

CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Tropical AgriSciences



Czech University of Life Sciences Prague

**Faculty of Tropical
AgriSciences**

**Comparative analysis of cashew value chain in
major African producing countries**

Bachelor's THESIS

Prague 2019

Author: Ponloeu Chhour

Chief supervisor: Ing. Jiri Hejkrlik, Ph.D.

Declaration

I hereby declare that I have done this thesis entitled Comparative analysis of cashew value chain in major African producing countries independently, all texts in this thesis are original, and all the sources have been quoted and acknowledged by means of complete references and according to Citation rules of the FTA.

In Prague, 12/04/2019

.....

Ponloeu Chhour

Acknowledgements

I would like to thank to Czech University of Life Science Prague and all my colleges in the past 3 years of my study in Faculty of Tropical AgriSciences

I would like to thank my thesis supervisor Ing. Jiri Hejkrlik, Ph.D. for his valuable time, patience and acceptance with my competence, communication skills and mistakes.

Abstract

Cashew appears to be an ordinary perennial tree crop, which value farmers overlook. This type of tree crop naturally provides additional benefits besides its nuts as a food people daily consume. Actually, cashew has been used for fighting against deforestation in many tropical countries. At the same time, cashew tree itself also provides wood product and its fruits can be used to produce gums. Moreover, cashew is a cash-crop product, which has high adaptability with its drought resistance suitable for arid environment.

Thanks to its abundant advantages, this plant is a potential crop for farmers especially in African countries. This paper therefore aims to answer research question on how African countries benefit from cashew growing potential, how their markets are organized, and what is the relationship between the level of integration into the world markets and development of cashew production and export institutional setup.

To answer the research question, it was necessary to conduct comparisons of certain indicators with the use of quantitative and qualitative data provided by FAOSTAT, OEC, Web of Science, Science Direct, and ResearchGate. This methodology is accompanied by the review of literature regarding general characteristics of cashew, cashew production countries and its global market. Following that, a personal argument is made in order to academically and statistically answer the research questions. Finally there will be a conclusion that cashew is an important crop for African countries in both economic and environmental sense.

Key words: *Cashew nut, Africa, environment, poverty, value chain, trade*

Contents

Declaration	1
Acknowledgements	2
Abstract	3
Contents	4
List of tables	6
List of figures.....	6
Abbreviations	7
1. Introduction	9
2. Literature Review	11
2.1. Cashew Characteristics.....	11
2.2. Cashew Growing Regions	12
2.3. Cashew Market.....	13
2.3.1. In-shell Cashew or Raw Cashew	13
2.3.2. Cashew kernels	14
2.4. Cashew Agroecosystem.....	14
2.4.1. Climatic requirements	15
2.4.2. Land requirements.....	15
2.4.3. Cashew Farming Systems	15
2.5. Top 11 Cashew Producer.....	16
2.5.1. Brazil.....	16
2.5.2. Burkina Faso	17
2.5.3. Co'te d'Ivoire.....	17
2.5.4. Ghana	18
2.5.5. Guinea-Bissau	19
2.5.6. India	20
2.5.7. Kenya	21
2.5.8. Mozambique.....	22
2.5.9. Nigeria.....	23

2.5.10.	United Republic of Tanzania	24
2.5.11.	Viet Nam	25
2.6.	Impact on poverty	26
2.7.	Impact on Environment	27
3.	Objectives and Methodology	29
3.1.	Selected countries	30
3.2.	Criteria for comparison.....	30
3.2.1.	Existence of governmental support.....	30
3.2.2.	Export support and Support from private and international organizations.....	31
3.2.3.	Export tariff.....	32
4.	Results.....	33
4.1.	Comparison Figure	33
4.2.	Production and support.....	38
4.3.	Export and support	38
4.4.	Export tariff	40
5.	Discussion	41
6.	Conclusions	43
7.	Refernces	44

List of tables

TABLE 1 COMPARISON OF SELECTED COUNTRIES	37
--	----

List of figures

FIGURE 1 WORLD CASHEW NUT CULTIVATED AREA IN TONS (SOURCE FAO 2018).....	12
FIGURE 2 PRODUCTION IN TONS/HARVEST AREA IN HA OF CASHEW NUTS IN THE WORLD (SOURCE FAO 2018)	13
FIGURE 3 HARVEST AREA IN RESEARCH COUNTRIES IN HECTARES (DOTTED LINE REPRESENTS MAJOR PRODUCING COUNTRIES)	33
FIGURE 4 YIELD IN RESEARCH COUNTRIES IN KG/HA (DOTTED LINE REPRESENTS MAJOR PRODUCING COUNTRIES).....	34
FIGURE 5 EXPORT QUANTITY IN RESEARCH COUNTRIES IN TONS (DOTTED LINE REPRESENTS MAJOR PRODUCING COUNTRIES).....	35
FIGURE 6 PRODUCTION IN RESEARCH COUNTRIES IN TONS (DOTTED LINE REPRESENTS MAJOR PRODUCING COUNTRIES).....	35
FIGURE 7 EXPORT VALUE IN RESEARCH COUNTRIES IN 1000USD (DOTTED LINE REPRESENTS MAJOR PRODUCING COUNTRIES).....	36

Abbreviations

ACA	: African Cashew Alliance
ACI	: African Cashew Initiative
ACP	: African, Caribbean and Pacific Group of States
AfDB	: African Development Bank
AMCOS	: Agriculture Market Cooperative Societies
ARECA	: Cotton and Cashew Nut Regulation Authority
CCIA	: Chamber of Commerce Industry and Agriculture
CDC	: Cashew Development Centres
CDI	: Center For Development and Integration
CDP	: Cashew Development Project
CDTF	: Cashew Development Trust Fund
CEPCI	: The Cashew Export Promotion Council of India
CO ₂	: Carbon Dioxide
CRIN	: Cocoa Research Institute of Nigeria
CSPPA	: Caisse de Stabilisation des Prix des Products Agricoles
DCCD	: Directorate of Cashew Nut and Cocoa Development
ENDC	: Eastern Nigeria Development Corporation
ERC	: European Research Council
FAO	: Food and Agriculture Organization
FDA	: French Development Agency
FENOPACI	: National Federation of the Producer of Cashew in Co ˆte d'Ivoire
FES	: Friedrich Ebert Stiftung
IEH	: Ethical Trading Initiative Norway
ILO	: International Labour Organization

INCAJU	: Instituto De Formento Do Caju
ITC	: International Trade Center
KARI	: Kenya Agricultural Research Institute
MAFC	: Ministry of Agriculture, Food Security and Cooperatives
MOA	: Ministry of Agriculture
NARI	: Naiendele Agricultural Research Institute
NGOs	: Non-Governmental Organizations
NO2	: Nitrogen Dioxide
OEC	: The Observatory of Economy Complexity
OTIFA	: Transitional Body of the Joint-Trade Organization of Cashew
SACCOS	: Credit Cooperative Societies
SINDICAJU	: Brazilian Association of Cashew Nut Manufactures
SO2	: Sulfur Dioxide
TSA	: Ten Senses Africa
UAE	: United Arab Emirate
UK	: United Kingdom
USA	: United State of America
USAID	: United State AID
WB	: World Bank
WNDC	: Western Nigeria Development Corporation

1. Introduction

Cashew (*Anacardium Occidentale*) is a tropical perennial tree native to Brazil. The crop was introduced to Africa and Asia by the Portuguese trader in sixteenth century. The world cashew production reaches currently 4.9 million tons in the total area of 6 million hectares (Figure 2). India was the first cashew processor and exporter in processed cashew nuts, while Viet Nam is currently the top raw cashew nuts producer and exporter in the world. These day Viet Nam is the top country exporter of processed cashew and African countries like Cote d'Ivoire, Ghana and Guinea-Bissau are the top raw cashew exporter on African continent. Cashew market is widely open due to many supplying countries in the world especially in West-Africa (Dendena & Corsi 2014).

Cashew production is increasing in African, South-east Asia and Latin America. The top cashew producer are Viet Nam, India, Brazil, Cote d'Ivoire, Nigeria, Tanzania, Mozambique and Guinea-Bissau (Figure 1). Ghana, Burkina Faso and Benin are the countries that currently expanding their cultivating area significantly. The cashew trades are mostly dominant by small number of traders in producing countries. Viet Nam and India are the top competitor in buying raw cashew kernel for processing. Cashew nuts cultivation is one of the important sources of revenue for many small-scale famers in the rural community. Most of these farmers use inter cropping system to achieve diverse foods for their consumption. African farmer met some difficulty in increasing their production. They were limited in service support (e.g. credit, marketing and technology) and lack in government support (Seth Osei-Akoto 2010).

The objective of this paper is to compare African cashew producing countries with major world cashew producing countries in order to evaluate potential of cashew for African small farmers' development. The study concentrates on production, yield, export value, export quantity, existence of government support, share in country export, export support, export tariff, and support from private organization in 8 African countries and 3 major producing country. The data is collected from FAOSTAT, OEC, Web of Science, Science Direct, Research Gate and World Bank.

The thesis is divided into 5 chapters. The first chapter talk about literature review, which describe general cashew characteristic, impact on poverty and environment, and top producer counties and their agricultural method. After that, the objective and methodology will be

explained. Then result will be presented with graphical illustration. Finally, discussion and conclusion will be made based on both professional and personal perspective.

2. Literature Review

2.1. Cashew Characteristics

Cashew is the common name indicating the genus *Anacardium Occidentale*, a fast-growing, drought resistant perennial tree that can rise to 20m. It belongs to the family Anacardiaceae. It is one of the originated plants native to arid north-eastern Brazil, broadly cultivated all over the tropics for its actual nutritious, cholesterol free nuts. The Portuguese and Spanish, which came to Brazil during the colonial times, took cashew around the globe. They mostly took cashew during their trade in Africa in 16th century (Joker 2003). The English name “cashew” originates from the Portuguese “caju” which originate from the Tupi Indian “acaju”. In Spanish it is recognized as “marañón” or “anacardo” (Rosengarten 1984).

Cashew is being known through its nut in the world, even though all parts of the tree are valuable. The prospects for cashew plantation are very good due to both domestic and international demand for its products. The top main producer countries are Viet Nam, Brazil, India, Mozambique and Tanzania. Both the trees and nuts share many important roles, the tree is considered as one of the important tropical tree crops, it is used for reforestation in order to prevent desertification and soil erosion. The wood from the tree can also be used as firewood, charcoal or even used for carpentry. While the nuts are used as a source of vitamins and protein. Cashew nuts are well known for its popularity as human consumption (Davis 1999). It ranks fourth among all nuts after the almond, walnuts and pistachios in the world production (INC 2017).

Cashew flourishes in the hot and dry tropics weather at the attitude around sea level to an altitude of about 1000 meters, in regions with annual rainfalls between 500 mm and 3750 mm. The trees grow in a wide range of climatic regions between the 25 °N and S latitudes. Although the cashew can survive in high temperatures, a monthly mean of 25 °C is observed as optimal. It has a broad root system and deep taproot and cultivates well even in sandy soils with poor fertility. Cashew is recognized as a “poor man’s crop” and is really good for smallholders because it will survive with least fertility and little inputs. Just because cashew is able to tolerate with poor soils and little rainfall; it does not mean the crop should be cultivated on this particular kind of places.

Cashew is the same as other crops, it will bare more fruits and give more nuts if the land is fertilized enough and have a lot of inputs (Dendena & Corsi 2014).

The trees bare fruits after about 4 years of growing and giving out its maximum in the age of 10 to 30 years. The tree does not bare the nut, but it bares pseudo fruit known as cashew “apple”. The nut itself is attached to the lower portion of the cashew apple. The cashew nut known as the seed hangs at the bottom of the fruit and is c-shaped. Cashew seed is not edible yet; it has the outer shell protecting the kernel. In its raw shape the cashew kernel is soft with white colour. After the process of roasting the colour and the taste changes. The cashew apple contains five times more vitamin C than orange and more iron, calcium and vitamin B1 than other fruits such as banana, avocados citrus etc (ITC 2018).

2.2. Cashew Growing Regions

The top producers of cashew are India, Viet Nam, Tanzania, Brazil, Nigeria, Mozambique, and Cote d’Ivoire (Figure 1). Other countries on the African and Asian continents also cultivate the crop on a smaller scale (Nair 2010). The global scenario of cashew nut growing region and top producer is shown in the Figure 1. In 2016, the global production of cashew nuts is about 4,898,200

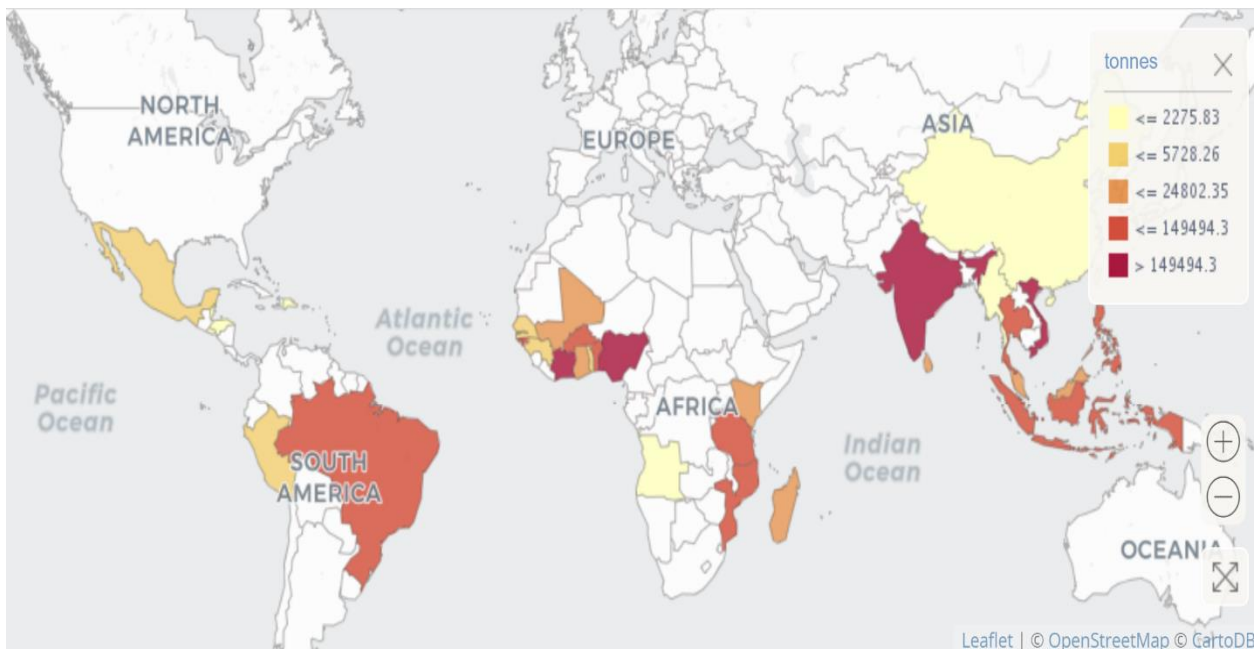
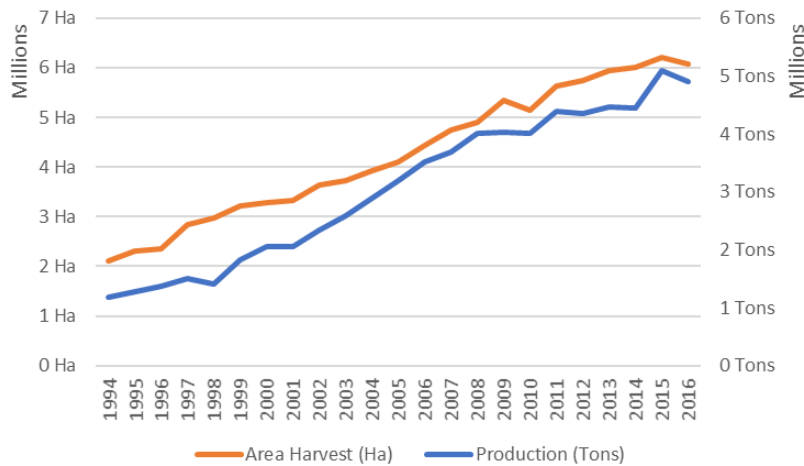


Figure 1 World Cashew Nut Cultivated Area in Tons (Source FAO 2018)

tons within the total harvest area of 6,083,212 hectares. The majority of the production come from 3 main regions; the largest region is Asia 53.4%, Africa 41.4% and Americas 5.2%. The Country like India, Viet Nam, Nigeria, Cote d'Ivoire have the most cashew production in the world (Figure 1). Since 1994 till now both cashew production and harvest area have increased exponentially (Figure 2).



2.3. Cashew Market

Figure 2 Production in tons/Harvest area in Ha of Cashew nuts in the world (Source FAO 2018)

Cashew nuts, fresh or dried are one of the most traded nut around the world. The type of cashew that traded around the world these days consists of 2 types - in-shell cashew which is the raw cashew and cashew kernels (shell removed). The main exports of in-shell cashew are West and East African, India, Viet Nam and Brazil. The main exports of cashew kernel are India, Viet Nam and Brazil. The major processing centres are in India, Viet Nam and Brazil, more likely they import the raw cashew from other countries and crack them down and export back in cashew kernels. The cashew kernels are mostly exported to Europe, USA, China and Australia (OEC 2018).

2.3.1. In-shell Cashew or Raw Cashew

In-shell cashew trade is controlled by local and as well the international traders, who purchase the crop both by them self for onward sale, or on behalf of the processor (Viet Nam,

India, Brazil). It is very often for traders to apply their funds at the beginning of the harvesting season to local representatives in producing countries to assure the supplies.

West African and East Africa countries are the countries that export in-shell cashew the most in the world. Those countries are Cote d'Ivoire, Nigeria, Guinea Bissau, Ghana, Burkina Faso, Gambia and others. They export a total of 1,410,526 tons in 2017 (ITC 2011; FAOSTAT 2018).

India is the biggest importer of raw cashew. India import raw cashew as supplementary of raw material for its local processing industry. According to COMTRADE (2012) statistics, India import about 82% of in-shell cashew world production, followed by Viet Nam 10%, Brazil 6%.

2.3.2. Cashew kernels

There are three main routes in cashew kernels export. The wholesale of primary- and secondary-processed kernels, which is from producing countries (India, Viet Nam, Brazil, Africa and other Asian Countries) are exported to USA, Europe and other consuming markets. Cashew kernels are also re-exporting from Europe and USA to other countries both directly or through final processing and labelling. Moreover, intra-trade in cashew kernels takes place between European Union countries. Viet Nam is the top cashew kernels exporting country with about 221,500 tons (equal to 53% of total world export) followed by India 24% (100,600 tons), European Union 10%, Brazil 6% and others (COMTRADE 2012).

The main importers of cashew kernels are the European Union, the United States and the Middle East countries. European Union imports about 32% of world production, followed by United States with 31% and Middle East with 8%, others like Australia, Canada, Russia, China, Japan and many other small countries. Viet Nam and India supply over 75% of the whole world cashew kernels (OEC 2018).

2.4. Cashew Agroecosystem

The cashew tree is a fast grown and a perennial evergreen tropical tree. It grows to a height of 12 m. The tree normally has the first flower blossom after the third year of planting. Every year

during November and January the tree blossoms and start to bear fruits. It takes about 2 months to ripe the fruit fully and be ready to harvest (ARC-Institute for Tropical and Subtropical Crops 2018).

2.4.1. Climatic requirements

Cashew tree can only survive in tropical weather condition and is very sensitive to cold weather. The tree itself has a well-developed root system and can endure drought conditions. However, when the temperature is above 36°C during flowering and fruiting period it could give a negative effect to the fruit and lower the production of the tree. Heavy rainfall during the flowering season also creates another problem, it causes flower abortion due to anthracnose and mildew. Cashew needs a climate with a precise dry season of at least four months to have the best yield. During harvesting season, famers harvest cashew nuts every day, since the tree drop the nuts on the ground, and it cannot lie on the soil too long especially when the soil is wet. The nuts easily germinate on the wet soil, it takes only 4 days (ARC-Institute for Tropical and Subtropical Crops 2018).

2.4.2. Land requirements

The cashew is a strong perennial plant that can grow in most type of soils, especially sandy soils, that are generally not suitable for other kind of fruit trees. The tree can be grown in a poor nutrient soil but, for the tree to give the best production, well-drained sandy or sandy-loam soil is needed. Cashew tree is hardly cultivating in poorly-drained soils. Water stagnation and flooding are not good for cashew. Heavy clay soils with poor drainage and soils with pH more than 8.0 are not appropriate for cashew cultivation (ARC-Institute for Tropical and Subtropical Crops 2018).

2.4.3. Cashew Farming Systems

Cashew farming systems are diverse in many regions of the world. There has been a record of two type of farming system - intercropping and commercial. Farmer which cultivate in intercropping system tend to have a land between 0.5 to 5 hectares. They mostly cultivate cashew with fruits, legumes, tuber crop and other kind of food crops to subsidies the expend on farmers'

cashew field. Most of these farmers lag in using technologies and machinery, they mostly work with their own labour.

For commercial farming, farmers cultivate the crop in the area of more than 50 hectares with just mono cropping system. There are a lot of machinery, labour and technologies used for both cultivating and harvesting. The practice of commercial farming system is considered as agroindustry similar to the cultivating of rubbers (Catarino et al. 2015).

2.5. Top 11 Cashew Producer

2.5.1. Brazil

Cashew originated in Brazil. The cashew industry is one of the main sources of income and employment for Brazilians. Cashew production has a huge socioeconomic importance for the country in semi-arid region, especially in the state Rio Grande do Norte and Ceara, where most of the cashew come from. In 2014, Cashew nut was the number one nut being exported from Brazil, which equal to 89% of all Brazilian nuts (USD 127,731,463) (Ministry of Development Industry and Foreign Trade 2012). The United States of America was the major importer. Cashew fields occupy 708,808 ha of land and employed about 62,000 rural population in the Brazilian semi-arid region (Alencar et al. 2018). The cashew nut production is focused on small-scale farmers in mixed or mono production systems, which have orchards of 50 ha on average with some subsistence crop among them. The use of mixed crops in cashew farming is normal in the north-east of Brazil, mainly for the subsistence families. Among small and medium cashew cultivators, 73% cultivate bean as secondary crop, 40% maize and 27% cassava. About 40% of cashew harvested area is cultivated by small scale farmers, while about 43% of cashew harvested area from large scale farmers (Callado et al. 2009). Cashew trade in Brazil is supported by Brazilian Association of Cashew Nut Manufactures (SINDICAJU). This association mainly focuses on creating cashew by-product.

2.5.2. Burkina Faso

Cashew plantations were introduced to Burkina Faso in 1960s by the Tropical Forest Technical Centre. Cashew tree was considered as a forest tree rather than a fruit tree until the project Anacarde come in. The project Anacarde used seeds imported from Casamance (Senegal) and northern Côte d'Ivoire. It started in 1981 and finished in 1991, financed by French Development Agency (FDA) and Caisse de Stabilisation des Prix des Produits Agricoles (CSPPA) (Kankoudry Bila et al. 2010).

There are about 45,000 of households in Burkina Faso that cultivate cashew in an area of 65,800ha located in Cascades, Sud-Ouest, Hauts-Bassins and Centre-Ouest regions. Most of the farmers in Burkina Faso cultivate cashew in small scale farming with mono and mixed production systems, which consist of 0.5 ha to 50 ha, mostly 2-5 ha or 5-10ha. Most of the farmer cultivate also cotton, karite, tubers, maize and vegetables as intercropping with cashew. Cashew trade in Burkina Faso is being promoted by African Cashew Alliance (ACA), but there are a lot of companies trading Cashew in Burkina Faso, such as Ham Co. Sucotrop, Safood, Watan etc. The target market for these companies are Ghana, India and Benin. Before the cashew is exported to abroad, normally it passes through the collector, which is known as the middlemen. These middlemen act between farmer and wholesale dealer and exporter, they buy the cashew directly from the famer as national exporter or the representative of international companies (Kankoudry Bila et al. 2010).

2.5.3. Co'te d'Ivoire

Cashew cultivation was introduced to Co'te d'Ivoire in 1960s to stop the advancing desert and as a contest against erosion. Cashew cultivation was the reforestation plan for the country savannah zone. Cashew plantation spread in Co'te d'Ivoire starting from 1997 because of the high demand and good price of cashew nut in the international market. From 1990-2008, the cashew production in Co'te d'Ivoire increased from 6,000t to 330,000t, making the country as 2nd world producer at that time after India. The cashew has become the source of income for more than 150,00 farmers and allowing 1.5M people to earn a living . The growth of cashew production does not really benefit the producers because 95% of the crop is exported in raw form, and the price

setting is own by international market. There are 19 regions in Co'te d'Ivoire and 11 of them produce cashew(Yao et al. 2011). Production in the country is commonly produce by small-scale farmers, which consist of the area between 2 and 5 hectares with mixed production system. Though there are also some industrial plantations established by the government. The land is distributed among farmer in the communities which own the lands. The average area of these land is between 150 and 200 hectares. Farmers use two kinds of farming system: the semi-direct and the nursery. The semi-direct is practiced during the rainy season by implanting kernels in pairs. The nursery is built on a selection of good nuts (large nuts) as germplasm.

The actors who participate in the purchase of cashew nuts can be separated into four categories: buyers, trackers, traders, and exporters - the first three are the intermediaries; they set the price for the producer without any rules. In 2002 the government of Co'te d'Ivoire created ARECA (Cotton and Cashew Nut Regulation Authority). Their mission is to track the trade and settle down any agreement between cashew and cotton. In 2005 the producers and traders create OTIFA (Transitional Body of the Joint-Trade Organization of Cashew) responsible as the representative of the cashew industry toward the government, donors, development partner and all sort of things relate to cashew. There is also an organization called FENOPACI (National Federation of the Producer of Cashew in Co'te d'Ivoire). Their mission is to find market for cashew producers, creating contract with manufacturers in Brazil, Viet Nam, and India, ensuring that the crop will be exported in high price. In 2007, INTERCAJOU (The Cashew Joint-Trade Organization) was established to set the price according to the international market for the farmer to have higher income as possible (Yao et al. 2011).

2.5.4. Ghana

Cashew cultivation in Ghana was first started in 1960s, but it did not become popular until the early 1990's when Ghana boarded on an Economic Recovery Program. Ever since then, farmer started to pay attention to the crop and cashew become popular on the market. Due to this mater, cashew cultivation started to get back the interest of the old farmer that had planted in the late 1980's under the National Agroforestry Program. The crop is mainly cultivated in Central and Greater Accra regions than spread to the Brong-Ahafo, Northern, Upper West and Upper East regions of Ghana (Ashitey 2012). The first cashew export from Ghana is in 1991 which is about

50 tones. Ever since then the cashew export has increased significantly to 249,324t in 2016 (FAO 2018). Cashew production in Ghana is normally carried by small scale farmer about 88% of total cashew farmers, which organize in to associations. This industry provide income to 70,000 farmers and share 43% in relating income of cashew farming family (Akoto 2010). The average size of cashew farm in Ghana is from 0.8 to 2.5 ha. The cultivation of cashew is practiced as intercropping production together with yam, maize, millet, sorghum, ground nut, soybean, pepper, pineapple and other cash crop such as cocoa, plantain, citrus, cassava, cowpea (African Development Fund 2000). There is a research of Ghana Ministry of Food and Agriculture that cashew production in Ghana could increase to 3,270,000 hectares. In 2003, Ghana government requested funds from African Development Bank (AfDB) to support Cashew Development Project (CDP) in five regions at a total of US\$13.2 million. The aim of the project was to increase the productivity and expand the cashew possessing at the village level. In 2010 Ghana had 12 processing companies and 21 kernel roasting companies operating in the country. India is the number 1 cashew buyer from Ghana which is about 96% of total cashew production in Ghana through RCN trader and other buying agents (Akoto 2010).

2.5.5. Guinea-Bissau

Cashew plantations in Guinea-Bissau was introduced by the Portuguese in the 19th century. The tree was mainly used by local farmers as the tree in home gardens. Cashew plantation had a first appearance in Guinea-Bissau under the encouragement of Governor Sarmiento Rodrigues (1945-1949). In 1974, after the end of colonial era there were hundreds of hectares of cashew tree cultivated, but there were no industrials processing due to the lack of demand in market. The orchard was known as the cash crop in the forest used to recover the soil fertility and were used to restrain deforestation. Since 1984 the government of Guinea-Bissau created a new policy on increasing agricultural production by granting and creating more agriculture land (Catarino et al. 2015). Cashew in Guinea-Bissau is cultivated in two cropping systems: (1) Ponteiro as if a commercially-oriented cropping system, (2) Peasantry the small-scale farming system for small household subsistence and sells to the market. In the first 3 to 4 years of cultivating, farmers there used the intercropping system so that they can maximize the uses of their land. The crop that is common to cultivate with cashew during their growing period are: rainfed rice, sorghum, millet,

maize and groundnuts. These are the source of additional small farmers income. The Cashew is the main core of Guinea-Bissau exports sharing about 92% of total country exports (OEC 2018). The country itself export 121,134 tons of cashew nuts both shelled and kernel in 2016 (FAOSTAT 2018).

In Guinea-Bissau the land is considered as state-owned which shared by government to farmers. There is also cashew campaign that run from March to August to support the cashew trade in the country. These 2 reasons above is why Guinea Bissau is the country that depend on cashew production. Cashew from Guinea Bissau is exported mostly to India and other international countries as both raw and dry. As well as other African country the Cashews trade in Guinea-Bissau are supported by ACA. In 2004, There were totally 300 total buying agents and 40 exporters of cashew which register for license to Ministry of Commerce and the Chamber of Commerce Industry and Agriculture (CCIA) (Catarino et al. 2015).

2.5.6. India

Cashew was introduced to India in 16th century in order to avoid soil erosion. Later it became a key source of economic for most of farmer in coastal areas. India has become one of top 3 main producer of Cashew in the world as well in processing, consuming and exporting (Elakkiya et al. 2017). The estimation of cashew production in India is 671,000 tons in 1,036,000 hectares (FAOSTAT 2018). India mainly cultivates their cashew in the peninsular areas. They cultivate along the west coast (Karnataka, Goa, Maharashtra and Kerala), east coast (Andhra Pradesh, Orissa, Tamil Nadu and West Bengal), North east states (Manipur, Assam, Tripura, Nagaland and Meghalaya) and on Nicobar and Andaman Islands. India was the first country who became involved in world cashew trade (Harilal et al. 2006). They are one of the largest cashew processing country, with about 3650 cashew processing factories. Cashew industry in India employs about 0,5 million of people and 95% of them are women. Cashew processing in India can be divided in to 2 parts: organized sectors (46%) and unorganized sectors (54%), the organized sectors mean that the employees are working regularly in one place (Harilal et al. 2006). The annual demand of cashew processing industry in India is 1.5 million tonnes, which only half of them are the country production. Therefore, the country needs to import to meet the demand of processing. Cashew nut processing in India faces number of problems, supply-demand imbalances, energy losses, inferior

product quality, health and environment issues. The main country where India import from are Tanzania, Congo, Indonesia, Guinea-Bissau and Thailand. India exports the processed nuts as well the by-products to UK, USA, Netherlands, Japan, Australia and Germany (Karthickumar & Sinija 2017)

India uses the intercropping system in the first 4 years of cashew cultivation to sustain income from the farm. We can find black gram, groundnut, green gram, cucumber, tuber crops, calabash, pineapple, turmeric, ginger, and pepper can be cultivated with involve with cashew. Indian government created Directorate of Cashew Nut and Cocoa Development (DCCD) in 1966 under the Union Ministry of Agriculture, working on cashew and cocoa development. India also created cashew development program under the State Forest Department started for providing seeds to famers, working on increasing maximum productivity, expanding land, as well the technology on both farming and processing (Kumar et al. 2015).

2.5.7. Kenya

Cashew was first cultivated in Kenya in 16th century by the influence of Portuguese in East African Coast. It was first used to control the soil erosion, then it was considered as an economic tree crop in Coast region of Kenya. The crop mostly cultivated in small scale farming in an average of 2 hectares per household. Most of the farmers in Kenya cultivate cashew as intercropping system with others food crops like coconut, citrus, mangoes, maize, legumes and cassava. The main cashew cultivating districts are Kaloleni, Kilifi, Kwale, Malindi, Msambweni, Tana Delta and Lamu. This industry employs about 70,000 farmers throughout the country. Kenya produces 24,954 tons of cashew nuts in 29,830 hectares (FAO 2016). Kenya mainly exports cashew nut both raw and by-product to Netherlands, India, Israel, Tanzania, Pakistan, Angola, Saudi Arabia, Sudan, United Kingdom and South Africa (Hammond 2009). The raw cashew processing and marketing in Kenya is carried by companies Millennium Management Limited, Wondernut Kenya Limited, Kenya Nut Coompany Limited, Equatorial Nuts and Nuts of Africa. There are other several exporters group such as Maersk (K) Ltd, Pago Agencies, Luxways Ltd, Salim Salim Ali etc. Kenya exports about 603 tons of cashew, which corresponds to about 4 million USD (FAO 2016). In Kenya, there are several players helping with crop promotions for the industry such as Ministry of Agriculture (MOA), NGOs, private companies and Kenya Agricultural Research Institute (KARI).

They provide training to farmers, new seedlings, financial support, and technologies. In 2009, Kenya Ministry of Agriculture acknowledged that cashew nut is a special crop for Kenyan in the future (The Revitalization of The Cashew Nut Industry in Kenya 2009).

2.5.8. Mozambique

Mozambique was a main producer of cashew nuts in 1960s and 1970s. During that time the crop was promoted by the Portuguese as a colonialist of Mozambique. In 1960s Mozambique produced half of the world cashew nuts, with 45 million cashew trees. Later on, in 1980s, the cashew production and exports dropped due to civil war in the country. The export was banned and there was no support to producers, therefore in 1990 Mozambique only export US\$15 million to the world, which is about 2.8% of world cashew exports. After the civil war, in 1990s there was an intensive reform to return this sector in original level of production and sustain the processing industry (Antonio & Griffith 2017). The taxes on cashew exporting are very high and the new investments in the country are mainly new business elites that have close connection with the political leadership, therefore not many small farmers can compete with them. There were many private NGOs and organizations like INCAJU and World Bank project on support in cashew product, but most of them were turned down due to a lack of management in Ministry of Agriculture. Mozambique government try to adopt new processing technologies that donate from private donor, which should be better than the old manual system. But in contrast, these new system could not compete with manual system due to high export taxes on raw cashew (Rüschkamp & Seelige 2010). Many of old cashew processor quit because of high amount of export taxes and lack of cashew promotion in the country. All though there were slightly increase in production from 1993 to 2008 in an average of 44 thousand tons, but in comparison with world exports there were a drop down from 2.1 to 1.6 percent in 2008 (Aksoy & Yagci 2012). In 2003 Around one million of rural household have access to cashew plantation, which consist about 40% of population (Eapen et al. 2003). In 2016 Mozambique cultivate about 123,437 hectares making about 104,179 tons of total cashew production (FAO 2016).

2.5.9. Nigeria

Just like in the other west African countries, cashew was introduced to Nigeria by the Portuguese traders in 16th century. It was first planted in Agege and Losos states then it spreaded over the country, especially in the western and eastern part. Many cashew trees were planted in the wild for afforestation and erosion control in the escarpment zones of Udi in Anambra state. The first commercial cultivation of cashew started in 1950 at Oji, Ogebe, Mbala and Udi by the Eastern Nigeria Development Corporation (ENDC) and Eruwa, Uper Ogun and Iwo by the Western Nigeria Development Corporation (WNDC). There was a huge increase of cashew production in Nigeria from 466,000 tons in 2000 to 836,500 tons in 2012 making the country worth 45% of cashew production in Africa (Olife et al. 2013). These day Nigeria is the top 2 cashew nut producer in the world producing 958,860 tons (FAO 2018). Nowadays, cashew is being cultivated in 27 states of Nigeria. They divide the state into two, the minor and the major producing. The minor producing state basically uses the intercropping system with pineapple, oil palm, rubber, cowpea, soybean, groundnuts, melons and vegetables. These minor group are small scale farmer with a land of 0.5 to 4 hectares in the southern and southwest states. While the major producing groups are the commercial farming with the average 20,000 hectares or more in area in south-eastern and central states. Nigerian government materialize its support to cashew production in the country by support rural cashew market, supporting the price liberalization, market information, providing infrastructure and giving out technologies to cashew nuts farmers (Adeigbe et al. 2016). There are also private organizations who support the cashew production in Nigeria such as African Cashew Alliance (ACA), Cocoa Research Institute of Nigeria (CRIN) and National Cashew Association of Nigeria. They provide farmers with market opportunities, technologies and new practices of cultivating the crop (Aliyu 2005). The Nigerian government also supports the partnership between NGOs, states, government and farmer's cooperative societies. Cocoa Research Institute of Nigeria has played an important role in cashew development in Nigeria, they provide funds and research facilities to the country in order to develop new varieties and making by-product of cashew. The main destination of Nigerian cashew nut are Viet Nam, India, China and US making about USD143 million (OEC 2018).

2.5.10. United Republic of Tanzania

Cashew was first brought to Tanzania by the Portuguese in 16th century. It has become a crop for local consumption in coastal region of Tanzania. The first cashew export of Tanzania was in 1938 to India about 210 tons. The cashews became wide spread planting throughout the country in 1945. It was one of the most important cash crops for small scale farmers. In 1960s, Tanzania was the top 4th exporter of cashew in the world exporting about 37,000 tons. The production of the country raised to 145,000 tons in 1973. During 1986 there was a problem with the biological factor and socio-economic sector, these effect the production of cashew nut in Tanzania. Through the problematic period the cashew nut production of Tanzania dropped down to 16,500 tons. Due to this matter, the government of Tanzania set up the recovery program which increased the productivity to 70,320 tons in 1994 (Martin et al. 1997). In 2016, Tanzania produced about 195,140 tons from 471,373 hectares of land (FAO 2016). The country mainly has their cashew cultivate in the southern coastal regions of Lindi, Pwani and Mtwara which consist of over 80% of total production and area of Tanzania (FAO 2012).

More than 85% of cashew production in Tanzania are cultivated by small scales farmers with an average of one hectare. Most of farmer are independent and have their own processing facility. Farmers often organize and join in primary cooperative societies, either in Agriculture Market Cooperative Societies (AMCOS) or in Credit Cooperative Societies (SACCOS). For farmers that join AMCOS, they can sell their product in the market more efficiency and get to pay for pesticide and other inputs in cheaper price. While farmers who join SACCOS, they can loan money from credit to use on pesticide or hired labour. There are a small group of medium and large producers owned by individuals, which mostly cultivate the cashew by hired labour. Most of these farmers abandoned their land when they are not getting enough profit from these. The country mainly exports their cashew nuts to India (83%), USA (5%) UAE (4%) and others (8%) (FAO 2012). Starting from 2010, Tanzanian government charges 15% on raw cashews exports. Tanzanian government support cashew production by funding Naiendele Agricultural Research Institute (NARI) to research on cashew. NARI have 10 Cashew Development Centres (CDC) throughout the country which focus on improving cashew varieties tolerant to diseases, providing training to farmers and giving out knowledge about technologies, so the farmers can maximize their product. The government also established the Cashew Development Trust Fund (CDTF) by

using 6% of the revenue that come from export tax of cashew and budget from the MAFC. CDTF pay an important role in subsidizing the inputs for cashew farmers (Ntemi & Alethia 2015).

2.5.11. Viet Nam

Cashew was presented to Viet Nam in 19th century as a home garden plant for shade. In 1989, the crop was approved by Viet Nam government as an industrial crop. The cashew cultivating in Viet Nam has grown at a notable speed over the past twenty years. The growth almost double between 2000-2007. These day Viet Nam is both the top cashew producer and exporter in the world. The country produces about 1,221,070 tons in the area of 281,047 hectares (FAO 2016).

The first cashew nuts export was done in 1988. Nowadays, Viet Nam exports their cashew nuts in a total of USD3.5 billion in 2017. The main exporting partners are USA, European, China and Australia. The cashew industry in Viet Nam employs over one million workers in 200,000 farming households and over 500 processing companies in the whole country. The main cashew cultivation in Viet Nam is located in the south-eastern region in Binh Phoc and Dong Nai provinces. Mostly the crop is cultivated by small scale farmer with an average of 2.5 hectares per household. Most of the farmers in Viet Nam still consider the crop as shaded tree for their home, therefore the country did not maximize the cashew production yet. According to Ministry of Agriculture and Rural Development (MARD), about 30% of cashew tree in Viet Nam are old to achieve its best productivity. In order to meet the production of cashew, the Viet Nam Cashew Association (VINACAS) implements 4 initiative projects from 2016 to 2020. The project intends: to cooperate between farmer and companies for intensive cultivating program aiming to double their production, launching a Cleaner and Greener cashew program to achieve high quality of the production, raising the value of cashew production by focusing on product and processing diversification, and creating Viet Nam National Food Brand to expand their trades and exports. In the same time with improving domestic program, VINACAS is also collaborating with Laos and Cambodia to extend their cashew farming area. They signed the agreement with Cambodia by increasing the land of cashew farming to 500,000 hectares in other to produce one million tons of cashew nuts and export to Viet Nam in the future. Viet Nam also imports cashew from African countries such as Tanzania, Guinea, Nigeria, Benin, Ghana and Ivory Coast which consist of 77% of Viet Nam total cashew import.

There are several stakeholders involved in cashew industry both from government and NGOs. The government stakeholders include VINACAS, Trade Union, MARD and others government agencies. The NGOs and other organizations involved are ILO, Oxfam, CDI, FES and ERC. The private NGOs mainly work on providing technical assistance, market orientation and overlook of labour that being practice in Viet Nam (IEH 2018).

2.6. Impact on poverty

Cashew production has been a hot cash crop to cultivate over the past decades. Cashew nut is one of most popular nuts as sources of nutrients snack and food. There are many uses of cashew production. People can consume the fruit and nuts as a food source, cashew gums for medical used, and timber. Cashew is an important source of food since the Cashew fruits and nuts are rich in minerals, vitamins and micronutrients.

Cultivating cashew can support also rural community with extra income and get through the hunger period especially in Africa and ACP countries (ACP 2014). There are many tropical countries especially African countries that support on cashew plantation in other to stop the poverty in their country. Private organizations and donors are also interested in support their funds to help famers cultivate cashew in other to fight the poverty in the last decades (Heinrich 2012). Professionals in cashew industry mention that cultivating cashew can help reduce the employment rate in rural community, increasing rural household revenue and inequality in the society (African Development Fund 2000; Kanarku 2018). According to USAID, cashew industry provides many jobs opportunities. The jobs are classified in to planting, harvesting, processing, exporting and marketing. By cultivating cashew, people can improve the livelihood as a farmer, light work for woman on cashew processing (grading, peeling, shelling, roasting, picking, sorting and packing) and exporting (Chemonics International Inc. 2002). Cashew is a good crop for small holder famers in rural areas since it did not require a lot of resources to grow and it give a lot of positive impact to rural livelihoods as mentions above.

Cashew cultivation does not improve the income in rural community alone, it also creates closer relation between older and younger generations, and among families in the communities and food securities. As people have better incomes, they can send their children to school for

education to help the community. There is one problem relate to cultivating just cash crop alone is that people could lose their diversity of food in the community (Gyedu-akoto et al. 2014). In contrast, there are also major negative impact such as, using limited financial resources on diseases, pest control and storage, the crop production depend on weather, and high cost to produce quality by-product (Azam-Ali & Judge 2001). According world bank research in Guinea-Bissau, there are two simulations run in order to reduce poverty. First is by increasing the price paid for producers, this is done by exporter reducing the transport and transaction costs. Second is reducing the tax on export and trade (Hanusch 2016). The study of ACI shows that, several of African countries have successfully fight over poverty by cultivating cashew. The empower of women in this industry is a big key to stop the inequality (African Cashew initiative 2012; Temudo & Abrantes 2014).

2.7. Impact on Environment

Cashew is an eco-friendly crop suitable for cultivation in tropical area, especially in semi-arid and dry region. It had been a valuable crop to fight over erosion and deforestation back in 1960s in Africa (Chemonics International Inc. 2002). These days cashew cultivating, and processing involve in many environmental aspects.

Cashew is the crop that benefits many livelihoods of people, some experts mentioned that Cashew was one of great crops to replace the deforestation that happen in tropical countries in the past (Kankoudry Bila et al. 2010). Currently, cashew is still used in certain African countries as a crop to replace the lost of forest and the tropical savannah area.

At the same time, it also causes problem to the environment. There are stages during the whole process of getting cashew from starting of growing to packing for the market that affect the environment. The early stage is during the needed of land, which people cutting down forest for the land. Deforestation is one of the major problems involved, the loss of biodiversity for both animals and other different kinds of plants in the forest (Monteiro et al. 2017). During the second stage of growing, small scale farmer with lack of education applying huge amount of fertilizer, pesticide, herbicide and other chemical component to the soil also consider one of the major problems (Ganeshamurthy et al. 2019). The level of chemical built up in the water, soil and air

cost huge damage to the environment. The water in the area are toxic and undrinkable, the soil gets damaged due to over nutritious and polluted by the chemical, and the air contains different kind of chemical substances (da Silva Barros et al. 2015). The last stages that cause a problem to the environment is processing. The problem created through processing period are air pollution, water waste, and solid waste. The air pollution happens during the roasting, cooking and drying process of cashew nut, which add up the amount of CO₂, NO₂, SO₂ and phenolic to the environment. Huge amount of water was consumed in processing cashew nuts. The cooking and roasting process require about 200 liters per day for a 2-4 hours process and about 70-80 liters per day on cleaning the oil and grease that trap in vessel discharge. The waste of solid cause by the shell of cashew that being removed from the kernels and the ash generate from roasting cashew nuts (Mohod & Jain 2011).

3. Objectives and Methodology

Research question

In this academic paper, there is a focus on how African countries are efficient in comparison with biggest world cashew producers. The question is also how they can potential benefit from cashew growing potential and what is the relationship between level of integration into the world markets and how value chain enabling institutions are set up.

Objectives

The main objectives of this bachelor thesis are:

1. To compare production and trade of major African countries and compare them to the world producers
2. To compare their external environment enabling cashew cultivation and export

Methodology

For response to the topic, two sources of information and data were used

Quantitative data for objective 1: This academic paper contained 5 variables for cross-country comparison:

- export value, export quantity, production, harvest area and yield

The datasets were from 1990-2016 provided mainly by FAOSTAT

MS Excel was used for simple analysing the datasets and making the graph showing the trends of different variables.

Qualitative data for objective 2: In this part, several areas were used for comparison: farming systems, producers' organizations, enabling institutions in the value chains, export tariff and government support.

The data was extracted from scientific articles, books, newspapers journals and websites of cashew-related organizations. Most of the data come from organizations that support and sponsor over cashew nut production in all the countries (like African Cashew Alliance). The key words used during the extracting of data from Science Direct, Research Gate, Web of Sciences

Google Scholar and Google were cashew nut, African countries, value chain, support, export, market, organization, farming system, development, agency, and sponsors.

3.1. Selected countries

The countries that were selected for cashew growing comparison are African countries and major producing countries. The African producing countries are Burkina Faso, Cote d'Ivoire, Ghana, Guinea-Bissau, Kenya, Mozambique, Nigeria, and United Republic of Tanzania.

The major producing countries are Brazil, Viet Nam, and India.

3.2. Criteria for comparison

There are many criteria that were compared in this bachelor thesis; all these indicators were mentioned in methodology. The main idea was to compare these indicators and see which country doing better with the production, yield, export and as well which country investing their land the most for cashew cultivation. The export share in different countries and the share of cashew to total agriculture export are mentioned in order to see how many countries depend on cashew production as their main national income. The paper also consists of different kinds of supports which farmers and processors receive from their government or private organizations. Last but not least, it records how much percentage of the cashew share among total exports in the selected countries.

The references below were used to support the cashew comparison in selected countries divide in to different criteria.

3.2.1. Existence of governmental support

Akoto SO. 2010. Poverty Impact Assessment – PIA Case Study Ghana African Cashew initiative.

Coulibaly L. 2018. Ivory Coast cashew sales slump on low world prices. Available from <https://www.reuters.com/article/ivorycoast-cashew/ivory-coast-cashew-sales-slump-on-low-world-prices-idUSL5N1UK2E2> (accessed February 20, 2019).

- IEH. 2018. Strengthening practices in the Vietnamese cashew nut industry A due diligence study on labour practices and sustainability.
- Isaac O. 2017. Kenya cashew nut exports decline after government ban. Available from <http://www.agromarketday.com/stories/12-kenya-cashew-nut-exports-decline-after-government-ban> (accessed February 20, 2019).
- Kankoudry Bila N, Djibo O, Constant P, Sanon B. 2010. Analysis of the Cashew Value Chain in Burkina Faso. Available from
- Ntemi N & Alethia C. 2015. Analysis of price incentives for cashew nuts in the United Republic of Tanzania 2005–2013.
- Seth Osei-Akoto. 2010. A Value Chain Analysis of the Cashew Sector in Ghana African Cashew initiative.
- Sishuba S. 2017. Kenya cashew nut exports decline after government ban. Available from <https://www.farmersweekly.co.za/agri-news/africa/kenya-cashew-nut-exports-decline-after-government-ban/> (accessed March 10, 2019).

3.2.2. Export support and Support from private and international organizations

- Ehui S. 2018. Cote D’Ivoire: Improving Opportunities Through Cashew Value Chains. Available from <https://www.worldbank.org/en/about/partners/brief/cote-divoire-improving-opportunities-through-cashew-value-chains> (accessed February 20, 2019).
- Hanusch M. 2016. Guinea-Bissau and the Cashew Economy. *Macroeconomics & Fiscal Management* **11**:1–8.
- IEH. 2018. Strengthening practices in the Vietnamese cashew nut industry A due diligence study on labour practices and sustainability.
- Isaac O. 2017. Kenya cashew nut exports decline after government ban. Available from <http://www.agromarketday.com/stories/12-kenya-cashew-nut-exports-decline-after-government-ban> (accessed February 20, 2019).

Kankoudry Bila N, Djibo O, Constant P, Sanon B. 2010. Analysis of the Cashew Value Chain in Burkina Faso.

Praxides C. 2019. Lamu to benefit from Sh200M EU-funded cashew project. Available from <https://www.the-star.co.ke/news/2019-02-20-lamu-to-benefit-from-sh200m-eu-funded-cashew-project/> (accessed February 20, 2019).

Rüschkamp AG, Seelige K. 2010. Analysis of the Cashew Value Chain in Mozambique African Cashew initiative:1–50.

3.2.3. Export tariff

Bavier J. 2016. Tax breaks to spur Ivory Coast exporters to process cashews. Available from <https://www.reuters.com/article/us-ivorycoast-cashew-idUSKBN13D2OM> (accessed February 20, 2019).

FAO. 2012. Analysis of Incentives and Disincentives for Cashew nuts in the United Republic of Tanzania October 2012.

FAO. 2014. Analysis of price incentives and disincentives for cashew nuts in the Republic of Mozambique for the time period 2005-2013.

Ghana Investment Promotion Centre. 2019. Investment Incentives and Guarantees. Available from <http://gipcghana.com/invest-in-ghana/sectors/17-investment-projects/agriculture-and-agribusiness/cash-crops.html> (accessed February 15, 2019).

PWC. 2018. Nigeria Corporate - Tax credits and incentives. Available from <http://taxsummaries.pwc.com/ID/Nigeria-Corporate-Tax-credits-and-incentives> (accessed February 20, 2019).

Vietnam Briefing. 2019. Vietnam's Import and Export Regulations Explained. Available from <https://www.vietnam-briefing.com/news/vietnams-import-export-regulations-explained.html/> (accessed February 20, 2019).

WTO, ITC, UNCTAD. 2012. Applied MFN tariffs. Page WTO, ITC and UNCTAD. Available from https://unctad.org/en/PublicationsLibrary/wto2012_en.pdf.

4. Results

4.1. Comparison Figure

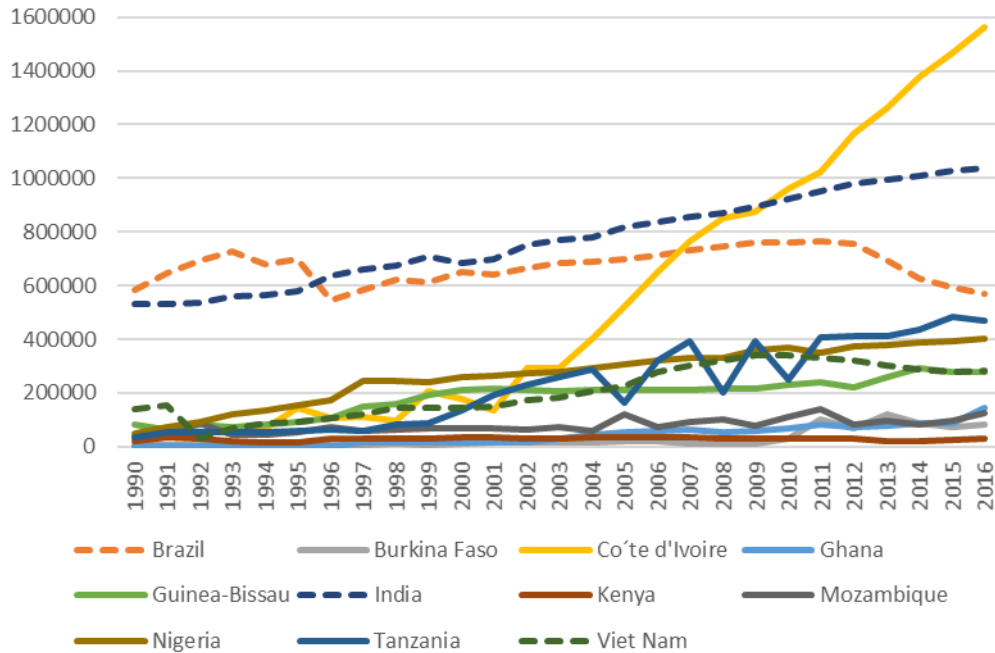


Figure 3 Harvest area in research countries in hectares (dotted line represents major producing countries)

As we can see from Figure 3 there are not many African countries who use their land for cashew production. The outstanding countries are Cote d'Ivoire, Tanzania and Nigeria. Cote d'Ivoire surprisingly has the amount of harvested areas about 130 thousand ha in 2001. In just 15 years, there is a huge jump from 130 thousand ha to almost 1.6 million ha. The most significant reason that attracts Ivoirian farmers to cultivate cashew is the tax break on cashew export, funding from World Bank and facilitated better market access for the farmers. India, which is the 2nd country that spent a lot of area cultivating cashew in the past remains the same and as well gradually doubles the cultivated area in 2016. Tanzania was the country that had no interest in cashew cultivation in the past, but recently it has become one of the top countries to use the land for cashew cultivation. Meanwhile, the harvested area in Brazil, where cashew originally came from, has become smaller and smaller over the last decade. The country harvested area had plummeted from 1990 to 2016. The reason behind was that there was a lack in government supports in the country and as well the shift from agriculture to services in the country.

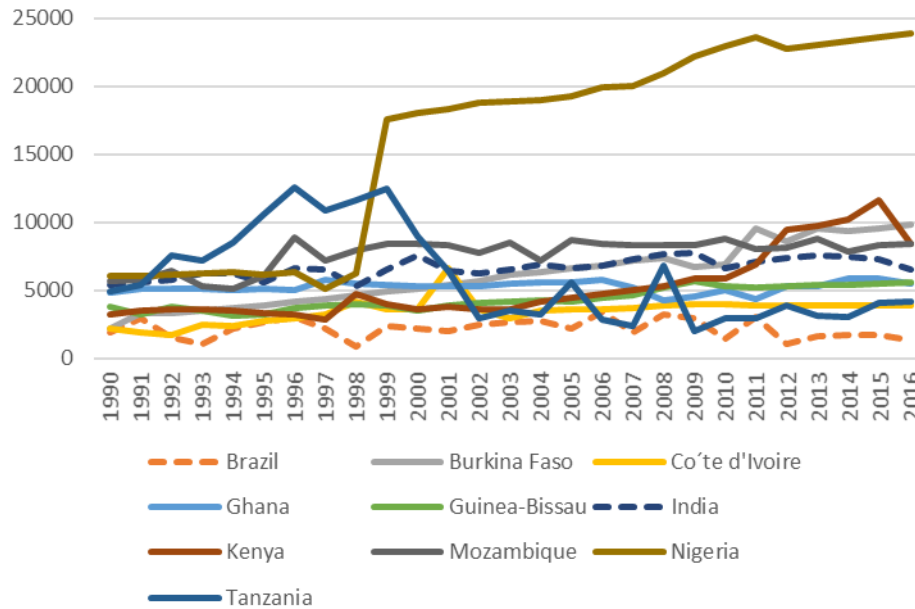


Figure 4 Yield in research countries in kg/ha (dotted line represents major producing countries)

According to Figure 4 Viet Nam¹ is the country with the most yield among the 11 countries, with the highest peak of 5 thousand kg/ha in 2015, followed by Nigeria which has stayed constant for almost 2 decades at the amount of approximately 2 thousand kg/ha. It is surprising that Brazil as the origin of the cashew has had the lowest yield fluctuating around 130 kg /ha throughout the timeline. The third and fourth highest amounts of yield are produced in Kenya and Burkina Faso, both of which similarly have the yield of about 1 thousand kg/ha.

As shown in Figure 5, Viet Nam has the most production among the 11 countries followed by Nigeria, India and Cote d'Ivoire. Viet Nam has increased the production of cashew significantly from 2001 to 2016. It has organized system practice in cashew cultivation and especially they have a very good logistic system. At the same time, Nigeria, as one of the focus countries, has increased the production significantly from 1998 to 2016. Nigerian government supports the cashew production in the country by supporting rural cashew market, providing market information and infrastructure for cashew farmers.

¹ Without Viet Nam because they have the highest yield

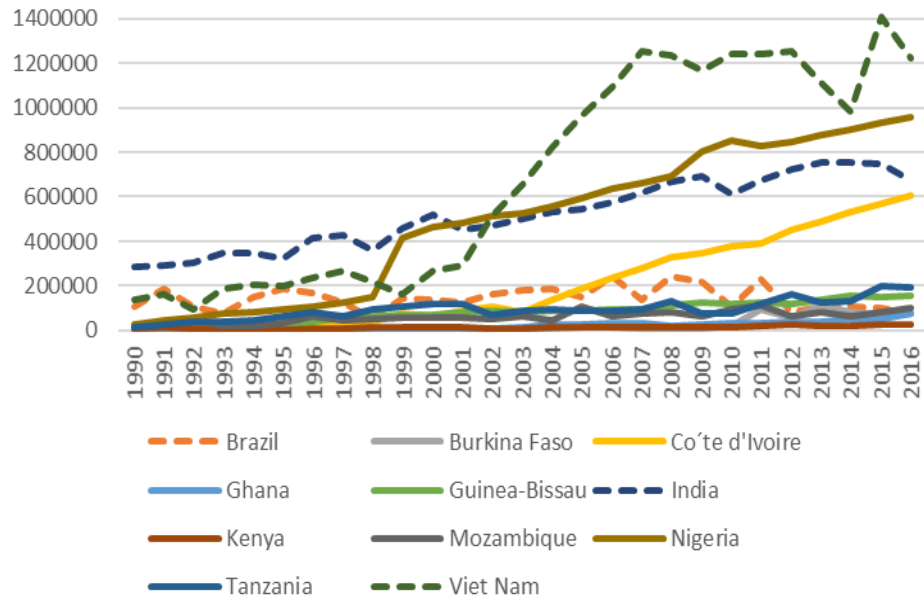


Figure 6 Production in research countries in tons (dotted line represents major producing countries)

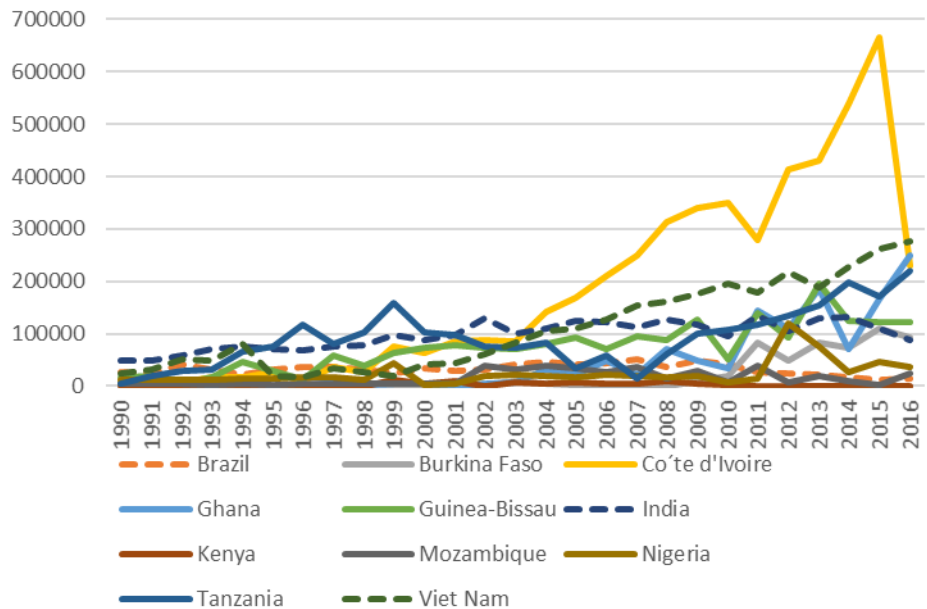


Figure 5 Export quantity in research countries in tons (dotted line represents major producing countries)

As we can see from Figure 6, Viet Nam, Cote d'Ivoire and Ghana are the top three exporters in term of quantity both shelled cashews and in-shell cashews. Cote d'Ivoire is one of the top countries that export cashew in term of quantity; however, they did not receive as much value as Viet Nam do (Figure 7). Cote d'Ivoire exports mostly in-shell cashews, which does not earn as

much compared to Viet Nam shelled cashew. Shelled cashews are more valuable in the market because of the expense during processing in term of finance and labour. India was one of the top cashew exporters in early 2000s. Due to the interest in processing than producing, nowadays India providing more shelled cashews to the international market than in-shelled cashews they used to in 2000s.

As illustrated in Figure 7, Viet Nam exports the most cashew value of about 2 billion USD followed by Ghana in about 980 Million USD. Viet Nam has increased significantly in exporting cashew value over the past 15 years. It surpassed India and became the top 1 exporter in 2006.² Most of the cashews that are exported from Viet Nam are processed cashew, while African countries mostly export the raw cashews to the global market. India is the only country that competes with Viet Nam in trading shelled cashew and other by-products of cashew. Most of Indian and Viet Nam cashews are not from their own production. Both countries import them mainly from Africa and their neighbouring countries. Ghana, Cote d'Ivoire and Tanzania are the top African countries that export the most amount of raw cashew nuts to the world. The reason that they do not compete with the other processing countries are because they have poor logistic system, no new technical practices and old machinery in manufacturing.

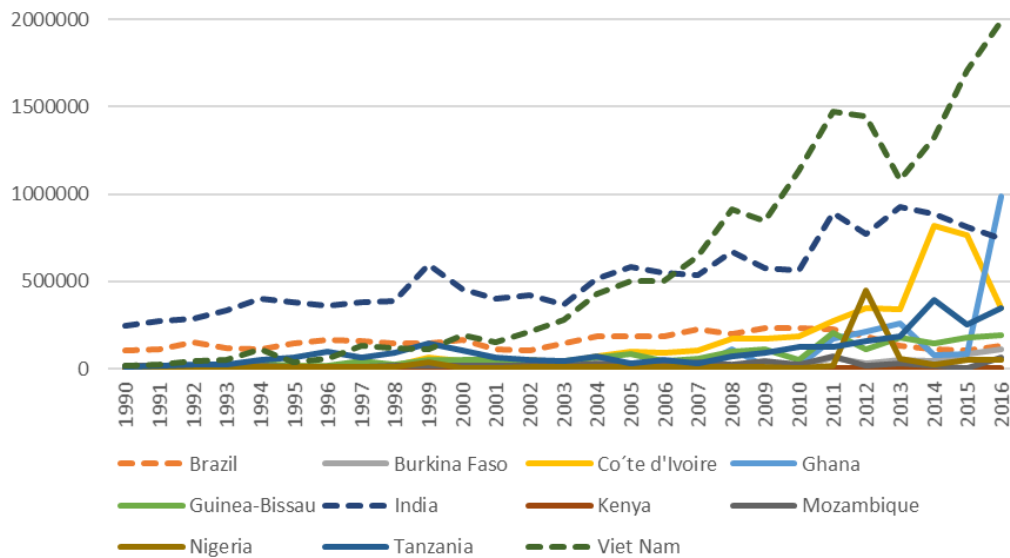


Figure 7 Export value in research countries in 1000USD (dotted line represents major producing countries)

² Export both in-shelled and shelled cashew

Table 1 Comparison of selected countries

CRITERIA/ COUNTRY	BRAZIL	BURKINA FASO	CO' TE D'IVOIRE	GHANA	GUINEA-BISSAU	INDIA	KENYA	MOZAMBIQUE	NIGERIA	TANZANIA	VIET NAM
TOTAL PRODUCTION IN 2016 (TONS)	75,548	78,533	607,300	78,268	154,139	671,000	24,954	104,179	958,860	195,140	1,221,070
TOTAL AREA HARVEST IN 2016 (HA)	567,547	80,033	1,562,640	142,275	277,679	1,036,000	29,830	123,457	400,822	471,373	281,047
TOTAL YIELD IN 2016 (KG/HA)	133.1	981.3	388.6	550.1	555.1	647.7	836.5	843.8	2,392.2	414	4,344.7
EXPORT QUANTITY IN 2016 (TONS)	15,605	94,036	229,071	249,324	121,134	88,727	603	25,237	37,206	219,229	277,013
EXPORT VALUE IN 2016 (1000USD)	129,611	112,571	343,903	987,423	189,446	742,939	4,241	62,407	50,370	347,384	1,990,325
SHARE IN COUNTRY EXPORT (2016)	0.06%	2.27%	3.34%	5.94%	69.14%	0.28%	0.09%	1.58%	0.14%	5.42%	0.95%
SHARE IN COUNTRY AGRICULTURE EXPORT (2015)	0.14%	12.84%	10.3%	3.15%	98.37%	2.84%	0.11%	0.78%	5.62%	12.18%	13.46%
EXISTENCE OF GOVERNMENTAL SUPPORT	No Gov Support	Support by African Bank	Gov Support MFD Approach	Gov Support Provide loan to farmer	Gov Support by Campaign	Gov Support CEPCI	Promote the trade of process cashew	No Gov Support	Liberalization's policy on commodity crop	Gov Support AMCOS SACCOS	Gov Support VINACAS
EXPORT SUPPORT	No export support	No export support	Government export bonus	Assist with market Information	No export support	CEPCI	Export banned on raw cashew	No export support	Promotion Council	Facilitation of International Market Info	Promotion Programs on export
SUPPORT FROM PRIVATE AND INTERNATIONAL ORGANIZATIONS	SINDICAJU	Promote Cashew sector	World Bank	TIPCEE by USAID	World Bank	No Data	EU V4 Project	Project were turn down by Government	Assist with Technical USAID	Financial, Training, and Research	Oxfam, ILO, FES
EXPORT TARIFF	10%	15%	2.5% Tax Break (2016)	Tax holiday for 10 years than 8%	14.06%	5%	15%	18%	5%	15% on Tax	10%

4.2. Production and support

According to table 1, we can see that Viet Nam is the top 1 cashew nut producer in the world with approximately 1,221,070 tons, followed by Nigeria, India and Cote d'Ivoire. Despite that, Cote d'Ivoire is the country with the most harvested area in the world with about 1.5 million hectares of area, followed by India, Brazil, Tanzania and Nigeria. Out of all the selected countries for comparison, Viet Nam stays out as the most successful country in producing because the country has the highest yield with roughly 43,447 hg/ha. There are several reasons behind the export value and export quantity; as we can see from table 1: Cote d'Ivoire, Ghana and Tanzania export similar quantity as Viet Nam did, but receive a lot lower pay than Viet Nam. This is because Viet Nam mostly exports shelled cashew unlike African countries which typically export in-shell cashew. Viet Nam is the county, which export the most in shell cashew in the world earning almost 2 billion USD in 2016.

If we look at Guinea-Bissau, the country economy and income to foreigner reserves is basically based on cashew-nut sharing about 69.14% of total country exports and about 98% share in total agriculture exports. We can assume than Guinea-Bissau economy is dependent on cashew production. In Ghana and Tanzania, cashew production contributes around 6% of the country export. For the rest of the countries, cashew production seems to be less significant, with the share of only about 1% of their total exports. In 2015, Cashew has shared important role in Agriculture export in Viet Nam, Tanzania, Guinea-Bissau, Burkina Faso and Cote d'Ivoire with more than 10%. While Mozambique, Kenya and Brazil economy did not depend on cashew production since the share of cashew to total agriculture export is less than 1%.

4.3. Export and support

As illustrated in Table 1, Brazil is the country, where cashews originated, but the government does not have any interest in supporting on cashew development and as well putting any effort on maintaining the production of cashew. These days the biggest cashew-supporting organization in Brazil is SINDICAJU. SINDICAJU mainly focus on promoting the export of cashew by-product from Brazil. Most of the African countries

that cultivate cashew receive some supports from government, except Mozambique. The support comes in many forms. Most of the countries like Burkina Faso, Ghana, Nigeria and Tanzania receive market information and new cultivation techniques extension from their governments. Cote d'Ivoire is a special country; since 2017 companies that process cashew could. Guinea-Bissau and Kenya obtain government supports through campaign with some free or subsidised seedlings and other extension services. The situation in Kenya is a bit different; the Kenyan government shows their support toward cashew nuts productions by banning the export of cashews in raw form. The objective was that this ban could add up more value to the product and support the country economy by providing jobs to the locals. Kenyan government mainly allows just the trade of process cashew. In Tanzania, their government has created two type of loans called Agriculture Market Cooperative Societies (AMCOS) or in Credit Cooperative Societies (SACCOS) to support their farmers in term of finance and certain materials. While in Nigeria, the government has created liberalization's policy on commodity crops in order to trade and export in both local and international markets.

The major cashew producing countries like India and Viet Nam also receive governmental support. Indian government build CEPCI (The Cashew Export Promotion Council) in order to promote the export of cashew kernels and cashew-nut shells. At the same time, Viet Nam government creates VINACAS (Viet Nam Cashew Association) as occupational and social association supporting the cashew trade in Viet Nam. VINACAS has more than 500 members as processors, brokers, traders, research institutes, machine producers and farmers' associations. Basically, VINACAS represents their members to government, provides market information, technologies and trainings to its members.

Out of all selected countries, almost all of them receive supports from private organizations, but there is no clear data mentioned about India getting any support from private organizations. USAID provides many funds to west African countries especially in Ghana and Nigeria. In Ghana, USAID designed project called TIPCEE in order to increase employment opportunities and innovate Ghana's export industries. While in Nigeria, USAID supports on boosting the trade and investment on processing. World bank also provides many important projects in developing cashew nut production in African countries. They mainly donate funds to Cote d'Ivoire, Guinea-Bissau and Mozambique. World Bank provided loan of 200 million USD to help Cote d'Ivoire with

increasing productivity, quality and processing industry in the country. In Guinea-Bissau, World Bank provides funds for Guinea-Bissau farmers to cultivate new crops. World Bank also donates money to invest in small-scale cashew farmers in Mozambique, but most of them got rejected due to the low management skills in Ministry of Agriculture. Burkina Faso and Tanzania receive money also from small NGOs and ACI (African Cashew Initiative), which mostly focuses on small projects providing knowledge to small-scale farmers and market information. Kenya is one of the smallest cashew-producing countries, which recently received supports from EU Trust Fund V4³ countries. V4 countries mainly provide support through Ten Senses Africa (TSA) organization, which operates in the coast. The project focuses on providing new technologies to farmers, establishing connection between farmers and buyers, and supporting woman to work in cashew value chain. Viet Nam as the most producing country still receives supports from Oxfam, ILO and FES. ILO and FES mainly focus on technical assistance to famers and Oxfam mainly focus on labour practices toward cashew cultivation in Viet Nam.

4.4. Export tariff

As shown in table 1, Cote d'Ivoire and Ghana are the countries in Africa which reduce the tax on cashew export. The government of Ghana provides tax break on export for the first 10 years of cashew cultivation, then after that 10 years, 8% of export tax is applied to cashew export. Cote d'Ivoire government also provides tax break for cashew nuts in order to increase the production. Mozambique is the country that charges the highest tax on cashew export with about 18%. Burkina Faso, Kenya, Tanzania and Guinea-Bissau charge about 15% taxes on cashew exports. Nigeria and India charge about 5% of the tax on cashew export. The origin and major cashew producing countries like Brazil and Viet Nam charge 10% of tax on the export of cashew.

³ V4: Czech Republic, Slovakia, Hungary and Poland

5. Discussion

Cashew has been a great cash crop for small scale farmers. Cashew production shares both impact to poverty and the environment. According to (Kanarku 2018), cashew cultivation helps reduce the unemployment rate and inequality in African countries. This helps reduce the poverty in African livelihood (Temudo & Abrantes 2014). Cashew production has many impacts on the environment; it was one of the best crops to fight against deforestation in tropical countries (Kankoudry Bila et al. 2010). At the same time, it also causes damage to the environment during the growing and processing period. The soil gets damaged due to over usage of chemical substances; simultaneously, the air pollution is caused by processing of cashew nuts and the solid waste from cashew shell (Mohod & Jain 2011; da Silva Barros et al. 2015; Ganeshamurthy et al. 2019).

Viet Nam is the top cashew nut producer country in the world. The country is currently having the highest yields in the world, but it is not the country that spends the most land to cultivate the crop. If we compare Viet Nam to African countries, we can see that Viet Nam export less volume of cashew than African countries, but they receive higher income from it. The reason behind all of the difference of market value between Viet Nam and African countries is because Viet Nam mostly export processed cashew nuts, which is worth more than raw nuts exported by African countries. Most of African raw cashew nuts are exported to India and Viet Nam in order to process (Yun 2018)

According to FAOSTAT, African countries use more land to cultivate cashew than the major producing countries. If we see Figure 1, African countries have started to build interest in cashew cultivation in the last 10 years. They have gained the interest due to the supports and funds provided by private organizations and their own governments. Most of the African countries still have a problem with low yields. This certainly results in some of the African countries having a low production rate. The majority of African countries lack of technologies, cultivation methods and new type of seedlings. At the moment, they maybe a little behind the major producing country, but in the future if they could have access to better machinery and necessary knowledge to optimize the yield, they are likely to do better in production and exports. Guinea-Bissau is the only African country that depend cashew since the share of cashew export is about 70% within total export.

As we can see from Table 1, African countries receive many types of support from both their government, private and international organizations. Cote d'Ivoire government provides bonus to farmers by paying 400CFA (0.65USD) for each kilogram of processed cashew nuts that they export (Bavier 2016; Oxford Business Group 2017). Guinea-Bissau economy depends mostly on cashew production thus the country government has created cashew campaign, which supports the farmers with free or subsidised seedlings and other extension services to increase their production (Catarino et al. 2015; Hanusch 2016; Monteiro et al. 2017). Likewise, Kenya government shows their support on cashew production by banning the trade of raw cashew and promote the export of process cashew, so the value of cashew is higher (Sishuba 2017). Recently Kenya received supports from EU Trust Fund V4 countries (Czech Republic, Slovakia, Hungary and Poland) through Ten Senses Africa (TSA) focusing on providing new technologies to farmers, establishing connection between farmers and buyers, and supporting woman to work in cashew value chain (European Union External Action 2018; Praxides 2019). Meanwhile, In Tanzania, the government has created two type of loans called Agriculture Market Cooperative Societies (AMCOS) or in Credit Cooperative Societies (SACCOS) to support their farmers in term of finance (FAO 2012).

As discussed above, cashew share many impacts to both environment and poverty in many countries. We could say that African countries have a huge potential to cultivate cashew. They have excessive free land to invest on cash crop. At the same time, with the donation from developed countries for developing projects regarding cashew cultivation, African countries could maximize their production in certain years in the future. African countries like Cote d'Ivoire, Nigeria and Tanzania could lead the world production and become world major producing countries.

6. Conclusions

The thesis result demonstrate that Viet Nam has the highest production and yield of cashew in the world. Nigeria is the only African country that have the highest yield with about 2.5 tons per ha. Among all selected African countries, Cote d'Ivoire, Tanzania and Nigeria use the most land to cultivating cashew. Cote d'Ivoire have the highest export quantity compare with other African countries. Currently, Viet Nam and India process the most cashew in the world. To be able to meet their demand in processing, India and Viet Nam import raw cashews from African countries. India and Viet Nam have more processing factory than other countries in the world. Guinea-Bissau is the only country in the world that depend on cashew the most. Cashew share about 70% of total Guinea-Bissau export and about 98% of total agriculture export.

Most of the African countries receive a lot of support from their governments and international and non-governmental organization. The support comes in many ways. From the government side the support can be provision of market information, promotion programs, or some sort of export bonus. While from non-governmental organization, the support can be some funds on building capacity building, technologies or other form of research to make cashew cultivation better. Mozambique is the only African country that does not have any government support nor non-government support. They turn down many projects provided by private and international organization. Mozambique Ministry of Agriculture have a lack in management skills; therefore, they have low support toward the cultivation cashew. Ghana government's provides tax holiday in exporting cashew to farmer for the first 10 years of their cultivation then after the period done, they start to charge 5% on export tariff. Cote d'Ivoire have the least export tax on cashew, which is about 2.5% and in 2016 there was a tax break. To sum up, cashew is an important crop to cultivate in African countries, since location of the country meet the requirement of the crop. At the same time, it also gives a lot of benefit to African livelihood in term of income and full fill the emptiness in savannah regions.

7. References

- ACP. 2014. Cashew – an opportunity for poverty reduction in ACP countries Cashew – an opportunity for poverty reduction in ACP countries.
- Adeigbe OO, Olasupo FO, Adewale BD, Muyiwa AA. 2016. A review on cashew research and production in Nigeria in the last four decades. *Scientific Research and Essays* **10**:196–209.
- African Cashew initiative. 2012. Gender transformation in the African Cashew value chain Findings from the African Cashew initiative ' s qualitative gender survey conducted in Ghana and Burkina Faso - Processing -.
- African Development Fund A. 2000. Original : English Republic of Ghana Inland Valleys Rice Development Project Appraisal Report.
- Akoto SO. 2010. Poverty Impact Assessment – PIA Case Study Ghana African Cashew initiative.
- Aksoy MA, Yagci F. 2012. Mozambique Cashew reforms revisited. *World*:40. Available from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1982448.
- Alencar PG de, Espindola GM de, Carneiro ELN da C. 2018. Dwarf cashew crop expansion in the Brazilian semiarid region: Assessing policy alternatives in Piau . *Land Use Policy* **79**:1–9. Elsevier. Available from <https://doi.org/10.1016/j.landusepol.2018.07.042>.
- Aliyu OMHLA. 2005. Nigerian cashew economy: a rievew of nut production sector .
- Antonio L, Griffith G. 2017. The Cashew Value Chain in Mozambique: Analysis of Performance and Suggestions for Improvement. *Int. J. Food System Dynamics* **8**:208–221.
- ARC-Institute for Tropical and Subtropical Crops. 2018. Cultivating cashew nut. Available from <https://www.nda.agric.za/docs/infopaks/cashew.htm> (accessed December 20, 2018).
- Ashitey E. 2012. Ghana Cashew Nut Industry is Growing.
- Azam-Ali SH, Judge EC. 2001. Small-scale cashew nut processing. *FAO* :70
- Bavier J. 2016. Tax breaks to spur Ivory Coast exporters to process cashews. Available

- from <https://www.reuters.com/article/us-ivorycoast-cashew-idUSKBN13D2OM> (accessed February 20, 2019).
- Callado SMG, Janssens MJJ, Pohlan HAJ, Ipiranga ASR. 2009. Cashew Systems in North-east Brazil: relationship between Typology, Productivity and Characterization:1–15.
- Catarino L, Menezes Y, Sardinha R. 2015. Cashew cultivation in Guinea-Bissau – risks and challenges of the success of a cash crop. *Scientia Agricola* **72**:459–467.
- Chemonics International Inc. 2002. Subsector Assessment of the Nigerian Cashew Industry:44.
- COMTRADE. 2012. UN Comtrade Database. Available from <https://comtrade.un.org/> (accessed December 20, 2018).
- da Silva Barros V, Lopes Serrano LA, Potting J, Brito de Figueirêdo MC, Gondim RS, Nemecek T, Bezerra MA. 2015. Environmental assessment of tropical perennial crops: the case of the Brazilian cashew. *Journal of Cleaner Production* **112**:131–140.
- Davis K. 1999. CASHEW.
- Dendena B, Corsi S. 2014. Cashew, from seed to market: A review. *Agronomy for Sustainable Development* **34**:753–772.
- Eapen M, Jeyaranjan J, Harilal KN, Padmini Swaminathan P, Kanji N. 2003. Liberalisation, Gender, and Livelihoods: The Cashew nut case.
- Elakkiya E, Sivaraj P, Vijayaprabhakar A. 2017. Growth and Performance of Cashew Nut Production in India- An Analysis. *International Journal of Current Microbiology and Applied Sciences* **6**:1817–1823.
- European Union External Action. 2018. Joint V4 project to support Kenyan farmers in the Coast. Available from https://eeas.europa.eu/topics/eu-global-strategy/46290/joint-v4-project-support-kenyan-farmers-coast_en (accessed March 10, 2019).
- FAO. 2012. Analysis of Incentives and Disincentives for Cashew nuts in the United Republic of Tanzania October 2012.
- FAOSTAT. 2018. FAO. Available from <http://www.fao.org/faostat/en/#home> (accessed July 30, 2018).

- Ganeshamurthy AN, Kalaivanan D, Rupa TR. 2019. An Assessment of the Fertilizer Needs of Horticultural Crops in India Abstract. *Indian Journal of Fertilisers* **3**:286–205.
- Gyedu-akoto E, Lowor ST, Assuah M, Kumi W, Dwomoh EA, Fund AD, Mariwah S, Antwi KB, Evans R, Osei-akoto S. 2014. Growing cashew nuts in Ghana – land access , food security and poverty alleviation **3**:953–965.
- Hammond S. 2009. TREE NUTS ANNUAL Kenya Macadamia Annual Report. Policy.
- Hanusch M. 2016. Guinea-Bissau and the Cashew Economy. Page *Macroeconomics & Fiscal Management*. Available from <http://documents.worldbank.org/curated/en/443831467999735473/102933-REVISED-PUBLIC-MFM-Practice-Note-11.pdf>.
- Harilal KN, Kanji N, Jeyaranjan J. 2006. Power in Global Value Chains: Implications for employment and livelihoods in the cashew nut industry in India. Available from <http://pubs.iied.org/14514IIED/?a=J+Jeyaranjan>.
- Heinrich M. 2012. Lessons from Working with New and Multiple Partners – Emerging Results Case study of the African Cashew Initiative – Focus: Ghana:1–27. Available from http://www.value-chains.org/dyn/bds/docs/824/DCED_ACiGhana_July2012.pdf.
- IEH. 2018. Strengthening practices in the Vietnamese cashew nut industry A due diligence study on labour practices and sustainability.
- INC. 2017. INTERNATIONAL NUT AND DRIED FRUIT COUNCIL: Nuts & amp; Dried Fruits Statistical Yearbook:76. Available from https://www.nutfruit.org/files/multimedia/1510229514_1497859419_Statistical_Yearbook_2016-2017.pdf.
- ITC. 2011. Market News Service Mns Palm Products.
- ITC. 2018. Cashew nuts. Available from <http://www.intracen.org/itc/market-insider/cashew-nuts/> (accessed December 20, 2018).
- Joker D. 2003. Informatio about Cashew Nut (*Anacardium occidentale*).
- Kanarku NNA. 2018. Cashew processing in Africa will reduce poverty – Experts.

- Kankoudry Bila N, Djibo O, Constant P, Sanon B. 2010. Analysis of the Cashew Value Chain in Burkina Faso. Available from http://www.africancashewinitiative.org/imglib/downloads/ACI_BurkinaFaso_gb_high_resolution.pdf.
- Karthickumar P, Sinija V r. 2017. Indian Cashew Processing Industry-An overview. *Journal of Food Research and Technology* **2**:60–66.
- Kumar SM, Ponnuswami V, Padmadevi K. 2015. Cashew industry in India. *Acta Horticulturae* **1080**:97–101.
- Martin PJ et al. 1997. Cashew nut production in Tanzania: Constraints and progress through integrated crop management. *Crop Protection* **16**:5–14.
- Ministry of Development Industry and Foreign Trade. 2012. Brazil nuts. Available from <http://www.mdic.gov.br> (accessed December 20, 2018).
- Mohod A, Jain S. 2011. Cashew nut processing: sources of environmental pollution and standards. *BIOINFO Environment and Pollution* **1**:5–11. Available from <http://www.bioinfo.in/contents.php?id=272>.
- Monteiro F, Catarino L, Batista D, Indjai B, Duarte MC, Romeiras MM. 2017. Cashew as a high agricultural commodity in West Africa: Insights towards sustainable production in Guinea-Bissau. *Sustainability (Switzerland)* **9**:1–14.
- Nair KPP. 2010. Cashew Nut (*Anacardium occidentale* L.). Page The Agronomy and Economy of Important Tree Crops of the Developing World. Available from <http://linkinghub.elsevier.com/retrieve/pii/B9780123846778000023>.
- Ntemi N, Alethia C. 2015. Analysis of price incentives for cashew nuts in the United Republic of Tanzania 2005–2013.
- OECD. 2018. Cashew Nuts, fresh or dired. Available from <https://atlas.media.mit.edu/en/profile/hs92/080130/> (accessed December 30, 2018).
- Olife IC, Jolaoso MA, Onwualu AP. 2013. Cashew processing for economic development in nigeria. *Agricultural Journal* **8** 1:45–50.
- Oxford Business Group. 2017. As world's top exporter of cashews, Cote d'Ivoire stands to benefit from economic opportunities. Available from <https://oxfordbusinessgroup.com/analysis/cashing-world's-top-exporter-cashews->

country-stands-benefit-host-economic-opportunities.

Praxides C. 2019. Lamu to benefit from Sh200M EU-funded cashew project. Available from <https://www.the-star.co.ke/news/2019-02-20-lamu-to-benefit-from-sh200m-eu-funded-cashew-project/> (accessed February 20, 2019).

Rosengarten FJ. 1984. *The Book of Edible Nuts*.

Rüschkamp AG, Seelige K. 2010. Analysis of the Cashew Value Chain in Mozambique African Cashew initiative.

Seth Osei-Akoto. 2010. A Value Chain Analysis of the Cashew Sector in Ghana African Cashew initiative. Available from http://africancashewinitiative.org/imglib/downloads/ACI_Ghana_high.pdf.

Sishuba S. 2017. Kenya cashew nut exports decline after government ban. Available from <https://www.farmersweekly.co.za/agri-news/africa/kenya-cashew-nut-exports-decline-after-government-ban/> (accessed March 10, 2019).

Temudo MP, Abrantes M. 2014. The Cashew Frontier in Guinea-Bissau, West Africa: Changing Landscapes and Livelihoods. *Human Ecology* **42**:217–230.

The Revitalization of The Cashew Nut Industry in Kenya. 2009.

Yao B, Assidjo E, Dornier M, Soro D, Abreu F, Reynes M. 2011. The cashew (*Anacardium occidentale*) industry in Côte d'Ivoire: analysis and prospects for development . *Fruits* **66**:237–245.

Yun W. 2018. Cashew Prices on a Rise. Available from <https://www.tridge.com/stories/cashew-prices-on-a-rise> (accessed February 10, 2019).