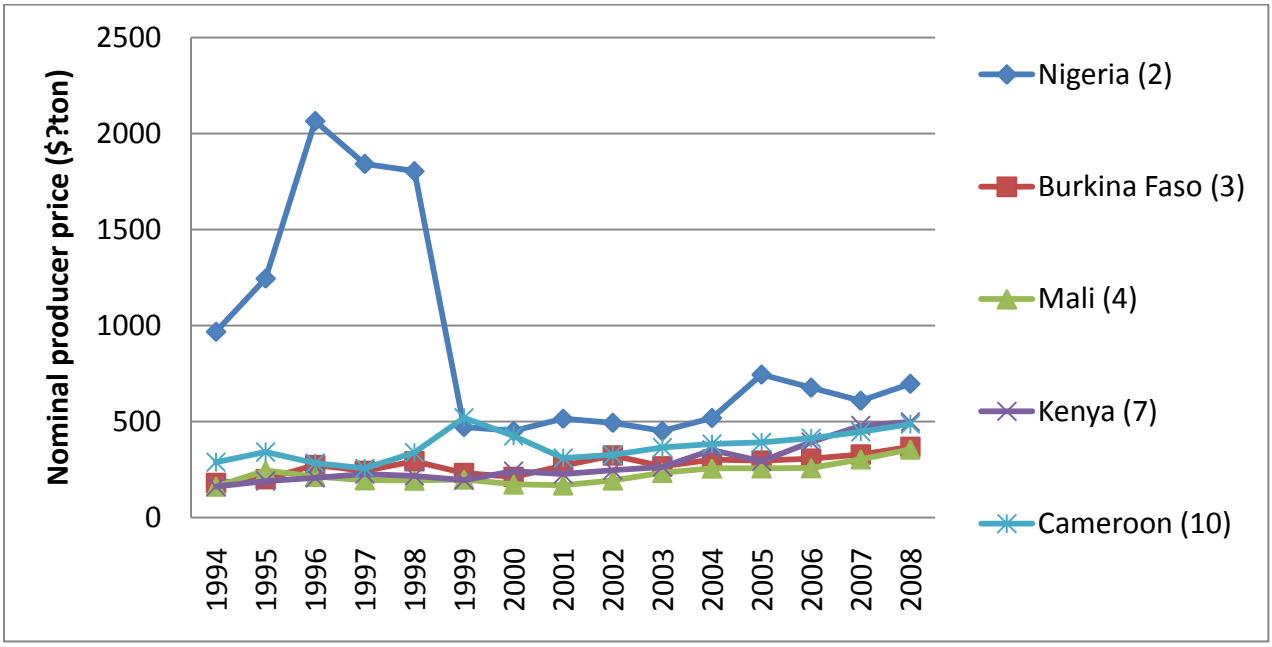
Figure 18 shows price changes over the 14 years preceding 2008 in most important cowpea-producing countries[16]. The top five cowpea-producing countries (for which price data are available) as shown in table 3, are Niger, Nigeria, Burkina, Mali, and Senegal[17]. Most countries show stagnant producer price series up to 2002 and a slight increase after 2002. However Nigeria seems an anomaly, with a producer price of more than $1,000/ton in mid-1990s; while the producer price for cowpea rose exponentially in 1996, it then dropped drastically in 1999. Since then, the prices stabilized with a slightly increasing trend. An explanation of the drastic upward swing in prices in Nigeria in mid-1990s is that the country

[16] Only the producing countries for which data are available on producer price (from FAO data) are taken into account on the figure.

[17] Brazil and India are important producers of cowpea, but no FAO data are available for these countries.

went through a structural adjustment period in the form of liberalization of currency market which saw a steep depreciation of its currency against U.S.$ in 1995.

**Figure 18: Cowpea producer price in top producing countries (nominal values), 1994 to 2008/a**




*a/ Only includes top producing countries for which data are available. Numbers in bracket are ranks of the countries in terms of area harvested*

Being a large cowpea consuming country that depends on imports to meet the domestic demand, the mis-match in demand and supply of cowpea could be another reason for the large fluctuations in cowpea producer prices observed in Nigeria in mid-1990s.

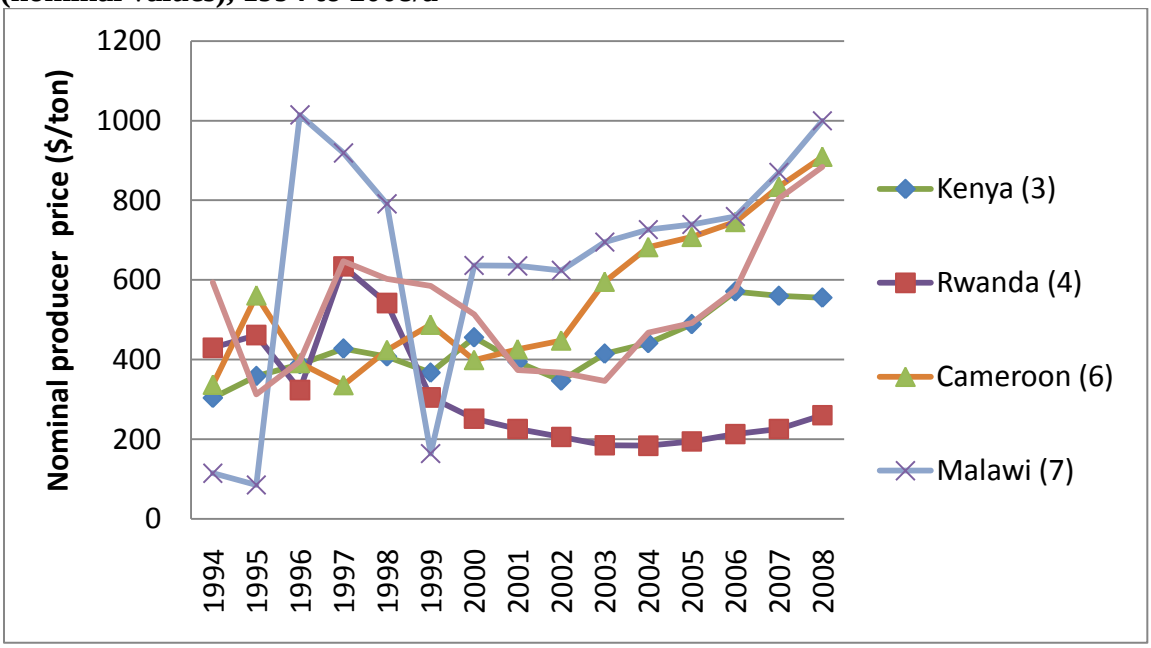
The producer price for cowpeas in most important 15 countries in SSA is given in Table A5 in the Annex. Average producer price across all the 15 countries observed a significant increase in 1996 before dropping in 1999. This movement is highly correlated with the price movement in Nigeria during the same period of time. However, the average producer price has increased steadily since 2001. Compared to 1994-96, producer price increased in most top producing countries (Burkina Faso, Mali, Kenya, Cameroon) during 2006-08. However a

decrease is observed in Nigeria, which is related to the abnormal increase in price in 1996 followed by a steep decline in 1999 (Figure 18).

**Dry beans**

Dry bean producer prices (nominal) fluctuated from 1994 to around 2002 in all the major producing countries –Kenya, Rwanda, Cameroon, Malawi, and Burundi. However, from 2002 to 2008, prices steadily increased in Kenya, Burundi, Cameroon and Malawi but declined in Rwanda (Figure 19).

**Figure 19: Dry bean producer price in selected major SSA producing countries (nominal values), 1994 to 2008/a**




*a/ Only includes top producing countries for which data are available. Numbers in bracket are rank of the countries in terms of area harvested*

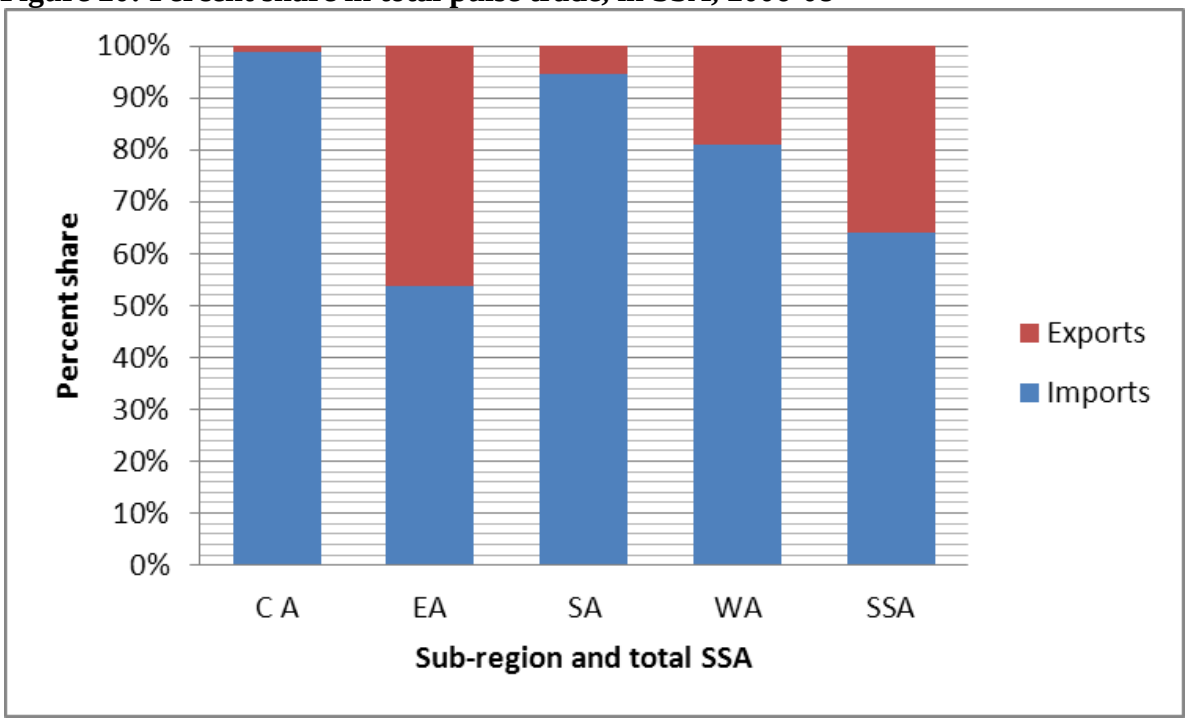
Table A6 in the Annex gives dry bean prices for the top 15 dry bean producers in SSA as well as nominal and real average prices. Figure 19 shows the average producer price for five of the top 10 dry bean producing countries for which data are available. From 1994 to 1998, there was a steady increase in prices, followed by a more pronounced decrease between 1998 and 2002. A

rapidly increasing trend followed from 2002 to 2008; except for Rwanda where the increase was much slower (Figure 19).

## VII. Trade

Given the importance of pulse legumes in SSA, it is important to examine volume and trend in trade within the region and also with other regions in the world. From SSA and sub-regional perspective, Table A10 in the Annex provides a comprehensive picture of trade for various pulse crops between 1994-96 and 2006-08.

**Figure 20: Percent share in total pulse trade, in SSA, 2006-08**

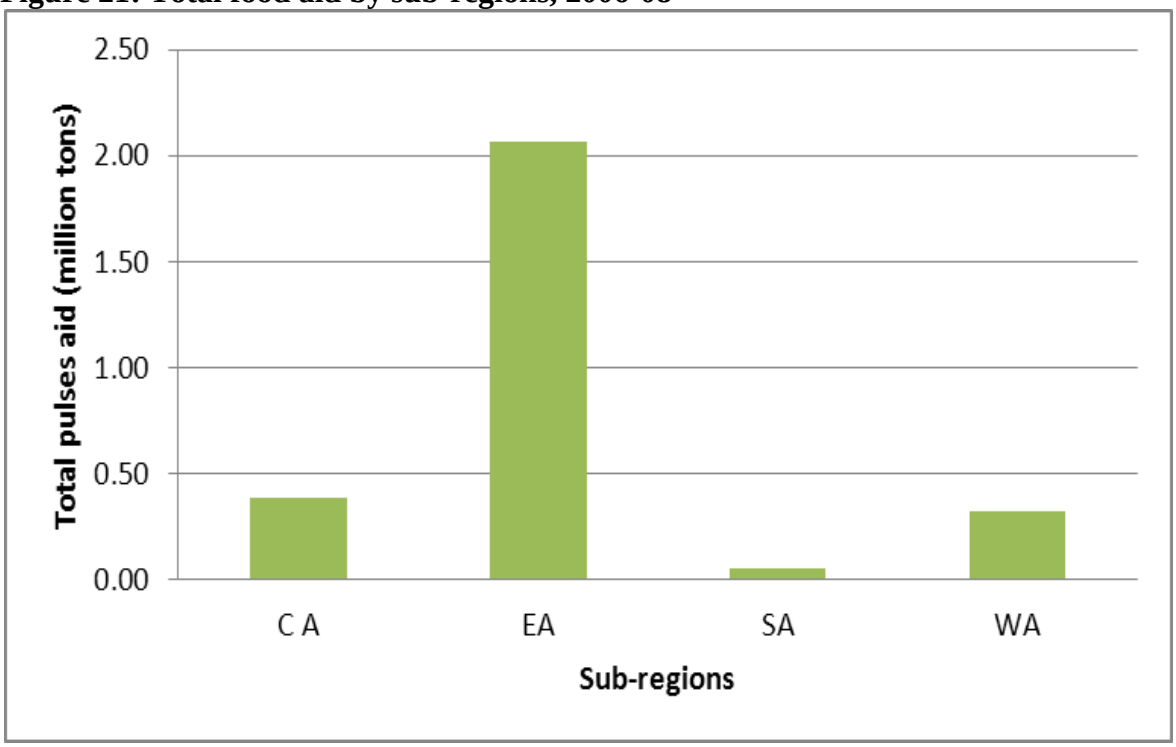



Continent wide, 0.4 million tons were traded as imports and 0.15 million tons as exports in 1994-96, compared to 0.6 million tons as imports and 0.36 million tons as exports in 2006-08. That represents an increase of about 65% in imports and 142% increase in exports. Table A10 also shows the net importer status of SSA in total pulses. The status of net importer is true for all

pulse crops studied (cowpea, dry bean and "other pulses"). Comparing 1994-96 to 2006-08, it is apparent that SSA has remained a net importer of pulse crops (total pulses, cowpea, dry bean and "other pulses"). SSA as a whole, as well as all the sub-regions were net importers of total pulses in 2006-08 (Figure 20). Major importers of total pulses are Sudan, South Africa, Kenya, Angola, Ethiopia and Zimbabwe with a combined total share of 32% of total pulse imports in SSA (Table A11 in the Annex). Major total pulse exporters are Ethiopia (38% of total exports), Tanzania (18%), Malawi (7%), Uganda (7%) and Kenya (5%), together accounting for almost 75% of SSA's total exports (Table A12 in the Annex).

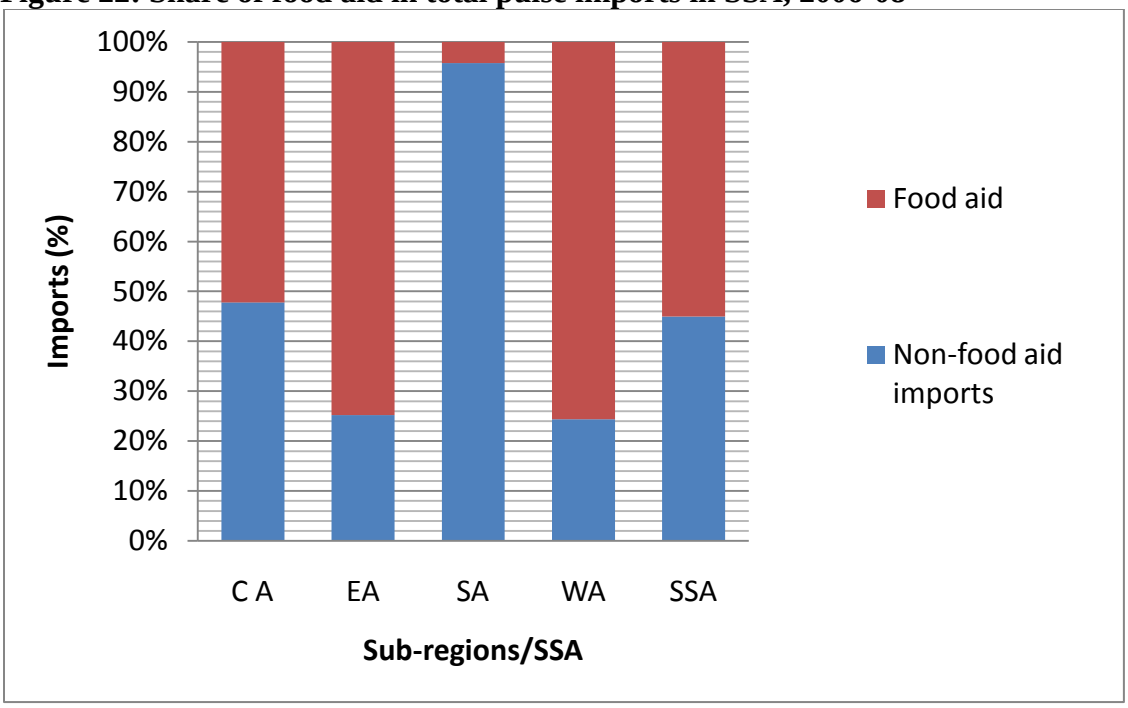
Imports in SSA are largely in the form of food aid. Figure 21 shows in absolute terms total pulse crops received as food aid in different sub-regions. East Africa dominates in receipt of pulse food aid and this situation contributes to its status as a net importing sub-region.

**Figure 21: Total food aid by sub-regions, 2006-08**



In relative terms, pulse food aid represents at least 50% of total imports in all sub-regions (about 75% in EA and WA, 52% in CA) except SA where it is only about 4% (Figure 22).

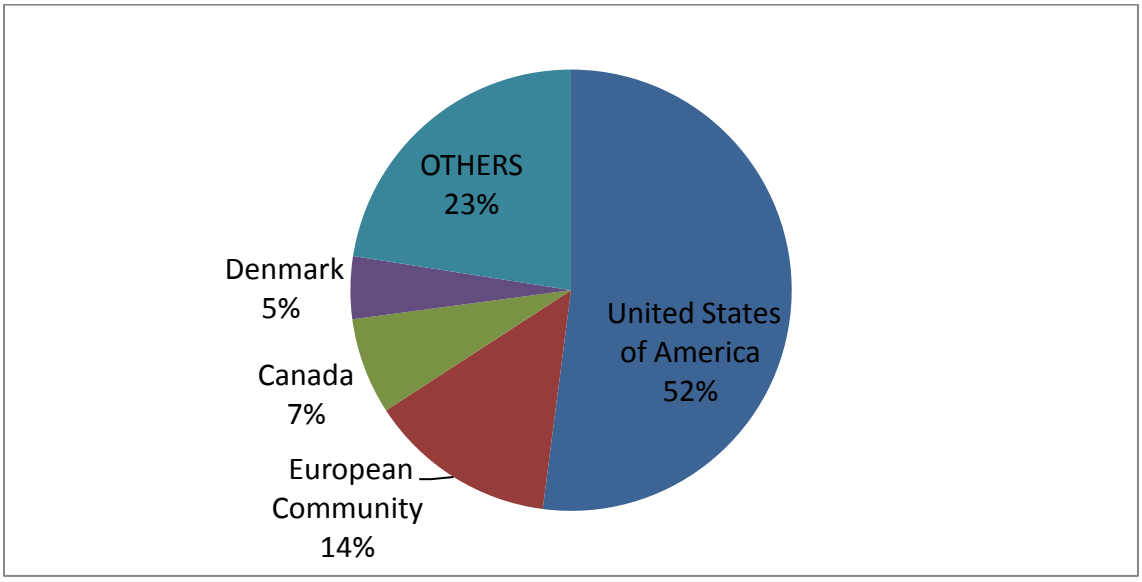
**Figure 22: Share of food aid in total pulse imports in SSA, 2006-08**




Food aid targeted for SSA originates from several different countries. For the whole Sub-Saharan Africa, USA (52%) leads far ahead of the European Community (14%), Canada (7%), Denmark (5%) and many others countries having less than 5% in share. Those latter countries are put together under "Others" in Figure 23.

In terms of percentage share in total production, in 2006-08 total exports represented 5.5% and total imports 3.1% of total pulse production in SSA. At sub-regional level, total pulse imports as a percentage of total production was 10% for CA, 7% for EA, and 1% in WA, confirming the position of those sub-regions as mainly pulse producing sub-regions compared to SA where the percentage of imports in total pulse production was 93%. This latter figures show the importance of imports in pulse industry in SA.

**Figure 23: Shares of different countries as sources of total food aid targeted for SSA, 2006-08**




Comparing changes in exports and imports for the whole SSA region from 1994-96 to 2006-08, there is an increase of about 142% in exports amidst 46% increase in imports, suggesting a tighter pulse trade balance in favor of exports (Table A10). Comparing these figures to the level of 1994-1996, in term of percent in total pulse production, exports have grown by about 42% while imports have decreased by about 4% (Table A13). This high increase in exports relative to imports suggests a growing opportunity for trade (exports) outside the SSA region. For example, in 2008, Tanzania the top producing country of dry bean in SSA, exported at least 50%[18] of its total pulse exports outside the region to India and Oman. Ethiopia, another top producer of dry beans and the leading producer of lentils in SSA, exported at least 20% of its total exports in lentils outside the region to Saudi Arabia and Pakistan; and at least 90% of its dry bean total exports outside the region to Yemen, United Arab Emirates, US, England, Italy, Germany and many other countries.

[18] Source FAO : Detailed Trade Flows

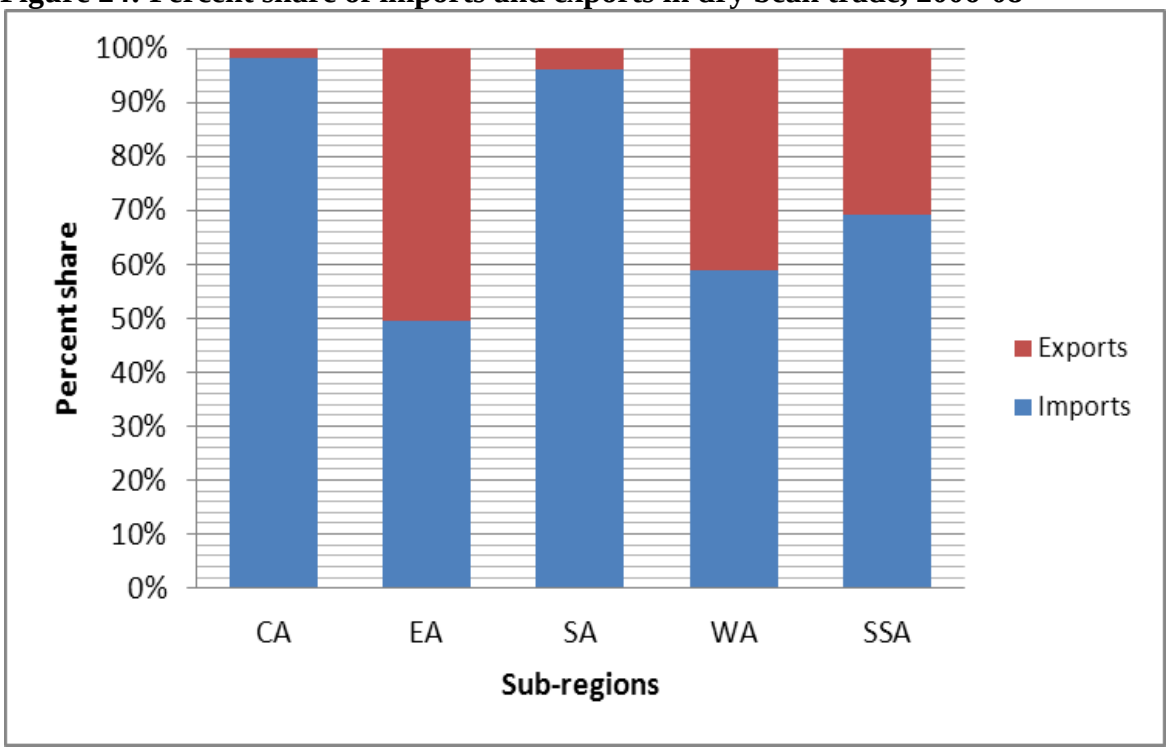
**Cowpea**

FAO data for SSA indicates that cowpea is neither imported nor exported. However, Langyintuo et al. (2003) report informal trade within West and Central Africa and official sources that show that at least 285,000 t of cowpeas were shipped between regions in 1998. According to their analysis, in the 1990s, Niger, Burkina Faso, Benin, Mali, Cameroon, Chad and Senegal were net exporters; and Nigeria, Ghana, Togo, Cote d'Ivoire, and Mauritania were net importers. So this limitation of FAO data might come from an absence of reports for cowpea trade at regional level

**Dry bean**

As for dry bean, imports totaled 0.25 million tons in 2006-08 increasing by 27% compared to 1994-96. Exports totaled 0.11 million tons in 2006-08 increasing by 4% compared to 1994-98. At sub-regional levels, Central Africa and Southern Africa are net importers, while West Africa and East Africa are self-sufficient. All sub-regions have seen an increase in imports of dry beans over the 14 years, except Western Africa. Central Africa has seen the highest increase in imports of dry beans (74%) followed by Southern Africa (25%) and East Africa (14%). In 2006-08, all sub-regions in SSA were net importers of dry bean except Eastern Africa, where quantities imported and exported had almost equal share in total trade (Figure 24, Table A10).

**Figure 24: Percent share of imports and exports in dry bean trade, 2006-08**



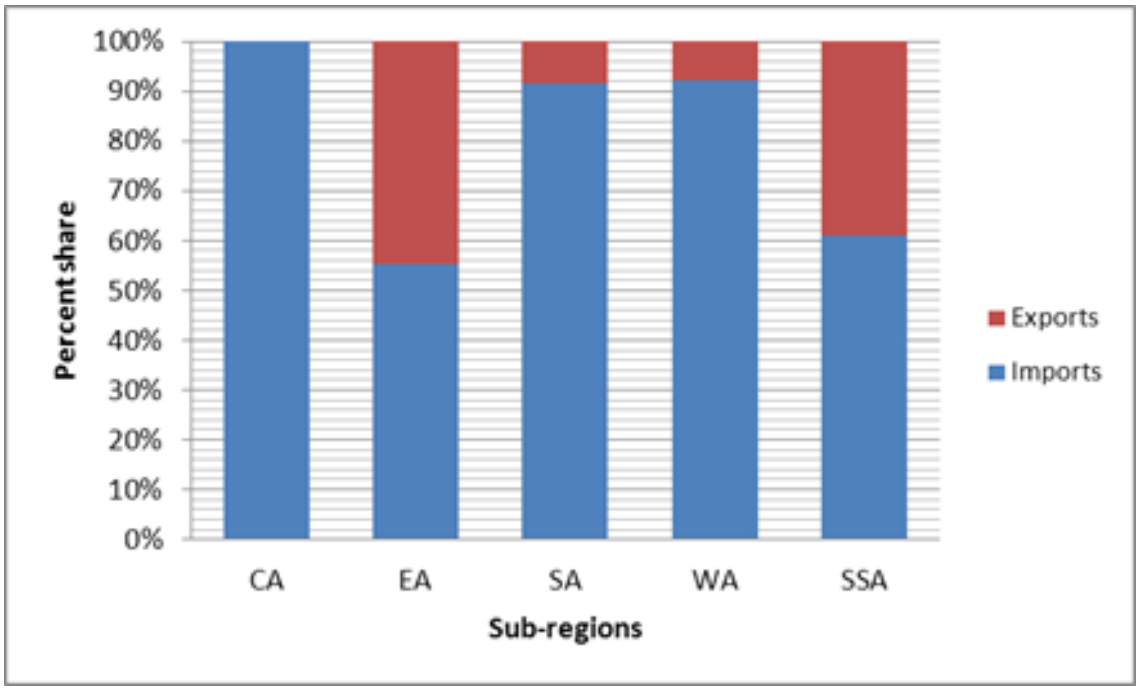

Major dry bean importing countries are South Africa (23% of total imports), Kenya (14%), Angola (13%), Zimbabwe (5%), Sudan (2%) and Burundi (2%), representing together more than 60% of total dry bean imports (Table A14). Major exporters are Ethiopia (36% of total exports), Uganda (14%), Tanzania (5%), Kenya (4%), Niger (4%) making together 63% of the region's total exports (Table A15).

**Other pulses**

Quantities of "other pulses" (i.e., chickpea, pigeonpea, faba bean, pulses nes, peas, vetches, lupins, and Bambara beans) imported by SSA were 0.19 million tons in 1994-96 and 0.40 million tons in 2006-08, representing more than 100% increase. In 2006-08, more than half (62%) of other pulses imported were from Eastern Africa, while Southern Africa accounted for 19%, Central Africa 13% and West Africa for 6%. Export of other pulses within SSA has increased drastically over the last 14 years, from 0.04 million tons in 1994-1996 to 0.25 million tons in

2006-08 (reflecting a 493% increase)--Table A10. However, in late 1990s, all sub-regions remain net importers of 'other pulses.' (Figure 25 and Table A10).

**Figure 25: Percent share of imports and exports in "other pulses" trade in SSA, 2006-08**




Major importers of 'other pulses' are Sudan (10%) , Kenya (4%), Ethiopia (4%), South Africa (3%), Uganda (2%) and Zimbabwe (2%) accounting for more than 25% of total 'other pulses' imports in SSA (table A16). Major exporters are Ethiopia (39%), Tanzania (25%), Malawi (10%), Kenya (5%), Mozambique (3%) making up more than 80% of the region's total exports (Table A17).

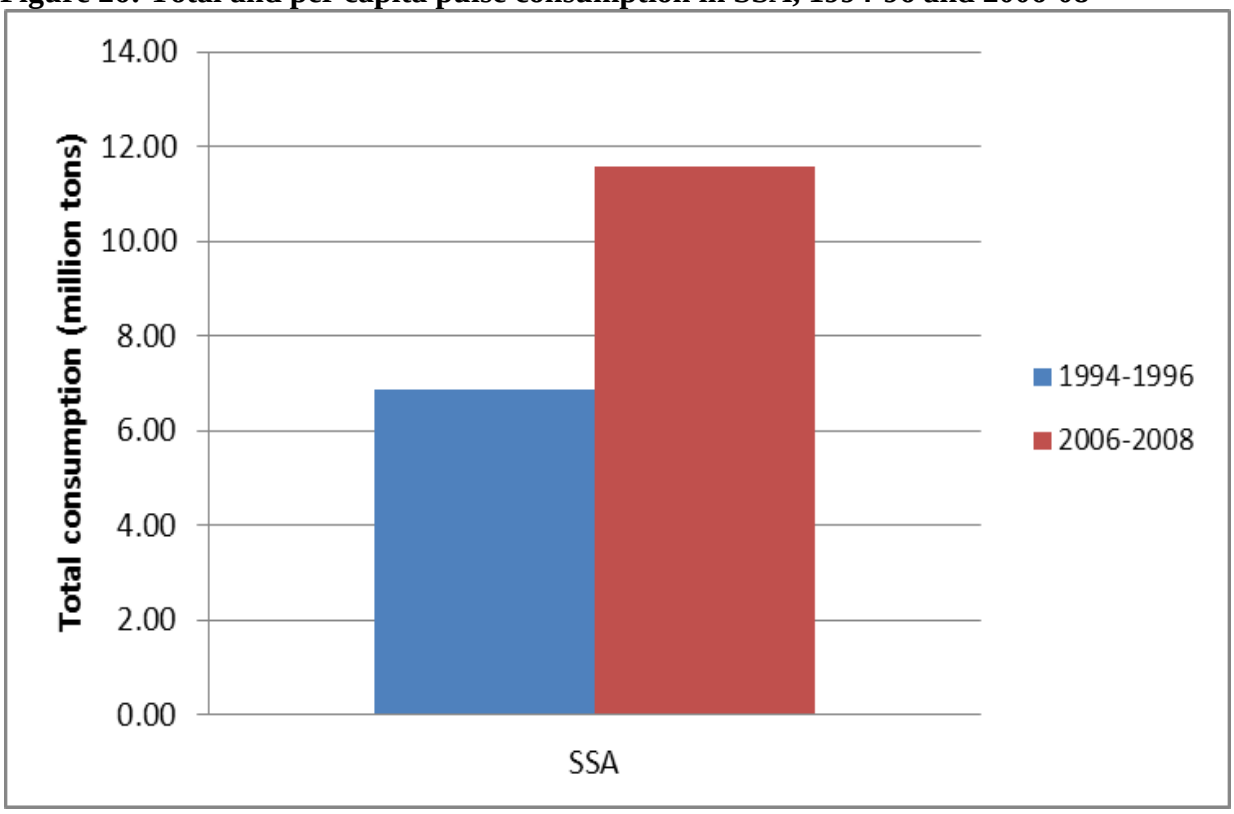
## VIII. Consumption

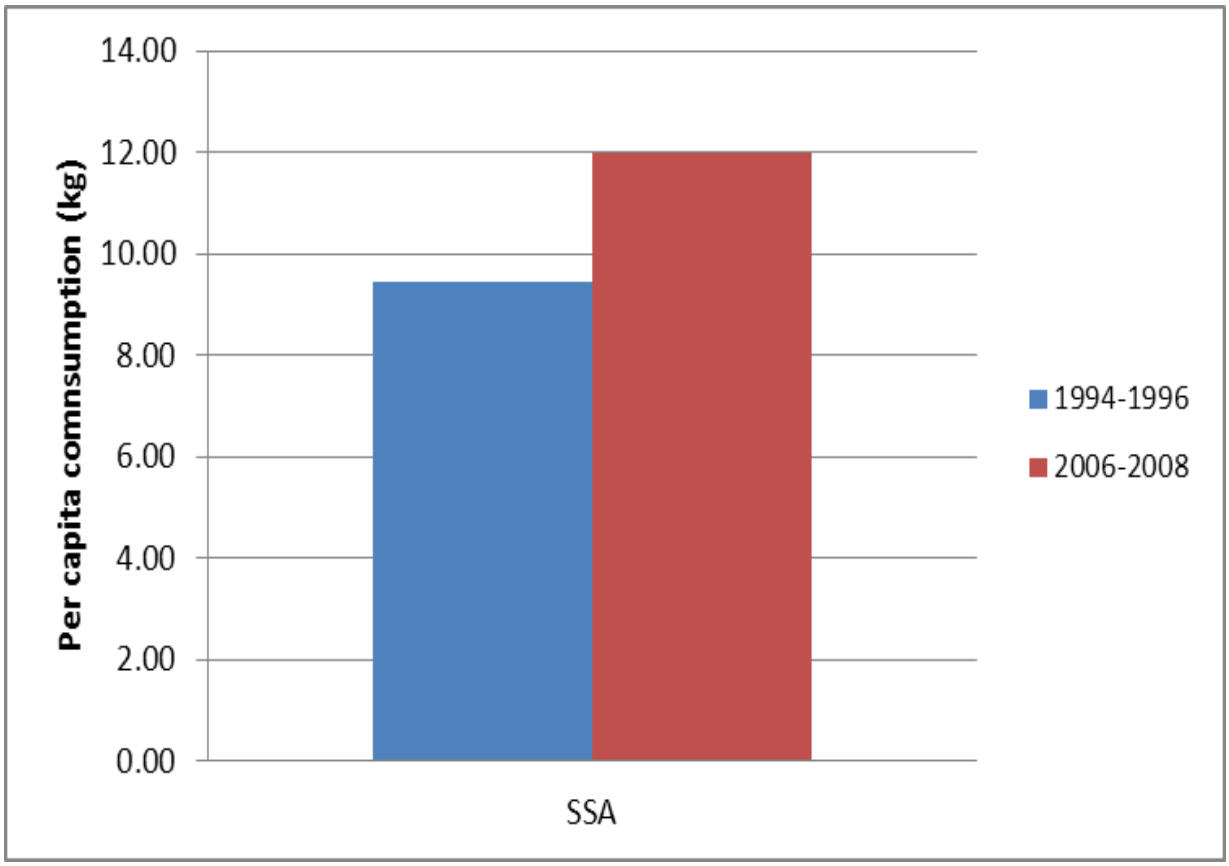
Consumption of pulses in Sub-Saharan Africa varies across sub-regions. This diversity is reflected in total consumption, as well as consumption per capita. As actual consumption data are not available, FAO data was used to estimate total availability and per capita availability by adding quantity produced to quantity imported and subtracting quantity exported. This estimate does not take into account stocks held by private traders or the public sector, wastages after harvest and before consumption, and quantity used for feed use. Thus, the data estimates may not be equal to the actual consumption of pulse crops that could be obtained from household surveys. Unless otherwise specified, data on consumption refers to quantity 'available' for consumption rather than quantity actually consumed. The per capita availability is obtained by dividing the total availability by the population. Table A18 in the Annex provides the general picture of pulse consumption in SSA.

### Total pulses

Total consumption of all pulse crops was 7.02 million tons in 1994-96 and 11.87 million tons in 2006-08; representing a 69% increase over the 14 year period at a robust rate of 3.8%/year. Per capita net availability of pulses averaged 9.7 kg in 1994-96 and it increased to 12.3 kg in 2006-08, representing a 27% increases at a 1.7% growth rate (Table A18, Figure 26).

**Figure 26: Total and per capita pulse consumption in SSA, 1994-96 and 2006-08**



In 2006-08, the average per capita consumption of all pulses in the developing world averaged about 8 kg/year which is almost double the consumption per capita in developed countries. The average per capita consumption in developing countries as a whole increased at a modest rate of 0.8% per year from 7.3 kg in 1995 to 7.9 kg in 2007 (Akibode and Maredia, 2011). Thus compared to other developing regions, the per capita pulse consumption is much higher in SSA has increased at a higher growth rate than the rest of the developing world. .

Cowpea is the most consumed pulse crop in SSA, accounting for 42% of total pulse consumption in SSA in 2006-08 (Figure 27).

**Figure 27: pulse crop share in total pulses consumption in 1994-96 and 2006-08**

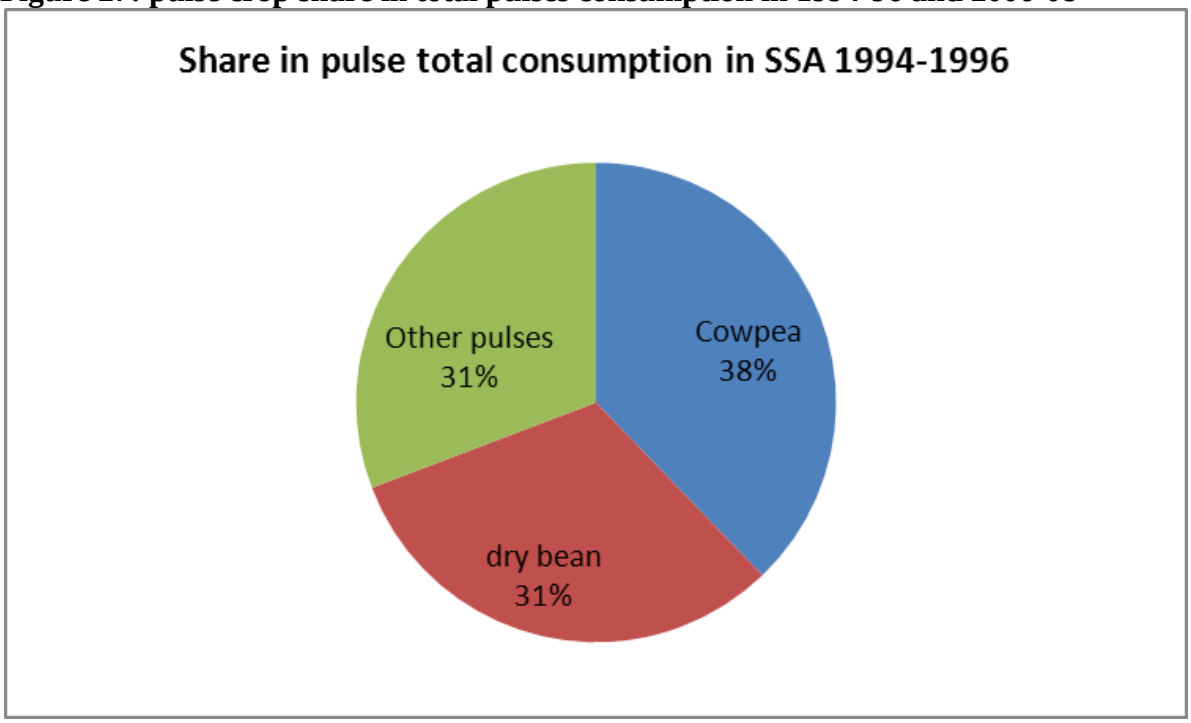
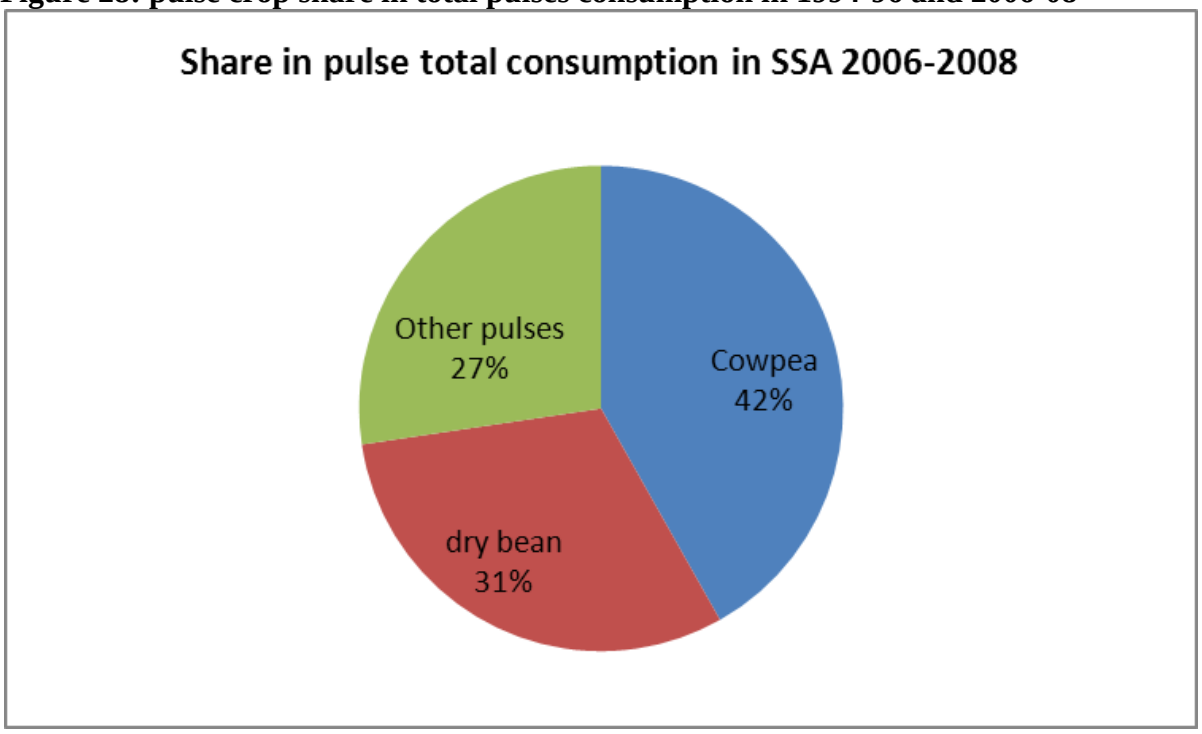


**Figure 28: pulse crop share in total pulses consumption in 1994-96 and 2006-08**



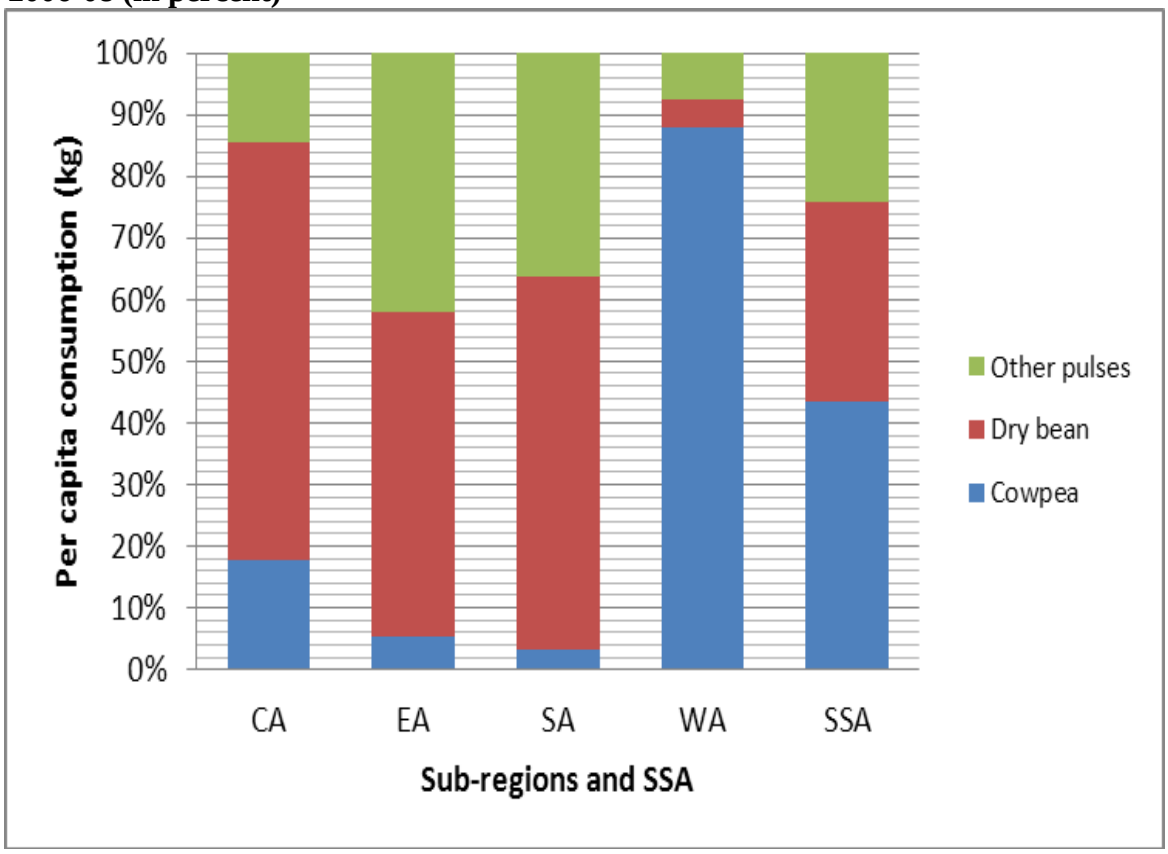

Cowpea has increased its share in total consumption by 4% between 1994-06 and 2006-08, mainly at the expense of "other pulses", whose share in total consumption declined during the same time period. However, the share of dry beans in total consumption over the past 14 years remained at 32% (Figure 24).

Regarding sub-regional trends, per capita availability of pulse crops increased from 1994-06 to 2006-08 in all sub-regions, with the greatest increase observed in West Africa and East Africa. As shown on Figure 25, the per capita consumption of all pulses increased most significantly in West Africa (35%) from 13.4 kg/year to 18.1 kg/year, and in Eastern Africa (18%) from 15.8kg/year to 18.5 kg/year (Table A18).

**Figure 29: Total pulse per capita consumption by sub-region in SSA, 1994-96 and 2006-08**

In contrast, in Southern Africa per capita consumption of pulses declined by about 4% from 1994-96 to 2006-08. However, Eastern Africa and West Africa have one of the highest rates of per capita pulse consumption in both SSA and the world. About 90% of pulses consumed in West Africa are cowpea and about 50% of pulses consumed in Eastern Africa are dry beans. “Other pulses” are also highly consumed in Eastern Africa, which accounts for more than 45% of per capita pulse consumption (Figure 30).

**Figure 30: Composition of per capita pulse consumption by sub-regions in SSA, 2006-08 (in percent)**




In 2006-08, Eastern Africa had the highest per capita consumption (18.5 kg/year), followed by West Africa (18.1 kg/year), Central Africa (7.5 kg/year), and Southern Africa (4.26 kg/year). For SSA as a whole, cowpea (5.6 kg/capita)) is the most consumed pulse crop followed by dry bean (3.8 kg/capita) and other pulses (3.4 kg/capita)—Figure 31.

**Figure 31: Composition of per capita pulse consumption by sub-regions in SSA, 2006-08 in kg**

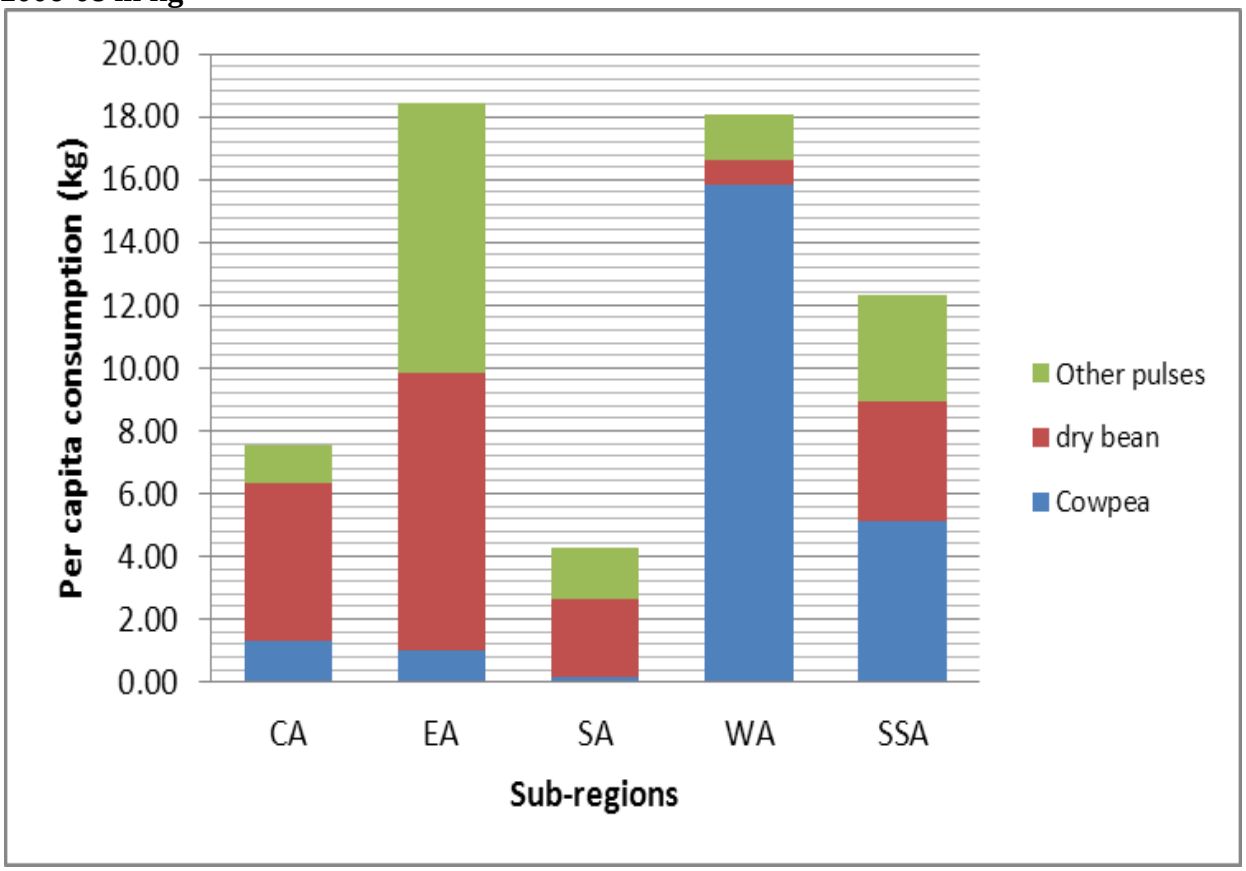
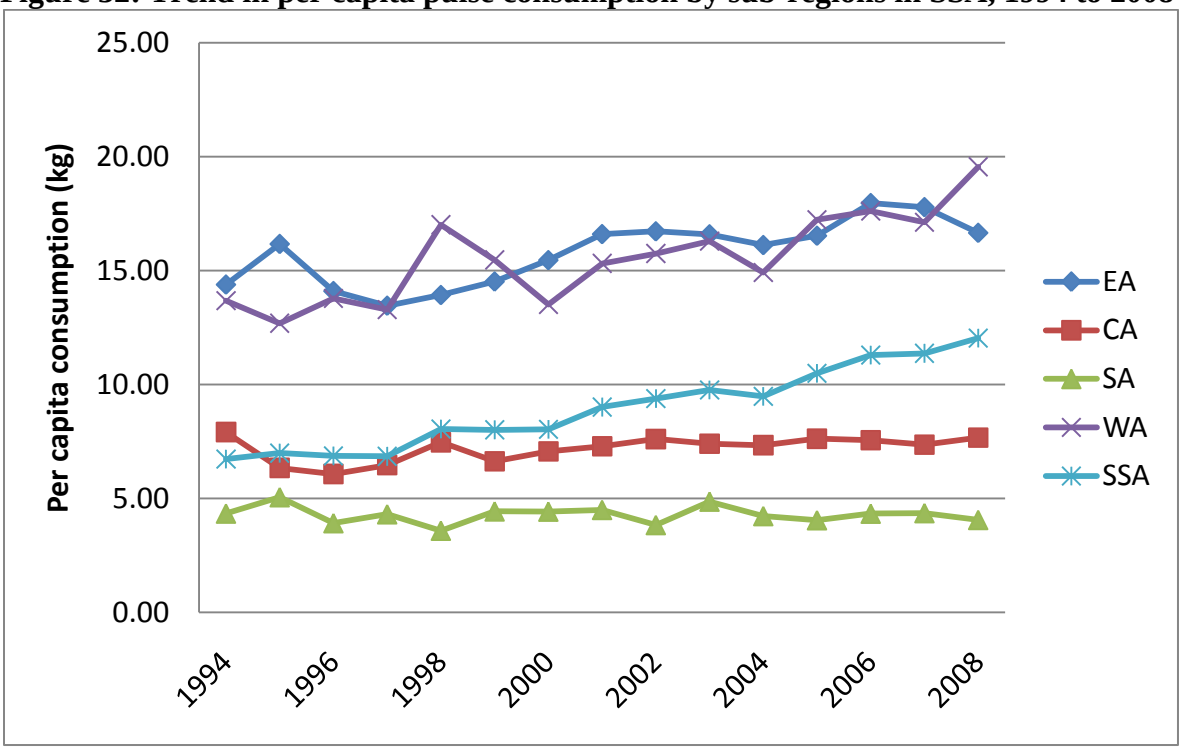



Figure 32 shows trends in per capita pulse consumption from 1994 to 2008. Per capita consumption was stagnant only in SA, but increasing all other sub-regions. An almost steady increase is seen for the whole SSA (Figure 32).

**Figure 32: Trend in per capita pulse consumption by sub-regions in SSA, 1994 to 2008**



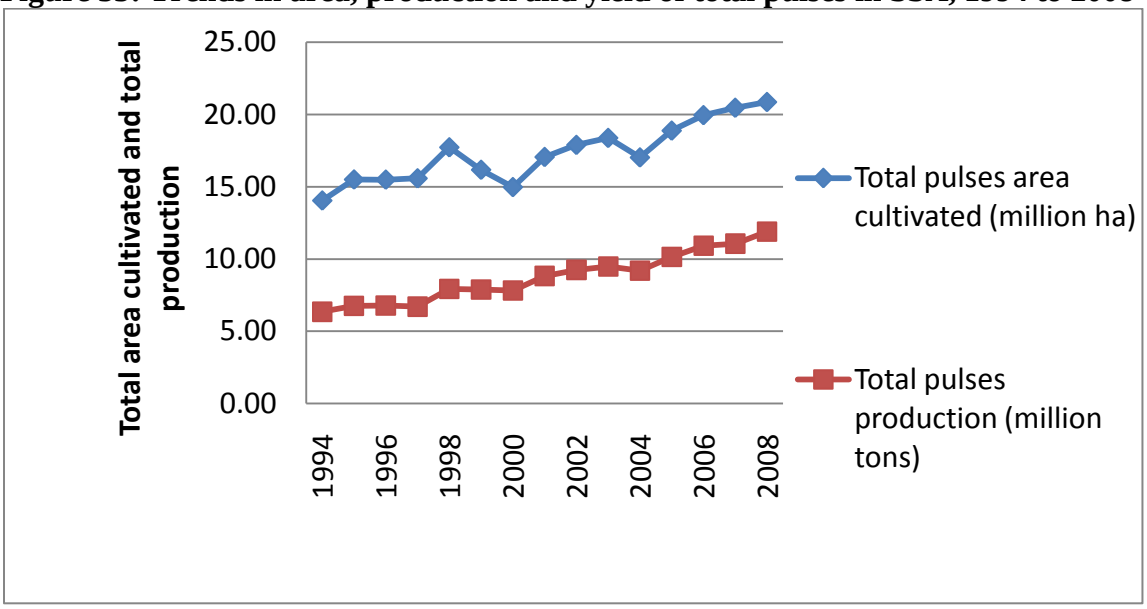

## IX. Future Outlook for Pulses in SSA

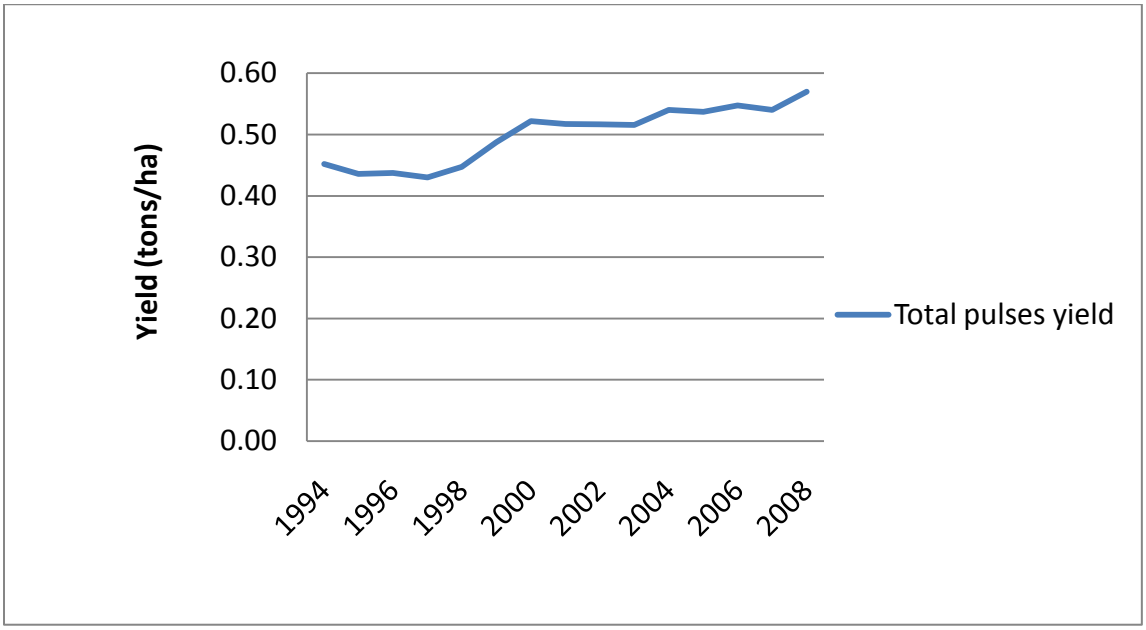
In presenting the future outlook of the pulse sector in mid- to late-1990s, Kelley et al, (2000) made the observation that "The future of pulse subsector depends on social, dietary, economic, environmental, and infrastructural factors, some of which are predictable in the process of economic growth while other—such as government intervention, competitiveness of pulses are quite unpredictable. Also, research breakthroughs and situation with competing crops or protein sources are highly unpredictable and could rapidly change the supply and demand for pulses". This observation on the role of different factors as determinants of the future outlook of the pulse sector around the world remains true today also.

Production determinants are factors such as the prices of pulses crops and other food commodities composing the consumer basket (cereals, meat, poultry, milk…), land resources,

agricultural techniques, availability and prices of agricultural inputs (e.g., fertilizer, labor), technology, infrastructure development, public policy, natural environment, as well as political stability.

**Figure 33: Trends in area, production and yield of total pulses in SSA, 1994 to 2008**




Total pulse production, area and yield have shown an upward trend in SSA in the period from 1994 to 2008 (Figure 33). If this past growth rates in total pulse area continues, by 2030, total pulse area harvested could increase by 55% in SSA, which is opposite of what is expected

globally (Clancey, 2009). Since total population in SSA is projected to grow by 2% each year, ceteris paribus, the continuation of growth trends observed in recent past years represents a very positive outlook of an increase in future per capita pulse production and consumption in SSA (if much of this increased production is consumed within SSA). However, a decline in yield growth rate of less than the historical 1.6%/year or a decrease in the growth rate of area harvested of less than the recently observed 2.2%/year would threaten the projected growth in production vis-à-vis population growth rate. Indeed, at a global level, Clancey points out the likelihood of a reduction in pulse production in developing countries as a result of increased competition for farm land use from other crops and government policy aimed at moving farmers into more visible "food security" crops and bio-energy uses (Clancey, 2009). How these factors (i.e., competition for land for bio-energy and other food security crops) play out in SSA and whether SSA can sustain a 2.2% growth rate in area devoted to pulse crops remain to be seen.

Total pulses production and area, although projected to increase, have had a relatively stagnant trend in recent years (2005-2008) in East Africa, Central Africa and Southern Africa. The overall increasing trends both in area and production are due to the growth performance in area and production in recent years in West Africa, which produced mainly cowpea, suggesting the important role of cowpea in future growth of the pulse subsector and the importance of looking closely at the reasons behind the stagnation in area and production in East Africa and Central Africa which are mainly dry bean producing sub-regions.

The production trends are intricately tied to consumption trends. Future demand for pulse crops will depend on pulse prices, other food crops' prices, disposable revenue and some household characteristics (for example whether households are urban or rural), population growth, etc. According to Clancey (2009), pulse consumption in Africa could rise by 27% within

the next decade and another 50% by 2030, as a direct consequence of the forecasts in the region's population growth.. As urban population grows much higher than rural population in SSA, ceteris paribus, a decrease in per capita demand should be expected in the long run.

In terms of trade, Clancey (2009) further contends that if civil unrest and drought remain a feature of the African landscape for the coming two decades, imports will continue to be dominated by food aid. On the other hand, if civil unrest moderates and local agricultural output improves, more commercial demand will emerge, but it may be at the expense of food aid volumes.

There are two factors which influence the price which can be obtained for pulses: how much farmers can earn from growing pulses instead of other crops; and how much consumers can gain by eating pulses instead of other foods (Clancey, 2009). There has been an increasing price over the past 14 years and in the medium term pulse prices are projected to maintain an upward trend (Clancey 2009). Also, despite the increase in price, consumers' demand for pulses has grown and is expected to grow in years to come. These positive growths in producer price and demand suggest a competitive opportunity for farmers in SSA to grow pulses.

## X. Conclusion

Food legume crops represent an important component of the food crops consumed in Sub-Saharan African countries. They provide a vital source of livelihood for millions of people and help contribute to the goals of food and nutritional security because they are a cheap source of protein and minerals. The objectives of this study were to provide a factual and contextual analysis of the food legume economy in Sub-Saharan Africa and to assess commodity-specific trends and developments in food legume crop productivity, cultivated area, price, trade and

consumption since the mid-1990s. FAO data, despite some weaknesses, were used as a primary source of data for the analysis presented.

The analysis shows that area harvested under food legumes has increased about one-third in the past 14 years. Although yields in SSA are low (0.55 ton/ha) compared to developing countries in general (0.72 ton/ha), they increased at an annual rate of 1.6% versus 0.95% for all developing countries. Production also increased at 3.9% annual growth rate compared to 1.8% for all developing countries. These increases in production, area and yields are followed by an increase in producer price in most major pulse producing countries over the 14 year period. While, official data show that imports increased by 65% and exports by 142%, SSA remains a net importer. Per capita consumption is relatively high in SSA compared to other regions of the world and is growing at a modest pace than any other parts of the world.

Demand for food legume, despite the increase in prices, is expected to grow 10% by 2020 and 23% by 2030 globally. The expected growth rate in SSA is higher than the world average growth rate. This signals a positive outlook for pulses in SSA. The expected growth in supply and price would ensure the availability of pulse crops and its contribution to increasing revenues for pulse producers. However, prohibitive price increases could hinder consumption and weaken food security. Other factors that can boost food legume supply through higher productivity include factors such as better agronomic and management practices, lowering production risks, low transaction costs in the pulse value chain, better varieties adapted to local stresses and climate change, and well-functioning seed systems to supply improved seeds and other inputs to farmers. Thus, looking towards the future, policy and research attention is needed to continue to address the issue of how to achieve better pulse crop yields and delivering the needed knowledge and inputs to pulse farmers throughout Sub-Saharan Africa.

# APPENDIX

Table A1: **Total pulse top producers' areas, productions and yields in SSA 1994-06 and 2006-08**

| Country | Region Code | Area harvested (million ha) | | | | | Production (million ha) | | | | | Yield (tons/ha) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1994-1996 | 2006-2008 | Change | Change (%) | Growth rate (%) | 1994-1996 | 2006-2008 | Change | Change (%) | Growth rate (%) | 1994-1996 | 2006-2008 | Change | Change (%) | Growth rate (%) |
| Niger | WA | 3.20 | 4.81 | 1.62 | 50.51 | 3.47 | 0.35 | 1.12 | 0.77 | 216.80 | 10.09 | 0.11 | 0.23 | 0.11 | 101.13 | 6.00 |
| Nigeria | WA | 3.66 | 4.52 | 0.87 | 23.65 | 1.79 | 1.76 | 2.97 | 1.21 | 68.39 | 4.44 | 0.48 | 0.66 | 0.17 | 35.69 | 2.58 |
| Tanzania | EA | 0.74 | 1.65 | 0.92 | 125.00 | 6.99 | 0.38 | 1.11 | 0.73 | 189.6 | 9.27 | 0.52 | 0.67 | 0.15 | 29.42 | 2.17 |
| Ethiopia | EA | 0.93 | 1.38 | 0.45 | 48.22 | 3.33 | 0.73 | 1.57 | 0.84 | 114.4 | 6.57 | 0.78 | 1.13 | 0.36 | 45.54 | 3.18 |
| Kenya | EA | 1.44 | 1.22 | -0.21 | -14.85 | -1.33 | 0.59 | 0.59 | 0.00 | 0.24 | 0.02 | 0.41 | 0.48 | 0.07 | 18.45 | 1.42 |
| Uganda | EA | 0.75 | 1.06 | 0.31 | 41.02 | 2.91 | 0.46 | 0.62 | 0.16 | 35.10 | 2.54 | 0.61 | 0.58 | -0.03 | -4.53 | -0.39 |
| Burkina Faso | WA | 0.57 | 0.77 | 0.20 | 36.04 | 2.60 | 0.27 | 0.39 | 0.12 | 42.78 | 3.01 | 0.49 | 0.51 | 0.02 | 5.08 | 0.41 |
| Malawi | EA | 0.42 | 0.61 | 0.19 | 43.91 | 3.08 | 0.24 | 0.37 | 0.13 | 54.20 | 3.67 | 0.57 | 0.61 | 0.04 | 7.30 | 0.59 |
| Rwanda | EA | 0.17 | 0.43 | 0.26 | 157.26 | 8.19 | 0.11 | 0.32 | 0.21 | 180.1 | 8.96 | 0.70 | 0.75 | 0.05 | 6.92 | 0.56 |
| Cameroon | MA | 0.17 | 0.40 | 0.22 | 129.09 | 7.15 | 0.15 | 0.36 | 0.22 | 146.1 | 7.79 | 0.85 | 0.91 | 0.06 | 7.56 | 0.61 |
| Angola | MA | 0.24 | 0.39 | 0.15 | 62.19 | 4.11 | 0.11 | 0.11 | 0.00 | 3.42 | 0.28 | 0.42 | 0.28 | -0.14 | -33.30 | -3.32 |
| DR Congo | MA | 0.36 | 0.38 | 0.02 | 5.33 | 0.43 | 0.21 | 0.20 | -0.01 | -5.26 | -0.45 | 0.57 | 0.51 | -0.06 | -10.17 | -0.89 |
| Mozambique | EA | 0.36 | 0.31 | -0.05 | -13.39 | -1.19 | 0.12 | 0.16 | 0.03 | 25.95 | 1.94 | 0.34 | 0.50 | 0.16 | 46.28 | 3.22 |
| Sudan | EA | 0.12 | 0.28 | 0.16 | 136.56 | 7.44 | 0.16 | 0.30 | 0.14 | 90.44 | 5.51 | 1.31 | 1.07 | -0.24 | -18.24 | -1.66 |
| Burundi | EA | 0.33 | 0.28 | -0.05 | -15.17 | -1.36 | 0.31 | 0.24 | -0.07 | -23.33 | -2.19 | 0.95 | 0.86 | -0.09 | -9.21 | -0.80 |

Table A2**: Cowpea top 5 producing countries area, production and yield in SSA, 1994-06 and 2006-08**

| | | Area harvested (million ha) | | | | | Production (million ha) | | | | | Yield (tons/ha) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| country | Sub-Region | 1994-1996 | 2006-2008 | Change | Percent Change (%) | Growth rate (%) | 1994-1996 | 2006-2008 | Change | Percent Change | Growth rate (%) | 1994-1996 | 2006-2008 | Change | Percent change (%) | Growth rate (%) |
| Niger | WA | 3.15 | 4.76 | 1.60 | 50.84 | 3.48 | 0.33 | 1.10 | 0.76 | 227.26 | 10.38 | 0.11 | 0.23 | 0.12 | 106.84 | 76.56 |
| Nigeria | WA | 3.54 | 4.40 | 0.86 | 24.22 | 1.82 | 1.71 | 2.92 | 1.20 | 70.25 | 4.53 | 0.49 | 0.66 | 0.18 | 36.52 | 55.86 |
| Burkina Faso | WA | 0.51 | 0.70 | 0.19 | 37.81 | 2.71 | 0.22 | 0.33 | 0.11 | 52.05 | 3.55 | 0.43 | 0.47 | 0.04 | 10.16 | 57.58 |
| Mali | WA | 0.24 | 0.25 | 0.01 | 3.74 | 0.31 | 0.07 | 0.07 | 0.00 | 1.78 | 0.15 | 0.34 | 0.29 | -0.04 | -12.31 | 60.78 |
| Senegal | WA | 0.09 | 0.21 | 0.12 | 128.52 | 7.13 | 0.03 | 0.08 | 0.05 | 161.34 | 8.33 | 0.33 | 0.36 | 0.04 | 11.55 | 61.13 |

Table A3**: SSA dry beans top 5 producing countries area, production and yield 1994-06 and 22006-08**

| | Area cultivated (million ha) | | | | | | Production (million tons) | | | | | Yield (tons/ha) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| country | Sub-region | 1994-1996 | 2006-2008 | Change | Percent change (%) | Growth rate (%) | 1994-1996 | 2006-2008 | Change | Percent change (%) | Growth rate (%) | 1994-1996 | 2006-2008 | Change | Percent change (%) | Growth rate (%) |
| Tanzania | EA | 0.35 | 1.20 | 0.85 | 246.15 | 10.90 | 0.23 | 0.85 | 0.62 | 264.29 | 11.37 | 0.67 | 0.71 | 0.04 | 5.73 | 0.47 |
| Uganda | EA | 0.60 | 0.87 | 0.28 | 46.17 | 3.21 | 0.33 | 0.43 | 0.10 | 29.64 | 2.19 | 0.56 | 0.50 | -0.07 | -11.75 | -1.04 |
| Kenya | EA | 0.69 | 0.83 | 0.14 | 20.01 | 1.53 | 0.29 | 0.41 | 0.11 | 38.70 | 2.76 | 0.42 | 0.48 | 0.06 | 14.81 | 1.16 |
| Rwanda | EA | 0.16 | 0.40 | 0.24 | 153.97 | 8.08 | 0.11 | 0.31 | 0.20 | 174.62 | 8.78 | 0.72 | 0.77 | 0.04 | 5.78 | 0.47 |
| Angola | CA | 0.24 | 0.39 | 0.15 | 62.19 | 4.11 | 0.11 | 0.11 | 0.00 | 3.42 | 0.28 | 0.42 | 0.28 | -0.14 | -33.30 | -3.32 |

**Table A4: Total pulse producer prices for selected top producing countries 1994 to 2008/a**

| Rank | country | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | Average 1994-1996 | Average 2006-2008 | change | % change |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Niger | 112 | 140 | 131 | 129 | 122 | 115 | 131 | 157 | 136 | 145 | 159 | 157 | 160 | 179 | 205 | **128** | **181** | **54** | **42** |
| 2 | Nigeria | 968 | 1245 | 2065 | 1842 | 1804 | 472 | 451 | 515 | | 451 | 519 | 745 | 677 | 609 | 697 | **1426** | **661** | **-765** | **-54** |
| 3 | Tanzania | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 4 | Ethiopia | 281 | 296 | 260 | 234 | 229 | 226 | 216 | 159 | 139 | 205 | 234 | 243 | 228 | 396 | 475 | **279** | **366** | **87** | **31** |
| 5 | Kenya | 247 | 292 | 316 | 348 | 332 | 299 | 371 | 320 | 320 | 363 | 404 | 398 | 460 | 511 | 522 | **285** | **498** | **213** | **75** |
| 6 | Uganda | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** |
| 7 | Burkina Faso | 162 | 180 | 246 | 240 | 262 | 201 | 163 | 259 | 293 | 180 | 204 | 203 | 210 | 222 | 246 | **196** | **226** | **30** | **15** |
| 8 | Malawi | 90 | 77 | 859 | 783 | 634 | 147 | 480 | 479 | 475 | 573 | 555 | 556 | 554 | 630 | 700 | **342** | **628** | **286** | **84** |
| 9 | Rwanda | 477 | 517 | 362 | 710 | 607 | 341 | 282 | 253 | 230 | 207 | 206 | 218 | 238 | 253 | 292 | **452** | **261** | **-191** | **-42** |
| 10 | Cameroon | 312 | 451 | 337 | 296 | 381 | 504 | 412 | 368 | 387 | 480 | 533 | 550 | 579 | 640 | 698 | **367** | **639** | **272** | **74** |
| 11 | Angola | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 12 | D.R. Congo | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 13 | Mozambique | 219 | 189 | 287 | 280 | 283 | 254 | 225 | 189 | 64 | 63 | 64 | 59 | 56 | 54 | | **163** | **55** | **-108** | **-66** |
| 14 | Sudan | 489 | 870 | 614 | 515 | 620 | 645 | 590 | 461 | 368 | 637 | 707 | 822 | 986 | | 1236 | **683** | **1111** | **428** | **63** |
| 15 | Burundi | 629 | 484 | 529 | 820 | 726 | 602 | 573 | 442 | 458 | 411 | 543 | 708 | 612 | 1003 | 1103 | **643** | **906** | **263** | **41** |
| **Total pulse** | | **362** | **431** | **546** | **563** | **546** | **346** | **354** | **327** | **287** | **338** | **375** | **424** | **433** | **450** | **618** | **427** | **500** | **73** | **17** |
| **CPI base 2005** | | **76** | **78** | **80** | **82** | **83** | **85** | **88** | **91** | **92** | **94** | **97** | **100** | **103** | **106** | **110** | **78** | **107** | **28** | **36** |
| **Real price** | | **4.8** | **5.5** | **6.8** | **6.9** | **6.5** | **4.1** | **4.0** | **3.6** | **3.1** | **3.6** | **3.9** | **4.2** | **4.2** | **4.2** | **5.6** | **4.7** | **4.7** | **-0.1** | **5.0** |

*a/For top producing countries that have FAO data on prices*

Table A5: Cowpea producer price **for selected top producing countries 1994 to 2008/a**

| Rank | | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 1994-96 | 2006-08 | change | % change |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Niger | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 2 | Nigeria | 968 | 1245 | 2065 | 1842 | 1804 | 472 | 451 | 515 | 494 | 451 | 519 | 745 | 677 | 609 | 697 | **1426** | **661** | **-765** | **-54** |
| 3 | Burkina F | 180 | 200 | 274 | 244 | 293 | 232 | 212 | 270 | 323 | 267 | 302 | 296 | 306 | 329 | 369 | **218** | **335** | **117** | **53** |
| 4 | Mali | 162 | 245 | 213 | 195 | 193 | 199 | 173 | 168 | 194 | 233 | 256 | 257 | 258 | 304 | 355 | **207** | **306** | **99** | **48** |
| 5 | Senegal | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 6 | Tanzania | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 7 | Kenya | 162 | 191 | 207 | 227 | 217 | 195 | 242 | 226 | 247 | 263 | 351 | 294 | 393 | 479 | 498 | **186** | **457** | **270** | **145** |
| 8 | DR Congo | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 9 | Sudan | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 10 | Cameroon | 288 | 341 | 284 | 257 | 339 | 520 | 425 | 310 | 326 | 365 | 383 | 392 | 413 | 447 | 487 | **304** | **449** | **145** | **48** |
| 11 | Malawi | 69 | 79 | 783 | 665 | 574 | 151 | 452 | 479 | 428 | 535 | 549 | 515 | 507 | 578 | 637 | **310** | **574** | **264** | **85** |
| 12 | Uganda | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 13 | Mauritania | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 14 | South Africa | 315 | 415 | 305 | 231 | 265 | 240 | 223 | 205 | 212 | 303 | 297 | 267 | 358 | 416 | 424 | **345** | **399** | **54** | **16** |
| 15 | Madagascar | 391 | 322 | 376 | 244 | 179 | 178 | 260 | 198 | 237 | 288 | 218 | 222 | 231 | 291 | 349 | **363** | **291** | **-73** | **-20** |
| Nominal price | | 317 | 380 | 563 | 488 | 483 | 273 | 305 | 296 | 308 | 338 | 359 | 374 | 393 | 432 | 477 | **420** | **434** | **14** | **3** |
| CPI base 2005 | | 76 | 78 | 80 | 82 | 83 | 85 | 88 | 91 | 92 | 94 | 97 | 100 | 103 | 106 | 110 | **78** | **107** | **28** | **36** |
| Real price | | 4.2 | 4.9 | 7.0 | 5.9 | 5.8 | 3.2 | 3.5 | 3.3 | 3.3 | 3.6 | 3.7 | 3.7 | 3.8 | 4.1 | 4.3 | **4.3** | **4.1** | **-0.2** | **4.2** |

*a/Countries which have FAO data available*

Table A6: **Dry bean producer price for selected top producing countries 1994 to 2008/a**

| Rank | | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 1994-06 | 2006-08 | change | % change |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Tanzania (1) | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 2 | Uganda (2) | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 3 | Kenya (3) | 304 | 359 | 388 | 427 | 408 | 367 | 456 | 394 | 347 | 415 | 441 | 489 | 571 | 560 | 555 | **350** | **562** | **212** | **61** |
| 4 | Rwanda (4) | 430 | 462 | 323 | 634 | 542 | 305 | 252 | 226 | 206 | 185 | 184 | 194 | 213 | 226 | 261 | **405** | **233** | **-172** | **-42** |
| 5 | Angola (5) | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 6 | Cameroon (6) | 337 | 561 | 391 | 336 | 424 | 487 | 399 | 426 | 448 | 595 | 682 | 708 | 745 | 834 | 909 | **430** | **829** | **400** | **93** |
| 7 | Malawi (7) | 115 | 85 | 1015 | 919 | 791 | 164 | 636 | 635 | 624 | 695 | 726 | 739 | 759 | 870 | 999 | **405** | **876** | **471** | **116** |
| 8 | Burundi (8) | 594 | 312 | 396 | 647 | 603 | 585 | 513 | 373 | 367 | 346 | 468 | 491 | 575 | 804 | 884 | **434** | **754** | **320** | **74** |
| 9 | D R Congo (9) | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 10 | Ethiopia (10) | 284 | 287 | 246 | 227 | 216 | 219 | 209 | 148 | 120 | 191 | 210 | 213 | 229 | 257 | 303 | **272** | **263** | **-9** | **-3** |
| 11 | Togo (11) | 283 | 333 | 592 | 396 | 437 | 406 | 287 | 278 | 301 | 358 | 392 | 481 | 414 | 374 | 786 | **403** | **525** | **122** | **30** |
| 12 | Benin (12) | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 13 | Chad (13) | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 14 | Madagascar (14) | 546 | 576 | 763 | 565 | 582 | 535 | 426 | 439 | 384 | 413 | 313 | 318 | 522 | 746 | 588 | **629** | **619** | **-10** | **-2** |
| 15 | Somalia (15) | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| **Dry bean average nominal price** | | **361** | **372** | **514** | **519** | **500** | **383** | **397** | **365** | **350** | **400** | **427** | **454** | **503** | **584** | **661** | **416** | **583** | **167** | **40** |
| **CPI base 2005** | | **76** | **78** | **80** | **82** | **83** | **85** | **88** | **91** | **92** | **94** | **97** | **100** | **103** | **106** | **110** | **78** | **107** | **28** | **36** |
| **Real price** | | **4.8** | **4.8** | **6.4** | **6.3** | **6.0** | **4.5** | **4.5** | **4.0** | **3.8** | **4.2** | **4.4** | **4.5** | **4.9** | **5.5** | **6.0** | **5.0** | **5.5** | **0.5** | **5.5** |

a/Countries which have FAO data available

Table A7: **Chickpea producer price for selected top producing countries 1994 to 2008/a**

| Rank | | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 1994-06 | 2006-08 | change | % change |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Ethiopia | 262 | 304 | 246 | 216 | 231 | 217 | 223 | 164 | 148 | 196 | 215 | 230 | 253 | 456 | 523 | **270** | **411** | **140** | **52** |
| 2 | Malawi | 104 | 77 | 913 | 1004 | 640 | 149 | 415 | 396 | 499 | 493 | 506 | 475 | 467 | 522 | 559 | **365** | **516** | **152** | **42** |
| 3 | Tanzania | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 4 | Eritrea | 307 | 368 | 428 | 360 | 606 | 752 | 580 | 501 | 479 | 525 | 610 | 588 | 674 | 732 | 842 | **368** | **749** | **382** | **104** |
| 5 | Sudan | 219 | 390 | 275 | 231 | 278 | 289 | 264 | 207 | 165 | 575 | 667 | 793 | 948 | | 1218 | **295** | **1083** | **788** | **267** |
| 6 | Uganda | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 7 | Zimbabwe | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 8 | Niger | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 9 | Kenya | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| | **Chickpea** | **223** | **285** | **465** | **453** | **439** | **352** | **370** | **317** | **323** | **447** | **499** | **521** | **586** | **570** | **786** | **324** | **647** | **323** | **99** |
| **CPI base 2005** | | **76** | **78** | **80** | **82** | **83** | **85** | **88** | **91** | **92** | **94** | **97** | **100** | **103** | **106** | **110** | **78** | **107** | **28** | **36** |
| **Real price** | | **2.9** | **3.6** | **5.8** | **5.5** | **5.3** | **4.1** | **4.2** | **3.5** | **3.5** | **4.7** | **5.2** | **5.2** | **5.7** | **5.4** | **7.1** | **4.8** | **6.1** | **1.3** | **6.0** |

*a/Countries which have FAO data available*

Table A8: **Faba bean producer price for selected top producing countries 1994 to 2008/a**

| Rank | | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 1994-96 | 2006-08 | change | % change |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Ethiopia | 218 | 221 | 189 | 174 | 167 | 169 | 161 | 153 | 128 | 195 | 214 | 220 | 237 | 333 | 360 | **209** | **310** | **101** | **48** |
| 2 | Sudan | 491 | 873 | 616 | 517 | 622 | 648 | 592 | 463 | 370 | 532 | 580 | 669 | 804 | | 928 | **660** | **866** | **206** | **31** |
| 3 | Eritrea | 380 | 363 | 402 | 374 | 591 | 655 | 508 | 337 | 381 | 418 | 483 | 482 | 553 | 602 | 693 | **382** | **616** | **234** | **61** |
| 4 | Sierra Leone | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 5 | Cameroon | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| **Nominal price** | | **363** | **486** | **403** | **355** | **460** | **490** | **420** | **318** | **293** | **382** | **426** | **457** | **531** | **468** | **661** | **417** | **553** | **136** | **33** |
| **CPI base 2005** | | **76** | **78** | **80** | **82** | **83** | **85** | **88** | **91** | **92** | **94** | **97** | **100** | **103** | **106** | **110** | **78** | **107** | **28** | **36** |
| **Real price** | | **4.8** | **6.2** | **5.0** | **4.3** | **5.5** | **5.8** | **4.8** | **3.5** | **3.2** | **4.1** | **4.4** | **4.6** | **5.1** | **4.4** | **6.0** | **5.3** | **5.2** | **-0.2** | **-3.0** |

Table A9**: Pigeon pea producer price for selected top producing countries 1994 to 2008/a**

| Rank | | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 1994-06 | 2006-08 | change | % change |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Kenya | 277 | 327 | 354 | 390 | 372 | 335 | 416 | 339 | 367 | 410 | 421 | 412 | 417 | 496 | 514 | **320** | **476** | **156** | **49** |
| 2 | Malawi | 74 | 65 | 727 | 545 | 531 | 126 | 418 | 408 | 351 | 570 | 440 | 496 | 481 | 551 | 604 | **289** | **546** | **472** | **163** |
| 3 | Uganda | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 4 | Tanzania | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| 5 | Dem. Rep. Congo | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | **NA** | **NA** | **NA** | **NA** |
| **Nominal price** | | **176** | **196** | **541** | **468** | **452** | **230** | **417** | **373** | **359** | **490** | **431** | **454** | **449** | **523** | **559** | **304** | **511** | **206** | **68** |
| **CPI base 2005** | | **76** | **78** | **80** | **82** | **83** | **85** | **88** | **91** | **92** | **94** | **97** | **100** | **103** | **106** | **110** | **78** | **107** | **28** | **36** |
| **Real price** | | **2.3** | **2.5** | **6.7** | **5.7** | **5.4** | **2.7** | **4.7** | **4.1** | **3.9** | **5.2** | **4.5** | **4.5** | **4.4** | **4.9** | **5.1** | **4.4** | **4.8** | **0.3** | **4.8** |

**Table A10: Imports and exports by sub-region and by crop in SSA, 1994-96 and 2006-08**

| | CA | EA | SA | WA | SSA | CA | EA | SA | WA | SSA | CA | EA | SA | WA | SSA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | IMPORT | | | | | EXPORT | | | | | Net Import (-) or Net Export (+) | | | | |
| | Cowpea | | | | | Cowpea | | | | | Cowpea | | | | |
| 1994-1996 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2006-2008 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Change in imports/exports | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | | |
| % Change | - | - | - | -100.0 | -100.0 | - | - | - | - | - | | | | | |
| Growth rate ( %/year) | - | - | - | -100.0 | -100.0 | - | - | - | - | - | | | | | |
| | Dry bean | | | | | Dry bean | | | | | Dry bean | | | | |
| 1994-1996 | 0.03 | 0.09 | 0.07 | 0.01 | 0.20 | 0.00 | 0.09 | 0.01 | 0.01 | 0.11 | -0.03 | 0.00 | -0.06 | 0.00 | -0.09 |
| 2006-2008 | 0.06 | 0.10 | 0.08 | 0.01 | 0.25 | 0.00 | 0.10 | 0.00 | 0.01 | 0.11 | -0.06 | 0.00 | -0.08 | 0.00 | -0.14 |
| Change in imports/exports | 0.02 | 0.01 | 0.02 | 0.00 | 0.05 | 0.00 | 0.01 | -0.01 | 0.00 | 0.00 | | | | | |
| % Change | 74.46 | 14.28 | 25.11 | -14.06 | 26.63 | 209.88 | 15.84 | -60.79 | -43.73 | 3.99 | | | | | |
| Growth rate ( %/year) | 4.06 | 0.96 | 1.61 | -1.08 | 1.70 | 8.41 | 1.06 | -6.47 | -4.02 | 0.28 | | | | | |
| | Other pulses | | | | | Other pulses | | | | | Other pulses | | | | |
| 1994-1996 | 0.02 | 0.12 | 0.04 | 0.01 | 0.19 | 0.00 | 0.04 | 0.00 | 0.00 | 0.04 | -0.02 | -0.08 | -0.04 | -0.01 | -0.15 |
| 2006-2008 | 0.03 | 0.30 | 0.03 | 0.03 | 0.39 | 0.00 | 0.24 | 0.00 | 0.00 | 0.25 | -0.03 | -0.06 | -0.03 | -0.03 | -0.14 |
| Change in imports/exports | 0.01 | 0.18 | 0.00 | 0.01 | 0.20 | 0.00 | 0.20 | 0.00 | 0.00 | 0.21 | | | | | |
| % Change | 38.6 | 147.9 | -4.2 | 95.1 | 103.8 | 128.6 | 549.5 | 121.3 | -21.0 | 493.0 | | | | | |
| Growth rate ( %/year) | 2.4 | 6.7 | -0.3 | 4.9 | 5.2 | 6.1 | 14.3 | 5.8 | -1.7 | 13.6 | | | | | |
| | Total pulses | | | | | Total pulses | | | | | Total pulses | | | | |
| 1994-1996 | 0.1 | 0.2 | 0.1 | 0.0 | 0.4 | 0.00 | 0.12 | 0.01 | 0.01 | 0.15 | -0.05 | -0.08 | -0.09 | -0.01 | -0.24 |
| 2006-2008 | 0.1 | 0.4 | 0.1 | 0.0 | 0.6 | 0.00 | 0.34 | 0.01 | 0.01 | 0.36 | -0.08 | -0.05 | -0.11 | -0.03 | -0.28 |
| Change in imports/exports | 0.0 | 0.2 | 0.0 | 0.0 | 0.2 | 0.00 | 0.22 | 0.00 | -0.01 | 0.21 | | | | | |
| % Change | 61.3 | 92.4 | 14.8 | 48.8 | 64.6 | 209.3 | 176.80 | -34.47 | -38.86 | 141.83 | | | | | |
| Growth rate ( %/year) | 3.5 | 4.8 | 1.0 | 2.9 | 3.6 | 8.4 | 7.54 | -2.97 | -3.45 | 6.51 | | | | | |

**Table A11: "Total pulses" top importers in SSA 2006-08**

| Countries | Region codes | Imports 1994-1996 (m tons) | Imports 2006-2008 (m tons) | Percent share (%) | Cumul percent (%) | Change (m tons) | % Change | Growth rate (%) |
|---|---|---|---|---|---|---|---|---|
| Sudan | EA | 0.04 | 0.11 | 8.42 | 8.42 | 0.08 | 206.93 | 9.80 |
| South Africa | SA | 0.09 | 0.11 | 7.87 | 16.30 | 0.02 | 22.32 | 1.69 |
| Kenya | EA | 0.02 | 0.09 | 6.54 | 22.83 | 0.07 | 296.54 | 12.16 |
| Angola | CA | 0.03 | 0.04 | 3.14 | 25.98 | 0.01 | 30.18 | 2.22 |
| Ethiopia | EA | 0.01 | 0.04 | 3.08 | 29.06 | 0.03 | 406.35 | 14.47 |
| Zimbabwe | EA | 0.01 | 0.04 | 2.87 | 31.93 | 0.03 | 560.64 | 17.04 |
| Uganda | EA | 0.01 | 0.03 | 2.11 | 34.04 | 0.02 | 115.05 | 6.59 |
| DR Congo | CA | 0.02 | 0.02 | 1.75 | 35.79 | 0.00 | 25.76 | 1.93 |
| Somalia | EA | 0.00 | 0.02 | 1.36 | 37.15 | 0.01 | 396.59 | 14.29 |
| Burundi | EA | 0.01 | 0.01 | 0.99 | 38.14 | 0.00 | 7.98 | 0.64 |
| Mauritius | EA | 0.01 | 0.01 | 0.92 | 39.06 | 0.00 | 16.46 | 1.28 |
| Zambia | EA | 0.00 | 0.01 | 0.82 | 39.88 | 0.01 | 2418.22 | 30.85 |
| Tanzania | EA | 0.02 | 0.01 | 0.67 | 40.54 | -0.01 | -60.24 | -7.40 |
| Congo | CA | 0.00 | 0.01 | 0.52 | 41.06 | 0.01 | 1878.96 | 28.24 |
| Chad | CA | 0.00 | 0.01 | 0.50 | 41.56 | 0.01 | - | - |
| Liberia | WA | 0.01 | 0.01 | 0.46 | 42.02 | 0.00 | -1.21 | -0.10 |
| Djibouti | EA | 0.00 | 0.01 | 0.38 | 42.40 | 0.00 | 760.89 | 19.65 |

**Table A12 "Total pulses" top exporters in SSA 2006-08**

| Countries | Region codes | Imports 1994-1996 (m tons) | Exports 2006-2008 (m tons) | Percent share (%) | Cumul percent (%) | Change (m tons) | % Change | Growth rate (%) |
|---|---|---|---|---|---|---|---|---|
| Ethiopia | EA | 0.03 | 0.16 | 37.80 | 37.80 | 0.13 | 526.31 | 16.52 |
| Tanzania | EA | 0.02 | 0.07 | 17.71 | 55.51 | 0.05 | 229.96 | 10.46 |
| Malawi | SSA | 0.02 | 0.03 | 7.06 | 62.57 | 0.01 | 60.92 | 4.04 |
| Uganda | EA | 0.03 | 0.03 | 6.57 | 69.13 | -0.01 | -15.33 | -1.38 |
| Kenya | EA | 0.01 | 0.02 | 4.82 | 73.96 | 0.01 | 107.25 | 6.26 |
| Madagascar | EA | 0.01 | 0.01 | 2.52 | 76.47 | 0.00 | 7.49 | 0.60 |
| Mozambique | EA | 0.00 | 0.01 | 1.88 | 78.35 | 0.01 | - | - |
| Niger | WA | 0.01 | 0.01 | 1.69 | 80.05 | 0.00 | 19.53 | 1.50 |
| South Africa | SA | 0.01 | 0.01 | 1.45 | 81.50 | 0.00 | -38.72 | -4.00 |

**Table A13: Percent of total pulses imports in total pulses production in SSA 1994-06 and 2006-08**

| | CA | EA | SA | WA | SSA |
|---|---|---|---|---|---|
| | | | Imports/production (%) | | |
| 1994-1996 | 9.84 | 6.16 | 88.98 | 0.89 | 5.70 |
| 2006-2008 | 10.35 | 7.18 | 93.14 | 0.72 | 5.49 |
| Change | 0.50 | 1.02 | 4.16 | -0.17 | -0.21 |
| Percent change | 5.12 | 16.54 | 4.68 | -19.01 | -3.66 |
| | | | Exports/production (%) | | |
| 1994-1996 | 0.06 | 3.69 | 8.65 | 0.51 | 2.18 |
| 2006-2008 | 0.13 | 6.19 | 5.17 | 0.17 | 3.09 |
| Change | 0.06 | 2.50 | -3.48 | -0.34 | 0.91 |
| Percent change | 101.60 | 67.68 | -40.25 | -66.73 | 41.51 |

**Table A14: Dry bean top importers in SSA 2006-08**

| Countries | Region codes | Imports 1994-96 (m tons) | Imports 2006-08 (m tons) | Percent share (%) | Cumul percent (%) | Change (m tons) | % Change | Growth rate (%) |
|---|---|---|---|---|---|---|---|---|
| **South Africa** | SA | 0.06 | 0.08 | 22.87 | 22.87 | 0.01 | 17.83 | 1.38 |
| **Kenya** | EA | 0.02 | 0.05 | 13.99 | 36.85 | 0.03 | 119.21 | 6.76 |
| **Angola** | CA | 0.03 | 0.04 | 12.91 | 49.76 | 0.01 | 30.18 | 2.22 |
| **Zimbabwe** | EA | 0.00 | 0.02 | 5.28 | 55.04 | 0.01 | 340.31 | 13.15 |
| **Sudan** | EA | 0.00 | 0.01 | 2.06 | 57.10 | 0.01 | - | - |
| **Burundi** | EA | 0.01 | 0.01 | 1.99 | 59.09 | -0.01 | -47.31 | -5.20 |
| **Congo** | CA | 0.00 | 0.01 | 1.86 | 60.95 | 0.01 | 1638.45 | 26.87 |
| **Chad** | CA | 0.00 | 0.00 | 1.21 | 62.16 | 0.00 | - | - |
| **Somalia** | EA | 0.00 | 0.00 | 1.19 | 63.35 | 0.00 | - | 0.47 |
| **DR Congo** | CA | 0.00 | 0.00 | 1.18 | 64.53 | 0.00 | - | - |
| **Cape Verde** | WA | 0.00 | 0.00 | 1.16 | 65.69 | 0.00 | 43.99 | 3.09 |
| **Botswana** | SA | 0.00 | 0.00 | 1.01 | 66.70 | 0.00 | 9.16 | 0.73 |
| **Uganda** | EA | 0.01 | 0.00 | 0.97 | 67.67 | -0.01 | -61.54 | -7.65 |
| **Lesotho** | SA | 0.00 | 0.00 | 0.89 | 68.56 | 0.00 | - | - |
| **Malawi** | EA | 0.00 | 0.00 | 0.75 | 69.32 | 0.00 | 679.18 | 18.66 |
| **Ethiopia** | EA | 0.00 | 0.00 | 0.63 | 69.95 | 0.00 | 5.77 | 0.47 |
| **Swaziland** | SA | 0.00 | 0.00 | 0.62 | 70.57 | 0.00 | - | - |

**Table A15: Dry bean top exporters in SSA 2006-2008**

| Countries | Region codes | Imports 1994-1996 (m tons) | Exports 2006-2008 (m tons) | Percent share (%) | Cumul percent (%) | Change (m tons) | % Change | Growth rate (%) |
|---|---|---|---|---|---|---|---|---|
| **Ethiopia** | EA | 0.03 | 0.05 | 35.95 | 35.95 | 0.03 | 108.70 | 6.32 |
| **Uganda** | EA | 0.02 | 0.02 | 14.43 | 50.39 | 0.00 | -13.86 | -1.24 |
| **Tanzania** | EA | 0.02 | 0.01 | 4.57 | 54.95 | -0.02 | -70.33 | -9.63 |
| **Kenya** | EA | 0.00 | 0.01 | 3.68 | 58.64 | 0.00 | 12.16 | 0.96 |
| **Niger** | WA | 0.01 | 0.01 | 3.61 | 62.25 | 0.00 | -2.11 | -0.18 |

**Table A16: "Other pulses" top importers in SSA, 2006-08**

| Countries | Region codes | Imports 1994-1996 (m tons) | Imports 2006-2008 (m tons) | Percent share (%) | Cumul percent (%) | Change (m tons) | % Change | Growth rate (%) |
|---|---|---|---|---|---|---|---|---|
| **Sudan** | EA | 0.04 | 0.11 | 10.47 | 10.47 | 0.07 | 188.65 | 9.24 |
| **Kenya** | EA | 0.00 | 0.04 | 4.14 | 14.61 | 0.04 | 3195.49 | 33.81 |
| **Ethiopia** | EA | 0.01 | 0.04 | 3.87 | 18.48 | 0.03 | 532.69 | 16.62 |
| **South Africa** | SA | 0.02 | 0.03 | 3.05 | 21.53 | 0.01 | 34.71 | 2.51 |
| **Uganda** | EA | 0.00 | 0.03 | 2.48 | 24.01 | 0.02 | 408.74 | 14.52 |
| **Zimbabwe** | EA | 0.00 | 0.02 | 2.10 | 26.10 | 0.02 | 1011.42 | 22.22 |
| **DR Congo** | CA | 0.02 | 0.02 | 1.94 | 28.04 | 0.00 | 5.18 | 0.42 |
| **Somalia** | EA | 0.00 | 0.01 | 1.41 | 29.45 | 0.01 | - | - |
| **Mauritius** | EA | 0.01 | 0.01 | 1.10 | 30.55 | 0.00 | 20.51 | 1.57 |
| **Zambia** | EA | 0.00 | 0.01 | 0.89 | 31.43 | 0.01 | 4001.51 | 36.27 |
| **Tanzania** | EA | 0.02 | 0.01 | 0.77 | 32.20 | -0.01 | -54.93 | -6.43 |
| **Burundi** | EA | 0.00 | 0.01 | 0.67 | 32.87 | - | - | - |
| **Liberia** | WA | 0.01 | 0.01 | 0.61 | 33.49 | 0.00 | -0.10 | -0.10 |

**Table A17: "Other pulses" top exporters in SSA, 2006-2008**

| Countries | Region codes | Imports 1994-1996 (m tons) | Exports 2006-2008 (m tons) | Percent share (%) | Cumul percent (%) | Change (m tons) | % Change | Growth rate (%) |
|---|---|---|---|---|---|---|---|---|
| **Ethiopia** | EA | 0.00 | 0.11 | 38.79 | 38.79 | 0.11 | 84134.21 | 75.30 |
| **Tanzania** | EA | 0.00 | 0.07 | 24.74 | 63.53 | 0.07 | - | - |
| **Malawi** | EA | 0.02 | 0.03 | 9.97 | 73.50 | 0.01 | 57.19 | 3.84 |
| **Kenya** | EA | 0.00 | 0.01 | 5.43 | 78.94 | 0.01 | 199.29 | 9.57 |
| **Mozambique** | EA | 0.00 | 0.01 | 2.89 | 81.82 | 0.01 | - | - |
| **Madagascar** | EA | 0.01 | 0.01 | 2.66 | 84.49 | 0.00 | 29.44 | 2.17 |
| **Uganda** | EA | 0.01 | 0.01 | 2.36 | 86.84 | 0.00 | -19.80 | -1.82 |

**Table A18: Total and per capita consumption in SSA and sub-regions, 1994-06 and 2006-08**

| | Consumption (million tons) | | | | | Consumption per capita (kg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CA | EA | SA | WA | SSA | CA | EA | SA | WA | SSA |
| | Cowpea | | | | | Cowpea | | | | |
| 1994-1996 | 0.06 | 0.20 | 0.01 | 2.39 | 2.65 | 0.71 | 0.90 | 0.15 | 11.43 | 3.66 |
| 2006-2008 | 0.16 | 0.30 | 0.01 | 4.50 | 4.97 | 1.33 | 0.98 | 0.14 | 15.84 | 5.14 |
| Change in exports | 0.10 | 0.10 | 0.00 | 2.12 | 2.31 | 0.62 | 0.08 | -0.01 | 4.41 | 1.49 |
| % Change | 157.1 | 49.6 | 10.5 | 88.6 | 87.1 | 86.6 | 8.7 | -7.4 | 38.5 | 40.7 |
| Growth rate ( %/year) | 7.0 | 2.9 | 0.7 | 4.6 | 4.6 | 4.6 | 0.6 | -0.5 | 2.4 | 2.5 |
| | dry bean | | | | | dry bean | | | | |
| 1994-1996 | 0.42 | 1.55 | 0.13 | 0.10 | 2.20 | 4.93 | 7.04 | 2.73 | 0.49 | 3.04 |
| 2006-2008 | 0.60 | 2.68 | 0.14 | 0.23 | 3.65 | 5.03 | 8.87 | 2.49 | 0.81 | 3.79 |
| Change in total cons. | 0.18 | 1.14 | 0.01 | 0.13 | 1.45 | 0.09 | 1.84 | -0.24 | 0.32 | 0.75 |
| % Change | 41.47 | 73.36 | 8.73 | 124.36 | 65.80 | 1.87 | 26.09 | -8.90 | 64.73 | 24.78 |
| Growth rate ( %/year) | 2.51 | 4.01 | 0.60 | 5.94 | 3.68 | 0.13 | 1.67 | -0.66 | 3.63 | 1.59 |
| | Other pulses | | | | | Other pulses | | | | |
| 1994-1996 | 0.10 | 1.69 | 0.07 | 0.30 | 2.16 | 1.14 | 7.66 | 1.56 | 1.46 | 2.98 |
| 2006-2008 | 0.14 | 2.60 | 0.09 | 0.41 | 3.25 | 1.18 | 8.60 | 1.63 | 1.45 | 3.37 |
| Change in exports | 0.04 | 0.92 | 0.02 | 0.11 | 1.09 | 0.04 | 0.94 | 0.07 | -0.01 | 0.39 |
| % Change | 43.8 | 54.4 | 24.4 | 35.3 | 50.2 | 3.9 | 12.3 | 4.3 | -0.6 | 13.1 |
| Growth rate ( %/year) | 2.6 | 3.2 | 1.6 | 2.2 | 3.0 | 0.3 | 0.8 | 0.3 | 0.0 | 0.9 |
| | Total pulses | | | | | Total pulses | | | | |
| 1994-1996 | 0.58 | 3.43 | 0.21 | 2.80 | 7.02 | 6.78 | 15.60 | 4.44 | 13.38 | 9.67 |
| 2006-2008 | 0.90 | 5.58 | 0.24 | 5.15 | 11.87 | 7.53 | 18.45 | 4.26 | 18.10 | 12.30 |
| Change in exports | 0.32 | 2.15 | 0.03 | 2.35 | 4.85 | 0.75 | 2.85 | -0.19 | 4.71 | 2.63 |
| % Change | 54.0 | 62.7 | 14.3 | 84.1 | 69.0 | 11.1 | 18.3 | -4.2 | 35.2 | 27.2 |
| Growth rate ( %/year) | 3.1 | 3.5 | 1.0 | 4.5 | 3.8 | 0.8 | 1.2 | -0.3 | 2.2 | 1.7 |

**Table A19: Rate of adoption in specific countries and localities in SSA**

| Food legume | Country and specific location | Rate of adoption | date |
|---|---|---|---|
| Dry bean | **Ethiopia**, Alaba District<br>**Ethiopia** Melkassa and Awassa,<br>***Ethiopia,*** *nationwide*<br>**Kenya**, Kakamega and Vihiga Districts,<br>**Tanzania,** northwestern and northeastern,<br>***Tanzania,****nationwide,*<br>**Uganda**, six districts,<br>***Uganda,*** *nationwide,*<br>**Rwanda**,nationwide, for climbing beans **Rwanda**,nationwide, for bush bean | (15%) of farmers<br>*27%* of farmers<br>*8%* of farmers<br>35-80% of farmers<br>54% of farmers<br>4% of farmers<br>51% of farmers<br>*15%* of farmers<br>94% of farmers<br>26% of farmers | 2005<br>Before 2007<br>1998<br>2001<br>2004<br>*1998*<br>2003<br>*1998*<br>2004<br>2004 |
| Cowpea | **Nigeria**, Kano and Jigawa States,<br>**Nigeria**, Kano and Kaduna States,<br>**Nigeria**, Borno State,<br>**Senegal**, 90 farmers, some chosen from project villages<br>**Ghana,** Northern and Upper West Regions, 169 farmers from project villages | 38% of area<br>72%, 80% of area<br>40% of area<br>< 4% of farmers<br><br>16% of cowpea area | 1999<br>2003/04<br>2007<br>2004<br><br>2007 |

*Source: Tripp, Robert, 2011*

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