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African Countries' Agricultural Trade Value Chain Assessment Case study: Tanzania (Cashew nut exports)

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Abstract

Sub-Saharan Africa lost its status as a net exporter of agricultural products in the early 1980s when prices for raw commodities fell and local production stagnated. Since then, agricultural imports have grown faster than agricultural exports. In order to get to the bottom of this critical issue, UNIDO in partnership with the AU, IFAD, AfDB, FAO, and UNECA, developed the African Agribusiness and Agro-Industries Development Initiative (3ADI). The major objective of the 3ADI is to increase private sector investment flows going into the agriculture sector in Africa by mobilizing resources for agribusiness and agro-industrial development from the domestic, regional or international financial systems. This formed the basis of research with the objective of assessing the value addition chain for some vital agricultural commodities in the 3ADI focus countries. UNIDO is developing several action plans in a few African countries – one of them is Tanzania. In the case of Tanzania, the findings show the potential in cashew nuts. The paper's main goal is to propose a plan or set of steps leading to the improvement of added value generation in the area of agricultural trade in Tanzania. The paper is focused on one commodity Cashew-nuts. Tanzania boosts high volumes of local supply of this commodity, which is the key prerequisite for the value addition chain through local processing. The results from the analysis prove significant economic losses related to the current structure of Tanzanian trade in cashew nuts. The main problem of the current cashew nut trade activities is the very low added value of exported cashew nuts. The paper analyses the structure of value added activities related to the cashew nut trade and proposes a plan for increasing the share of processed cashew nuts at a much higher unit price in comparison to raw cashew nuts. The simulated development in the cashew sector in Tanzania to the year 2030 is based on two expectations a 5% increase of evaluation of particular steps and a 5% growth of processed cashew nuts export volume resulting in significant growth of export incomes and provides an important material stimulating discussion related to the importance of the transformation of the export structure from unprocessed raw products to processed – finalized products.

Keywords

Agribusiness, agricultural commodities, Africa, Tanzania, UNIDO 3ADI, local processing, value addition chain, cashew nuts, export, structure.

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Introduction

The Agricultural sector, respectively rural areas, plays a crucial role in the African region (Nyantakyi-Frimpong, 2014; Ambaye et al, 2014). In rural areas we can find over 675 mil. people (almost 60% of the total population). In the agricultural sector almost 237 mil. economically active people are employed (almost 52% of the total economically active population). The specific case represents, in this case, the Sub-Saharan region where almost 57% of economically active persons work in the agricultural sector (217 mil. out of 382 mil. people). Despite the fact that for many people the agricultural sector represents the only possibility to satisfy their basic needs, the agricultural sector represents only an appendix of the total African economy GDP formation (only about 10% respectively about 326 bn. USD). If we focus our attention especially on the Sub-Saharan region, we can see that the agricultural GDP value

is equal to about 261 bn. USD. But it is necessary to emphasize that agriculture plays a different role in individual African countries, while there is a set of countries where the share of agriculture in the total GDP formation is lower than 5% (e.g. South African rep.), there are also many countries where agriculture contributes over 50% of the national GDP value (e.g. Sierra Leone) (Clarke, 2006). African countries were supposed to be strong agricultural exporters in the past. But this situation changed at the beginning of eighties. Since then African countries agrarian trade has been in constant deficit. Since 1980 until nowadays (2013), the value of agrarian trade negative balance has increased from cc 1 bn. USD to almost 40 bn. USD. The majority of the trade deficit is represented by the trade deficit of Northern African countries (over 30 bn. USD). The trade deficit of Sub-Saharan countries is much lower, but still significant at between 7 and 10 bn. USD. Despite the fact that African countries agrarian production potential is significant, the enormous population growth (Jenicek, 2010) (while in 1950 African population was about 220 mil. people, nowadays there are more than 1.138 bn. people) together with the political and economy instability of the region (Reid, 2014) are the main reasons of the constantly growing food deficit in the region (Jenicek, 2011). The specific problem related to African agricultural trade is the existing disproportion in area of agrarian trade commodity structure (Jordaan, 2014). While more than half of agricultural exports are represented by raw production or semi-finalized production, about 70-80% of the total agrarian import value is represented by finalized food production. The African region is the source of basic raw agricultural materials for processing industry in other regions. Its food processing capacities are very limited (Schoenfeldt, Hall, Nicolette, 2013; Maitah et al., 2013;). The result of that development is the fact that African countries are exporting a huge quantity of agricultural products with limited or almost no added value, while a significant portion of imported products is represented by highly processed production with much higher unit/kilogram prices. The problem of Africa is its inability to improve and increase its home processing capacities and another problem of African food sector is the low level of agricultural production efficiency (Mugera, Ojede, 2014). Despite 24% of the world's agricultural land and 16% of arable land being in Africa gross production amounts to only 8% of world agricultural production (326 bn. USD from of 3817 bn. USD. African countries have specialized moreon the export of cash-crops (Anderman et al., 2014) (However this kind of specialization is accompanied by two effects. The first can be supposed as positive, while the second as negative. The positive effect is that it is very easy to sell those products whilst on the other hand the generated added value is limited or even zero.). The majority of exports is represented by raw-unprocessed commodities. One of the reason for such an approach to agricultural trade is the existence of tariff escalation in developed countries (Narayanan, Khorana, 2014) and the low level of development of the internal African market (While for example in the Europe more than 70% of all exports is between European countries, in Africa the share of intra-regional trade in individual countries' foreign trade is about 20%.).

Production and Commodities	In 1000 USD	Share of total
Agricultural Products, (Total)	45 204 232	
Commodities	**Export value**	
Cocoa, beans	6 764 173	14.96%
Coffee, green	2 051 060	4.54%
Cotton lint	2 042 791	4.52%
Rubber natural dry	1 960 725	4.34%
Crude materials	1 899 731	4.20%
Tobacco, unmanufactured	1 792 503	3.97%
Oranges	1 281 808	2.84%
Tea	1 192 657	2.64%
Sugar refined	1 185 562	2.62%
Maize	1 158 388	2.56%
Cashew nuts, with shell	1 047 146	2.32%
Sugar Raw Centrifugal	877 314	1.94%
Sesame seed	870 365	1.93%
Wine	780 887	1.73%
Oil, palm	723 715	1.60%
Grapes	696 517	1.54%
Food Prep Nes	687 101	1.52%
Cocoa, paste	584 756	1.29%
Cocoa, butter	487 685	1.08%
Tangerines, mandarins	467 069	1.03%
Top 20	28 551 953	63.16%

Source: FAOSTAT, 2014

Table 1: African countries agricultural export performance and structure 2011/2012 (in 1000 USD)

When talking about agricultural trade, it is necessary to highlight the fact that African trade is going to be negative in the future. The expected population growth (in 2100 the population is expected to reach more than 2.3 billion people), will have a negative effect on the ability of the region to generate enough food to cover domestic demand at the same time as generating an overproduction for export purposes

(Khan et al., 2014). For the future Africa will be definitely dependent on importing a significant quantity of agricultural and foodstuff products and its export ambition will be limited only to a specific segment of commodities. The main task of African agrarian trade policy will be to keep the negative trade balance to a sustainable level.

As has already been mentioned above, Africa lost its net export status in the early 1980s when prices for raw commodities fell and local production stagnated (Green, 2013). Since then, agricultural imports have grown faster (8.2% a year) than agricultural exports (cc 5% a year in 1961 – 2012) and by 2011/2012 reached a record high over 80 bn. USD yielding a deficit of over 35 bn. USD. Its agricultural export performance on the other hand measured only about 45 bn. USD. The value o f agricultural exports from France, the Netherlands or Germany is currently greater than for the whole African continent.

The low performance of agricultural exports in relation to imports is a result of the limited added value of African exports and constantly increasing domestic demand for agricultural products. The inability of Africa to improve infrastructure, efficiency of the production of farms and the capacities of local processing companies is the main barrier for the future positive development of the agrarian trade of African countries.

On the base of the above mentioned facts, it has become evident that there is need to develop a value chain assessment methodology upon which the development strategies can be founded. UNIDO developed The African Agribusiness and Agro-Industries Development Initiative (3ADI) in partnership with the AU (African Union), IFAD (International Fund for Agricultural Development), AfDB (African Development Bank), FAO, and UNECA (United Nations Economic Commission for Africa), has as the major objective to increase private sector investment flows going into the African agriculture sector. This will be done by mobilizing resources in the domestic, regional and international financial systems for agribusiness and agro-industrial development. The focus areas include transfer/development of skills and technologies for the post-production segments of agri-value chains; innovative institutions and services; financing and risk mitigation mechanisms and enabling policy promotion for the development of agribusiness.

If we are analyzing the potential of individual African regions for the future improvement of agricultural and foodstuff sector performance, it is necessary to focus our attention especially on countries located in Sub-Saharan Africa. These countries have some agricultural potential as their climate and environment condition provide at least some chances to improve the position of this region compared to the rest of the world. Of course it is not possible to develop one universal strategy for all Sub-Saharan countries. Every country is different. Therefore it is necessary to develop individual strategies focused exactly on individual countries' needs, ambitions and possibilities.

This paper is focused on Tanzania. Tanzania is one of the countries that were studied under the 3ADI project. It is a country situated in east Africa. Tanzania is an agricultural based country. The agricultural sector contributes approximately 25% to the GDP added value and it employs cc 76% of the economically active population. Its agricultural exports are valued at about 1 bn. USD a year and the share of agrarian export in total exports is about 20%. The commodity structure of Tanzania agrarian exports are as follows:

Trade and Commodities	In 1000 USD	Share of agricultural trade
Total Merchandise Trade	4 734 960	
Agricultural Products, Total	982 513	
Commodities	**Export Value**	
Coffee, green	140 043	14.25%
Tobacco, unmanufactured	106 585	10.85%
Cashew nuts, with shell	105 699	10.76%
Sesame seed	73 077	7.44%
Crude materials	58 961	6.00%
Cotton lint	53 596	5.45%
Tea	46 938	4.78%
Flour, wheat	40 071	4.08%
Peas, dry	34 338	3.49%
Cloves	31 416	3.20%
Top 10		70.30%

Source: FAOSTAT, 2014

Table 2: Tanzanian agricultural export performance and structure 2011/2012 (in 1000 USD).

It is possible to see the majority of export value is represented by unprocessed products with very limited added value. On the other hand all the above mentioned commodities are used in the markets of developed countries as components in high priced finished foodstuff products. To improve the situation of Tanzania and other African countries, it is necessary to change the structure of exports. It is necessary to reduce the share of raw products and to increase

the share of semi-finished or even finished products. In this case a very good opportunity for Tanzania could be the trade in Cashew nuts. Tanzania is one of the leading producers (8th), and exporters (5th) of Cashew nuts (cc 10% of world exports). The majority of its Cashew nuts production is exported in the raw unshelled form (cc 150 000 tonnes). Only about 15 - 20 000 tonnes a year is exported shelled (after processing this is about 4 000 tonnes). The difference between the slightly different forms of export is apparent. While the export of Cashew nuts with shell/raw cashew nuts is valued at cc 165 mil. USD, the export of the commodity with a bit of processing (Cashew nuts shelled) is value at only cc 23 mil. USD (There is a significant difference in the final unit price – while 1 kg of raw nuts is exported for 1 USD, one kg of processed nuts is exported for more than 6 USD). As in other branches, the lack of capital for crop utilization is evident here, so the major part of the harvest is exported in the raw form.

This paper's main goal is to suggest a set of steps leading to the improvement of added value generation in the area of agricultural trade in Tanzania. The paper is focused on one commodity Cashew-nuts.

Materials and methods

Agricultural commodities are subjected to various processes of value addition. Originally Michael Porter's concept of the value chain recognized that apart from the manufacturer, the value of a product is created by a multitude of other players: component vendors, distributors, retailers, and end users all contribute value. An example of the agricultural value chain would be: the farmer receives seeds, fertilizer, pesticides, water, etc. from other entities; the product of the farm is further increased in value by many other entities, such as supermarkets and restaurants. Without a robust chain of participating entities, not as much value can be delivered to the end user (Inclusive Technologies, 2012). The value chain is a mechanism that allows producers, processors, and traders - separated by time and space – to gradually add value to products and services as they pass from one link in the chain to the next until reaching the final consumer (domestic or global). The Main actors in a value chain are firms from the private sector (UNIDO, 2011a).

The nature of this research problem requires countries where the appropriate data is available in databases (e.g. FAOSTAT) to be studied. This is the reason why we chose Tanzania for our research. Another reason why Tanzania is the target country of our research activities is UNIDO research conducted just a few years ago. One of the co-authors of this paper is an active member of the UNIDO team and this paper represents a revision of previous research.

To be able to understand the current Cashew nut foreign trade activities in Tanzania, the paper provides an overview of trade and production activities for the period 2005 – 2013. The paper analyses the volume of Cashew nut production and trade in raw cashew nuts (with shells) and processed cashew nuts (shelled and roasted). The paper analyses the impact of processing activities on final Tanzania cashew nut export performance.

The base databases used for the construction of this paper are: FAOSTAT (United Nations), UN Comtrade database, WDI database (World Bank) and CBT database (Cashew nut Board of Tanzania).

Technically the analytical part of the paper is divided into two main parts. The first analyses the current Cashew market development. This part of the paper also includes a simulation related to the possible income if 100% of cashew nut production were traded not as unprocessed raw cashew nuts, but as processed cashew nuts.

The second part of the paper analyses the value chain related to the cashew nuts processing procedure. The paper analyses the structure of the individual steps related to increasing added value of the finished product. Finally a plan for increasing export values from trade in cashew nuts is proposed.

Results and discussion

Global annual consumption of cashew nuts/kernels is approx. 550,000 tonnes. The value of the cashew nut business is about 5 billion USD each year. Consumption is growing by 6 - 8% per year. Supply/demand is developing into acute shortage. 90% of African Cashew nuts are exported for processing in Asia each year - processing at origin would have inherent cost and environmental savings. Cashews are grown by smallholders and require minimal inputs (ANSAF, 2014a).

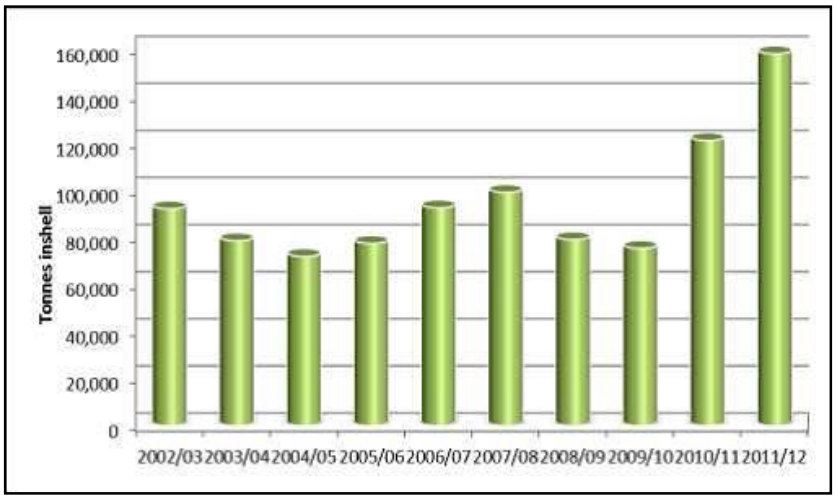
One of the main world and especially African cashew nut producers is Tanzania. Its production is about 10% of the total world production and is continuously rising. Related to quality indicators - Tanzanian cashews are supposed to be one

of the best in Africa. The significant advantage of Tanzania is the harvest season. The main portion of the harvest takes place in the part of the year when global harvesting is at its lowest and demand at its peak (ANSAF, 2014a).

Despite its status as Africa's third – and the world's eighth – largest cashew nut producer, Tanzania has missed out on adding value to its agricultural output. Only 10-15% of domestic output is currently processed and the remainder is exported as raw nuts. Studies have shown that the sector has the potential to provide 45,000 jobs, including for women and young people, if a larger proportion of the cashew nuts produced were processed locally Some 700,000 rural households - and an even larger but an undefined number of farm workers - generate income by producing raw cashew nuts while only some 5,000 to 8,000 are employed in the processing of nuts (UNIDO, 2013).

The production of cashew nuts in Tanzania recorded a significant growth during the last decade. While in 2002/2003 the volume of production was less than 100 thousand tonnes, in 2011/2012 the volume of production almost reached 160 thousand tonnes (see Figure 1).

A Tanzanian export of cashew nuts represents over ninety percent of total local production. However the majority of export activities are represented by the export of unprocessed production. The current raw cashew nuts export volume was 150 882 283 kg. On the other hand the export of processed cashew nuts was only 3 821 482 kg (cc 15 000 000 – 20 000 000 kg raw equivalent). The value of exports of raw cashew nuts is equal to 165 mil. USD whilst that of processed nuts is 23 mil. USD. There is also a significant difference between the unit price of raw cashew (cc 1.1 USD/kg) and processed cashew nuts (6.1 USD/kg). But it is necessary to emphasize that from one tonne of raw nuts we can get between 200 - 350 kg of processed nuts. The cashew market is very unstable and it is possible to see the cashew price oscillating and also the volume traded is very volatile (the reason for this volatility is the political instability existing within the region and also weather and harvesting problems). On the other hand cashew nut unit prices are growing. In the analyzed time period the raw nuts' unit price recorded an inter-annual growth of 4.4% a year and the unit export price of processed nuts recorded a growth of about 6.2% a year. The final value of exported raw nuts recorded growth of 19% a year and the final value of exported processed nuts had growth of 17% a year (during the period 2005 – 2013). The reason why the value of exported raw nuts is higher in comparison to that of processed nuts' is the continuous volume growth of raw nut exports and the inability of Tanzania to increase the export volume of processed cashew nuts. It is the inability of Tanzania to change the structure of its cashew trade which is one of the main barriers to the cashew industry development. Although Tanzania is one of the main producers its role in the retail market area is marginal. Tanzania is losing a significant portion of income coming from world market, because of its inability to improve the value added chain. The following Table 4 provides a simple simulation related to the lost opportunities in the cashew market. On the base of results shown in Table 4 we can see that Tanzania exported in period 2005 – 2013 cc 747 mil. kg of raw cashew nuts, which is equivalent to cc 200 mil. kg



Source: ANSAF, 2014b

Figure 1: The development of Tanzanian cashew nut production.

of processed cashew nuts. If we take in consideration that in the monitored time period the average unit price of raw nuts was much lower in comparison to that of processed nuts (for details see Table 3). We can see that for its raw nuts exports Tanzania got cc 702 mil. USD for the whole analyzed time period. On the other hand if 100% of the raw nut trade were converted into processed nuts trade the export value would have reached 992 mil. USD in total. In this case it is also necessary to take into account the impact of the side effects of the processing activities. These side effects are because the processing process is accompanied by the production of by-products such as Cashew nutshell liquid (CNSL) and cashew shells. Both these by-products can also be traded internationally. The expected volume of by-products is calculated in Table 5. Therefore if we take into consideration not only trade in processed nuts, but also the trade in CNSL (estimated export value cc 84 mil. USD) and cashew shell (estimated export value cc 23 mil. USD), the final positive impact on Tanzanian export is not only equal to the difference between raw and processed nuts export value (cc 290 mil. USD), but the final positive impact is 397 mil. USD for the whole analyzed time period. It is the inability of Tanzania to increase its processing capacities which has resulted in huge economic loses.

	Raw Cashew nuts export value in USD	Processed Cashew nuts export value in USD	Raw Cashew nuts export quantity in kg	Raw cashew Unit value USD/kg	Processed Cashew nuts export quantity in kg	Processed Cashew Unit value USD/kg	Inter annual growth rate of raw cashew nuts unit value in USD/kg	Inter annual growth rate of processed cashew nuts unit value in USD/kg
2005	39 230 276	6 548 534	50 565 466	0.776	1 739 636	3.764		
2006	35 023 672	14 876 949	55 064 832	0.636	3 821 512	3.893	0.820	1.034
2007	5 189 570	22 241 148	8 860 620	0.586	5 980 826	3.719	0.921	0.955
2008	42 871 000	26 503 195	52 742 661	0.813	7 724 955	3.431	1.388	0.923
2009	68 379 973	21 845 070	95 576 751	0.715	4 874 088	4.482	0.880	1.306
2010	98 603 277	26 541 421	102 706 979	0.960	6 675 534	3.976	1.342	0.887
2011	105 699 286	17 459 241	99 425 279	1.063	3 791 847	4.604	1.107	1.158
2012	142 293 971	19 041 867	130 882 422	1.087	3 355 052	5.676	1.023	1.233
2013	164 904 531	23 269 272	150 882 283	1.093	3 821 482	6.089	1.005	1.073
Average value	78 021 728	19 814 077	82 967 477	0.859	4 642 770	4.404	1.044	1.062
GEOMEN - inter annual growth rate	1.1966	1.1717	Min	0.586	Min	3.431	GEOMEAN	
			Max	1.093	Max	6.089		
			Standard dev.	0.198	Standard dev.	0.920		

Source: UNIDO 2013; UN Comtrade, 2014; FAOSTAT 2014; own calculations 2014

Table 3: Selected characteristics of Tanzanian cashew nuts export activities.

	Raw nuts - export quantity in kg	Alternative Processed Cashew nuts production (all exported raw production is converted into processed one) in kg	Alternative exported value in USD	Real value coming from actual raw cashew export in USD	Difference between actual raw nut export value and hypothetic export value of processed nuts in USD	Additional income coming from CNLS export in USD	Additional income from cashew shell trade in USD	Final added value positive effect in USD
2005	50 565 466	14 039 869	52 850 458	39 230 276	13 620 182	5 676 275	1 538 901	20 835 359
2006	55 064 832	15 289 151	59 519 875	35 023 672	24 496 203	6 181 356	1 675 834	32 353 393
2007	8 860 620	2 460 216	9 148 906	5 189 570	3 959 336	994 657	269 663	5 223 657
2008	52 742 661	14 644 383	50 242 745	42 871 000	7 371 745	5 920 678	1 605 162	14 897 585
2009	95 576 751	26 537 579	118 938 206	68 379 973	50 558 233	10 729 060	2 908 767	64 196 061
2010	102 706 979	28 517 339	113 382 788	98 603 277	14 779 511	11 529 471	3 125 768	29 434 750
2011	99 425 279	27 606 151	127 110 195	105 699 286	21 410 909	11 161 081	3 025 893	35 597 883
2012	130 882 422	36 340 456	206 253 173	142 293 971	63 959 202	14 692 333	3 983 255	82 634 790
2013	150 882 283	41 893 562	255 092 840	164 904 531	90 188 309	16 937 436	4 591 927	111 717 673
Total	746 707 293	207 328 706	992 539 186	702 195 556	290 343 630	83 822 348	22 725 170	396 891 148

Source: UNIDO 2013; UN Comtrade, 2014; FAOSTAT 2014; own calculations 2014

Table 4: Simulation - raw cashew trade vs. processed cashew trade: 100% of raw cashew nuts is processed and then exported.

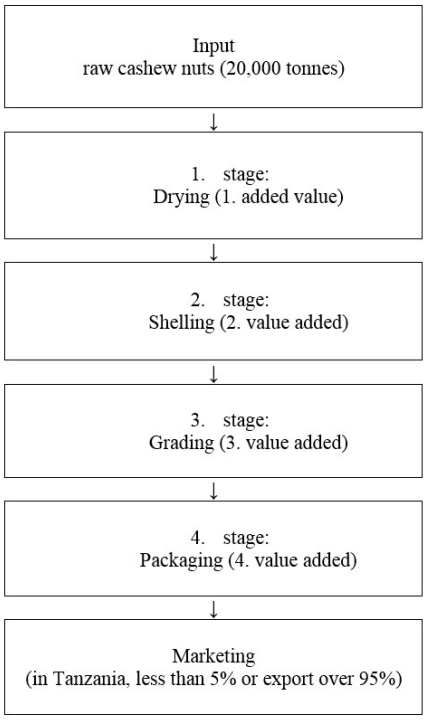
	CNLS production in kg	Shell production for feed stuff in kg
2005	12 613 945	25 227 890
2006	13 736 346	27 472 693
2007	2 210 350	4 420 700
2008	13 157 063	26 314 126
2009	23 842 357	47 684 713
2010	25 621 047	51 242 094
2011	24 802 401	49 604 803
2012	32 649 628	65 299 256
2013	37 638 747	75 277 495
Total	186 271 884	372 543 769

Source: UNIDO 2013; UN Comtrade, 2014; FAOSTAT 2014; own calculations 2014

Table 5: The volume of by-product production related to cashew nuts processing.

Plan for future cashew trade added value development/improvement

On the basis of the research activities undertaken and field survey individual steps related to cashew nuts processing activities/ added value growth were identified. The value chain for cashew nuts in Tanzania contains several operations as shown in Figure 2. Nowadays the processing capacity in Tanzania is about 20 000 tonnes of raw nuts. However that volume is equal to only 15% of the available production volume and on average is used for less than 70%. The processing capacity related to export activities is very important for Tanzania. Over 95% of the available production is exported and less than 5% of available domestic cashew production is sold on the Tanzanian domestic market. Tanzania sends the majority of its cashew exports to countries in Southeast Asia – especially India. Those countries afterwards receive the majority of the income from cashew processing business. Although Tanzania is a key producer its share of the final retail price is marginal. To improve the current situation UNIDO together with other foreign experts have proposed a plan for improving the Tanzanian cashew nut business. The plan is based on the identification of individual added value operations and their impact on the final price. The next step is a transformation plan focused on encouraging the growth of the volume of processed exports.



Source: UNIDO, 2013

Figure 2: Value chain operations.

On the base of field research conducted by UNIDO, the value added at the individual steps was identified (see Table 6). The results are as follows: 1 tonne of raw cashew nuts from the producer to manufacturer amounts to 1000 USD. This is the value of cultivation and harvesting. The cost estimate for growing cashew nuts is put at 500 USD and harvesting at 500. Farmers harvest the crop often on their own, as they are often too poor to hire outside labour. The own processing process represents about 369 USD (including fixed cost, variable costs and profit margin) per one tonne of raw cashew nuts. The result of that added value process is the fact that while one kg of raw nuts is exported for cc 1 USD, one kg of processed nuts can be exported for more than 6 USD (from one tonne of raw nuts it is possible to get between 220 - 350 kg of processed nuts). If we analyse the value added of individual steps – the most valuable are shelling and peeling. It is possible to see that although the individual steps are not cost intensive their impact on final prices is significant. The major advantage of Tanzania is the very cheap labour force available. It is cheap labour which provides Tanzania with the significant competitive advantage over other producers (Nuran, Zabibu, 2014).

Steps of value addition (1 tonne of raw cashew nuts)		TSh	1USD ± 1700 TSh
Growing (incl. use of pesticides etc.)		850 000	500
Harvesting		850 000	500
Grading of raw nuts	12 workers x 900 TSh	12 580	7.4
Boling and cooling	3 workers x 2 800 TSh	9 860	5.8
Shelling of raw nuts		257 210	151.3
Drying	2 days x 3 workers x 5 700 TSh per day	39 440	23.2
Peeling		131 240	77.2
Grading of kernels	2 days x 3 workers x 2 800 TSh per day	19 720	11.6
Roasting	2 days x 3 workers x 2 800 TSh per day	19 720	11.6
Packaging		98 430	57.9
Marketing costs		39 440	23.2
TOTAL		**2 327 640**	**1 369.0**

Note: TSh – Tanzanian Shilling
Source data: UNIDO (2011b) and own calculations, 2014

Table 6: Source data for value chain of the commodity cashew nuts in Tanzania.

Tanzania cashew nuts export - transformation plan

A simulation of the development of the cashew sector in Tanzania to the year 2030 was carried out. This consisted of a 5% increase (this increase is fully in compliance with Tanzanian agricultural sector development and abilities) of processed tonnes of cashew nuts in Tanzania per year (lowering the export of raw cashews) and 5% increase per year in the evaluation of particular steps in the value chain (the real growth of the value of processed cashew unit price is about 6%). Table 8 provides an overview of the development of added value related to the processing of one tonne of raw cashew nuts. Table 9 provides an overview related to the expected development of the added value in future years. It is possible to see the impact of the structural transformation of exports (the growth of the export of processed nuts) on cashew exports would be significant. While the current added value coming from trade in cashew nuts is about 7 mil. USD and the share of processed nuts (the volume of nuts used for processing) is less than 15% of total production, in 2030 it is expected that the volume of processed nuts in total nut production will have risen to be about 30% and the realized added value coming from trade in processed nuts will reach almost 39 mil. USD. Those 39 mil. USD represents additional income coming to the Tanzanian economy. The proposed plan represents additional export incomes for Tanzania in value of 344 985 842 USD (for the whole analysed time period). In fact the value of export incomes will be even higher because it is also possible to expect the growth of production and especially export of the side-products related to cashew nuts processing activity (CNSL and cashew shells for feeding). The proposed plan does not only have an impact on the value of exports, but it is also possible to expect a significant impact on the number of people working in the agricultural and the food processing sectors. The transformation plan, if it is undertaken has the potential to generate several thousand new jobs as well as having the potential to increase the income of Tanzanian farmers.

Year	Processed tonnes of cashew	Year	Processed tonnes of cashew
2013	20 000	**2022**	31 026.6
2014	21 000	**2023**	32 577.9
2015	22 050	**2024**	34 206.8
2016	23 152,5	**2025**	35 917.1
2017	24 310.1	**2026**	37 713
2018	25 525.6	**2027**	39 598.6
2019	26 801.9	**2028**	41 578.6
2020	28 142	**2029**	43 657.5
2021	29 549.1	**2030**	45 8404

Source: own calculations based on UNIDO estimations, 2014

Table 7: The simulated development in the cashew sector in Tanzania up to the year 2030.

Value added in the step (USD)	Grading of raw nuts	Boiling and cooling	Shelling of raw nuts	Drying	Peeling	Grading of kernels	Roasting	Packaging	Marketing costs	TOTAL
2013	7.4	5.8	151.3	23.2	77.2	11.6	11.6	57.9	23.2	369.0
2014	7.8	6.1	158.8	24.3	81.0	12.2	12.2	60.8	24.3	387.4
2015	8.2	6.4	166.8	25.5	85.1	12.8	12.8	63.8	25.5	406.8
2016	8.6	6.7	175.1	26.8	89.3	13.4	13.4	67.0	26.8	427.1
2017	9.0	7.0	183.9	28.1	93.8	14.1	14.1	70.4	28.1	448.5
2018	9.5	7.4	193.1	29.5	98.5	14.8	14.8	73.9	29.5	470.9
2019	9.9	7.8	202.7	31.0	103.4	15.5	15.5	77.6	31.0	494.5
2020	10.4	8.1	212.8	32.6	108.6	16.3	16.3	81.4	32.6	519.2
2021	10.9	8.6	223.5	34.2	114.0	17.1	17.1	85.5	34.2	545.1
2022	11.5	9.0	234.7	35.9	119.7	18.0	18.0	89.8	35.9	572.4
2023	12.1	9.4	246.4	37.7	125.7	18.9	18.9	94.3	37.7	601.0
2024	12.7	9.9	258.7	39.6	132.0	19.8	19.8	99.0	39.6	631.1
2025	13.3	10.4	271.6	41.6	138.6	20.8	20.8	103.9	41.6	662.6
2026	14.0	10.9	285.2	43.7	145.5	21.8	21.8	109.1	43.7	695.8
2027	14.7	11.5	299.5	45.8	152.8	22.9	22.9	114.6	45.8	730.5
2028	15.4	12.0	314.5	48.1	160.4	24.1	24.1	120.3	48.1	767.1
2029	16.2	12.6	330.2	50.5	168.5	25.3	25.3	126.3	50.5	805.4
2030	17.0	13.3	346.7	53.1	176.9	26.5	26.5	132.7	53.1	845.7

Source: own calculations based on UNIDO estimations, 2014

Table 8: The expected added value development related to one tonne of processed cashew nuts.

Years	Predicted Added value in USD
2013	7 380 000
2014	8 135 400
2015	8 969 940
2016	9 888 433
2017	10 903 091
2018	12 020 020
2019	13 253 546
2020	14 611 331
2021	16 107 219
2022	17 759 605
2023	19 579 313
2024	21 587 903
2025	23 798 688
2026	26 240 693
2027	28 926 801
2028	31 894 916
2029	35 161 744
2030	38 767 198

Source: own calculations based on UNIDO estimations, 2014

Table 9: Prediction of Value added from all the tonnes of processed cashew nuts in Tanzania in USD.

Conclusion

Further to the philosophy of 3ADI, the cashew nut case study in Tanzania particularly shows how important an indicator the value added chain is. The dominant factor in the value added chain is the inclusion of new technology selected in the manner that one is able to increase the value of a particular commodity and in particular cases for several commodities. As we can see from the cashew nut results, particularly in the field of the harvest and postharvest processes, the application of new technology and processes plays an irreplaceable role in the value added chain. Along with the inclusion of the proper technological upgrade, an upgrade and development in crop logistics is crucial. The value addition for Cashew nuts can take two main directions. The inclusion of new technology should be focused either on the improvement of yields from existing resources (a decrease of production and processing losses), or an increase of production. Considering the Tanzanian production scheme, in both cases the maximum potential is still not reached so yield improvement should be considered as the best approach.

The largest gaps in the value chain are closely linked to the general economic situation as well as the geographic location of farmers - the possibilities to improve the current situation exist especially in the following areas: production technology optimization, product handling and logistics including accessibility of inputs for producers. The value addition improvement in both cases is closely linked to the stability and predictability of the economic and political

environment, encouraging upgraded investment and the development of processing facilities. This development of processing facilities therefore allows various contract farming schemes, improving the resourcefulness of the prime producers.

On the basis of the results of the conducted analyses – the transformation of the structure of Tanzanian cashew exports is needed. Exports based on raw production represent a significant barrier for the transformation of the Tanzanian economy. Although Tanzania is a significant raw cashew nuts exporter, its share of the processed cashew nuts market is marginal. The full potential of Tanzania is not being realized. Every year Tanzania is losing 30 – 40 mil. USD as a result of its inability to export processed cashew nuts and by-products. The transformation process of the Tanzanian export structure together with added value growth are necessary for the future stability of Tanzania and for the fixing or even improving its export position and revealed competitive advantage in relation to main competitors. It is also necessary for Tanzania to improve its political and economy environment, to make them more stable. The transformation of the Tanzanian economy, including the agricultural sector's production and trade, is not possible without the significant participation of foreign direct investment and also government support activities. The 3ADI programme in this case represents a valuable activity, providing support to the Tanzanian government in the area of decision making related to its national economic transformation.

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