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WARESTA HORTICULTURE INDEX 2017

Trends 2013 - 2017

for Northern Mozambique

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"HORTI-SEMPRE - WARESTA HORTICULTURE INDEX 2017"

Horti-sempre "*WARESTA Horticulture Index*" is the most complete survey of the Horticultural market in Northern Mozambique. The "WARESTA Index 2017" is built on data collected daily by SDC funded Horti-sempre Project in collaboration with AGROWAM (the project's created Association of Horticultural Wholesalers of Nampula) at WARESTA wholesale market in Nampula, the biggest wholesale market for horticultural products in Northern Mozambique.

The WARESTA INDEX provides an insight on:

- The Traded Volumes (by crop), as indicator of the consumption (demand) of horticultural products in quantities in Northern Mozambique;
- Origin of the horticultural products, in which districts they have been produced / they come from drawing a distinction between what is produced locally "inside the Nacala Corridor" (geographical focus of SDC Funded Horti-sempre Project), and what is "imported" from "Outside the Corridor" either from other provinces (Central and Southern Mozambique), or from foreign countries (i.e. South Africa, China, etc.);
- The horticultural profile of the districts (which crops districts produce);
- Seasonality of the traded volumes;
- Price trends at wholesale level.

The WARESTA wholesale market, on which the WAESTA INDEX is built, covers an estimated 20% of the total volumes traded in Northern Mozambique and has a different degree of coverage/reliability depending on the crops and the characteristics of the districts.

In general, WARESTA INDEX has an above-average / higher coverage and is a highly reliable indicator for:

- Crops mostly consumed in urban centers (although produced in rural districts, such as for instance Tomato, Pepper, and Carrots);
- Crops such as Onions, Potatoes and Garlic mostly produced as "cash-crops" to be traded;
- District / Areas that mostly procure vegetables through Wholesale Markets in the hub of Nampula (WARESTA wholesale market).

On the other hand, WARESTA INDEX has a lower coverage and reliability for:

- Crops, such as Lettuce and Kale, that are frequently commercialized directly from the producers to the retailers (or vendors), bypassing wholesalers;
- Crops that have a high incidence of "local-consumption" and low surpluses to be traded (i.e. Cabbage in Ribaue cluster) whose production does not reach the WARESTA Wholesale Market being consumed locally;
- Districts / Areas that have developed their own supply chain alternative to the WARESTA Wholesale market (i.e. Nacala).

Warning: The *WARESTA INDEX* is not "the market" but a sample of the market, and a good indicator of the trends that are taking place in the market. Therefore, it should be used looking at trends, tendencies, percentages, rather than to "absolute values".

The WARESTA INDEX (published by Swisscontact Horti-sempre since 2013) has proved itself a powerful tool for Territory Development (clusters and crops promotion in specific areas), and for strategic planning being a reliable indicator on which crops are most likely to be competitive in a specific districts / area.

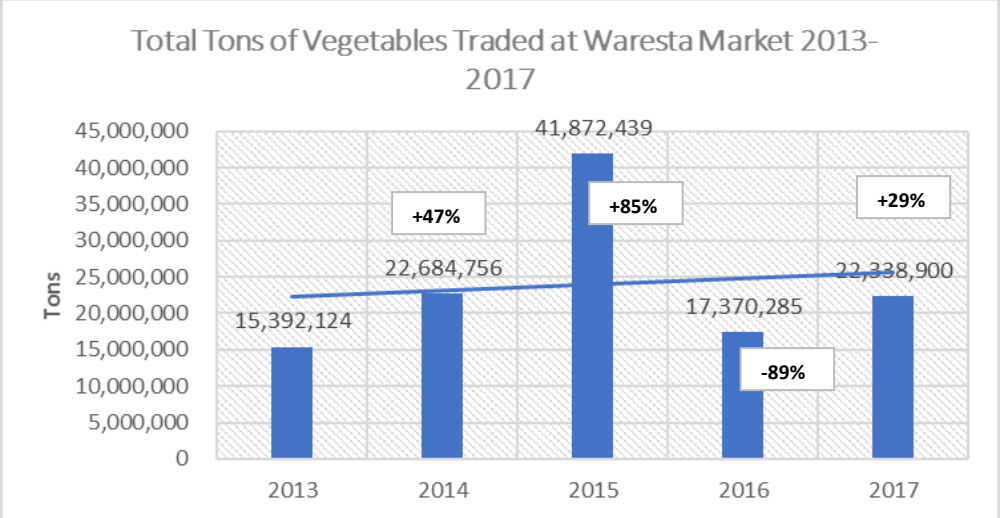
1. Main Trends Total Volumes Traded 2017 vs. 2016 and 2017-2013 (Traded Volumes as Proxy Indicator of Consumption)

The final objective of Horti-sempre is to promote Horticultural consumption and production in the Nacala Corridor in order to enhance the nutritional diet of its inhabitants (currently skewed on cereals and tubers) and generate additional income creation opportunities for smallholders through the selling of vegetables in the market.
Horticulture plays a vital role as cash crops for smallholders in Northern Mozambique being an "intensive crop" (possibility of high quantity production even in the small plots typical of Northern Mozambique), labor intensive, with short cycles of production (thus requiring limited working capital) and requiring small investment due to the affordable costs of seeds and the possibility obtaining sizeable yields even in a regime of "low inputs production" making little use of chemical fertilizers and defensives..

GENERAL TRENDS 2013-2017

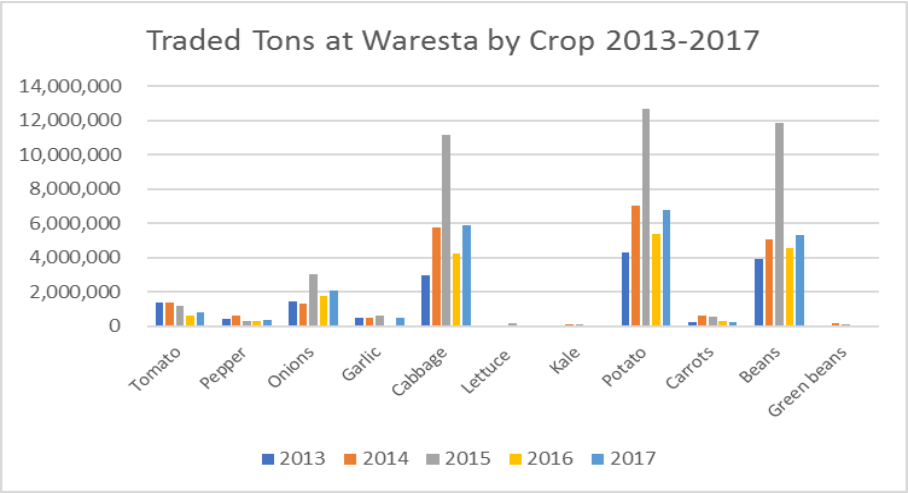
- The consumption of traded vegetables in the Nacala Corridor is partially recovering (see Fig.1) from the deep fall experienced in the year 2016 (-89% vs. 2015):
  - ✓ Showing a growth of +29% in volumes 2017 vs. 2016;
  - ✓ Recovering the level of volumes registered in 2014, but still far away from the peaks recorded in the year 2015;
  - ✓ Providing clear evidence, the consumption of vegetables is strictly correlated with purchasing power of consumers, and therefore severely hampered in period of economic crisis such the one experienced in Mozambique since late 2015 (and still underway).

Figure 1: Traded Volumes (Tons) at the WARESTA Wholesale Market 2013 - 2017



Source: Horti-sempre AGROWAM data

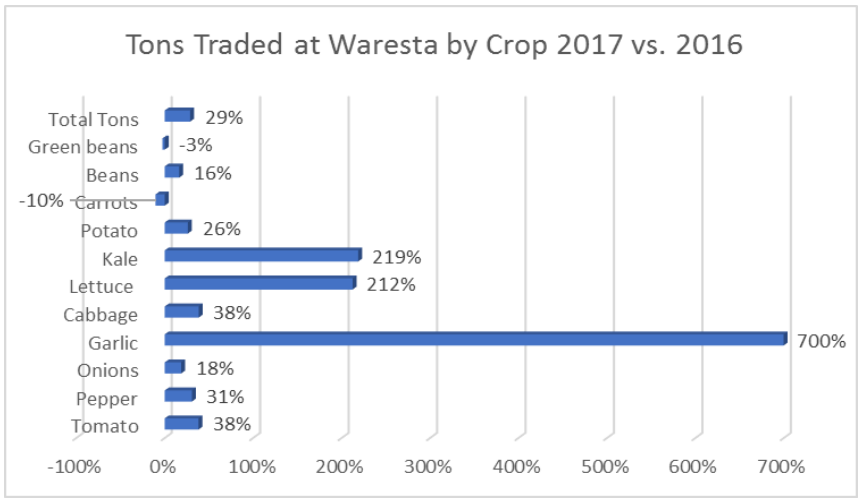
Figure 2: Traded Volumes at the WARESTA Wholesale Market by Crop 2013 - 2017



Source: Horti-sempre AGROWAM data

SHORT TERM TREND 2017 VS. 2016 MAIN FINDINGS

Figure 3: Traded Volumes at the WARESTA Wholesale Market by Crop 2017 vs. 2016

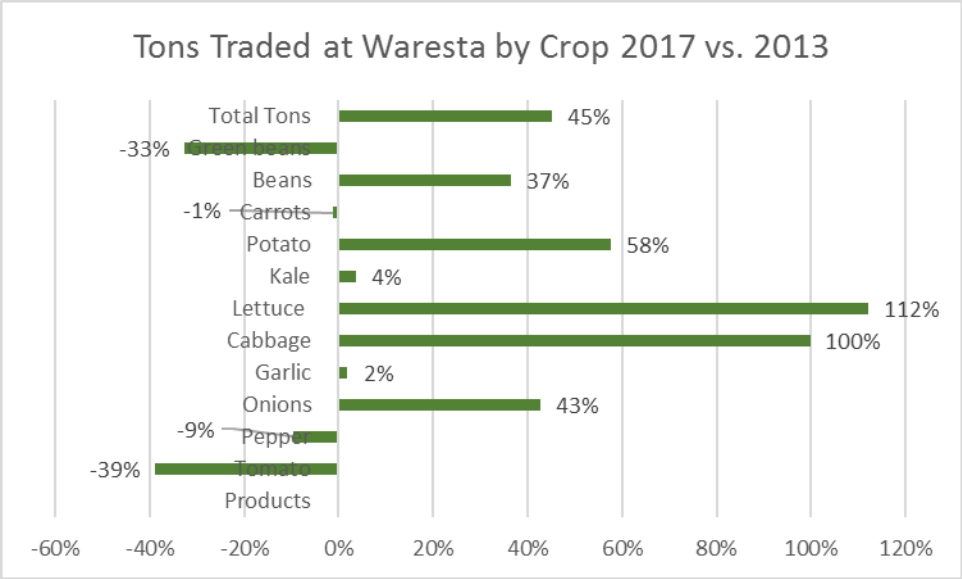


Source: Horti-sempre AGROWAM data

- In 2017, most of the crops have registered an increase vs. 2016. The fastest growing crops have been Garlic (+700%), Kale (+219%), and Lettuce (+212%);
- Tomato (+38%), Cabbage (+38%), Onions (+18%) Pepper (+31%), Potatoes (+26%), register an increase basically in line with market growth (+29%);
- Carrots (-10%) and Green beans (-3%) are the only crops showing a negative trend.

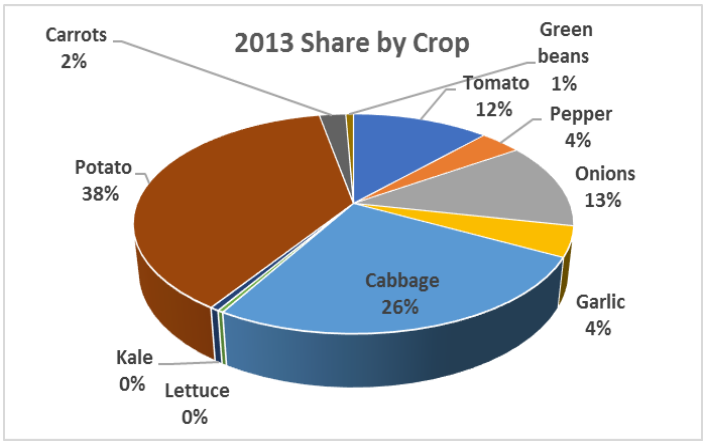
MEDIUM/LONG TERM TREND 2017 VS. 2013 MAIN FINDINGS

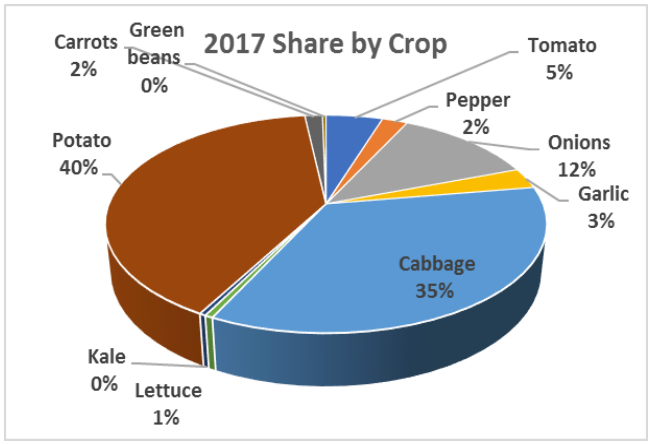
Figure 4: Traded Volumes at the WARESTA Wholesale Market by Crop – Year 2017 vs. 2013



Source: Horti-sempre AGROWAM data

Figure 5: Share of the Traded Volumes at the WARESTA Wholesale Market – % by Crop 2013 vs. 2017





Source: Horti-sempre AGROWAM data

- As a general trend, the crops that experienced the highest growth in the period 2013-2017 are those that are not used by consumers as “side-dishes” but those mostly used as meals and/or meals substitution or “complement” such lettuce, cabbage, potatoes, beans and onions used for dish-flavoring;

- In the period 2013 – 2017 the crops with the highest increase have been: Lettuce (+112%), Cabbage (+100%), Potato (+58%), Beans (+37%), and Onions (+43%);
- On the other hands, crops that heavily depend on "urban consumption" and used for side dishes, registered a negative trend: Tomato (-39%), Pepper (-9%), Carrots (-1%), probably due to an "urban consumption purchasing power" badly affected by an economic crisis affecting Mozambique since the end of 2015 and from which the country has not fully recovered yet;
- In the period 2013 and 2017 (Fig. 5) cabbage and potatoes have become more important crops increasing their shares on total traded vegetables in the Nacala Corridor. Cabbage share has soared from 26% in 2013 to 35% in 2017, and potato share from 38% in 2013 to 40% in 2017;
- On the other hand, tomato (from 12% in 2013 to 5% in 2017) as well as pepper (from 4% in 2013 to 2% in 2017) have lost shares, with onions basically being stable with a share around 12%-13% (Fig. 5).

VEGETABLES CONSUMPTION

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CONCLUSIONS & IMPLICATIONS FOR DEVELOPMENT PROJECTS AND HORTICULTURAL PLANNING

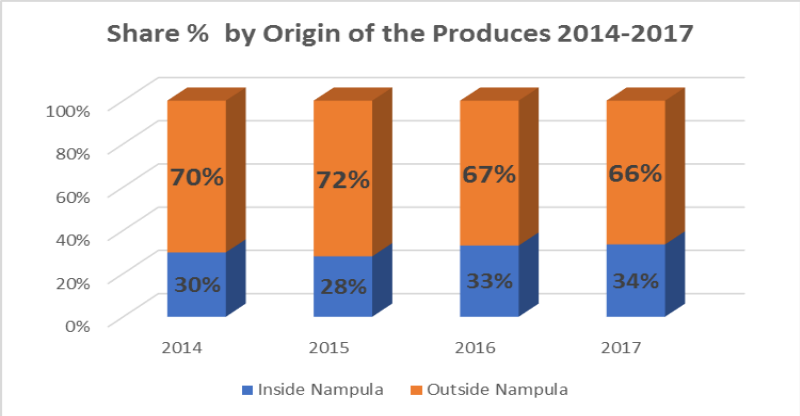
- In the period 2013-2017 the consumption of vegetables has increased by 45% in volumes in Northern Mozambique (using as indicator the WARESTA INDEX), however the market evolves at two speeds: fast growth for crops used in replacement of meal or as meals (potato, cabbage, lettuce, beans), and contraction for "premium" vegetables such as tomato, pepper, carrots used as "side dishes".
- The consumption of "side dishes" vegetables seems capped by the diminishing purchasing power of urban middle class whose appetite/demand for these vegetables has decreased considerably during the economic crisis started late 2015 beginning 2016.

2. Origin of the Produces 2013-2017 (Competitiveness of Local Production vs. Production from "Outside the Corridor of Nacala"

One of the paramount objectives of Horti-sempre Project is to increase local production (vegetables from inside the Nacala Corridor) vs. "Outside production" (production imported from other provinces of Central and Southern Mozambique, and from abroad (i.e. South Africa, China), in order to generate additional income creation for the producers of the Nacala Corridor and lower transportation costs making horticultural products less expensive thus more affordable to consumers.

ORIGIN OF THE PRODUCE SHARE OF "INSIDE THE CORRIDOR" VS. "OUTSIDE THE CORRIDOR"

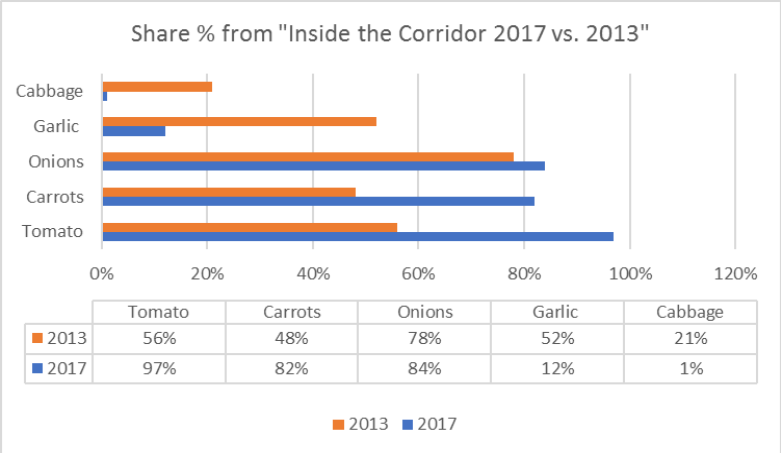
Figure 6: Total Traded Volumes by Origin (Inside and Outside the Nacala Corridor) 2014 - 2017



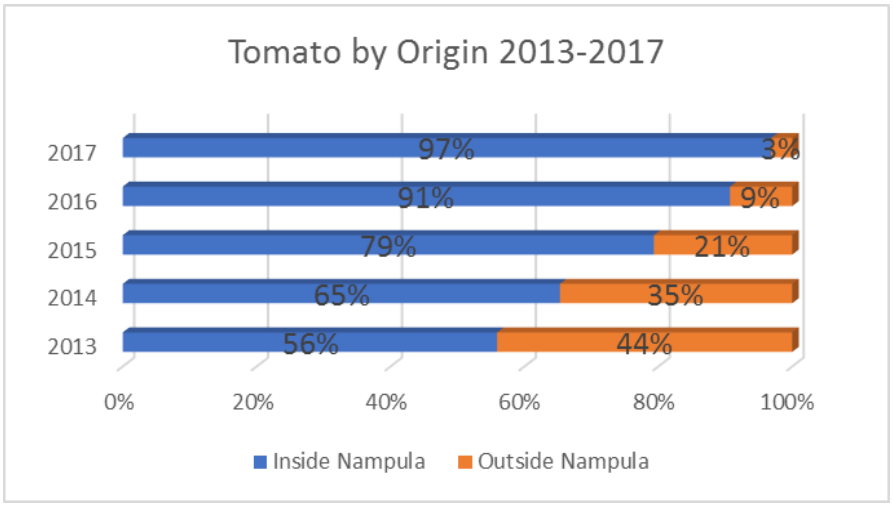
Source: Horti-sempre AGROWAM data

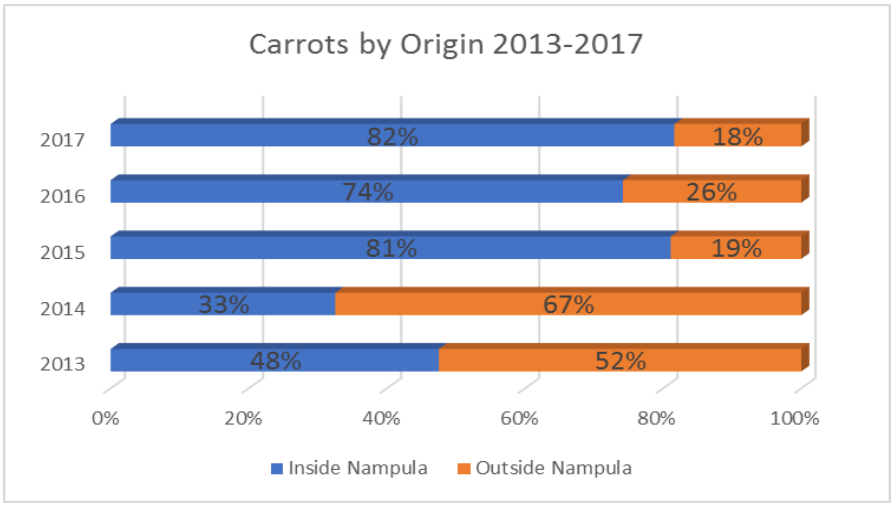
- The share of vegetables produced "Inside the Nacala Corridor" (as opposed to imports from "Outside the Corridor") has steadily progressed jumping from 30% in 2014 to 34% in 2017. (Fig. 6 above).

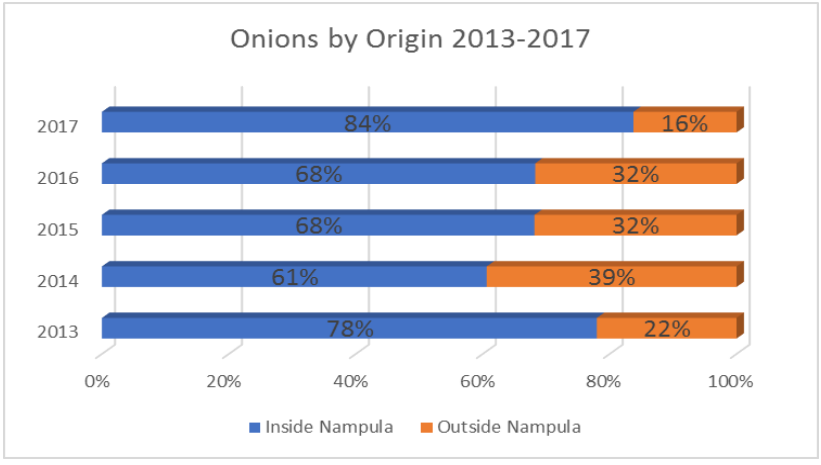
Figure 7: Total Traded Volumes by Origin by Crop 2013 - 2017



	Tomato	Carrots	Onions	Garlic	Cabbage
2013	56%	48%	78%	52%	21%
2017	97%	82%	84%	12%	1%

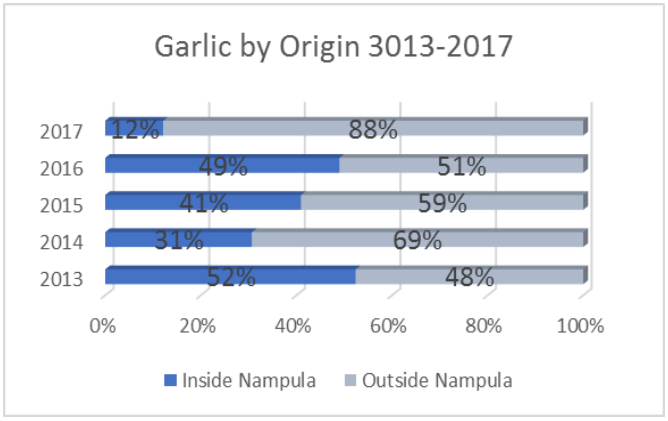


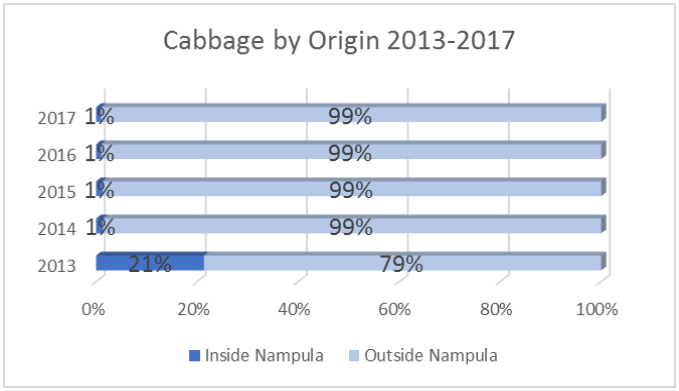




- In particular, during the years 2013-2017, the Nacala Corridor has become more competitive against import in **tomato** production (97% of the traded volumes in 2017 come from "inside the Corridor", against the 56% of 2013), **carrots** (82% of the traded volumes in 2017 come from "inside the Corridor", against the 48% of 2013), and **onions** (84% of the traded volumes in 2017 come from "inside the Corridor", against the 61% of 2014);

- On the other hand, the Nacala Corridor remains poorly competitive on the production of crops such as **cabbage** and **garlic** that are predominantly all imported from the "Outside the Corridor":





- **Lettuce** and **Pepper** continue to be produced 100% from "Inside the Nacala Corridor" (no changes between 2013-2017) due to their vey perishable nature that make production from "Outside the Corrido" uncompetitive.

- **Potatoes** on the contrary continue to be all imported from "Outside the Corridor", mostly from Angonia & Tsangano (no changes in the years 2013-2017).

2013 – 2017

100% PRODUCED "INSIDE THE CORRIDOR"

100% PRODUCED "OUTSIDE THE CORRIDOR"

ORIGIN

CONCLUSIONS & IMPLICATIONS FOR DEVELOPMENT PROJECTS AND HORTICULTURAL PLANNING

- The competitiveness of the Horticultural sector has increased in the Nacala Corridor during the years 2013-2017 (since the start of Horti-sempre Project) for the crops of **tomato**, **onions**, and **carrots.**
- For the years to come the best opportunities seem to lie with the crops of **garlic** and **cabbage** and **white onions** that are currently mostly imported from "Outside the Corridor" but could be produced "Inside the Corridor" creating additional income opportunities for local farmers and diversification.
- On the other hand, Angonia & Tsangano seem to have built a strong competitive advantage in potatoes production and trade, a gap difficult to close for clusters of "Inside the Nacala Corridor" whose know-how / expertise in potatoes production & trade seems rather limited.

3. Seasonality of the Production Overlook 2013-2017

(Increasing production in the "Out-of-season")

One of the paramount objectives of Horti-sempre Project is to reduce the seasonality of vegetables production in the Nacala Corridor that has been historically concentrated in the months May to August with limited supply (or reduced in the case of some crops) in the hot months of September to December and during the hot-rainy season from January to April.

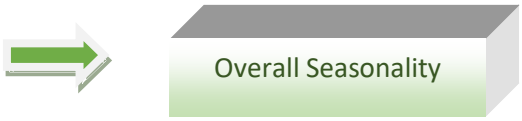
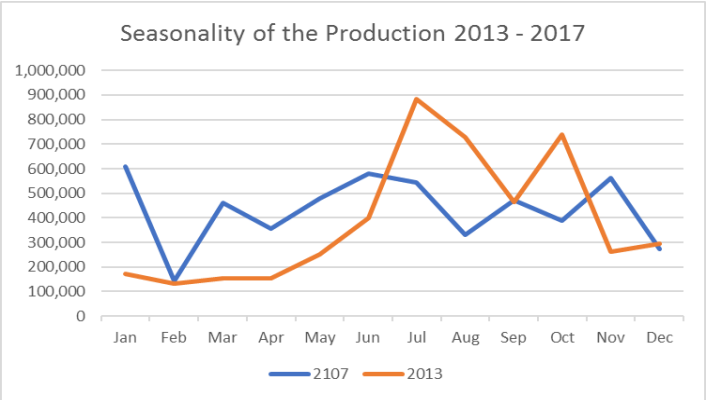
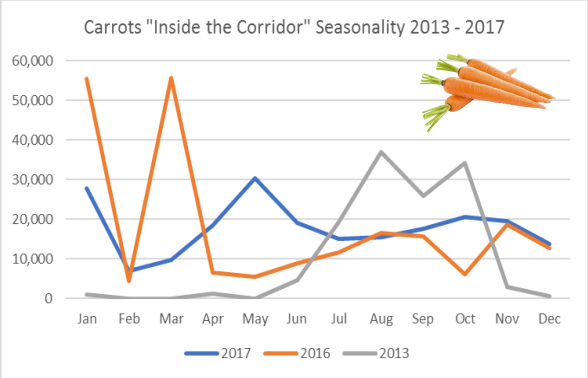


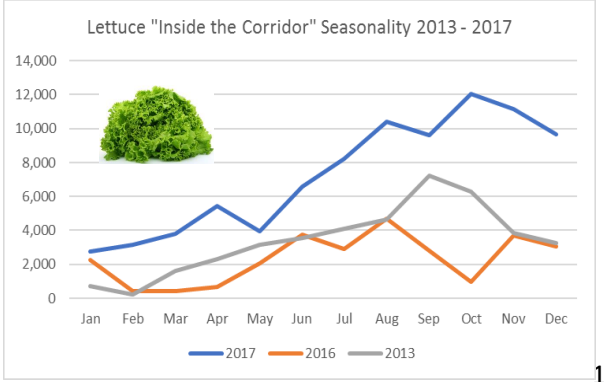
Figure 8: Seasonality of the Production "from Inside the Nacala Corridor" 2013 – 2017

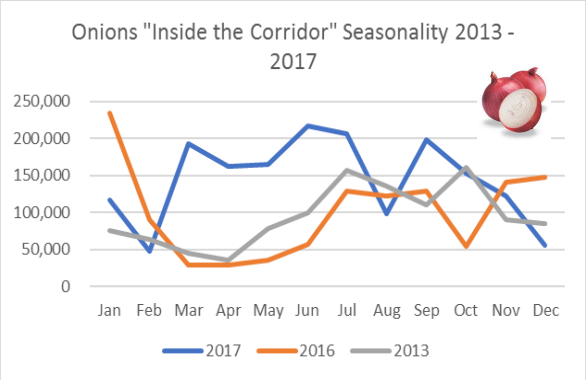


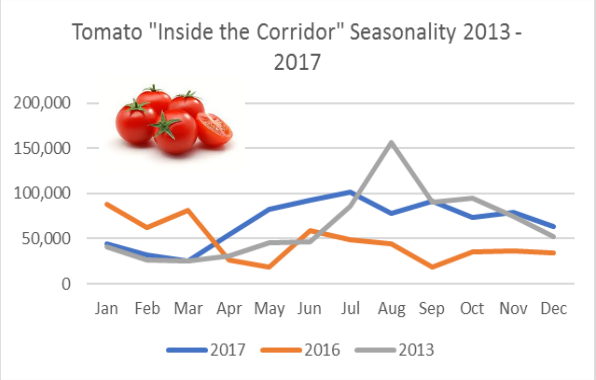
Source: Horti-sempre AGROWAM data

- The production of vegetables of Nacala Corridor has become less seasonal in the years 2013 – 2017 (Fig.8) with a significant increase in "out-of-season" as "early-season production" (months of March April), and in the hot and hot-rainy season (months from November to February).









- Best results in terms of deasonalization have been obtained in:
  - ✓ **Lettuce** and **Carrots** with significant increase in production in "early-season" (months February to April), and also "late-season" (months November to January);
  - ✓ **Onions** in "early-season" (months February to April);
  - ✓ And to a lesser extent for **Tomato** in "early-season" (month of April).

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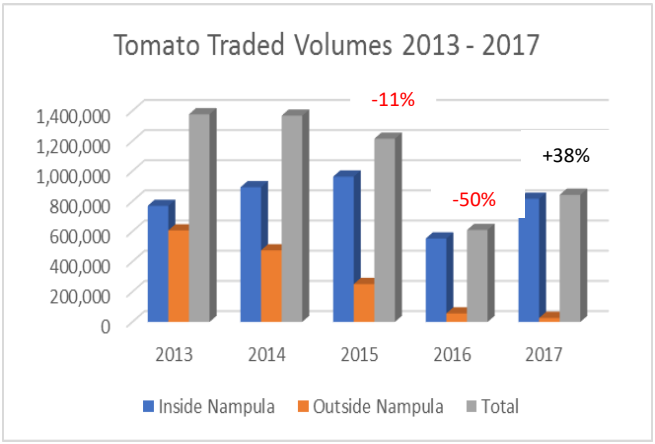
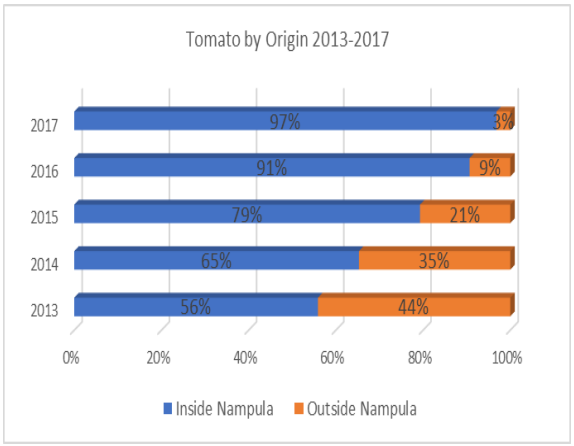
CONCLUSIONS & IMPLICATIONS FOR DEVELOPMENT PROJECTS AND HORTICULTURAL PLANNING

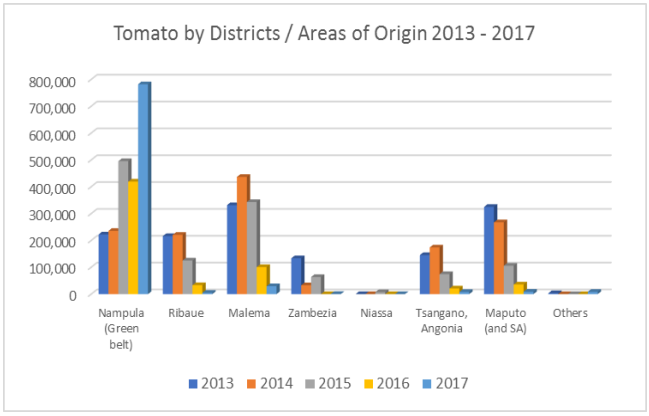
- The deseasonalization of vegetables production in the Nacala Corridor has significantly progressed in the years 2013 – 2017 and in particular in "early out-of-season" (February-May) and to a lesser extent in "late-season" production (November to January).
- Best results in terms of deseasonalization have been obtained with **lettuce**, **carrots**, and **pepper**, with some improvements (more limited) with **tomatoes.**
- The deseasonalization process started since 2013 also reflects Horti-sempre interventions supporting the introduction of tropical varieties (hot resistant), "early-varieties" (with shorter cycles of production), and new practices such as "scaling-of-the production", production of seedlings under tunnels and mini-tunnels, "high-beds" technique for rainy conditions.
- However, it is quite clear, further improvements for "out-of-season" production in the hot/rainy months from December to March will heavily depend on the dissemination of protected-cultivation (tunnels & mini-tunnels) that implies strong investments frequently not affordable to smallholders

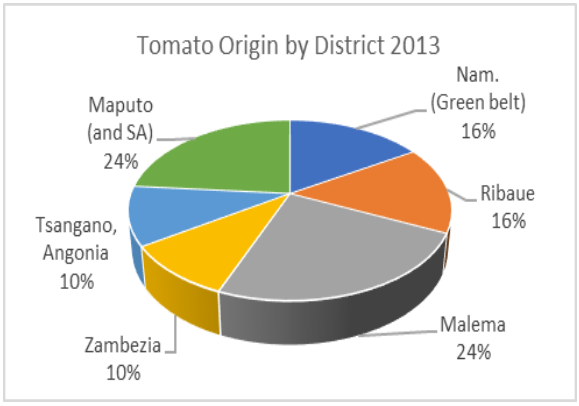
4. Crop Analysis Overlook 2013-2017

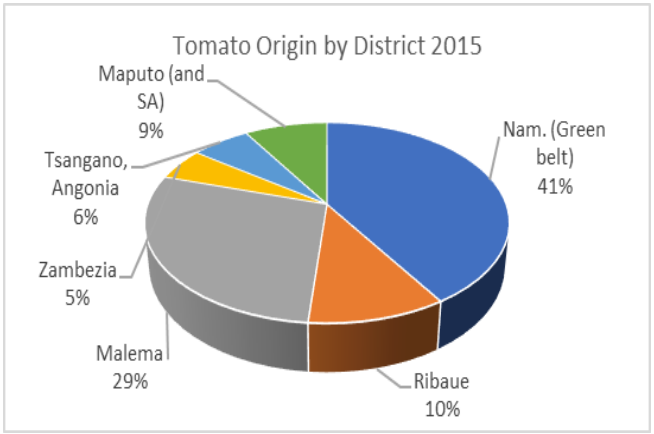
4.1 TOMATO

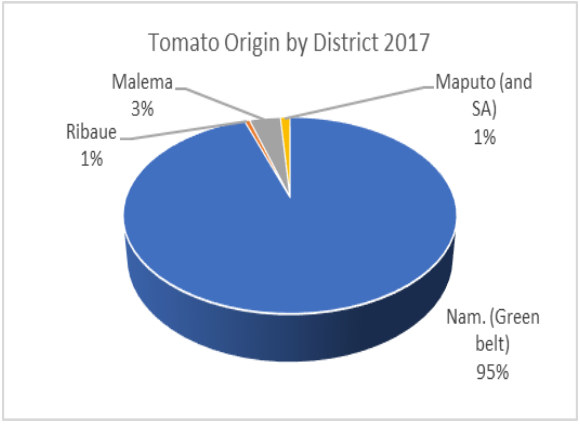






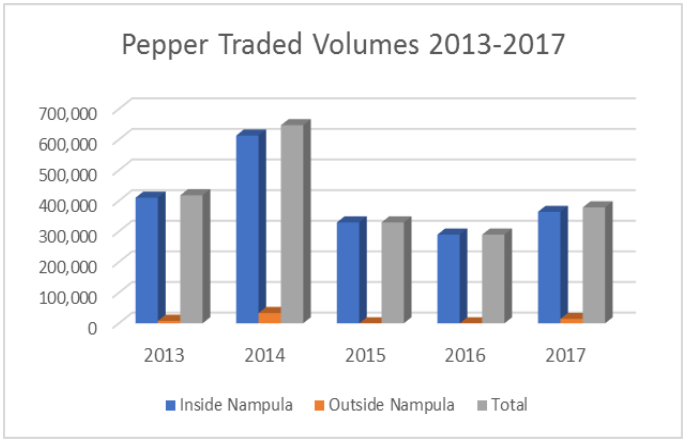


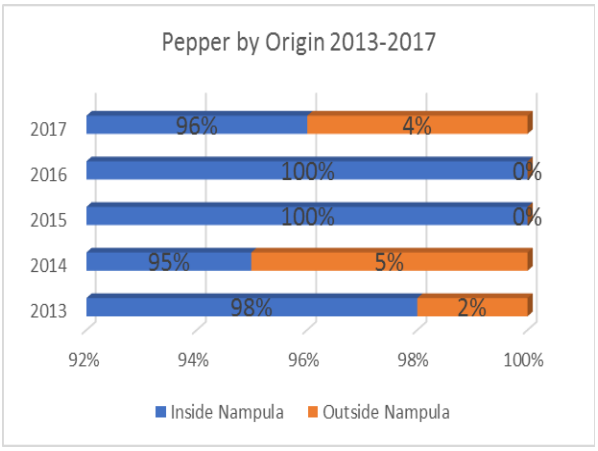


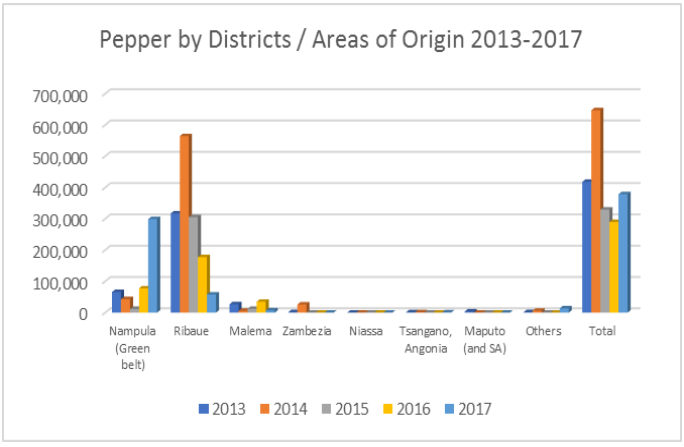


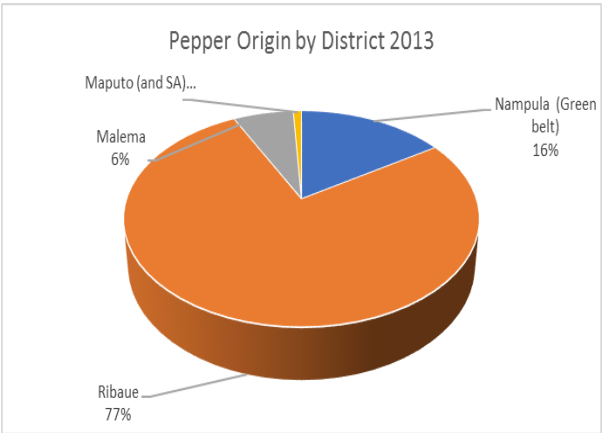
TOMATOES SUMMARY TRENDS	
Consumption	○ Partial recovery of the traded volumes / consumption in 2017 (+38% vs. 2016) but in the presence of a negative medium-long term trend (2017 -39% vs. 2013) confirming the fact tomato's consumption has been badly affected since late 2015 by an economic crisis that eroded purchasing power of the urban-middle class of the Nacala Corridor on which tomato consumption seems to depend.
"Inside-Outside the Corridor"	○ Imports (from "**Outside the Corridor**" have become less and less competitive over years 2013-2017. In 2017 almost, almost the entire supply of tomatoes, 97%, comes from "**inside the Corridor**" with only 3% from "Outside the Corridor".
Districts / Clusters	○ Almost the entire supply of tomatoes consumed in the Nacala Corridor (2017) is produced in **Nampula Green belt** that currently accounts for the delivery of 95% of the traded volumes of tomato in the Nacala Corridor. ○ Tomatoes supplier from **Zambezia**, **Malema**, and **Ribaue**, that historically accounted for 40-50% of the tomato production traded in the Nacala Corridor, have stooped producing tomato and/or have switched to different crops. ○ Similarly, imports from **Maputo** (and **South Africa**) that accounted for almost ¼ of the supply of tomatoes traded in the Nacala Corridor in 2013, have almost dried-up in 2017 probably because of rising costs in transportation, deterioration of the exchange rate (making imports from **South Africa** more expensive), and frequent disruption on the main artery connecting Southern with Northern Mozambique also negatively affecting the supply chain.

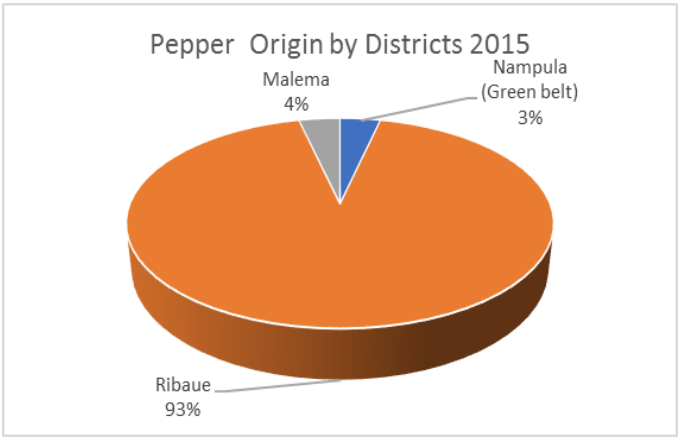
4.2 PEPPER

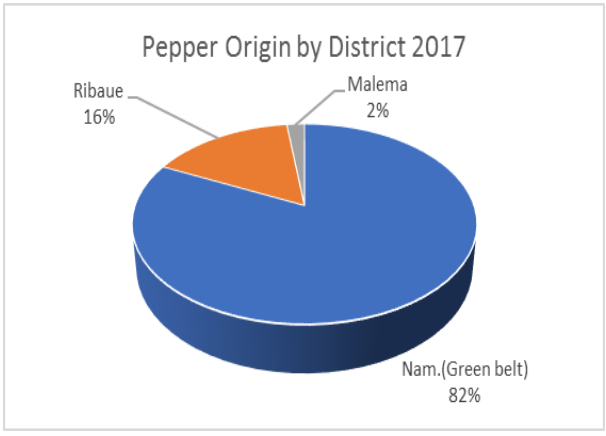

Pepper Traded Volumes 2013-2017
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
2013
2014
2015
2016
2017
Inside Nampula
Outside Nampula
Total


Pepper by Origin 2013-2017
2017
2016
2015
2014
2013
96%
4%
100%
0%
100%
0%
95%
5%
98%
2%
92%
94%
96%
98%
100%
Inside Nampula
Outside Nampula


Pepper by Districts / Areas of Origin 2013-2017
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Nampula (Green belt)
Ribaue
Malema
Zambezia
Niassa
Tsangano, Angonia
Maputo (and SA)
Others
Total
2013
2014
2015
2016
2017

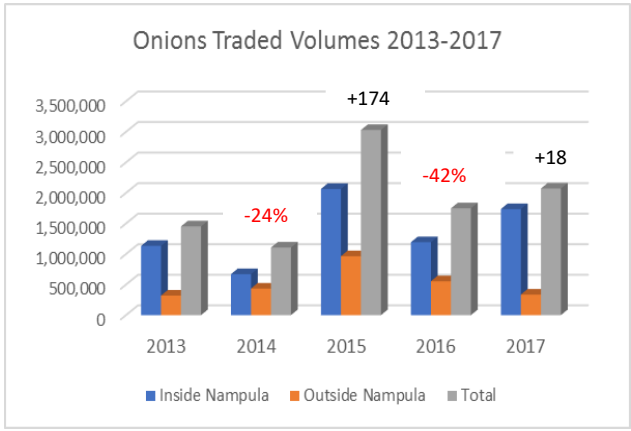

Pepper Origin by District 2013
Maputo (and SA)...
Nampula (Green belt)
16%
Malema
6%
Ribaue
77%

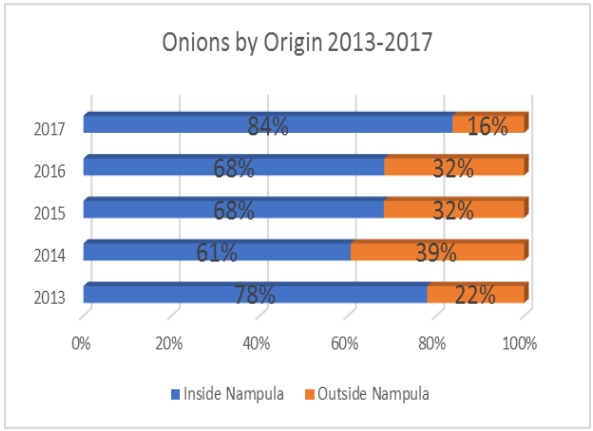

Pepper Origin by Districts 2015
Malema
4%
Nampula (Green belt)
3%
Ribaue
93%

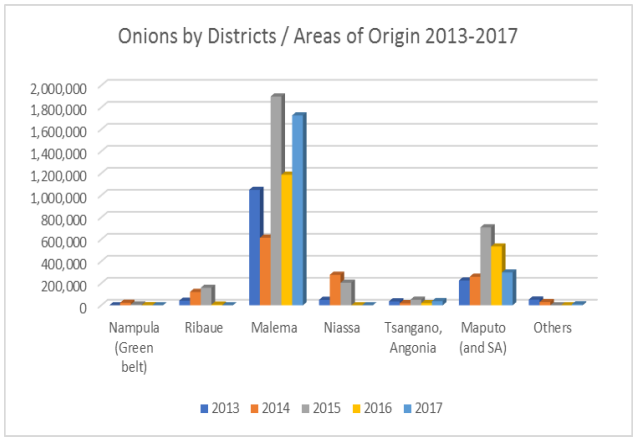

Pepper Origin by District 2017
Ribaue
16%
Malema
2%
Nam.(Green belt)
82%

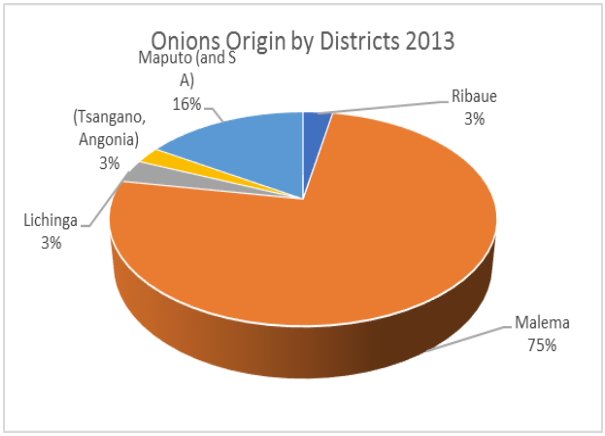
PEPPER SUMMARY TRENDS	
Consumption	○ Partial recovery of the traded volumes / consumption in 2017 (+31% vs. 2016) after the collapse of years 2015-2016 due to the economic crisis negatively affecting purchasing power of the urban middle-class. The medium-long term consumption trend is negative (2017 -9% vs. 2013).
"Inside-Outside the Corridor"	○ Basically, and historically, almost all the production comes from "**Intside the Corridor**" (from 95% to 100% during the year 2013-2017).
Districts / Clusters	○ A big change has taken place in 2017 (trend to be confirmed in the years to come) with **Ribaue** district (historically the most important producer of pepper) basically becoming a marginal supplier with production now concentrated in **Nampula Green belt** (82% share in 2017 vs. a share of only 3% in 2016).

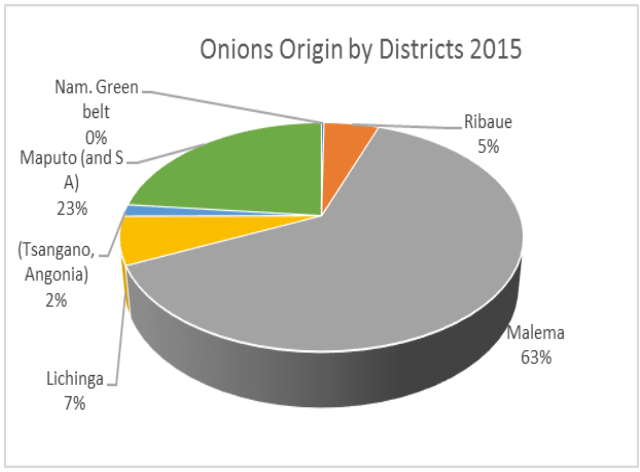
4.3 ONIONS

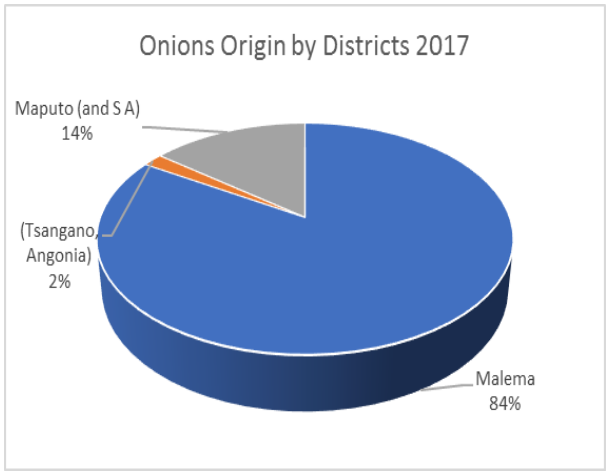

Onions Traded Volumes 2013-2017
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
+174
-24%
-42%
+18
2013
2014
2015
2016
2017
Inside Nampula
Outside Nampula
Total


Onions by Origin 2013-2017
2017
2016
2015
2014
2013
84%
16%
68%
32%
68%
32%
61%
39%
78%
22%
0%
20%
40%
60%
80%
100%
Inside Nampula
Outside Nampula


Onions by Districts / Areas of Origin 2013-2017
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Nampula (Green belt)
Ribaue
Malema
Niassa
Tsangano, Angonia
Maputo (and SA)
Others
2013
2014
2015
2016
2017

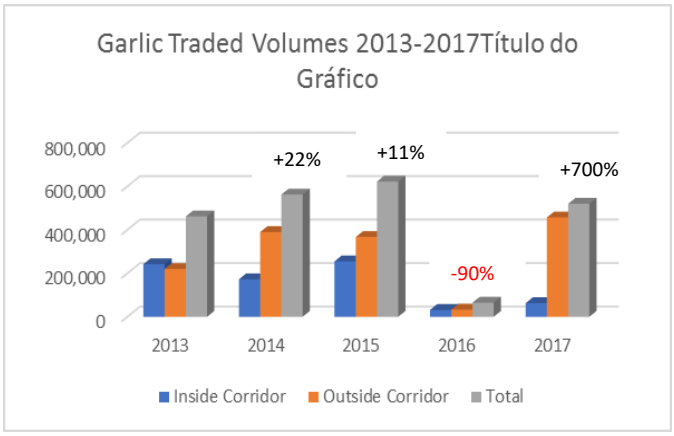

Onions Origin by Districts 2013
Maputo (and S A)
16%
Ribaue
3%
(Tsangano, Angonia)
3%
Lichinga
3%
Malema
75%

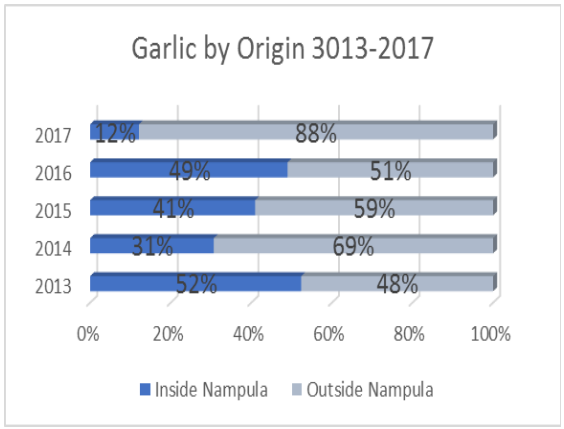

Onions Origin by Districts 2015
Nam. Green belt
0%
Ribaue
5%
Maputo (and S A)
23%
(Tsangano, Angonia)
2%
Malema
63%
Lichinga
7%

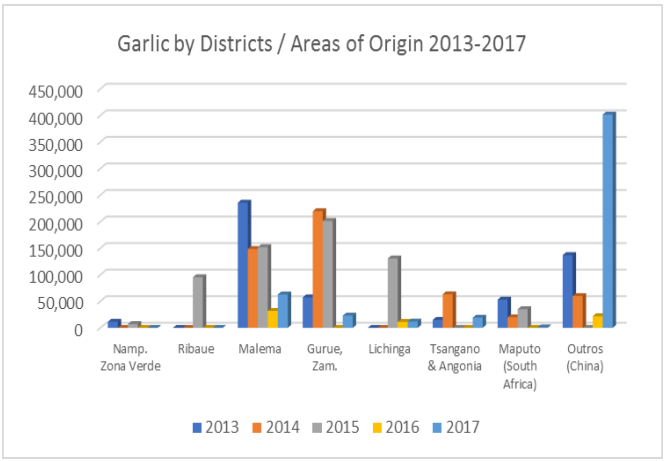

Onions Origin by Districts 2017
Maputo (and S A)
14%
(Tsangano, Angonia)
2%
Malema
84%

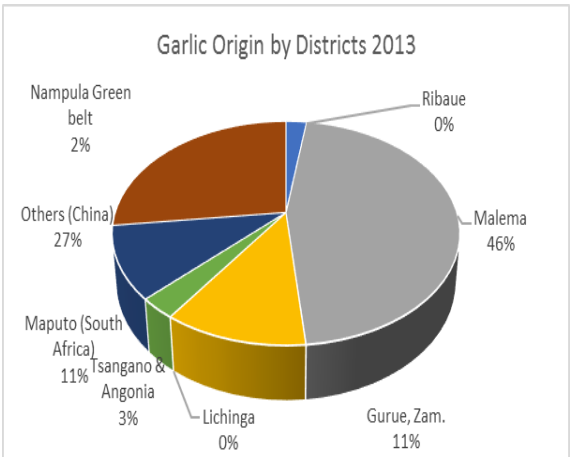
ONIONS SUMMARY TRENDS	
Consumption	○ Solid long-term growing trend with 2017 +43% vs. 2013, short-term onions grow below market average 2017 vs. 2016 (+18%)
"Inside-Outside the Corridor"	○ Clear signs of steady growing competitiveness of production from "Inside the Corridor" (84% share in 2017 vs. 68% in 2016)
Districts / Clusters	○ Strong / leading position of Malema (84% share in 2017 vs. 75% in 2013) that seems to focus again on onions after years of attempted diversification into tomato. ○ Strong reduction of imports from Maputo and South Africa since 2015 reflecting rising transportation costs due to higher fuel prices, disruption of the supply chain, and deterioration of the exchange rate Metical/Rand but also increased competitiveness of Malema on white onions (historically imported) and more de-seasonalized production.

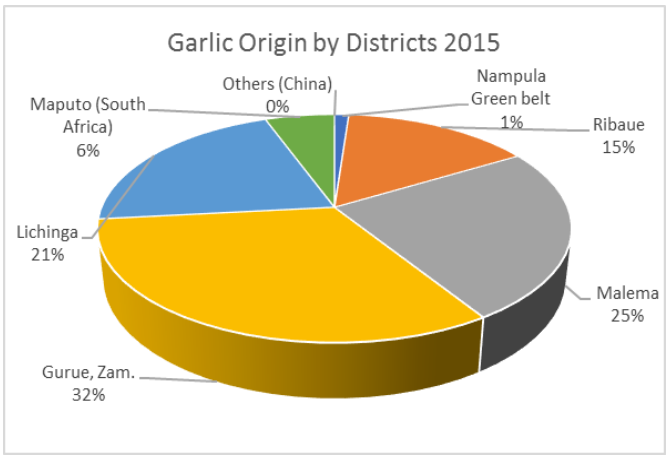
4.4 GARLIC

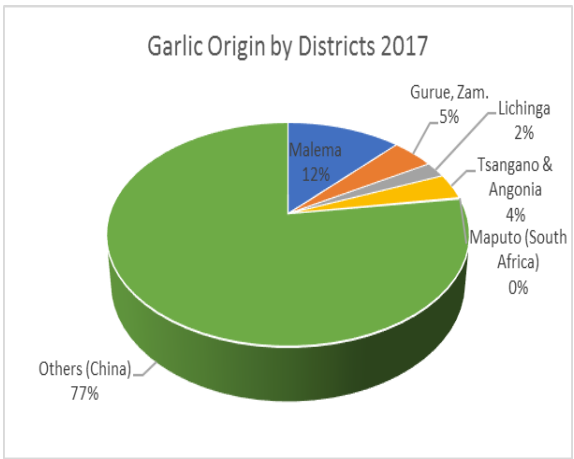

Garlic Traded Volumes 2013-2017Título do Gráfico
800,000
600,000
400,000
200,000
0
+22%
+11%
-90%
+700%
2013
2014
2015
2016
2017
Inside Corridor
Outside Corridor
Total


Garlic by Origin 3013-2017
2017
2016
2015
2014
2013
12%
88%
49%
51%
41%
59%
31%
69%
52%
48%
0%
20%
40%
60%
80%
100%
Inside Nampula
Outside Nampula


Garlic by Districts / Areas of Origin 2013-2017
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
Namp. Zona Verde
Ribaue
Malema
Gurue, Zam.
Lichinga
Tsangano & Angonia
Maputo (South Africa)
Outros (China)
2013
2014
2015
2016
2017

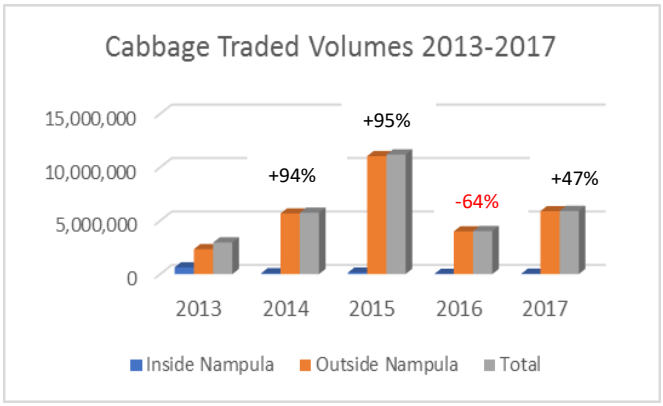

Garlic Origin by Districts 2013
Nampula Green belt 2%
Ribaue 0%
Malema 46%
Others (China) 27%
Maputo (South Africa) 11%
Tsangano & Angonia 3%
Lichinga 0%
Gurue, Zam. 11%

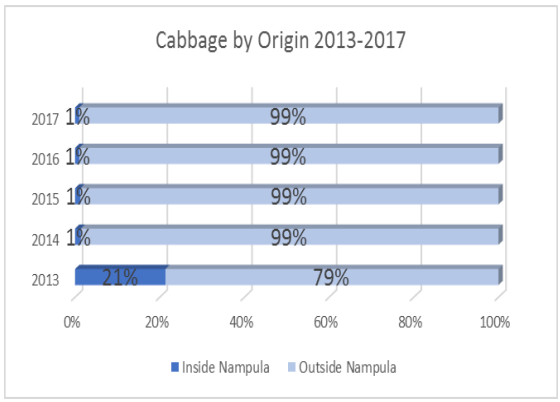

Garlic Origin by Districts 2015
Others (China) 0%
Nampula Green belt 1%
Maputo (South Africa) 6%
Ribaue 15%
Lichinga 21%
Malema 25%
Gurue, Zam. 32%

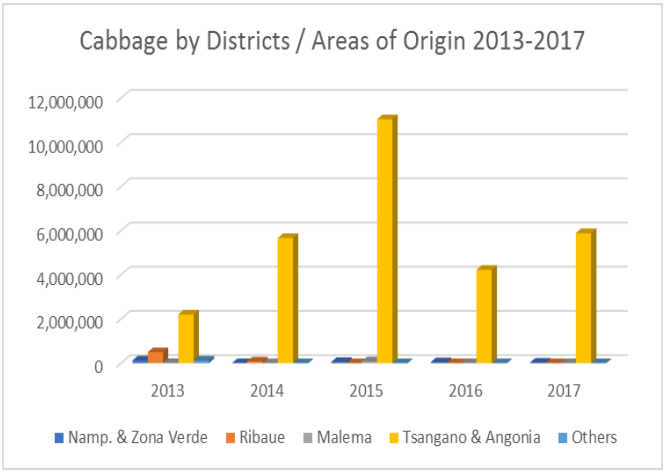

Garlic Origin by Districts 2017
Gurue, Zam. 5%
Lichinga 2%
Malema 12%
Tsangano & Angonia 4%
Maputo (South Africa) 0%
Others (China) 77%

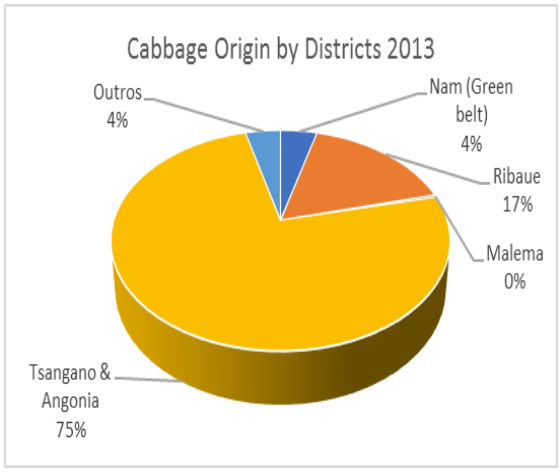
GARLIC SUMMARY TRENDS	
Consumption	○ Traded volumes / consumption during years 2013-2017 have remained basically stable (+2% 2017 vs. 2013). In 2017 have rebounded after the atypical year of 2016 when the entire supply chain of garlic got disrupted because of the strong devaluation of Metical and problems on the main road connecting Southern and Northern Mozambique frequently closed to traffic thus blocking imports from South and abroad (via Maputo).
"Inside-Outside the Corridor"	○ "**Inside the Corridor**" production has decreased significantly in 2017 (from a share of 49% in 2016 to 12% in 2017) showing the low competitiveness of the currently used local varieties (small cloves, commercially unsuitable).
Districts / Clusters	○ Imports from **China** and **Tanzania** currently dominate the market with **Malema, Gurue / Moloque,** and **Lichinga** losing ground and basically becoming marginal producers / suppliers in the market.

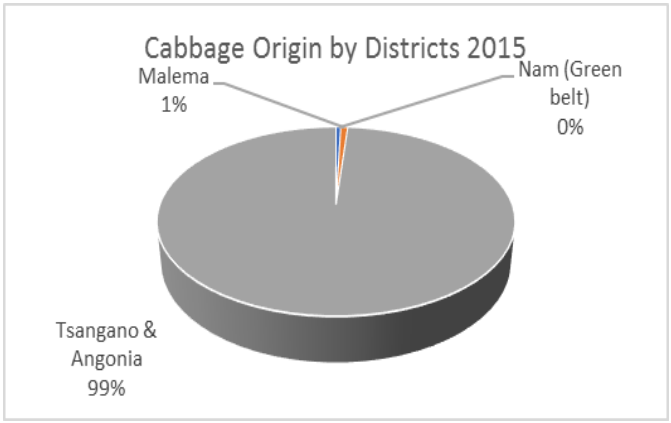
4.5 CABBAGE

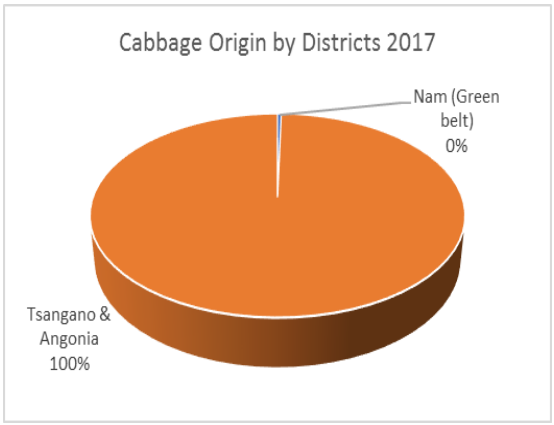

Cabbage Traded Volumes 2013-2017
15,000,000
10,000,000
5,000,000
0
+94%
+95%
-64%
+47%
2013
2014
2015
2016
2017
Inside Nampula
Outside Nampula
Total


Cabbage by Origin 2013-2017
2017 1%
2016 1%
2015 1%
2014 1%
2013 21%
99%
99%
99%
99%
79%
0%
20%
40%
60%
80%
100%
Inside Nampula
Outside Nampula


Cabbage by Districts / Areas of Origin 2013-2017
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
2013
2014
2015
2016
2017
Namp. & Zona Verde
Ribaue
Malema
Tsangano & Angonia
Others

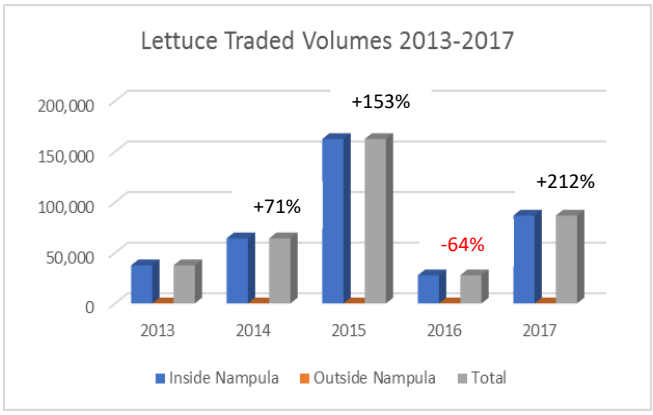

Cabbage Origin by Districts 2013
Outros 4%
Nam (Green belt) 4%
Ribaue 17%
Malema 0%
Tsangano & Angonia 75%


Cabbage Origin by Districts 2015
Malema 1%
Nam (Green belt) 0%
Tsangano & Angonia 99%


Cabbage Origin by Districts 2017
Nam (Green belt) 0%
Tsangano & Angonia 100%

CABBAGE SUMMARY TRENDS	
Consumption	○ Strong long-term growing trend, with volumes more than doubled from 2013 to 2017, strong recovery in 2017 (+47% vs. 2016) an increase well above the market average (29% for vegetables as a whole). ○ Cabbage is clearly a strategic crop for its volumes second only to potatoes. In 2017 cabbage accounts for 1/3 of the traded volumes of vegetables in the Nacala Corridor against the ¼ of 2013
"Inside-Outside the Corridor"	○ Current consumption (traded volumes) is almost all satisfied with imports from "**Outside-the Corridor**" from **Angonia / Tsangane**. There is evidence cabbage production is increasing "Inside the Corridor" but not enough to generate surpluses to be traded in the market.
Districts / Clusters	○ Ribaue has almost disappeared as cabbage supplier in the Nacala Corridor (from a share of 17% in 2013 to almost nothing in 2017). Cabbage supply is currently dominated by the districts of **Angonia / Tsanagane** (almost 100% share in 2017).

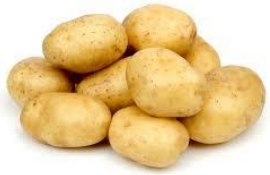
4.6 Lettuce

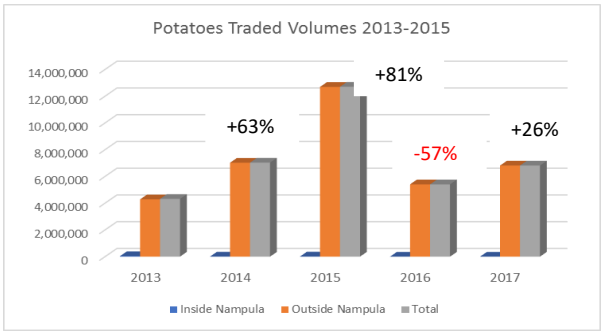


100% PRODUCED "INSIDE THE CORRIDOR" 100% IN NAMPULA GREEN BELT

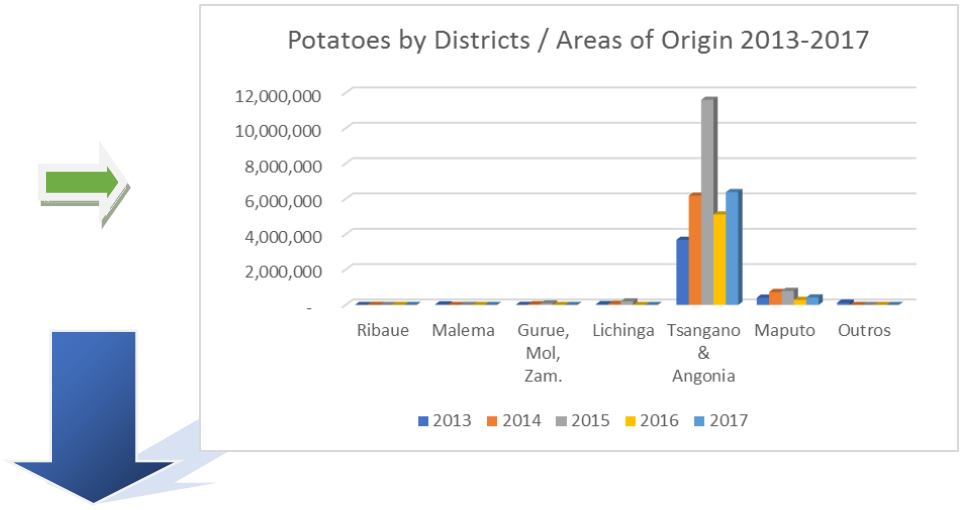
LETTUCE SUMMARY TRENDS	
Consumption	○ Lettuce consumption has rebounded strongly in 2017 (+212% vs. 2016) confirming high crop acceptance with urban consumers following a consumption pattern already existing in Maputo where lettuce is a staple food consumed by many almost on a daily basis.
"Inside-Outside the Corridor"	○ All lettuce production comes from Nampula green belt due to its perishable nature. **Nampula Green belt** has become more competitive in the years 2013-2017 by the adoption of tropical "short cycles varieties" (i.e *Veneranda* introduced by Horti-sempre with JNB), mini-tunnels, "high-bed production". The production of lettuce has also got more deseasonalized with currently more supply in the-out-of-season. ○ Surveys carried-out by Horti-sempre show average profitability of lettuce for farmers in Nampula green belt exceeds those of tomatoes and pepper.
Districts / Clusters	○ Historically (and year 2017 is no difference) lettuce production is dominated by district **Nampula Green belt** where more and more producers are adopting the new tropical varieties (hot resistant) introduced by Horti-sempre with JNB and ORUWERA since 2013 and starting production in the rainy season in mini-tunnels

4.7 POTATOES



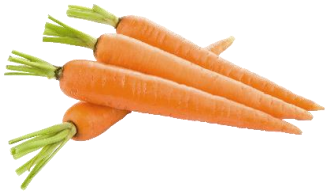


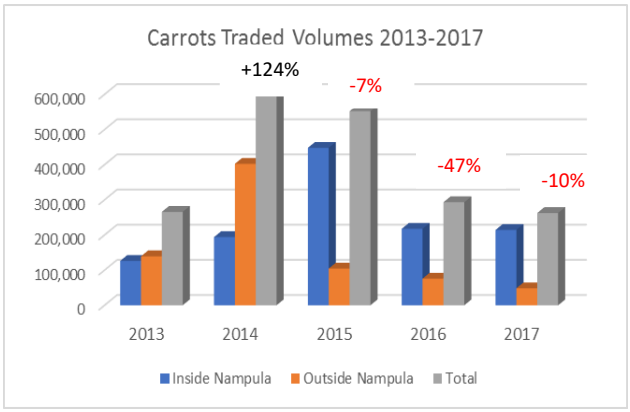
100% PRODUCED "OUTSIDE THE CORRIDOR"

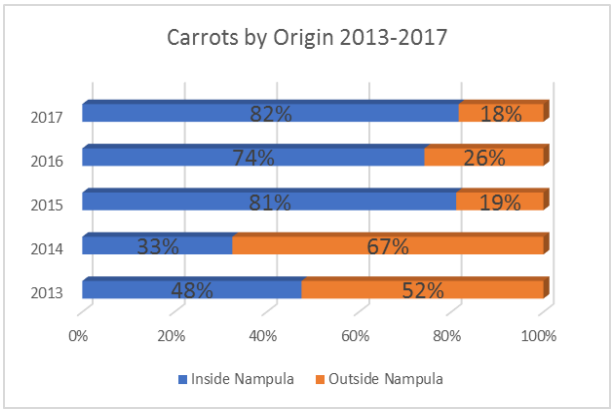


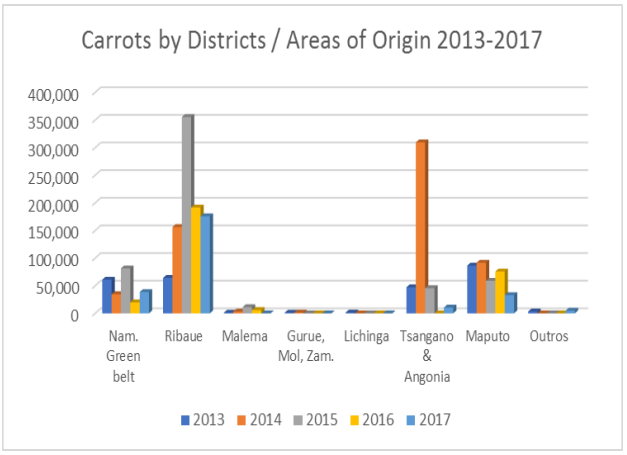
POTATOES SUMMARY TRENDS	
Consumption	○ Long-term trend traded volumes /consumption of potatoes continues strong with a growth rate in 2017 of +58% vs. 2013. In 2017 potatoes grew basically in line with market growth (+26% vs. 2016).
"Inside-Outside the Corridor"	○ Almost all potato supply come from "Outside the Corridor" from the districts of Angonia / Tsangano that have built over the time a strong competitive advantage for potatoes production and trade difficult to be challenged by other clusters.
Districts / Clusters	○ Historically (and year 2017 is no difference) potato production is dominated by district **Angonia / Tsangano.**

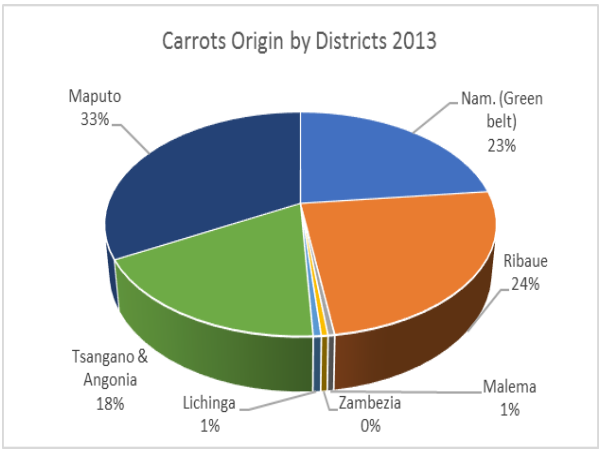
4.8 CARROTS

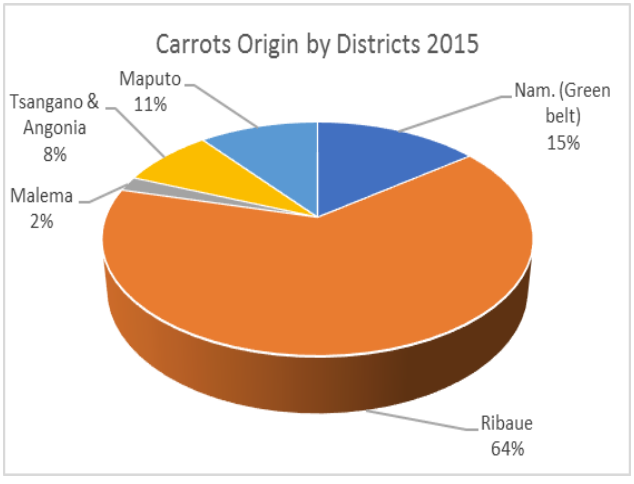


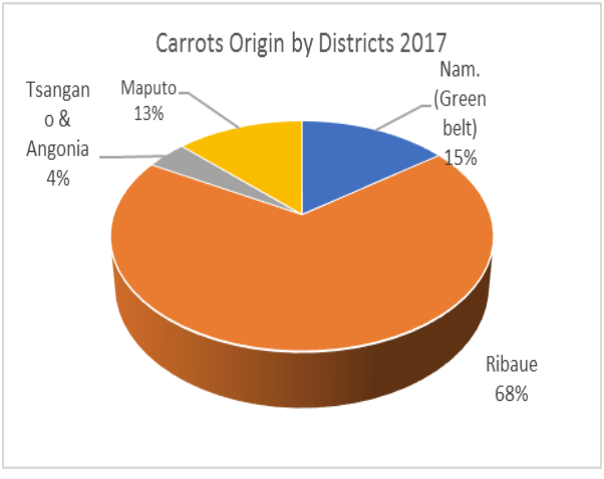

Carrots Traded Volumes 2013-2017
+124%
-7%
-47%
-10%
600,000
500,000
400,000
300,000
200,000
100,000
0
2013
2014
2015
2016
2017
Inside Nampula
Outside Nampula
Total

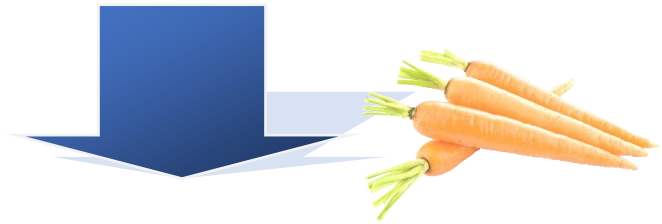

Carrots by Origin 2013-2017
2017
2016
2015
2014
2013
82%
18%
74%
26%
81%
19%
33%
67%
48%
52%
0%
20%
40%
60%
80%
100%
Inside Nampula
Outside Nampula


Carrots by Districts / Areas of Origin 2013-2017
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
Nam. Green belt
Ribaue
Malema
Gurue, Mol, Zam.
Lichinga
Tsangano & Angonia
Maputo
Outros
2013
2014
2015
2016
2017


Carrots Origin by Districts 2013
Maputo 33%
Nam. (Green belt) 23%
Ribaue 24%
Tsangano & Angonia 18%
Lichinga 1%
Zambezia 0%
Malema 1%

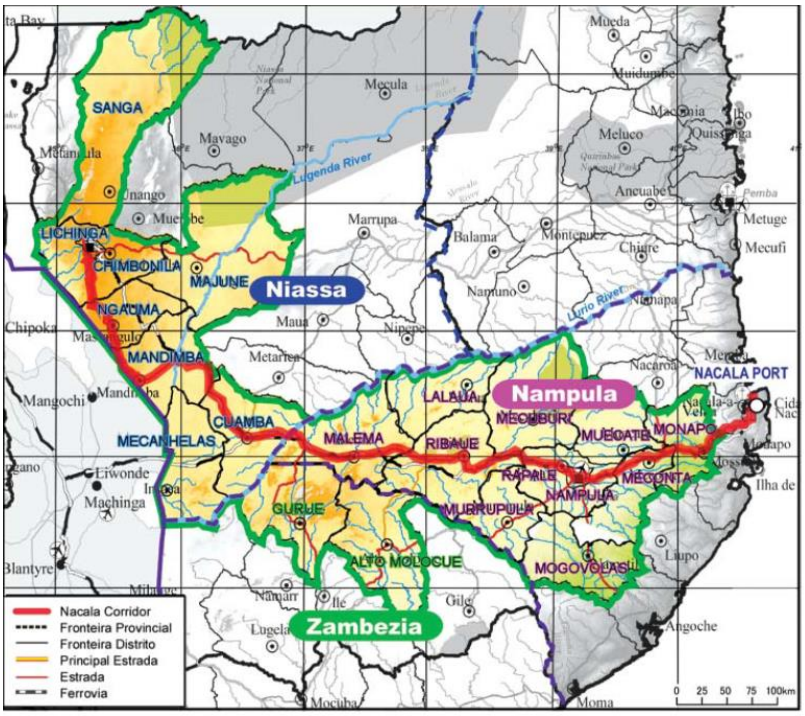

Carrots Origin by Districts 2015
Maputo 11%
Nam. (Green belt) 15%
Tsangano & Angonia 8%
Malema 2%
Ribaue 64%


Carrots Origin by Districts 2017
Tsangano & Angonia 4%
Maputo 13%
Nam. (Green belt) 15%
Ribaue 68%



CARROTS SUMMARY TRENDS	
Consumption	○ Carrots, like tomatoes, seems to suffer from the dwindling purchasing power of urban middle-class (core consumers for the crop). Carrots performance in 2017 was disappointing with trade volumes -10% vs. 2016 (worst performance among vegetables 2017 vs. previous year) ○ Carrots consumption grew spectacularly in 2014 but showed a strong fall in 2016 from which they have not recovered yet. Traded volumes in 2017 are basically at the same level of 2013
"Inside-Outside the Corridor"	○ The competitiveness of the Nacala Corridor as a supplier of carrots has increased significantly thanks to the excellent performance of Ribaue that is currently the most competitive cluster/district for carrots production with a share of 68%. Supply form "Inside the corridor" stands in 2017 at 82% against 48% in 2013.
Districts / Clusters	○ Ribaue has become the big winner in carrots supply, reaching a share of 68% in 2017 growing significantly from 2013 when its share was only of 24%. Ribaue has displaced Angonia/Tsangano as supplier in the out-of-season and Maputo that in 2017 has a share of 13% down from the 33% of 2013

5. Cluster Analysis Overlook 2013-2017



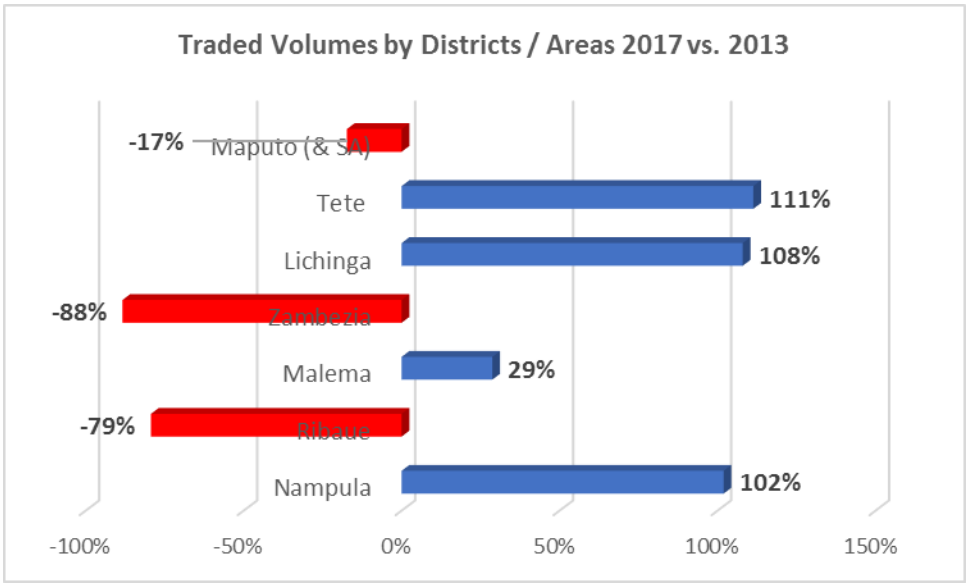
Fonte: ProSavana-PD

CLUSTERS

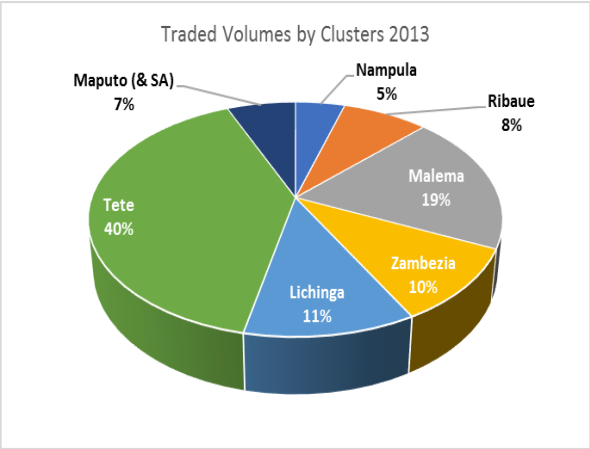
The term cluster, also known as an industry cluster, competitive cluster, was introduced and popularized by Michael Porter in The Competitive Advantage of Nations (1990).

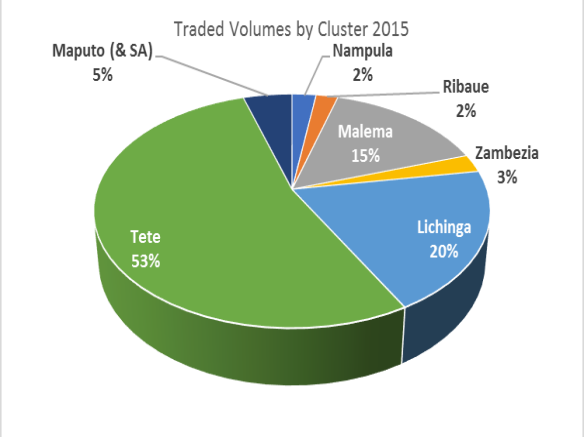
A horticultural cluster is defined as geographic concentration of inter-connected farmers and companies working in a common industry. In addition, clusters encompass an array of collaborating and competing services and providers that create a specialized infrastructure, which supports the cluster's industry.

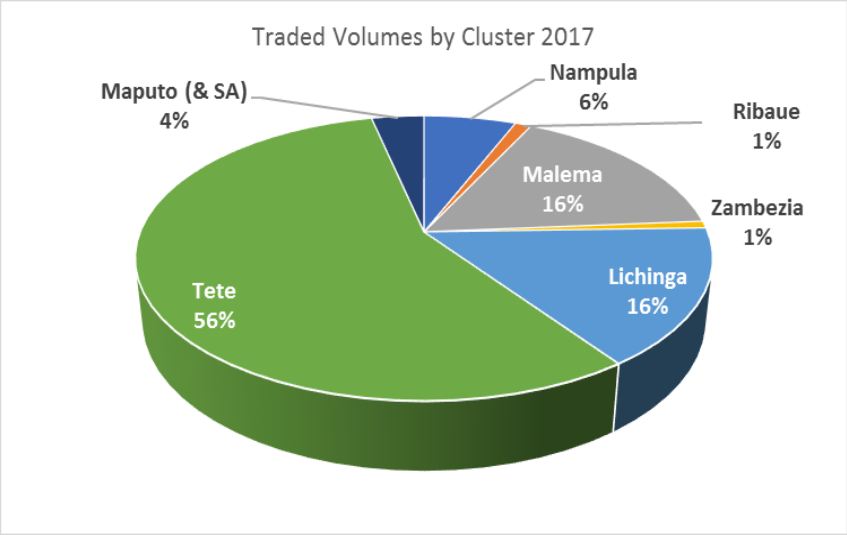
Figure 9: Total Traded Volumes by Cluster Comparison 2017 vs. 2013



Figures 10: Cluster Shares – Traded Volumes years 2013 – 2015 - 2017



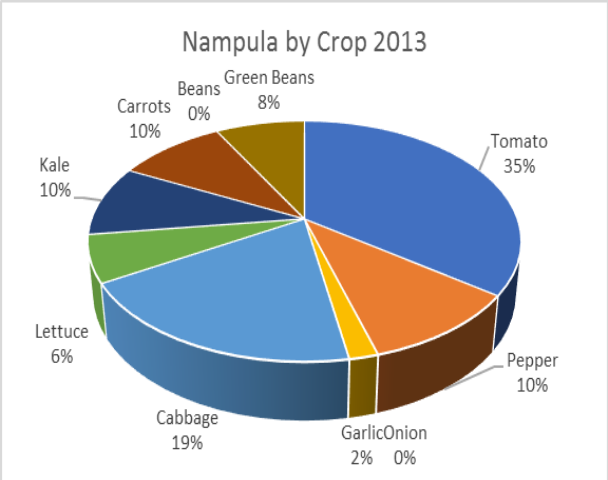


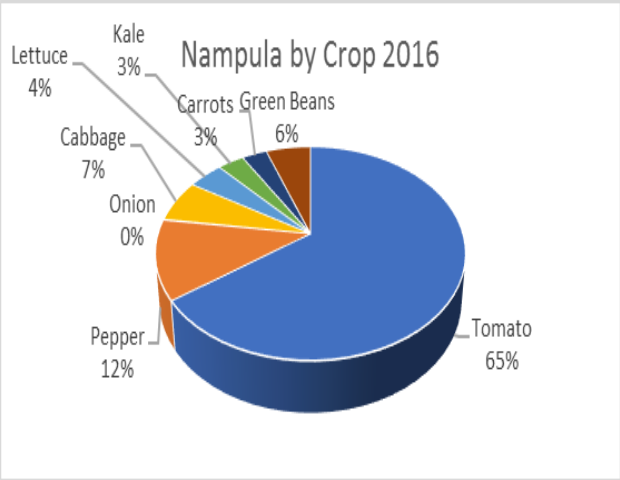


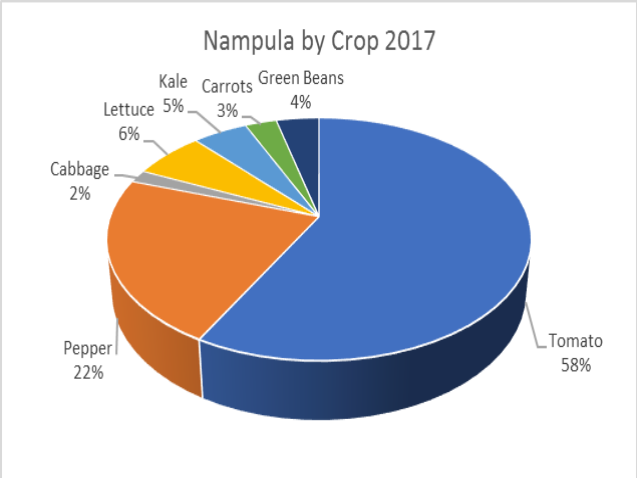
Source: Horti-sempre AGROWAM data

- The supply of tradable vegetables for the consumption in the Nacala Corridor is currently strongly dependent on the clusters of **Angonia / Tsangano** (having almost a monopolistic position on potatoes and cabbage), **Niassa-Lichinga** (being the biggest supplier of beans), the **Green belt of Nampula** that has built a strong position on "perishable vegetables" such lettuce, tomatoes, and pepper (outplaying Zambezia, Ribaue, and Malema competition), and **Malema** that still basically depends on onions after a failed diversification into tomatoes and garlic.
- The big losers over the years 2013-2017 have been the clusters of **Zambezia** and **Ribaue** that have experienced in the years 2013-2017 a strong decline in volumes (respectively -88% and -79%) as vegetables suppliers of the Nacala Corridor.
- Volumes from **Maputo** and **South Africa** have also decreased in the years 2017-2013 due Metical devaluation (that made imports from South Africa more expensive) and disruptions in the main road that connect Southern and Northern Mozambique.

5.1 Nampula Green Belt & Maratane



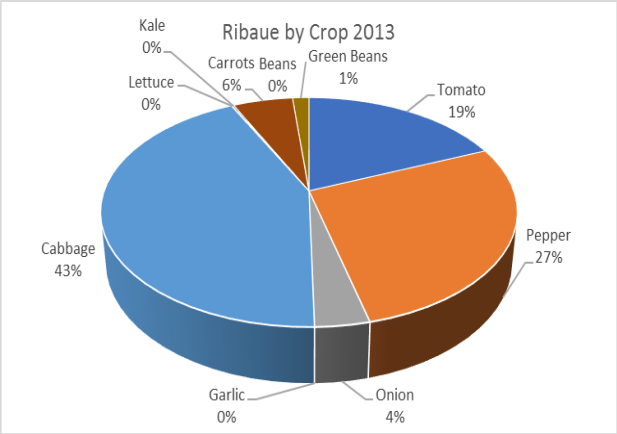


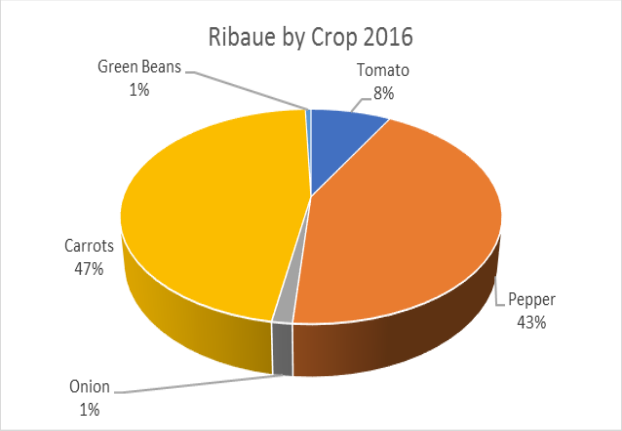


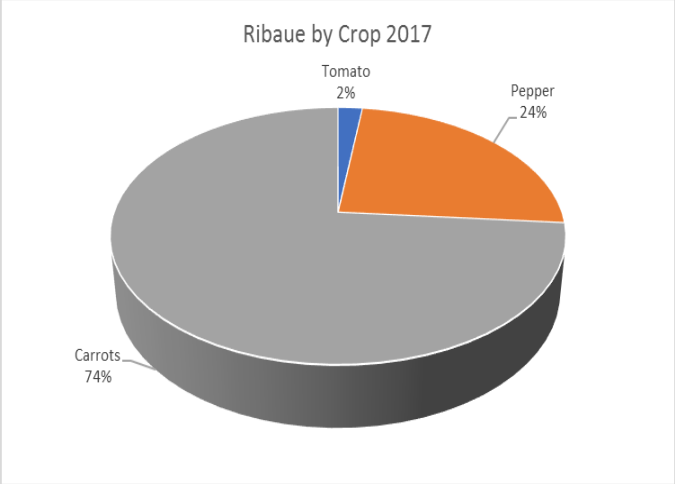
CLUSTER NAMPULA GREEN BELT / MARATANE

- The Cluster of Nampula Green belt / Maratane is getting stronger and stronger with an impressive increase 2017 vs. 2016 in traded volumes (+102%) and having doubled its traded volumes in the period 2013-2017.
- Cluster Nampula Green belt / Maratane seems to get specialized more and more in highly perishable vegetables such as **tomato** (displacing competition from Malema and Ribaue), **pepper** and **lettuce**, basically giving up cabbage production.
- **Lettuce** production (share of 6% in 2017) is quite underestimated since Horti-sempre specific surveys showed only approximately 1/10 of the lettuce volumes are traded through the wholesale channel.
- **Lettuce** real share could be as high as 40% (including volumes traded in other channels) and close to the one of tomato.

5.2 Ribaue



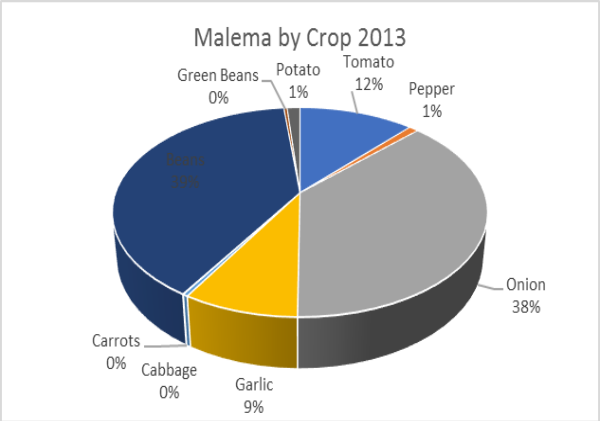


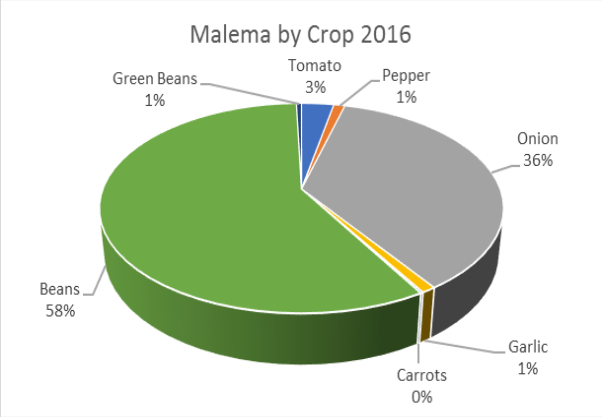


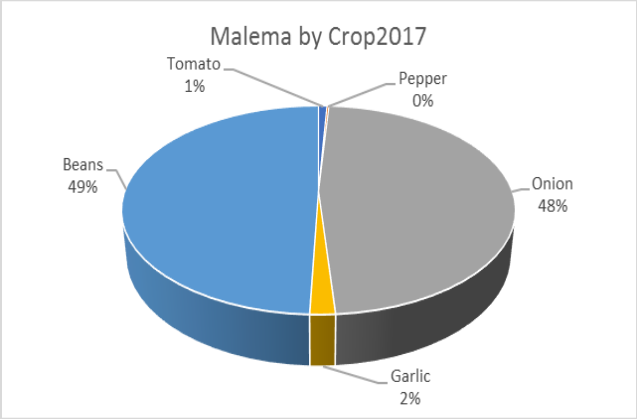
CLUSTER RIBAUE

- The profile of Ribaue cluster has changed significantly since 2013: it has switched from a "diversified" cluster with significant production of **tomato**, **carrots**, and **pepper** to a cluster of only **carrots** and **pepper** in 2016 and to a cluster with a predominant position of **carrots** in 2017 (share 74%) with **pepper** having a share of only 24% (vs. 43% in 2016).
- In addition, the cluster has lost importance as a supplier within the Nacala Corridor with traded volumes in 2017 being only ¼ of those of 2013.
- Ribaue competitiveness seems to suffer with the district losing ground in traded vegetables on behalf of Nampula green belt and Malema.

5.3 Malema



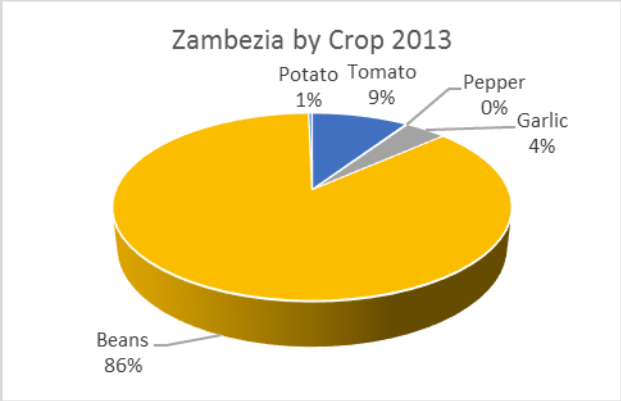


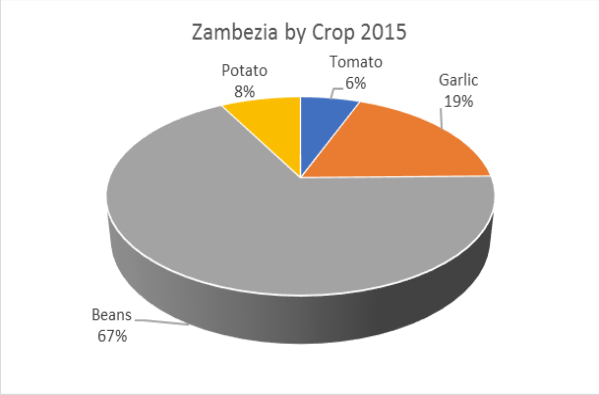


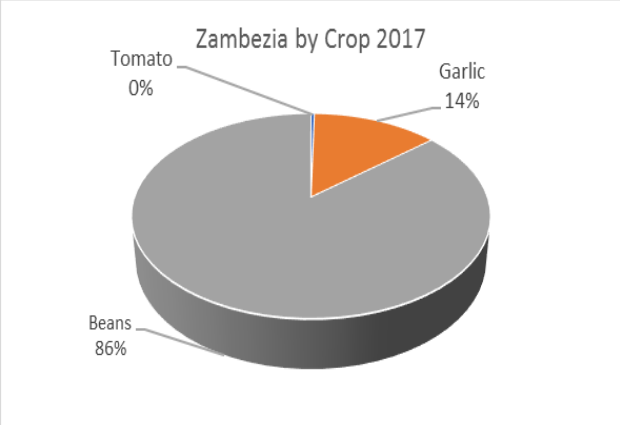
CLUSTER MALEMA

- The competitiveness of the Malema cluster remains strong in the short term (traded volumes +10% 2017 vs. 2016) and also in the medium/long term (+29% 2017 vs. 2013).
- The profile of the cluster has changed significantly in the period 2013-2017 getting specialized only on **onions** and **beans** (crops that allow storage) while basically giving up **tomato** and **garlic** production.
- **Onions** traded volumes have increased by a strong +45% 2017 vs. 2016 (+65% 2017 vs. 2013) almost recovering the record level of year 2015 (year before the economic crisis).
- **Beans** show also a medium-term positive trend (2017 +65% vs. 2013), while **tomato** (-91% 2017 vs. 2013) and **garlic** (-73% 2017 vs. 2013) have almost disappeared from the map.

5.4 Zambezia



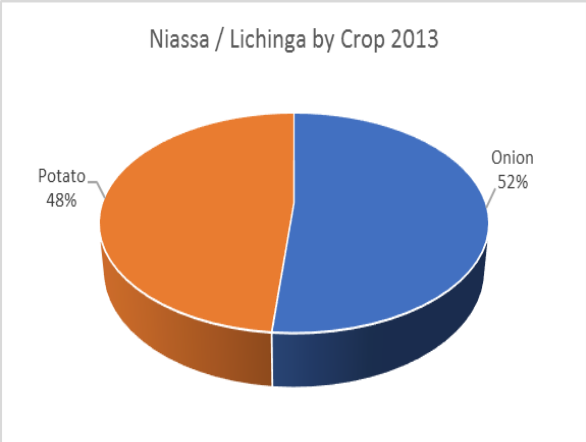


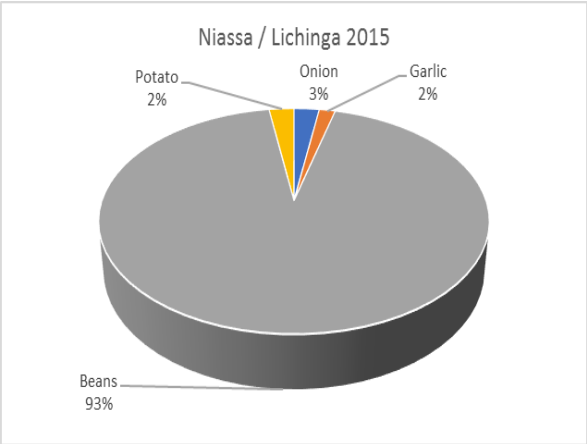


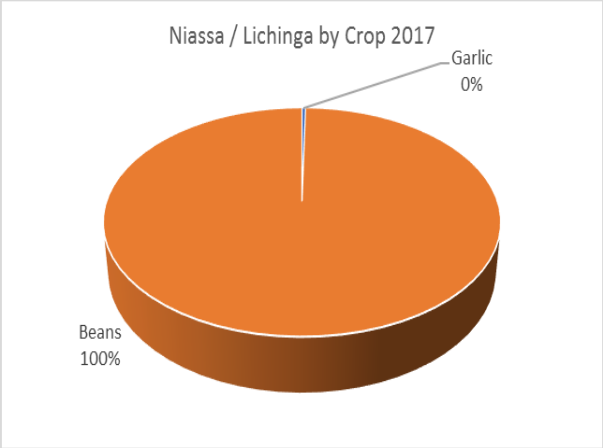
CLUSTER ZAMBEZIA (Gurue, Molocue, Zambezia)

- The district / cluster of Zambezia has progressively lost importance as provider of vegetables for the Nacala Corridor.
- In the period 2013-2017 Zambezia has basically stopped exporting tomato and garlic to the Corridor, maintaining beans as sole vegetable with significant export, although with declining volumes since 2013.
- Traded volumes of beans from Zambezia in 2017 have been only 1/8 of the volumes traded in 2013. Niassa / Lichinga seems to have taken share from Zambezia for beans export to the Nacala Corridor.

5.5 Niassa / Lichinga



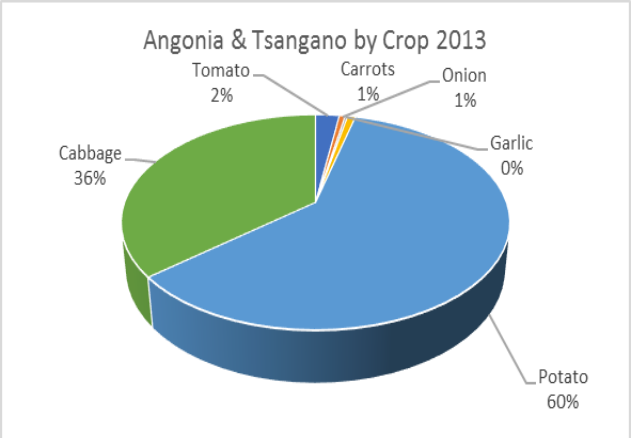


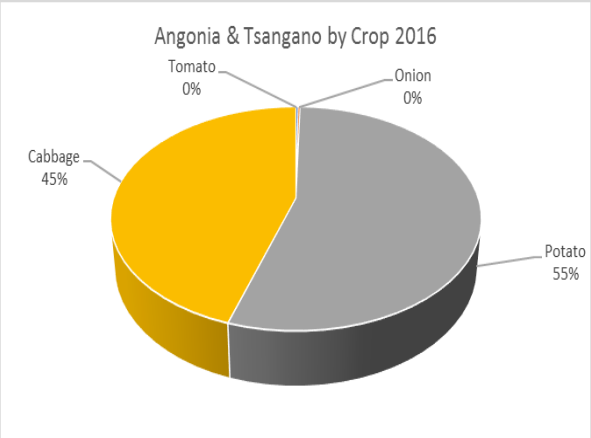


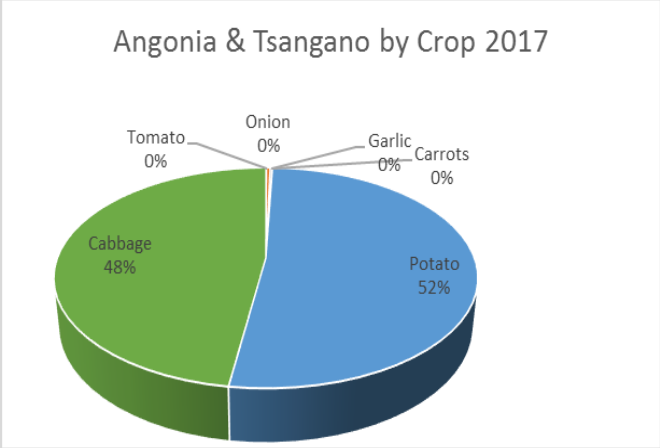
CLUSTER NIASSA / LICHINGA

- The district / cluster of Niassa / Lichinga from a marginal supplier of onions and potatoes (2013) has become the most important supplier of beans to the Nacala Corridor (+27% 2017 vs. 2016) gaining market share from Zambezia-Gurue-Molocue

5.6 Tete (Angonia & Tsangano)



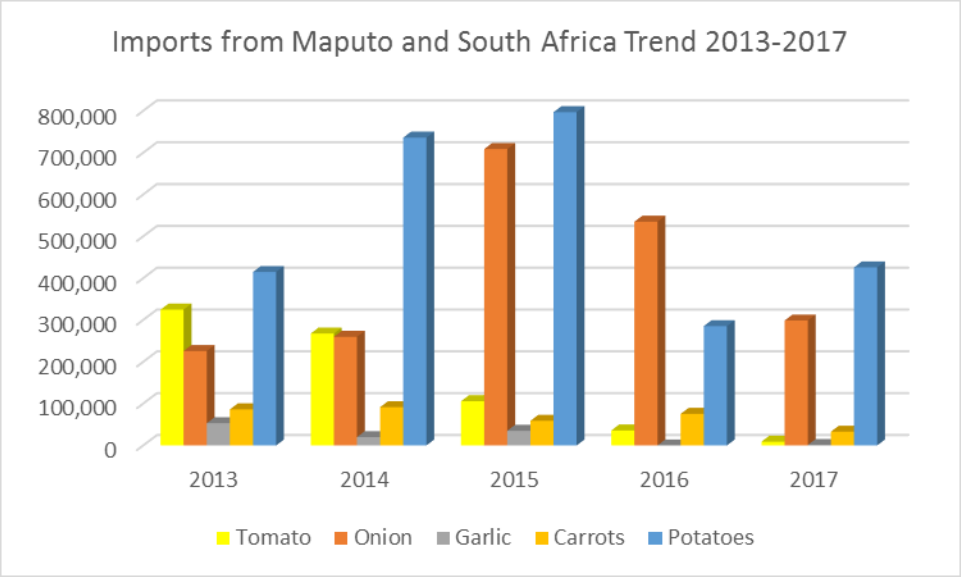




CLUSTER TETE (ANGONIA & TSANGANO)

- The district / cluster of Angonia & Tsangano remains a strong, almost monopolistic, supplier of potato and cabbage to the Nacala Corridor, being a marginal supplier of any other vegetables.
- Angonia & Tsangano growth in cabbage has been faster than in potatoes (cabbage +39% 2017 vs. 2016 and +167% 2017 vs. 2013, potatoes +25% 2017 vs. 2016 and +73% 2017 vs 2013), as a result cabbage and potatoes have in 2017 a similar share (52% potatoes, 48% cabbage) as compared to 2013 when potatoes had a 60% share and cabbage only 36%.

5.7 Maputo & South Africa



CLUSTER MAPUTO and SOUTH AFRICA

- Imports of vegetables from Maputo and South Africa continue to decrease (-18% 2017 vs. 2016, and -17% 2017 vs. 2013).
- Basically, imports from Maputo and South Africa have become almost insignificant for tomatoes, carrots and garlic and remain strong only with potatoes (+49% 2017 vs. 2016).
- On the other hand, imports of onions have decreased consistently (-44% 2017 vs. 2016) with the Nacala Corridor getting more and more competitive also in white onions (historically all imported via Maputo from South Africa).
- The drop of imports from South Africa (especially white onions) also reflects the deterioration of the exchange rate of Metical against the Rand that has made imports more expensive.
- There is also evidence garlic is now imported directly by some traders in the market from China rather than through sub-distributors in Maputo and South Africa.

Figures 11: Matrix Cluster / Crop - Year 2017 (i.e. 95% of the tomatoes supplied to the Nacala Corridor comes from Nampula Green belt, 3% from Malema)

CROP / CLUSTERS SHARE %	Nampula Green belt	Ribaue	Malema	Lichinga Niassa	Zambezia	Tsangano / Angonia	Maputo South Africa China
	95%		3%				
	82%	16%					
			84%		5%	4%	14%
			12%				72%
						91%	7%
						100%	
	100%						
	13%	68%				4%	15%
			30%	55%	14%		

6. Conclusions and Recommendations (a possible strategy)

CONCLUSIONS & RECOMMENDATIONS FOR DEVELOPMENT PROJECTS AND HORTICULTURAL PLANNING

- The consumption of "side-dishes" vegetables such as tomato, pepper and carrots seems to be limited by currently deteriorated purchasing power of urban / middle-class consumers (resulting from the economic crisis started in late 2015 and still afflicting Mozambique). Efforts to increase the yields, production, and productivity of these crop are likely to result in gluts in the market with unsold supply.
- Crop-wise, efforts should be concentrated on promoting cabbage early varieties (i.e. "*60 days*" introduced in Mozambique by the project with JNB), white onion, kale "*Mil folhas*", and garlic with the new *Hozan* varieties from Brazil.
- Best opportunities by clusters seem to lie on:
  - ✓ Promotion of kale "*mil folhas*" in Nampula Green belt, Ribaue, and Cabo Delgado;
  - ✓ Cabbage "*60 dias*" (early-short cycle varieties) in Ribaue and Cabo Delgado;
  - ✓ White onions in Malema;
  - ✓ Garlic in Montepuez;
  - ✓ Carrots for the out-of-season with high beds in Ribaue.
- Maintain project support with seeds providers (i.e. JNB and ORUWERA), promoting further dissemination of tropical varieties of lettuce *Veneranda*, Tomato *IPA 6*, Carrot *Brasilia*, Kale *mil-folhas*, onions *IPA 10*, *IPA 11* and *Alfa Franciscana*, garlic *Hozan*, Cabbage *60 dias.*
- Support domestic production of seeds of lettuce *Veneranda*, cabbage *60 dias*, kale *mil-folhas*, onions *IPA 10*, *IPA 11*, and *Alfra Franciscana*, and garlic *Hozan* with ORUWERA or other qualified seeds providers.