



Market price data visualization and analysis workflow

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Data preparation, cleaning and integration

- Assess data structure
 - Table format
 - Variable name consistency
- Identify main commodities
 - Crops
 - Check consistency (name and frequency)
- Market hierarchy
 - Main and local market
 - Prioritize target market
- Data frequency
 - Time: year, month, day
 - Time gaps
- Unit of observation
 - Observed and calculated unit price
 - Weights

Data preparation and integration

- Evaluate the data structure
- Identify legitimate discrepancies
 - abrupt variation in the context (price hikes due to shocks)
- Errors due to measurement or data entry error
 - mistakes due to human error
 - problem on recording system design

Data structure

2019-2020

Observation: single observation per row per crop per market

Time interval: weekly or fortnightly

Price variable: only observed price

→ Analyst calculates unit price

	A	B	C	D	E	F	G	H	I
1	Date	Market	Crops	Crop Type	Price	Pieces	Weight	Availability	Quality
2	2020-08-25	Gordons	Cabbage-English	Leafy & Flower Vegetable	6.00	1.00	1.24	Low	Good
3	2020-08-24	Gordons	Lettuce	Leafy & Flower Vegetable	2.00	1.00	0.25	Medium	Good
4	2020-08-25	Gordons	Pakchoi	Leafy & Flower Vegetable	1.00	1.00	0.35	Medium	Good
5	2020-08-25	Gordons	Wongbok	Leafy & Flower Vegetable	4.00	1.00	0.70	Medium	Good
6	2020-08-25	Gordons	Aibika	Indigenous Crop	2.00	1.00	0.48	Medium	Good
7	2020-08-25	Gordons	Amaranthus-Aupa	Indigenous Crop	1.00	1.00	0.19	Medium	Good
8	2020-08-25	Gordons	Fern	Indigenous Crop	1.00	1.00	0.19	High	Excellent
9	2020-08-25	Gordons	Choko-tips	Indigenous Crop	5.00	1.00	1.28	Medium	Good
10	2020-08-25	Gordons	Pumpkin-tips	Indigenous Crop	1.00	1.00	0.52	Medium	Good
11	2020-08-25	Gordons	Carrot	Root Crop	5.00	4.67	0.44	Low	Good
12	2020-08-25	Gordons	Cassava	Root Crop	2.67	1.00	1.30	Medium	Good

...data structure

2017-2019

Observation: multiple observation per row per crop per market

Time interval: weekly or fortnightly

Price variable: Only unit price (Mt. Hagen –sweet potato?)

→ Unit price already calculated, and total price is not in data

	A	B	C	D	E	F	G	H	I
1	Crops	Crop Type	Unit Price Kina/Kg	No of Pieces	Weight (Kg)	Supply Source (District)	Unit Price Kina/Kg	No of Pieces	Weight Kg
2	Karakap	Indigenous Crop							
3	Pakchoi	Leafy & Flower Vegetable	1.0	5.0	0.6	Kokopo			
4	Sweet Potato-Waghi Besta	Root Crop	2	9	1.9	Minimit	2	10	2.0
5	Pineapple	Fruit & Nut	4	1	1.5	Baiyer	4	1	1.5
6	Lettuce	Leafy & Flower Vegetable	4.0	2.0	0.8	Kokopo			
7	Pumpkin-tips	Leafy & Flower Vegetable	2.0	1.0	1.4	Pomio			
8	Sweet Potato-Waghi Besta	Root Crop	2	9	1.9	Minimp	2	10	2.0
9	Pineapple	Fruit & Nut	4	1	1.5	Baiyer	2	1	1.5
10	Aibika	Leafy & Flower Vegetable	1.0	3.0	1.1	Pomio	1.0	2.0	1
11	Fern	Leafy & Flower Vegetable	0.5	4.0	1.3	Gszelle	0.5	3.0	1
12	Sweet Potato-Waghi Besta	Root Crop	2	9	1.9	Minimp	2	10	2.0
13	Pineapple	Fruit & Nut	4	1	1.5	Baiyer	4	1	1.5
14	Pakchoi	Leafy & Flower Vegetable	3.0	3.0	1.0	Kokopo	3.0	3.0	1
15	Wongbok	Leafy & Flower Vegetable	6.0	1.0	1.2	Kokopo	6.0	1.0	1
16	Sweet Potato-Waghi Besta	Root Crop	2	9	1.9	Minimp	2	10	2.0

...data structure

2012-2016

Observation: single observation per row per crop per market

Time interval: weekly or fortnightly

Price variable: Observed and calculated unit price

→ Data reports total price and unit price

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	DAY	MONTH	YEAR	LOCATION	PRODUCE	TYPE	P/PRICE	WEIGHT	PRICE/KG	S/LEVEL	QUALITY	F/VENDOR	M/VENDOR
5	4	Feb	2016	Mt. Hagen	Fruit	Avocado	2.00	0.920	2.17				
6	4	Feb	2016	Mt. Hagen	Vege	Banana - cooking	8.00	2.080	3.85				
7	4	Feb	2016	Mt. Hagen	Fruit	Banana - ripe	3.00	1.740	1.72				
8	4	Feb	2016	Mt. Hagen	Vege	Bean - French	2.00	0.920	2.17				
9	4	Feb	2016	Mt. Hagen	Vege	Broccoli	2.00	1.000	2.00				
10	4	Feb	2016	Mt. Hagen	Vege	Cabbage - English	2.00	2.020	0.99				
11	4	Feb	2016	Mt. Hagen	Vege	Cabbage - pakchoi	2.00	1.060	1.89				
12	4	Feb	2016	Mt. Hagen	Vege	Capsicum	4.00	0.980	4.08				
13	4	Feb	2016	Mt. Hagen	Vege	Carrot	2.00	0.780	2.56				
14	4	Feb	2016	Mt. Hagen	Vege	Corn	2.00	1.980	1.01				
15	4	Feb	2016	Mt. Hagen	Vege	Cucumber	2.00	1.500	1.33				
16	4	Feb	2016	Mt. Hagen	Vege	Eggplant	2.00	1.560	1.28				
17	4	Feb	2016	Mt. Hagen	Vege	Garlic	20.00	0.820	24.39				
18	4	Feb	2016	Mt. Hagen	Vege	Ginger	4.00	0.760	5.26				

Data consistency issue example

Sweet Potato-3 Mun

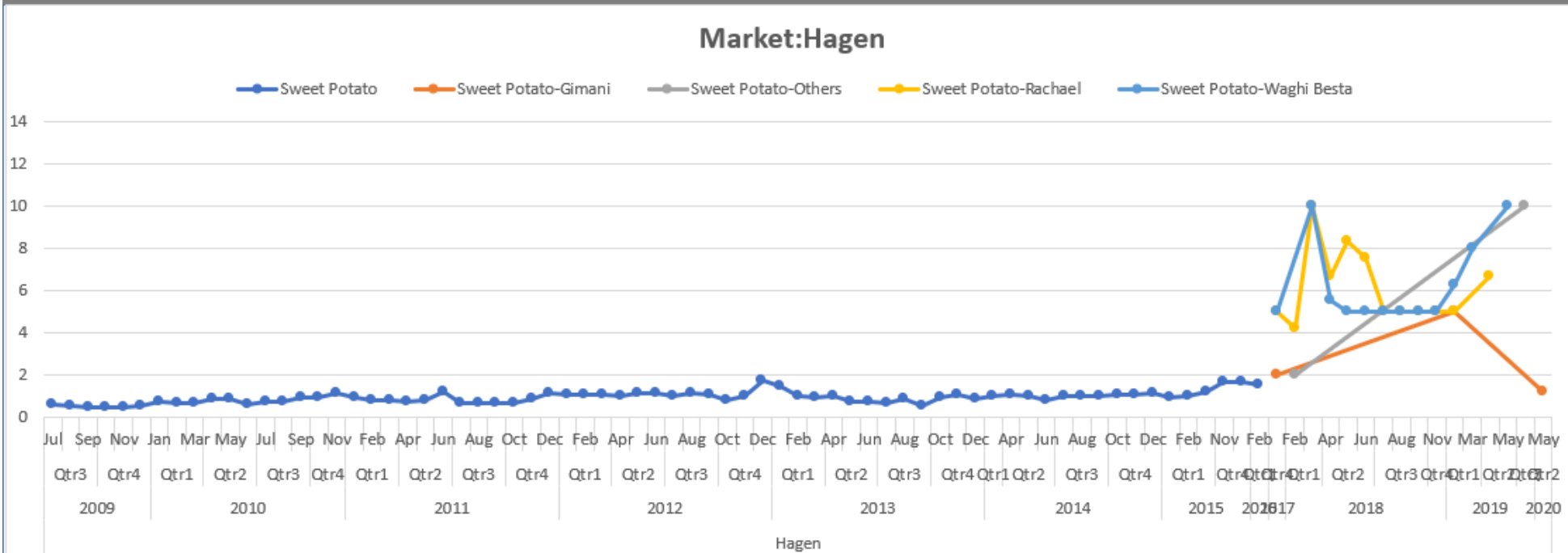
Sweet Potato-Gimani

Sweet Potato-Others

Sweet Potato-Rachael

Sweet Potato-Waghi Besta

- Naming issue: human error or problem on recording system
- Abrupt price variation
any context for the price hike? Like shocks?
- Time gap



Market consistency

Major vs local market? Or sub-markets?

Number of observation per year per market

Market	2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total		Year										Total			
14 Mile	0	0	0	0	0	0	0	0	0	0	1	4	5	Market	2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total	
15 Mile	0	0	0	0	0	0	0	0	0	0	3	2	5	Jiwaka	0	0	0	0	0	0	0	0	0	4	21	0	25	
17 Mile	0	0	0	0	0	0	0	0	0	0	0	4	4	Kagamuga	0	0	0	0	0	0	0	0	0	2	0	0	2	
4 Mile	0	0	0	0	0	0	0	0	0	0	0	1	1	Kairuku	0	0	0	0	0	0	0	0	0	0	1	4	5	
8 Mile	0	0	0	0	0	0	0	0	0	0	8	1	9	Kavieng	0	169	0	0	0	0	0	0	0	0	0	0	0	169
9 Mile	0	0	0	0	0	0	0	0	0	0	58	32	90	Keltiga	0	0	0	0	0	0	0	0	0	3	0	0	3	
Abau	0	0	0	0	0	0	0	0	0	1	4	5	10	Kerema	0	0	0	0	0	0	0	0	0	0	1	0	1	
Aroma	0	0	0	0	0	0	0	0	0	0	0	1	1	Koiari	0	0	0	0	0	0	0	0	0	0	4	3	7	
Asaro	0	0	0	0	0	0	0	0	0	0	3	0	3	Kokopo	32	701	1,077	1,049	958	629	647	166	59	100	248	734	6,628	
Australia	0	0	0	0	0	0	0	0	0	0	7	0	7	Kuriva	0	0	0	0	0	0	0	0	0	0	4	12	16	
Baiyer	0	0	0	0	0	0	0	0	0	4	4	0	8	Kwikila	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Bena	0	0	0	0	0	0	0	0	0	0	66	0	66	Lae	0	819	1,086	807	599	278	0	0	0	14	9	505	4,290	
Boana	0	0	0	0	0	0	0	0	0	1	0	0	1	Local	0	0	0	0	0	0	0	0	0	0	1	3	4	
Bomana	0	0	0	0	0	0	0	0	0	0	6	0	6	Lufa	0	0	0	0	0	0	0	0	0	0	5	0	5	
Brown River	0	0	0	0	0	0	0	0	0	1	49	40	90	Madang	0	846	820	482	788	629	527	74	0	0	0	0	4,166	
Bush Wara	0	0	0	0	0	0	0	0	0	0	11	14	25	Markham	0	0	0	0	0	0	0	0	0	2	0	0	2	
Central Rigo	0	0	0	0	0	0	0	0	0	0	2	0	2	Mini. (?)	0	0	0	0	0	0	0	0	0	1	0	0	1	
Dabunari Hiri	0	0	0	0	0	0	0	0	0	0	0	1	1	Morobe	0	0	0	0	0	0	0	0	0	0	12	0	12	
Daulo	0	0	0	0	0	0	0	0	0	0	9	0	9	Okapa	0	0	0	0	0	0	0	0	0	0	1	0	1	
Dei Council	0	0	0	0	0	0	0	0	0	3	28	0	31	PAU	0	0	0	0	0	0	0	0	0	0	1	1	2	
EHP	0	0	0	0	0	0	0	0	0	6	0	0	6	Pomio	0	0	0	0	0	0	0	0	0	45	106	90	241	
Erima	0	0	0	0	0	0	0	0	0	0	1	0	1	Popondetta	0	697	1,194	783	479	411	332	70	0	0	0	0	3,966	
Gaire	0	0	0	0	0	0	0	0	0	0	0	1	1	Port Moresby	0	580	1,273	843	814	578	671	185	55	4	0	10	5,013	
Gazelle	0	0	0	0	0	0	0	0	0	59	83	58	200	Rabaul	0	0	0	0	0	0	0	0	0	18	43	38	99	
Gembogl Chimbu	0	0	0	0	0	0	0	0	0	0	10	16	26	Rigo	0	0	0	0	0	0	0	0	0	7	114	120	241	
Gerehu	0	0	0	0	0	0	0	0	0	0	1	0	1	Sabusa	0	0	0	0	0	0	0	0	0	0	1	4	5	
Goilala	0	0	0	0	0	0	0	0	0	0	2	0	2	Seme	0	0	0	0	0	0	0	0	0	0	0	1	1	
Gordons	0	0	0	0	0	0	0	0	0	0	0	378	551	Simbu	0	0	0	0	0	0	0	0	0	3	21	0	24	
Goroka	0	1,037	1,617	1,223	1,065	718	715	207	52	2	92	259	7,156	Sogeri	0	0	0	0	0	0	0	0	0	1	48	54	103	
Habau	0	0	0	0	0	0	0	0	0	0	1	0	1	Tambul	0	0	0	0	0	0	0	0	0	0	6	19	0	25
Hagen	0	1,067	1,870	1,556	1,123	688	767	283	104	21	171	46	7,722	Tapini	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Henganofi	0	0	0	0	0	0	0	0	0	0	8	0	8	Tokarara	0	0	0	0	0	0	0	0	0	0	1	0	1	
Highlands	0	0	0	0	0	0	0	0	0	0	10	4	14	Ungai	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Hiri	0	0	0	0	0	0	0	0	0	2	0	0	2	Vanapa	0	0	0	0	0	0	0	0	0	0	2	17	19	
Hisiu	0	0	0	0	0	0	0	0	0	0	0	1	1	WHP	0	0	0	0	0	0	0	0	0	4	0	0	4	
ISR	0	0	0	0	0	0	0	0	0	2	0	0	2	Wewak	0	768	1,561	1,212	901	654	518	0	0	0	0	0	0	5,614
Imported	0	0	0	0	0	0	0	0	0	3	15	17	35	Yonki	0	0	0	0	0	0	0	0	0	0	1	0	1	
														Total	32	6,684	10,498	7,955	6,727	4,585	4,177	985	270	319	1,318	2,484	46,803	

Data cleaning steps

- Format variable, market and commodity name discrepancies
 - E.g. the case of sweet potato
- Combine sub-markets to the main market
 - E.g 4 Mile, 8 Mile, 9 Mile, 14 Market, 15 Market, 17 Market
- Consistent unit of measurement
 - E.g observed unit price, observed total price, calculated unit price
- Detect and treat outliers
 - Prices above 3 standard deviation flagged as outlier
 - Treat outlier with 3-month moving average (pursuant to data availability in the time window)

Example before major data cleaning

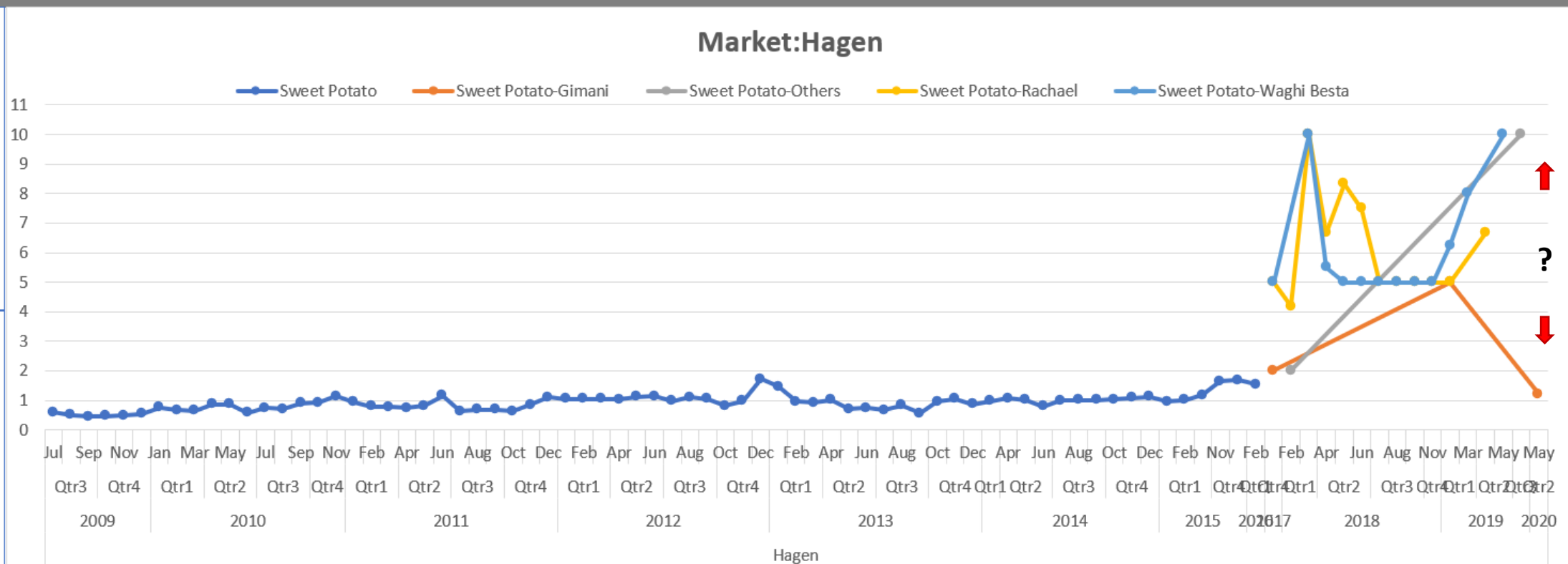
Nominal market price (source:FPDA)

market

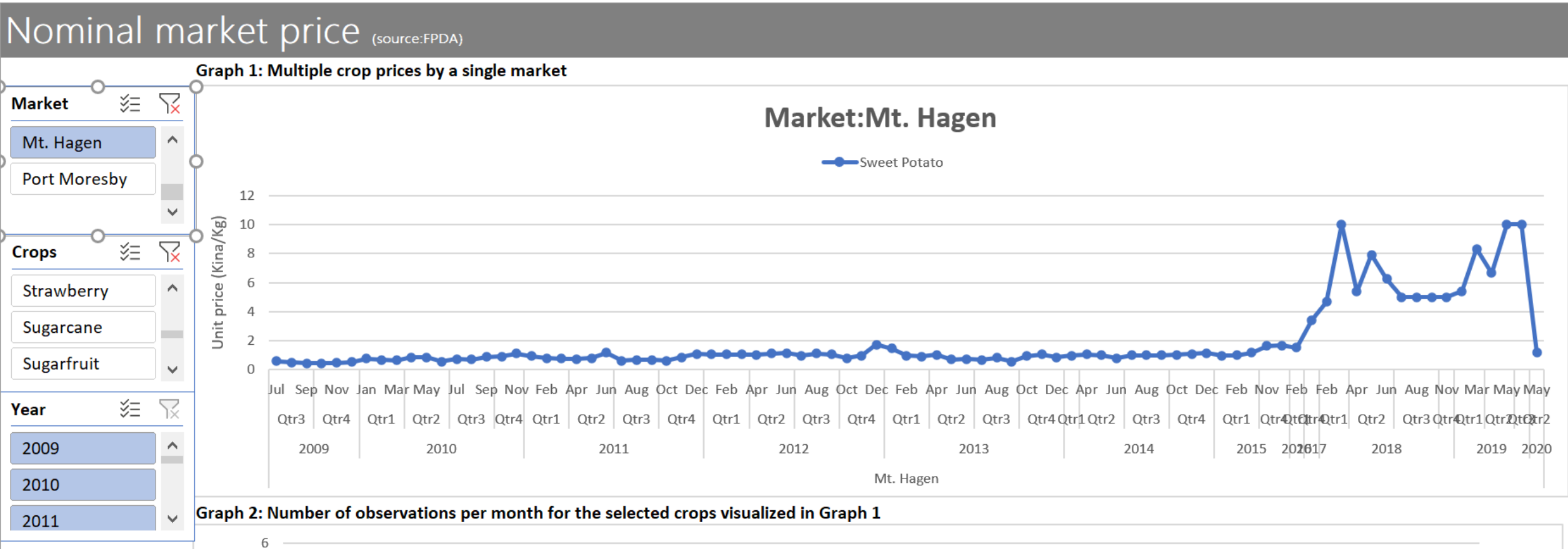
- Gordons
- Goroka
- Hagen
- Highlands
- Jiwaka
- Kavieng

crops

- Sweet Potato
- Sweet Potato-Gim...
- Sweet Potato-Oth...
- Sweet Potato-Rac...
- Sweet Potato-Wag...



After multiple sweet potato names merged



Zoom into 2015-2020

Nominal market price (source:FPDA)

Market (single sel...)

- Madang
- Mt. Hagen**
- Port Moresby

Crops (multi selec...)

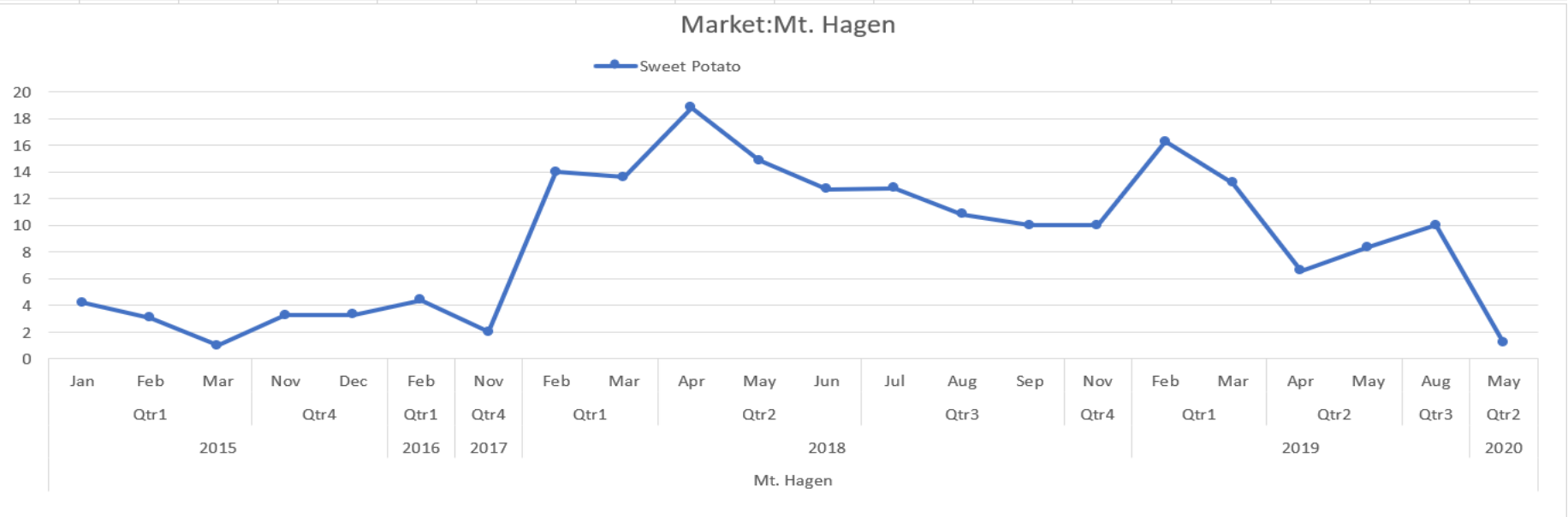
- Peas
- Pineapple
- Potato

Date

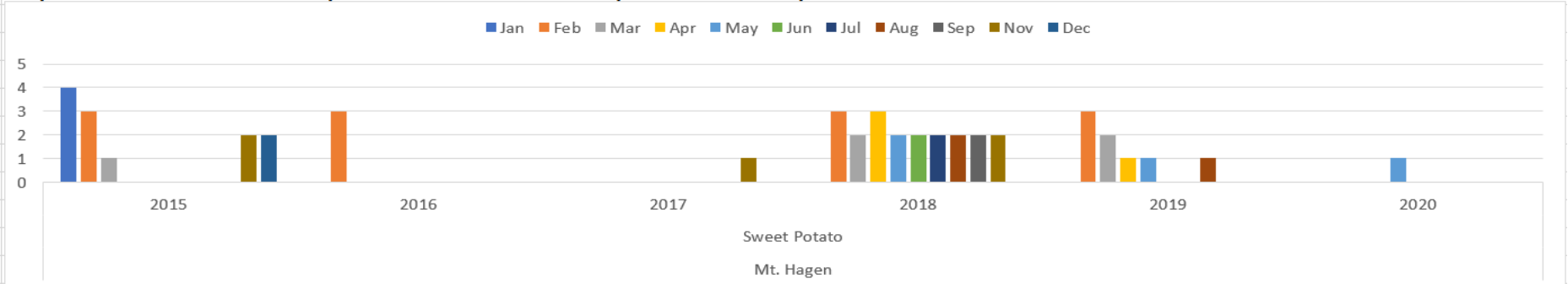
2015 - 2020 YEARS

2012 2013 2014 20

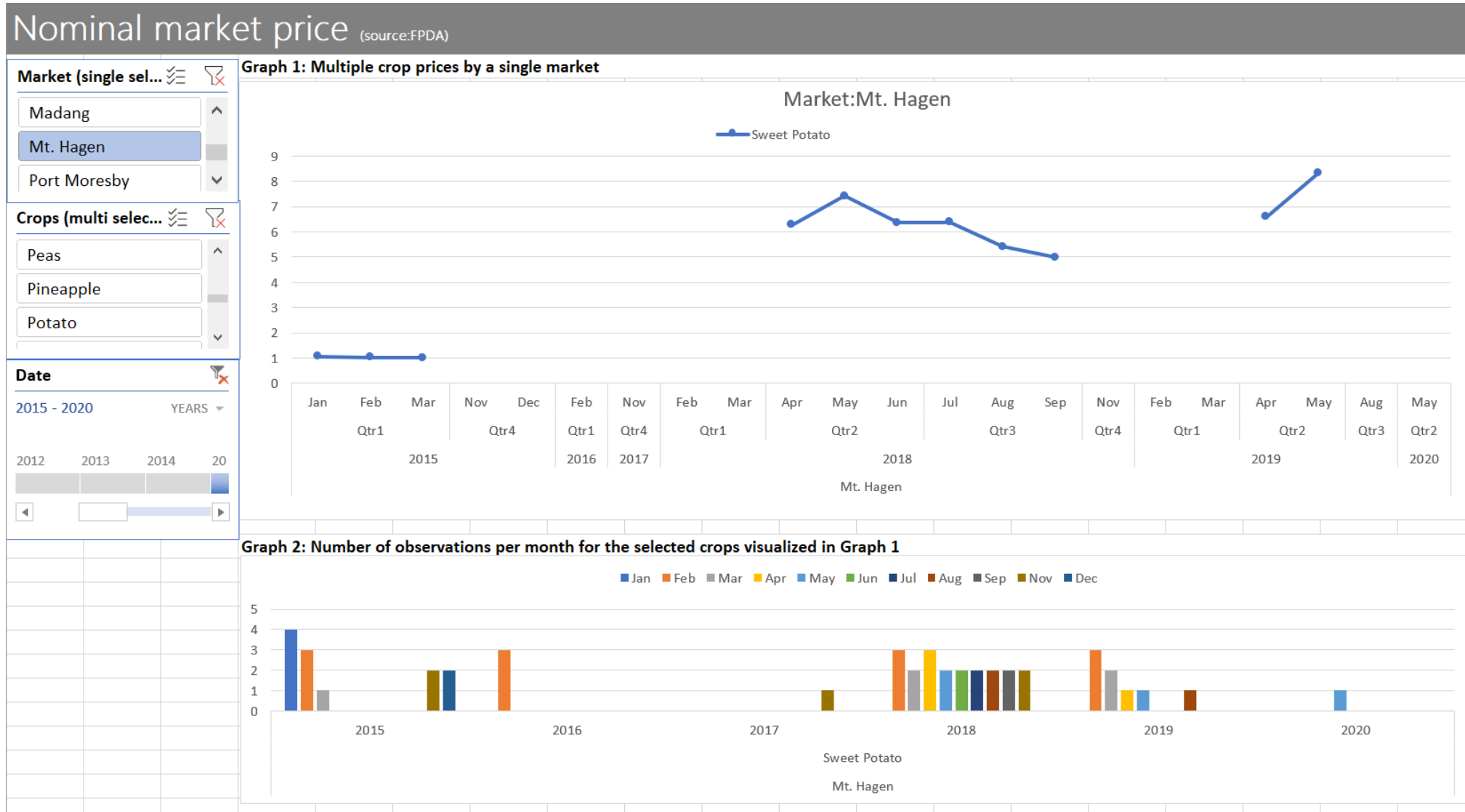
Graph 1: Multiple crop prices by a single market



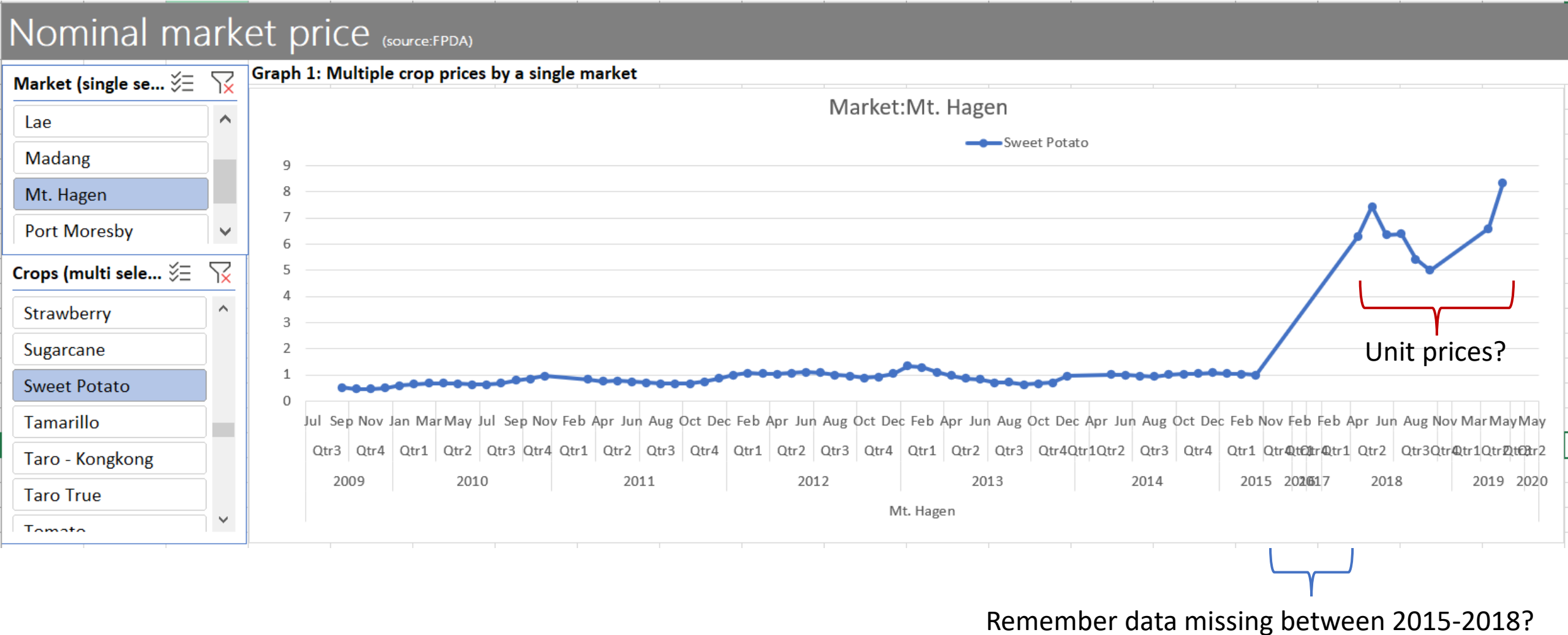
Graph 2: Number of observations per month for the selected crops visualized in Graph 1



Restrict values to only if we have at least 1 observation for three consecutive months



After cleaning and smoothing prices: 3-month average
– relook at the data trend from 2009 → unit issue?





Two visualizations:

1. Multiple markets per crop

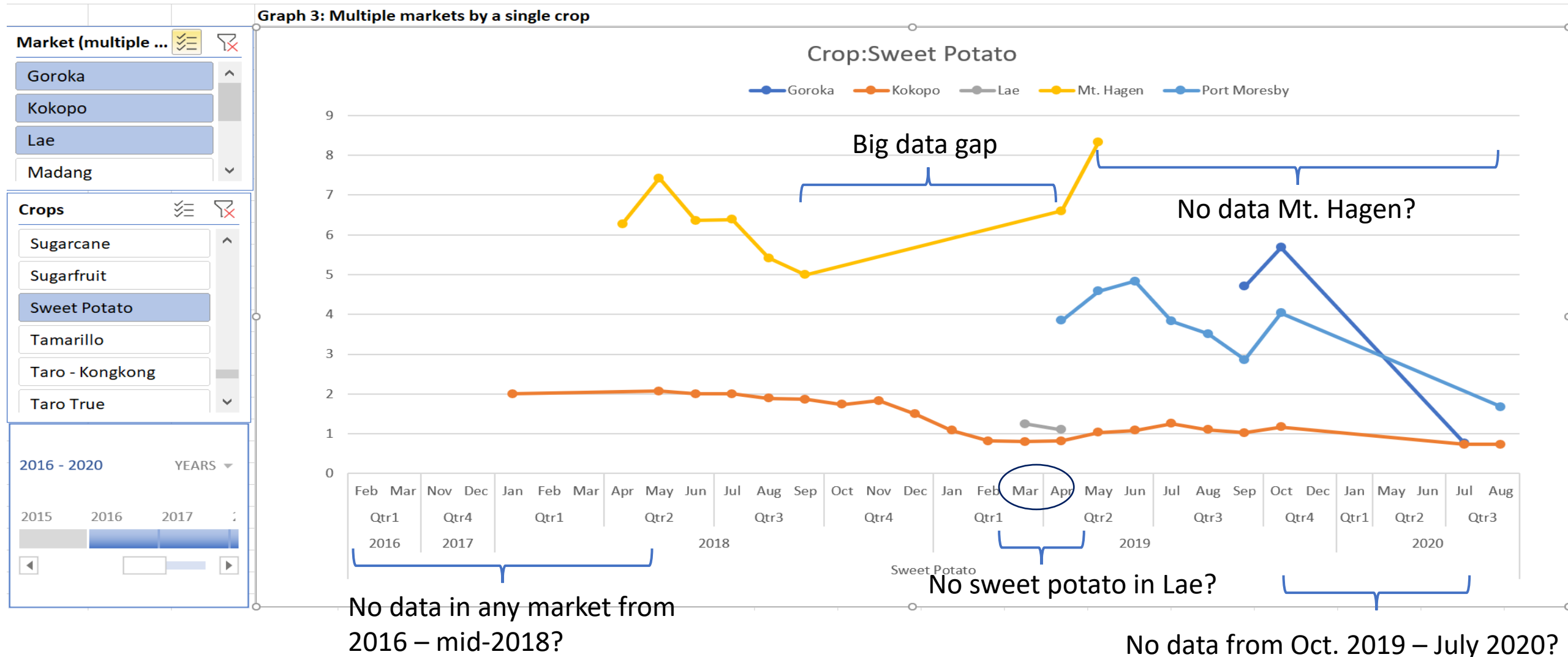
2. Multiple crops per market



Multiple markets
per crop

Selected market and crop

Sweet potato in 2019-2020 in Goroka, Lae, Kokopo and POM



- Mt. Hagen: did the price of sweet potato tick up in 2nd quarter 2019, and then drop (similar to Port Moresby?)
- Goroka: Did the price of sweet potato really fall that much between September 2019 and July 2020? – bumper crop?

Taro - True 2019-2020 in Goroka, Lae, Kokopo and POM

Market (multiple...)

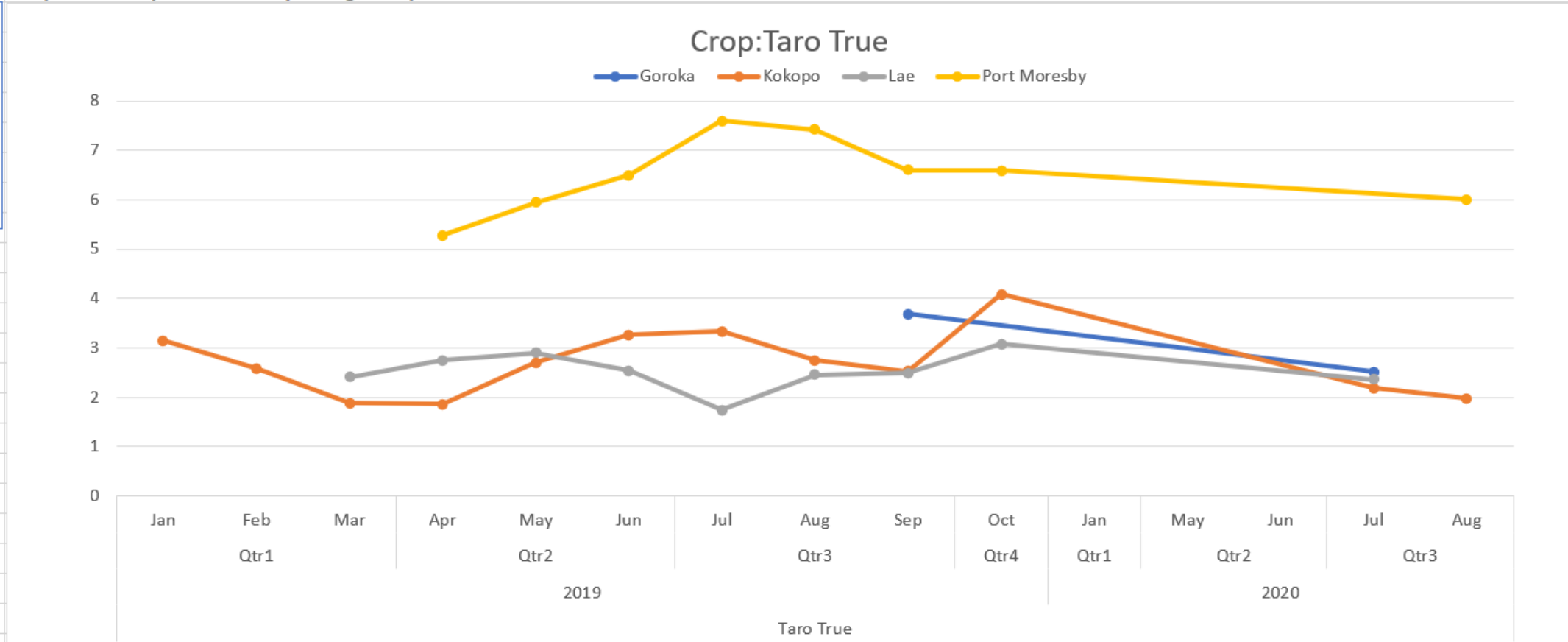
- Goroka
- Kokopo
- Lae
- Madang

Crops

- Sugarcane
- Sugarfruit
- Sweet Potato
- Tamarillo
- Taro - Kongkong
- Taro True

2019 - 2020 YEARS

Graph 3: Multiple markets by a single crop



No Taro in Goroka?

No data from Oct. 2019 – July 2020?

Cooking banana 2019-2020 in Goroka, Lae, Kokopo and POM

Market (multiple...)

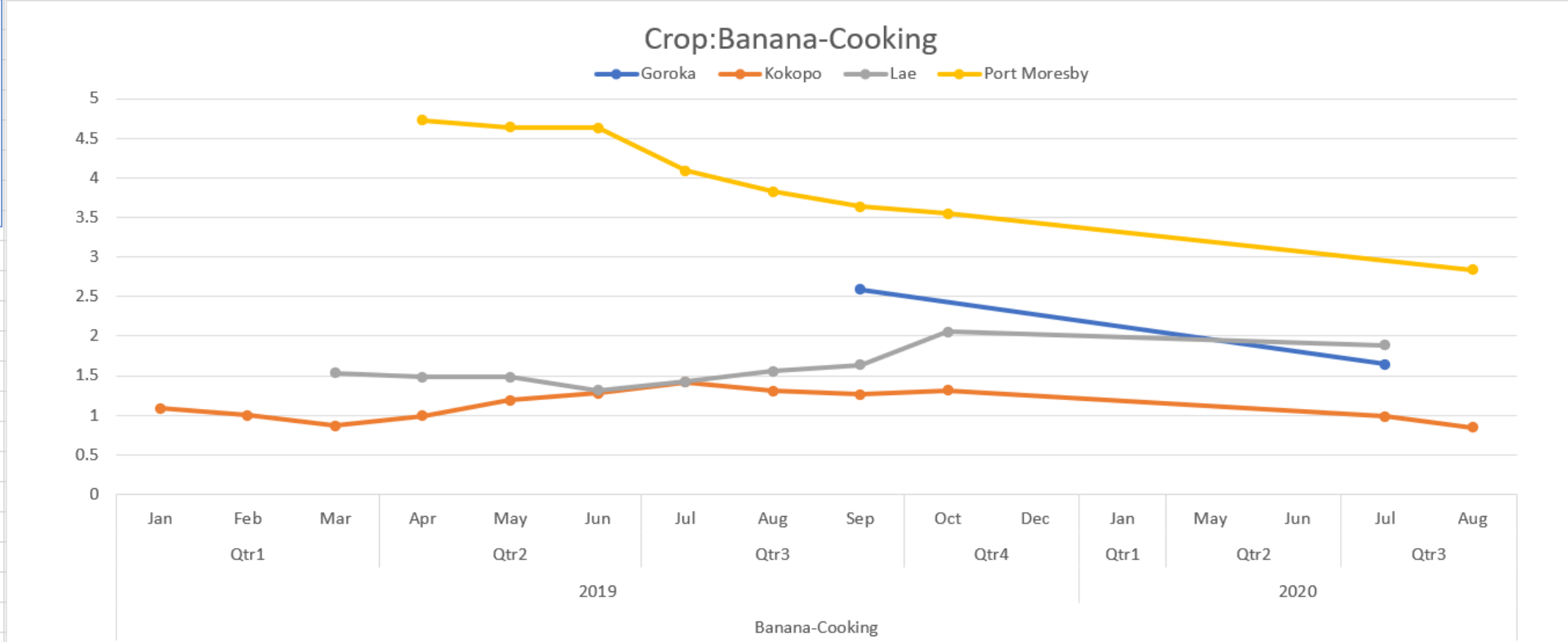
- Goroka
- Kokopo
- Lae
- Madang

Crops

- Banana-Cooking
- Banana-Ripe
- Bean - French
- Bean - Snake
- Bean - Winged
- Broccoli

2019 - 2020 YEARS

Graph 3: Multiple markets by a single crop



No cooking banana in Goroka?

No data from Oct. 2019 – July 2020?

Capsicum 2019-2020 in Goroka, Lae, POM, and Kokopo

Market (multiple...)

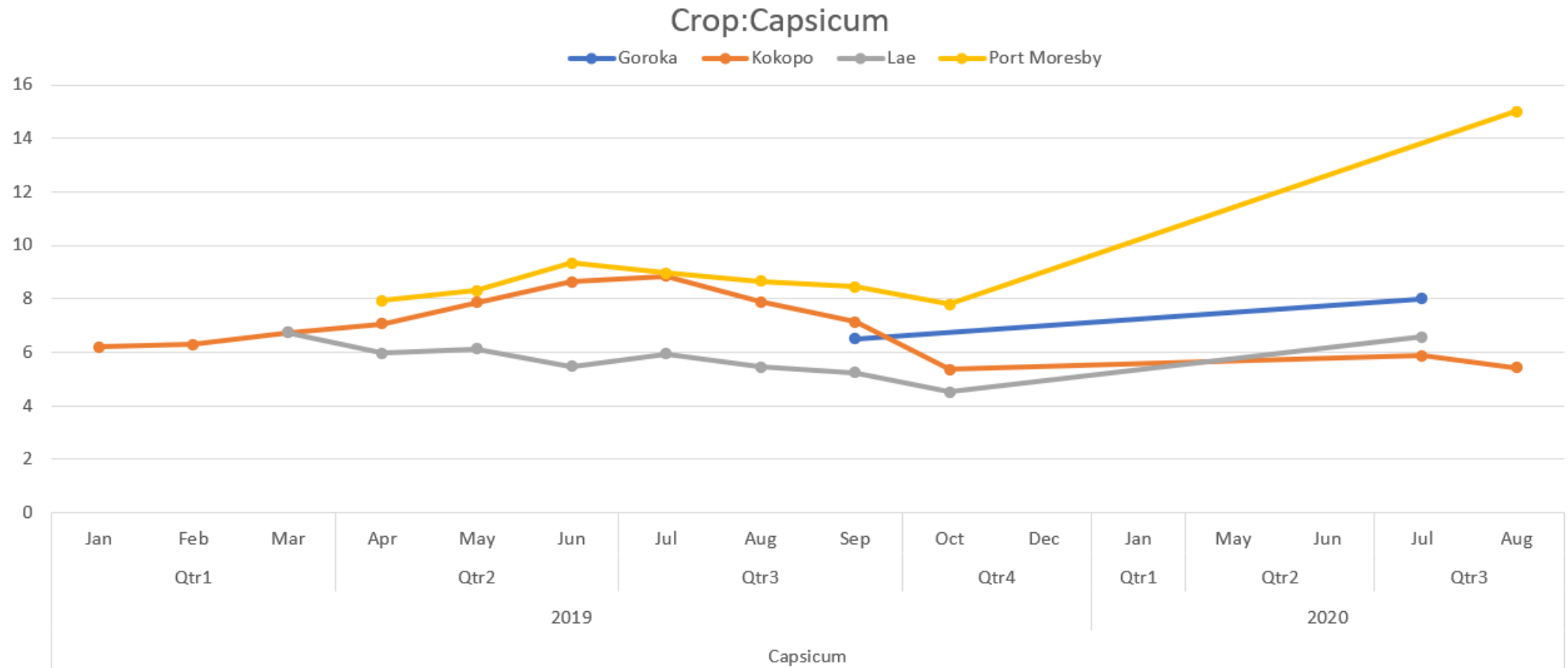
- Goroka
- Kokopo
- Lae
- Madang

Crops

- Broccoli
- Cabbage - chinese
- Cabbage - pakchoi
- Cabbage-English
- Capsicum**
- Carrot

2019 - 2020 YEARS

Graph 3: Multiple markets by a single crop



No data in Goroka?

No data from Oct. 2019 – July 2020?



Multiple crops
per market

Sweet potato, taro and carrot: in Port Moresby

Nominal market price (source:FPDA)

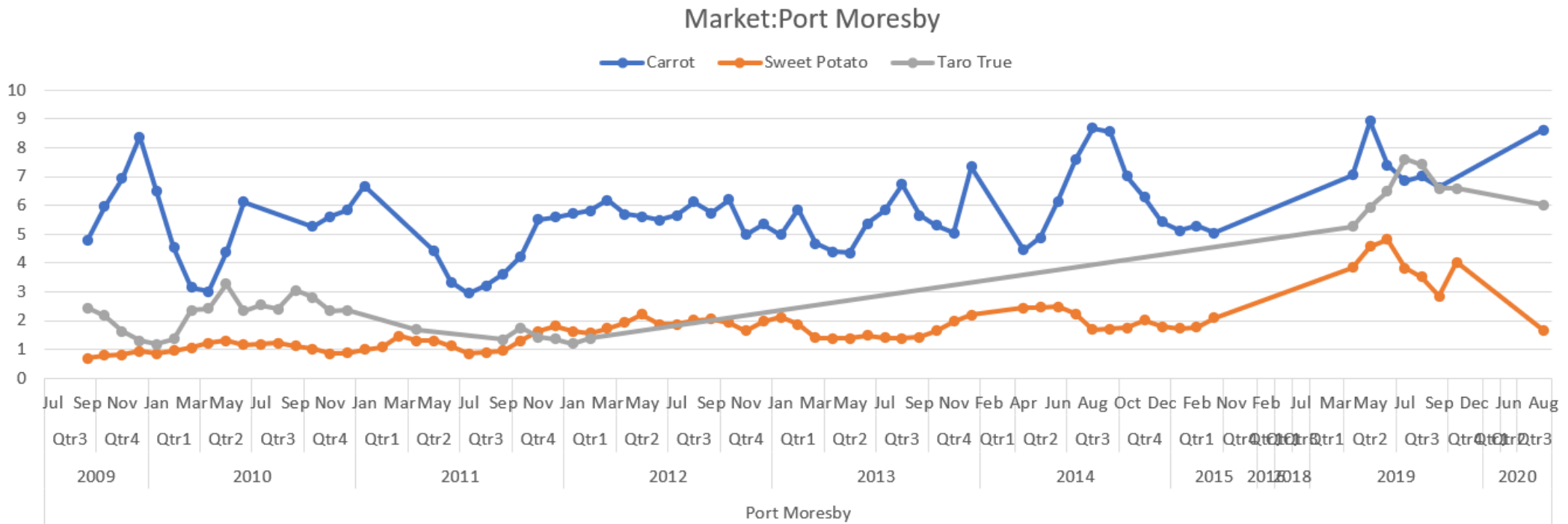
Market (single se...

- Madang
- Mt. Hagen
- Port Moresby

Crops (multi sele...

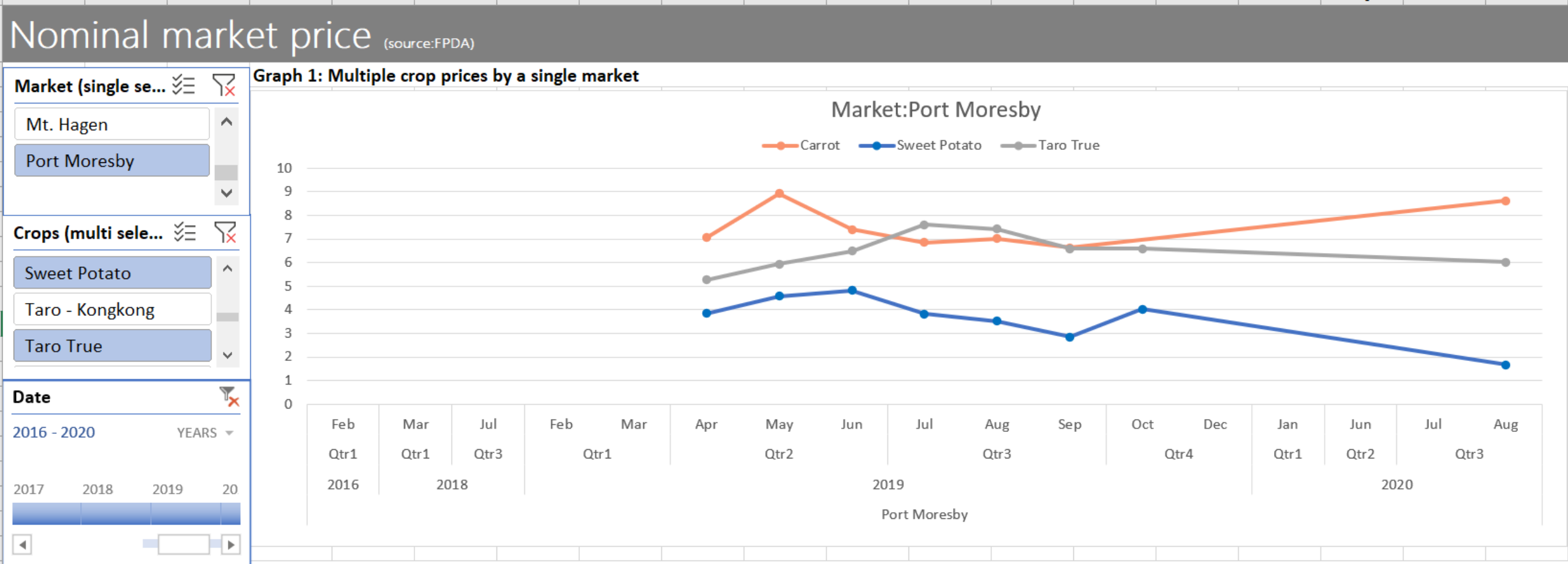
- Pumpkin-tips
- Shallots
- Sugarcane
- Sweet Potato
- Taro - Kongkong
- Taro True
- Tomato

Graph 1: Multiple crop prices by a single market



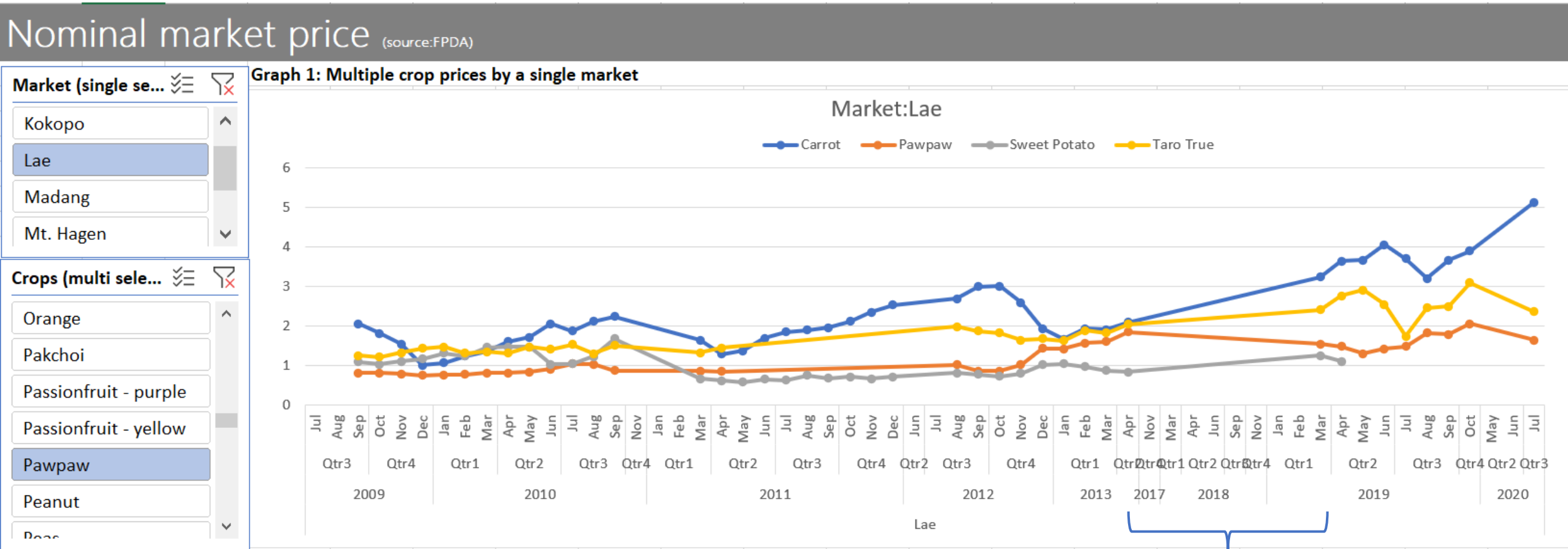
No data in POM for Taro from Feb. 2012– April 2019?

Sweet potato, taro and carrot: in Port Moresby: 2016-2020



No enough data in POM from 2016 – April 2019?

Sweet potato, taro, carrot and Pawpaw: in Lae



- Is taro generally more expensive than Pawpaw in Lae?

Sweet potato, taro and carrot: in Goroka

Nominal market price (source:FPDA)

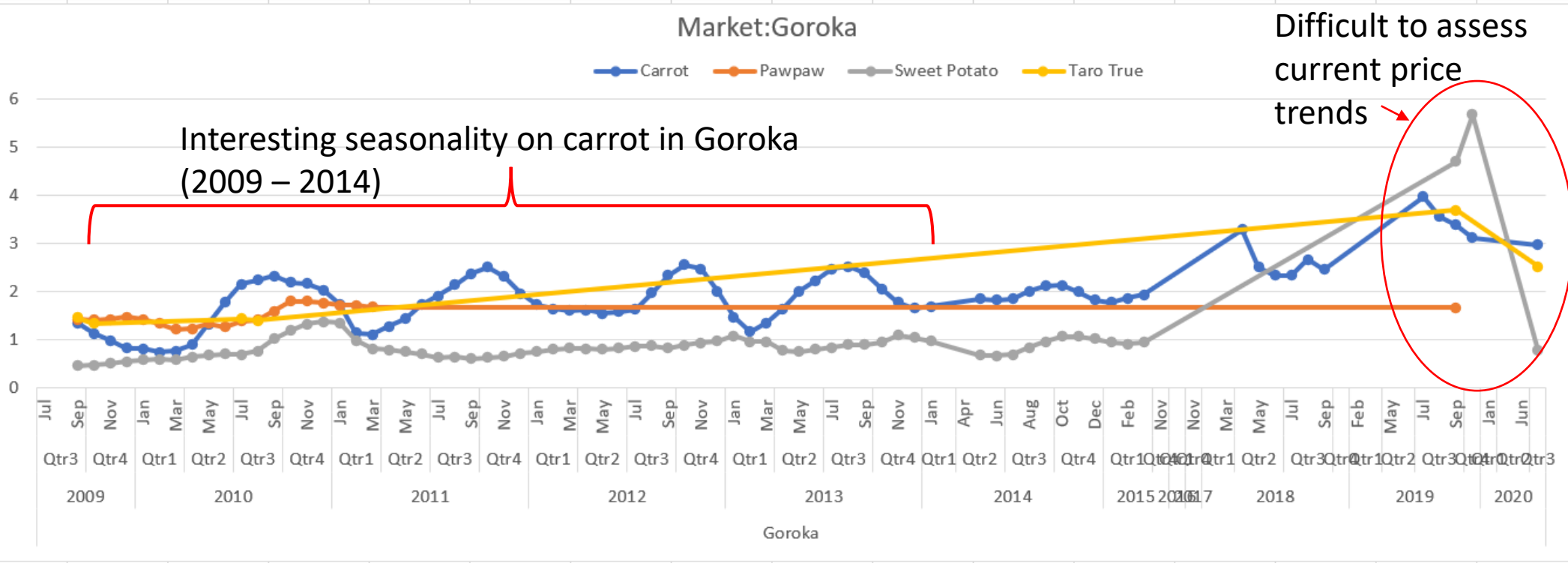
Market (single se...

- Goroka
- Kokopo
- Lae
- Madang

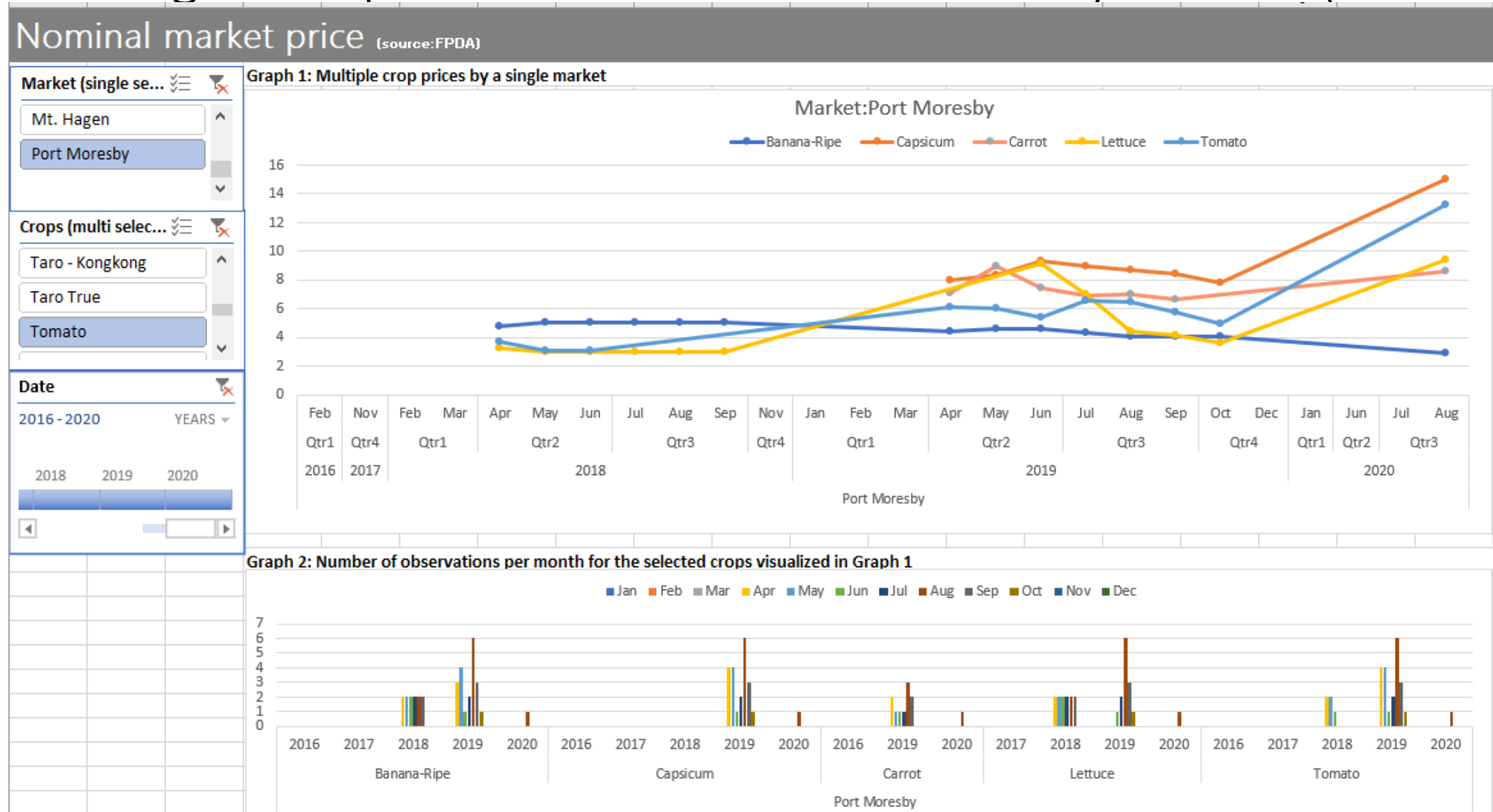
Crops (multi sele...

- Passionfruit - purple
- Passionfruit - yellow
- Pawpaw
- Peanut
- Peas
- Pineapple
- Potato

Graph 1: Multiple crop prices by a single market



Did fresh vegetable prices increase in Port Moresby in 2020 (COVID-19)?



Answer: Maybe?

Visualization: Dashboards in Excel

- Gives quick data insight
- Quick identification of data outliers
- Gaps and trends over time

Visualization: Dashboards in Excel

- Gives quick data insight
- Quick identification of data outliers
- Gaps and trends over time

Explore the dashboard

- Visualize a graph of three crops at single market for
 1. Pawpaw, sweet potato and Taro-true at POM [from 2009-2020 & 2016-2020]
 2. Pawpaw, sweet potato and Taro-true at Lae [from 2009-2020 & 2016-2020]
- Visualize a graph of crop price at three markets for
 1. Carrot at POM, Lae and Goroka [from 2009-2020 & 2016-2020]
 2. Sweet potato at POM, Lae and Goroka [from 2009-2020 & 2016-2020]

Pawpaw, sweet potato and Taro-true in POM (2009-2020)

Nominal market price (source:FPDA)

Market (single selection)

- Mt. Hagen
- Port Moresby**

Crops (multiple selection)

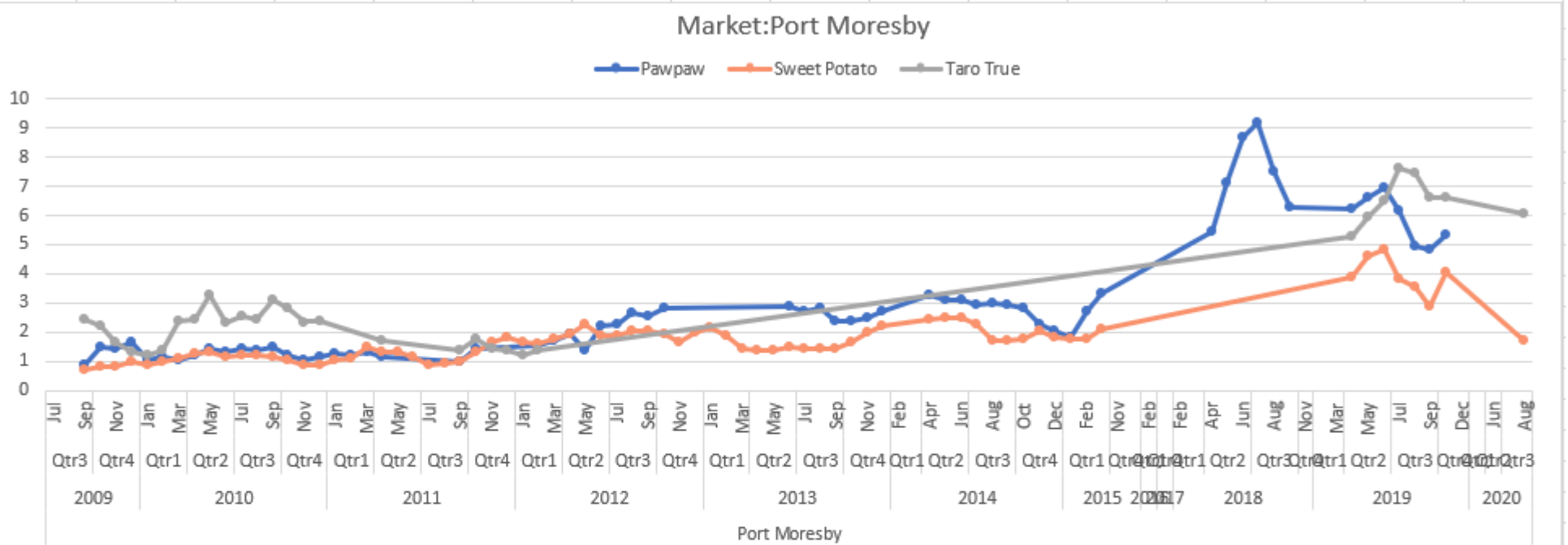
- Taro - Kongkong
- Taro True**
- Tomato

Date

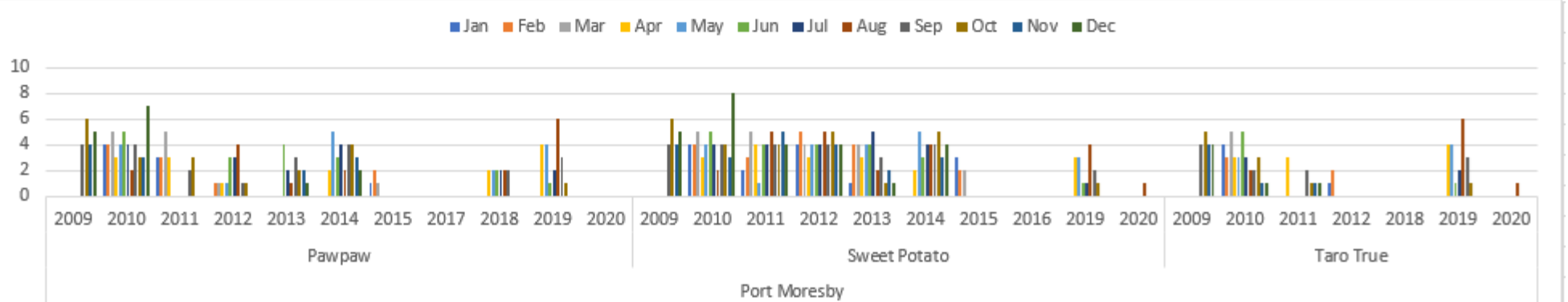
2009 - 2020 YEARS

2009 2010 2011 2020

Graph 1: Multiple crop prices by a single market



Graph 2: Number of observations per month for the selected crops visualized in Graph 1



Pawpaw, sweet potato and Taro-true in Lae (2016-2020)

Nominal market price (source:FPDA)

Market (single se...

- Kokopo
- Lae**
- Madang

Crops (multi selec...

- Pumpkin-tips
- Shallots
- Sugarcane

Date

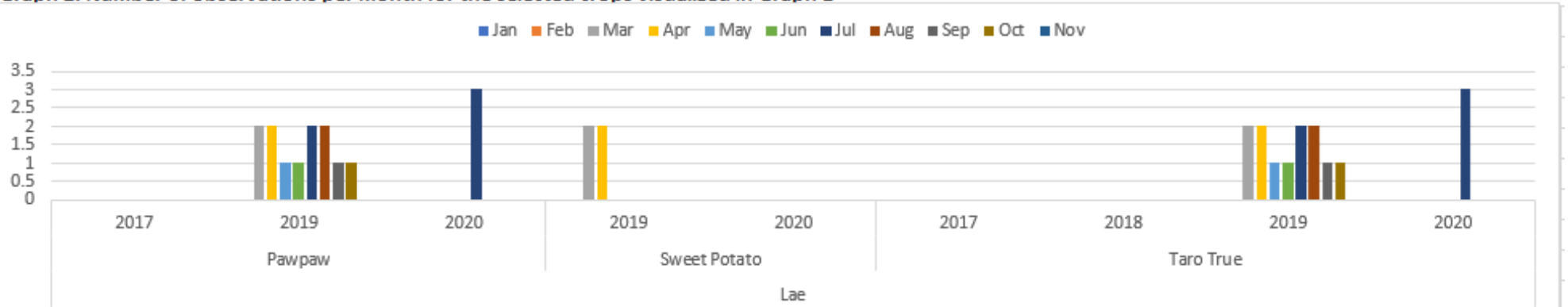
2016 - 2020 YEARS

2018 2019 2020

Graph 1: Multiple crop prices by a single market



Graph 2: Number of observations per month for the selected crops visualized in Graph 1



Carrot in POM, Lae and Goroka (2009-2020)

Graph 3: Multiple markets by a single crop

Market (multiple...)

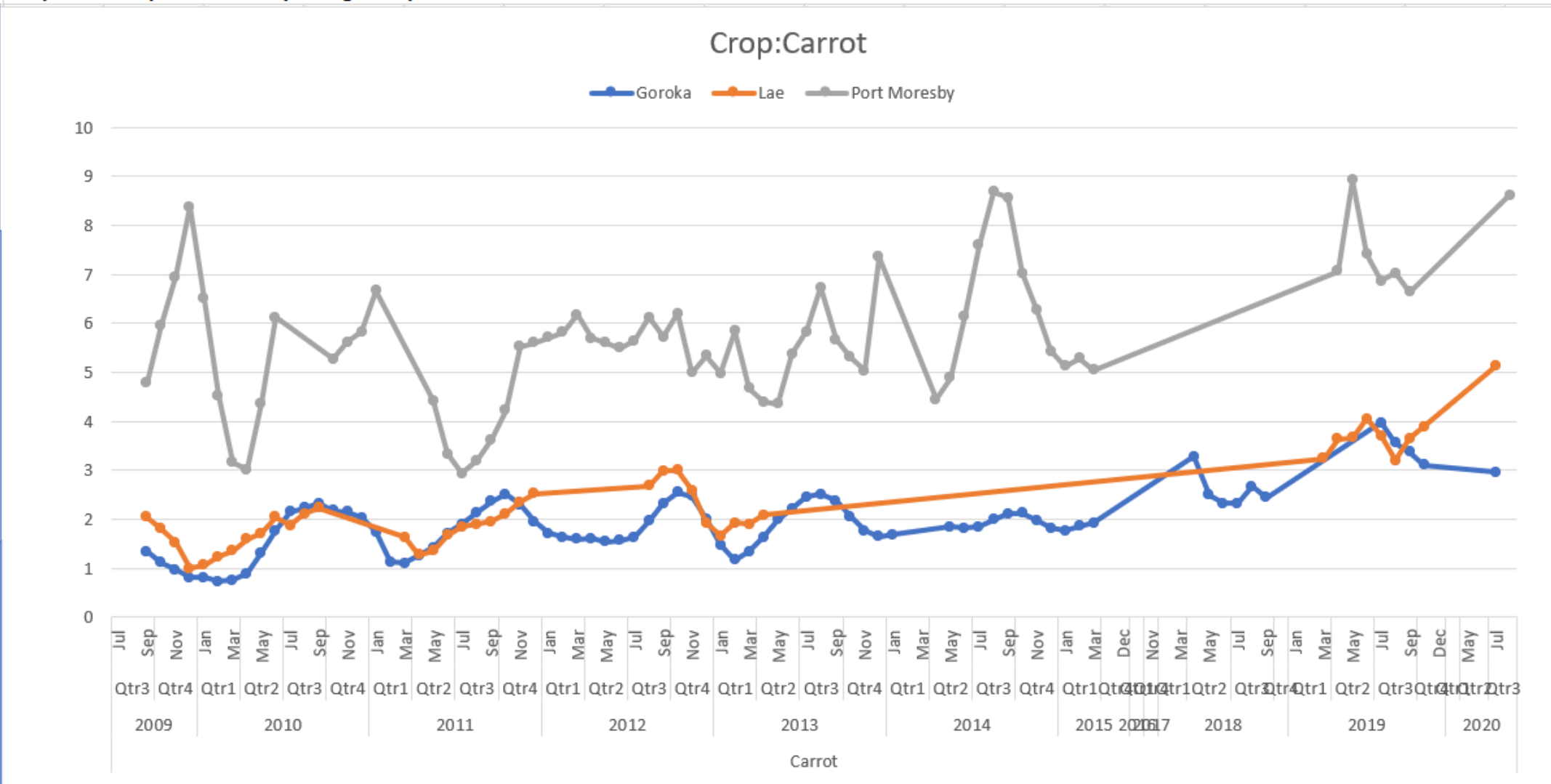
- Goroka
- Lae
- Mt. Hagen
- Port Moresby

Crops

- Broccoli
- Cabbage - chinese
- Cabbage - pakchoi
- Cabbage-English
- Capsicum
- Carrot

2009 - 2020 YEARS

2009 2010 2011 20



Carrot in POM, Lae and Goroka (2016-2020)

Graph 3: Multiple markets by a single crop

Market (multiple...)

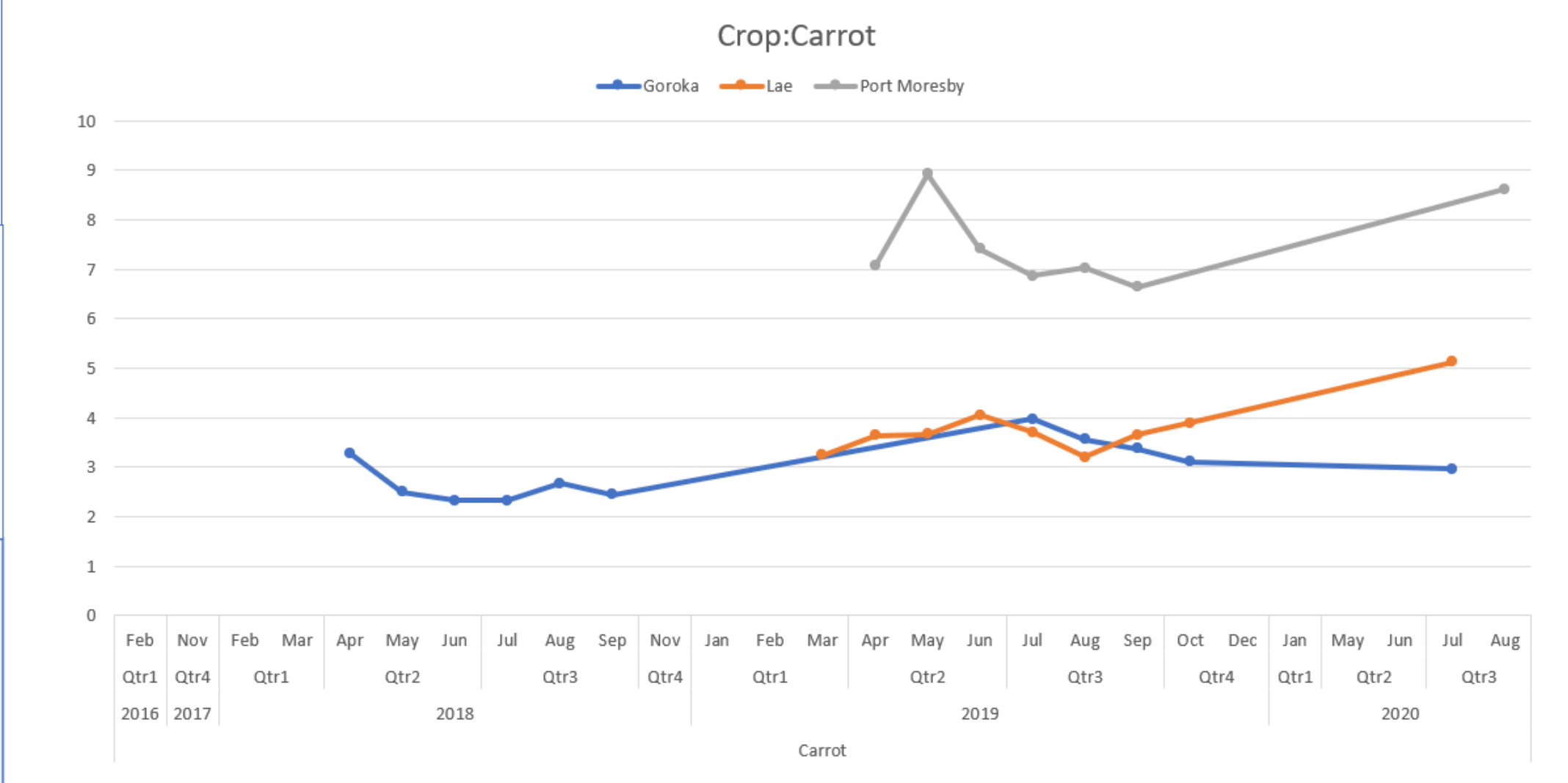
- Goroka
- Lae
- Madang
- Mt. Hagen

Crops

- Broccoli
- Cabbage - chinese
- Cabbage - pakchoi
- Cabbage-English
- Capsicum
- Carrot

2016 - 2021 YEARS

2019 2020 2021



Sweet Potato in POM, Lae and Goroka (2009 -2020)

Graph 3: Multiple markets by a single crop

Market (multiple...)

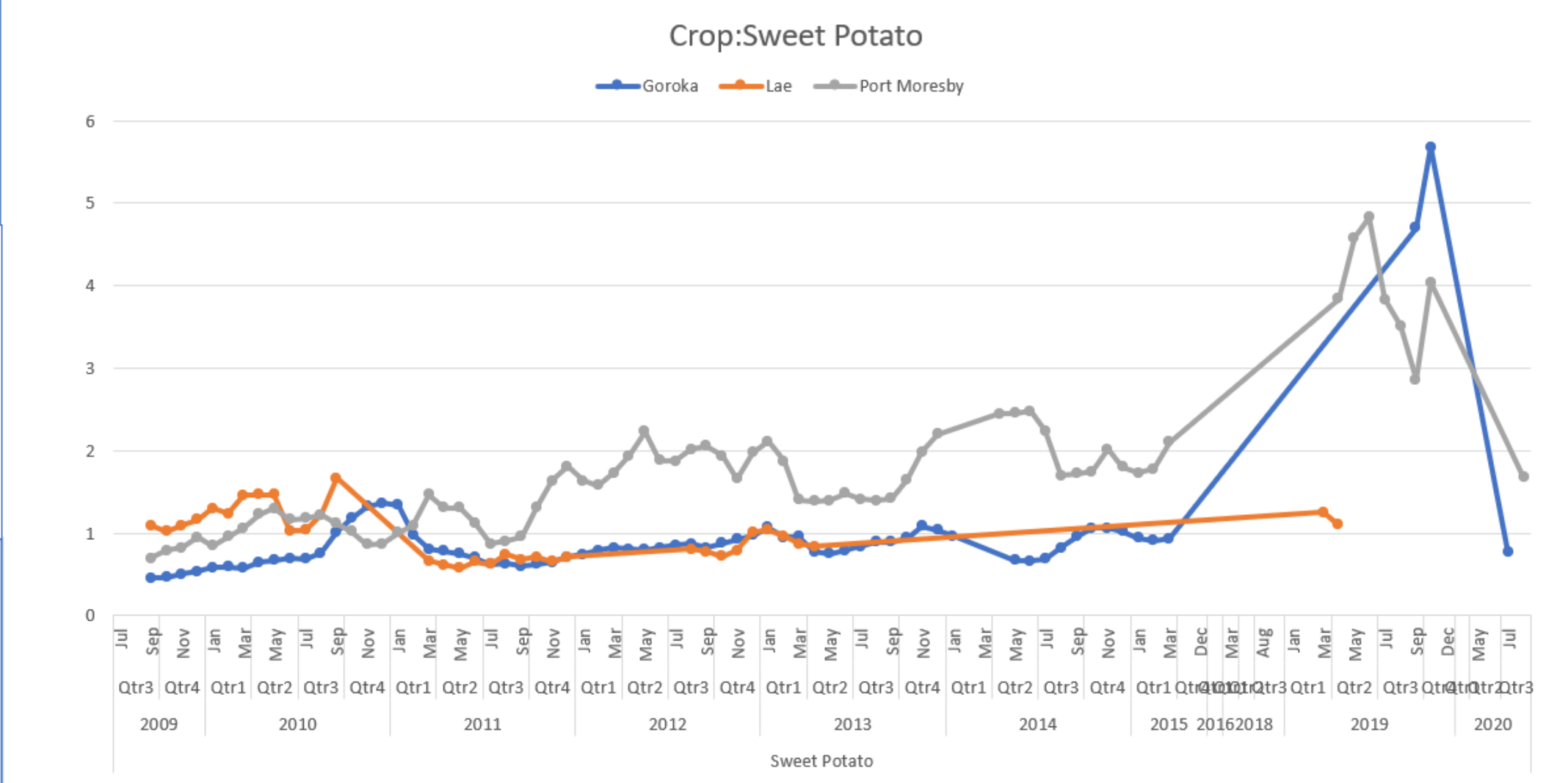
- Goroka
- Kokopo
- Lae
- Madang

Crops

- Silverbeet
- Strawberry
- Sugarcane
- Sugarfruit
- Sweet Potato
- Tamarillo

2009 - 2020 YEARS

2009 2010 2011 20



Sweet Potato in POM, Lae and Goroka (2016 -2020)

Graph 3: Multiple markets by a single crop

Market (multiple...)

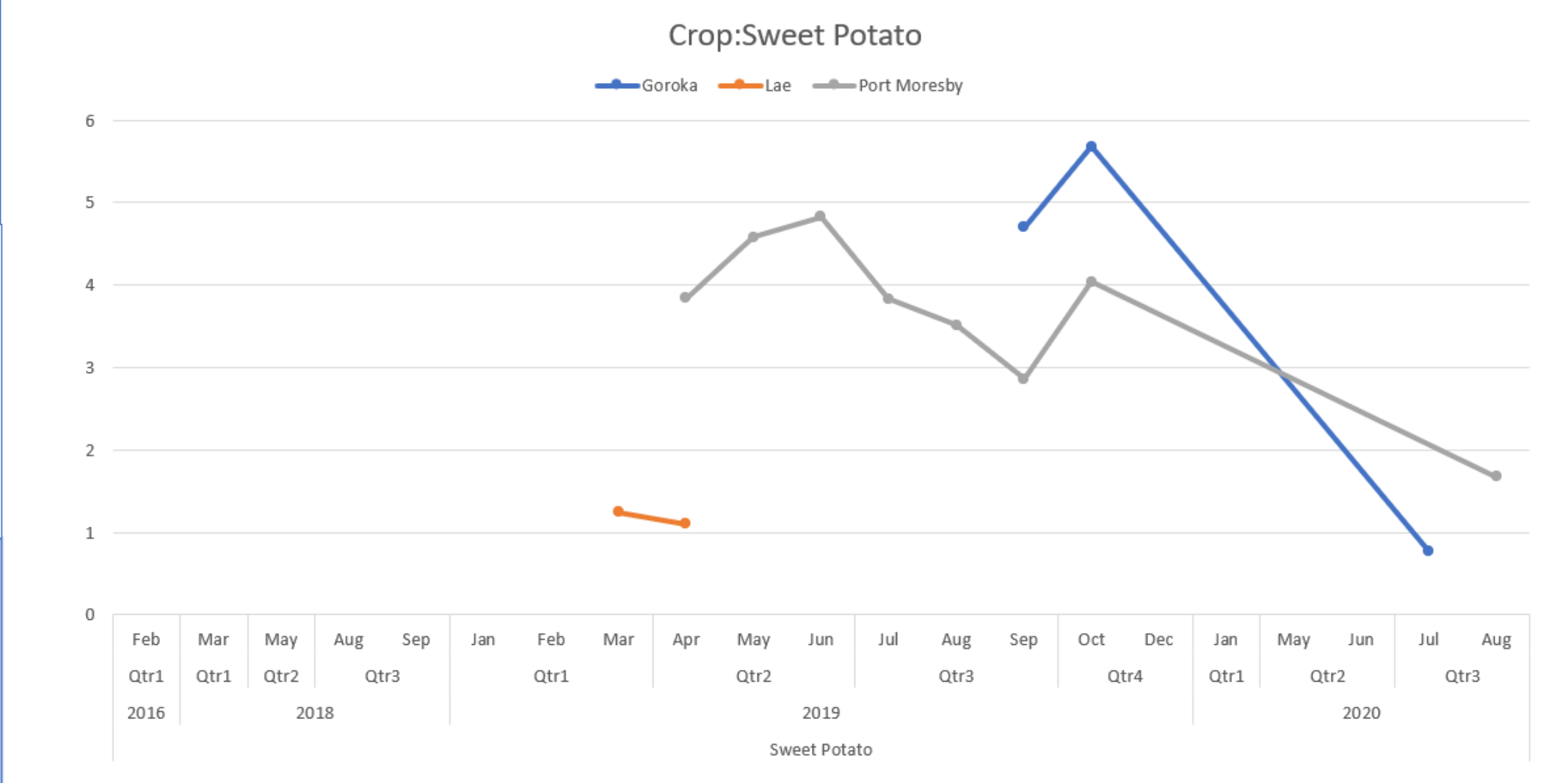
- Goroka
- Kokopo
- Lae
- Madang

Crops

- Silverbeet
- Strawberry
- Sugarcane
- Sugarfruit
- Sweet Potato
- Tamarillo

2016 - 2021 YEARS

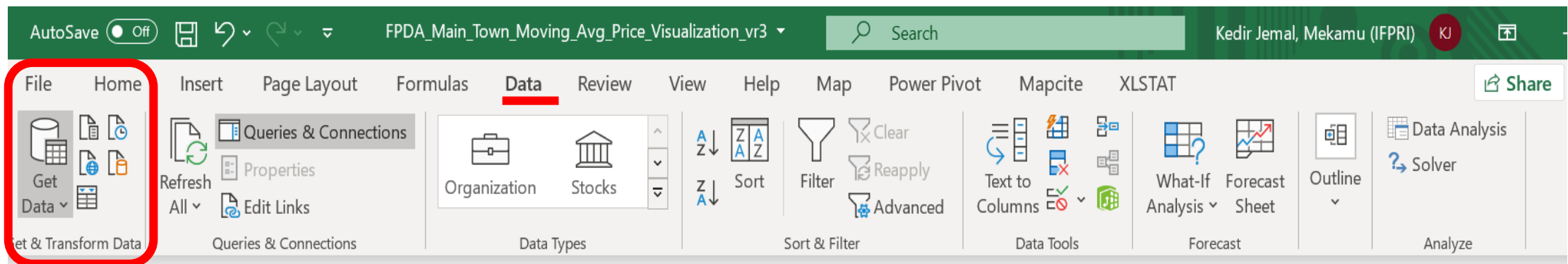
2019 2020 2021



The following is a simple guide intended to show how the market price data visualized in Microsoft excel

What Is Power Query?

- It is a tool available in Excel that allows import data from many different sources
- Able to clean, transform and reshape data as needed
- It is available as an add-in for Excel 2010 and 2013 and will appear as a new tab in the ribbon labelled **Power Query**.
- In 2016 it was renamed to **Get & Transform** and appears in the **Data** tab without the need to install any add-in.

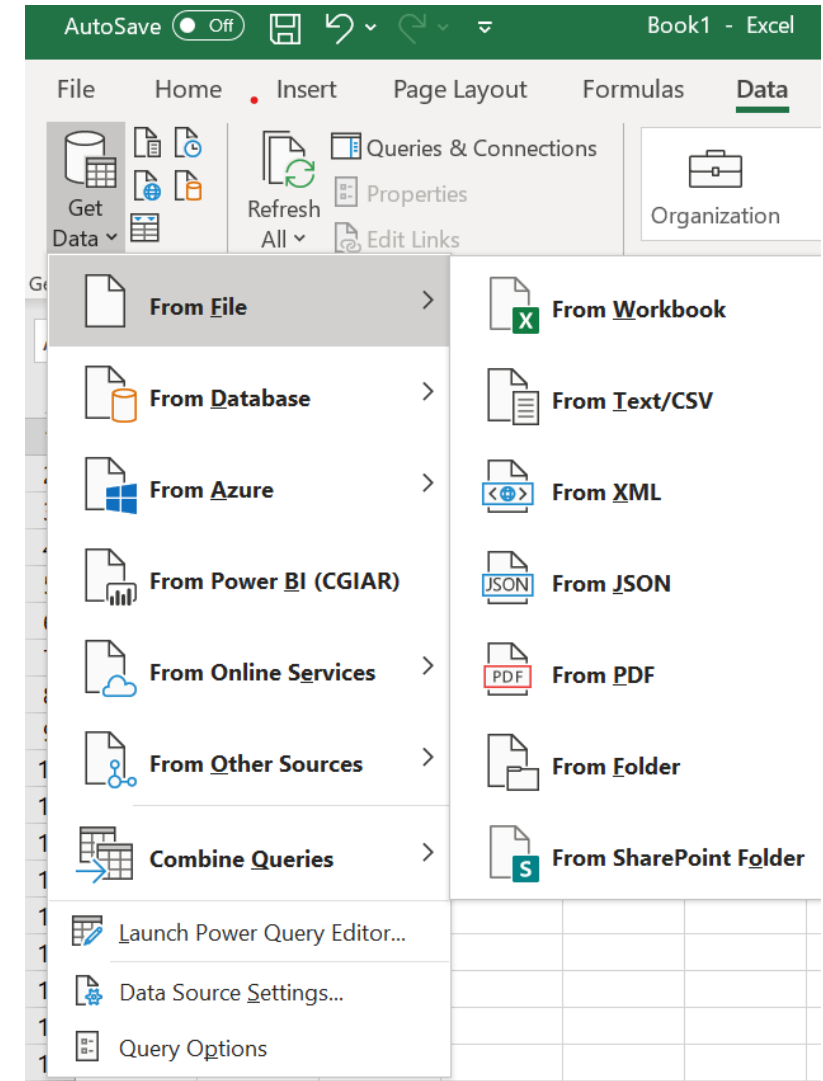


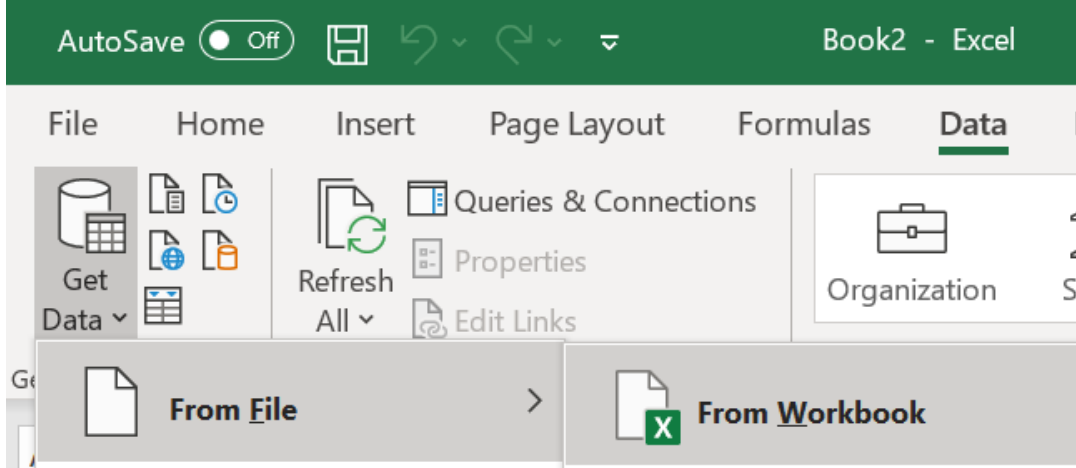
Importing Data With Power Query

Power Query provides many data type options to import

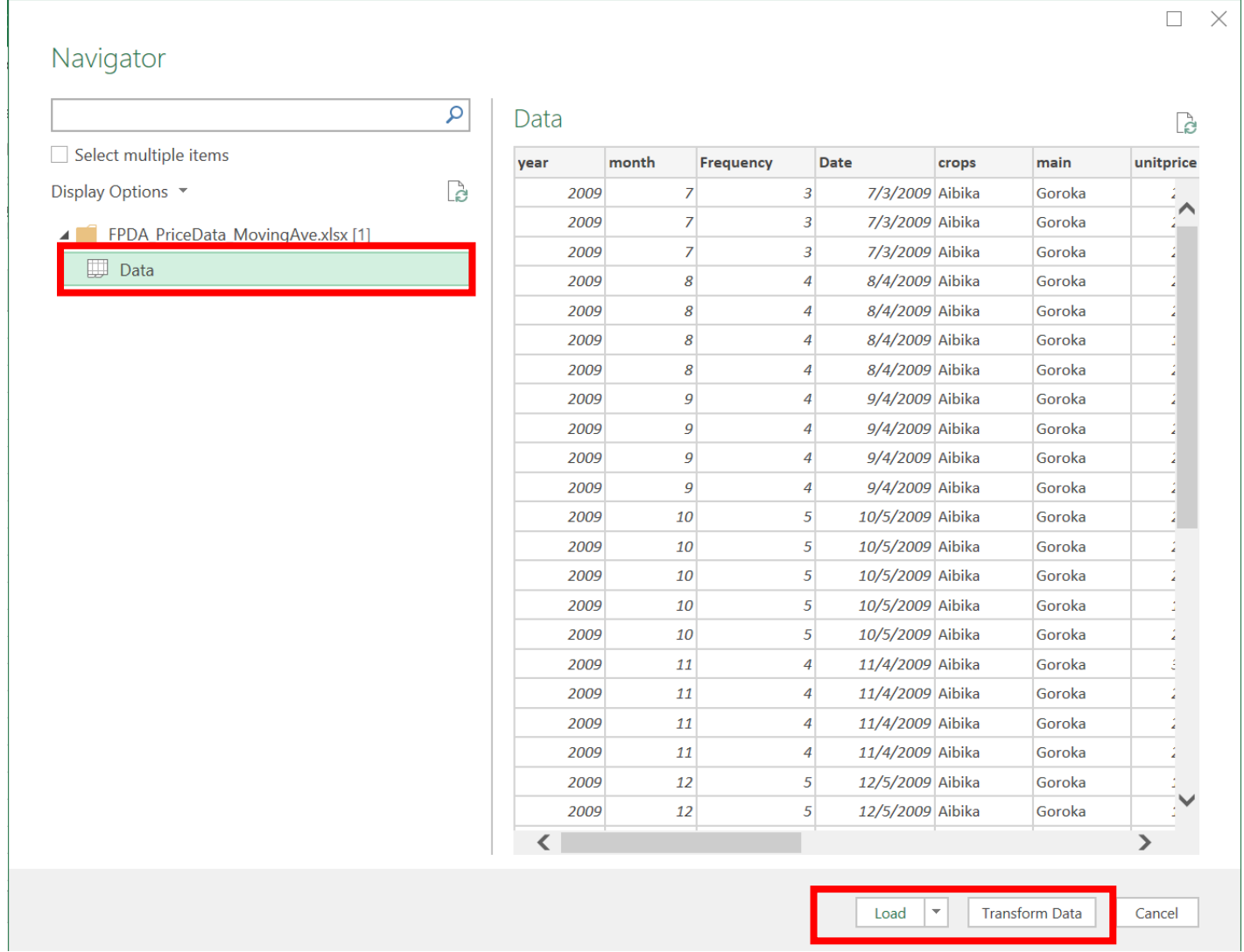
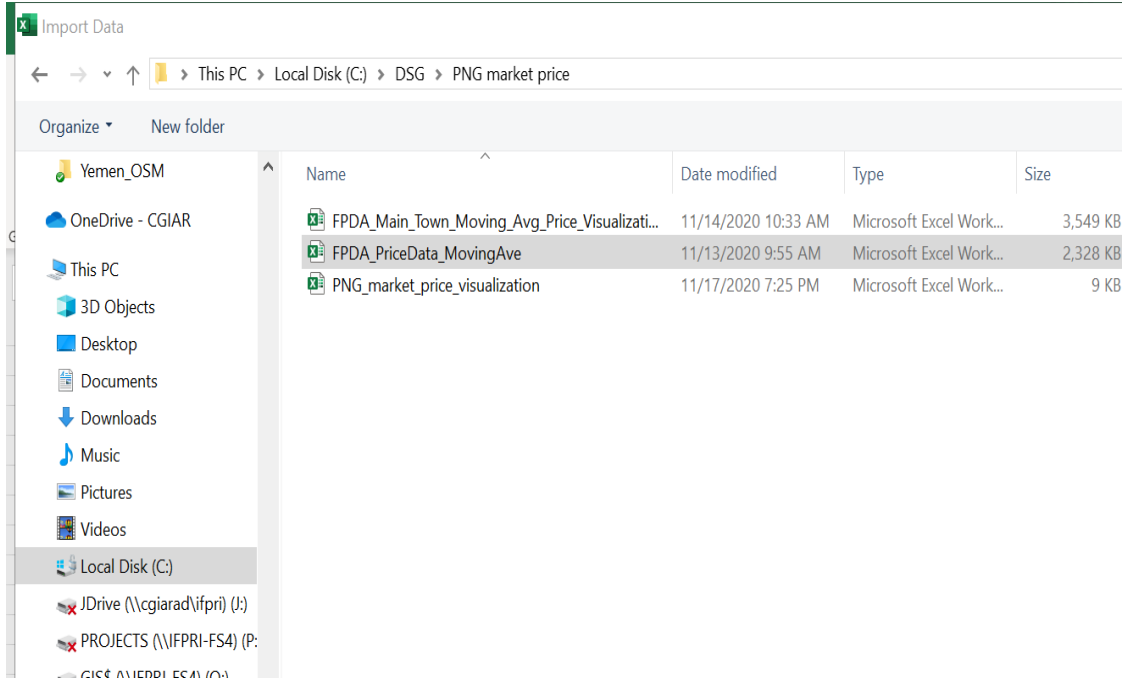
Under **Data** tab click **Get Data** command

- Get data from a **single file** such as an Excel workbook, Text or CSV file, XML and JSON files
- You can also import multiple files from within a given folder





Locate market price excel file



Load the data as is by pressing the **Load** button or proceed to the query editor to apply any data transformation steps by pressing the **Transform Data** button

Here you can edit and transform the data like data type, merge, append, replace error, etc

The screenshot shows the Microsoft Power Query Editor interface. The top ribbon includes tabs for File, Home, Transform, Add Column, and View. The Transform tab is active, showing options like 'Data Type: Whole Number', 'Merge Queries', 'Append Queries', 'Combine Files', 'Manage Parameters', 'Data source settings', and 'New Source'. The main area displays a data table with columns for year, month, frequency, date, and crop names. A 'Query Settings' pane on the right shows the 'APPLIED STEPS' list, with 'Changed Type' selected. A red box highlights the 'Close & Load' button in the ribbon, and a tooltip explains its function: 'Save your changes to this query, close the Query Editor window, and load results to the default destination.'

	12 ₃ year	12 ₃ month	12 ₃ Frequency	Date	A _B C crops	A _B C main
1	2009	7	3	7/3/2009	Aibika	Goroka
2	2009	7	3	7/3/2009	Aibika	Goroka
3	2009	7	3	7/3/2009	Aibika	Goroka
4	2009	8	4	8/4/2009	Aibika	Goroka
5	2009	8	4	8/4/2009	Aibika	Goroka
6	2009	8	4	8/4/2009	Aibika	Goroka
7	2009	8	4	8/4/2009	Aibika	Goroka
8	2009	9	4	9/4/2009	Aibika	Goroka
9	2009	9	4	9/4/2009	Aibika	Goroka
10	2009	9	4	9/4/2009	Aibika	Goroka
11	2009	9	4	9/4/2009	Aibika	Goroka
12	2009	10	5	10/5/2009	Aibika	Goroka
13	2009	10	5	10/5/2009	Aibika	Goroka
14	2009	10	5	10/5/2009	Aibika	Goroka
15	2009	10	5	10/5/2009	Aibika	Goroka

To load the data click **Close & Load**

The screenshot shows the Microsoft Excel interface with the Data tab selected on the ribbon. The ribbon includes options like Get Data, Refresh, Properties, and various data analysis tools. The task pane on the right, titled 'Queries & Connections', shows a query named 'Data' with 40,136 rows loaded. The main spreadsheet area displays a table with columns for year, month, frequency, date, crops, main, unitprice, and movingave_a through c.

year	month	Frequency	Date	crops	main	unitprice	movingave_a	movingave_b	movingave_c
2009	7	3	7/3/2009	Aibika	Goroka	2.173913002			
2009	7	3	7/3/2009	Aibika	Goroka	2.127659559			
2009	7	3	7/3/2009	Aibika	Goroka	2.617800951			
2009	8	4	8/4/2009	Aibika	Goroka	2.511773825			
2009	8	4	8/4/2009	Aibika	Goroka	2.169981956			
2009	8	4	8/4/2009	Aibika	Goroka	1.984126925			
2009	8	4	8/4/2009	Aibika	Goroka	2.192448139			
2009	9	4	9/4/2009	Aibika	Goroka	2.183406115	2.345397472	2.345397472	2.345397472
2009	9	4	9/4/2009	Aibika	Goroka	2.649006605	2.345397472	2.345397472	2.345397472
2009	9	4	9/4/2009	Aibika	Goroka	2.747252703	2.345397472	2.345397472	2.345397472
2009	9	4	9/4/2009	Aibika	Goroka	2.442002535	2.345397472	2.345397472	2.345397472
2009	10	5	10/5/2009	Aibika	Goroka	2.649006605	2.391216516	2.391216516	2.391216516
2009	10	5	10/5/2009	Aibika	Goroka	2.919708014	2.391216516	2.391216516	2.391216516
2009	10	5	10/5/2009	Aibika	Goroka	2.298850536	2.391216516	2.391216516	2.391216516
2009	10	5	10/5/2009	Aibika	Goroka	1.800180078	2.391216516	2.391216516	2.391216516
2009	10	5	10/5/2009	Aibika	Goroka	2.538071156	2.391216516	2.391216516	2.391216516
2009	11	4	11/4/2009	Aibika	Goroka	3.325942278	2.537562609	2.537562609	2.537562609
2009	11	4	11/4/2009	Aibika	Goroka	2.496532679	2.537562609	2.537562609	2.537562609
2009	11	4	11/4/2009	Aibika	Goroka	2.459016323	2.537562609	2.537562609	2.537562609
2009	11	4	11/4/2009	Aibika	Goroka	2.479338884	2.537562609	2.537562609	2.537562609

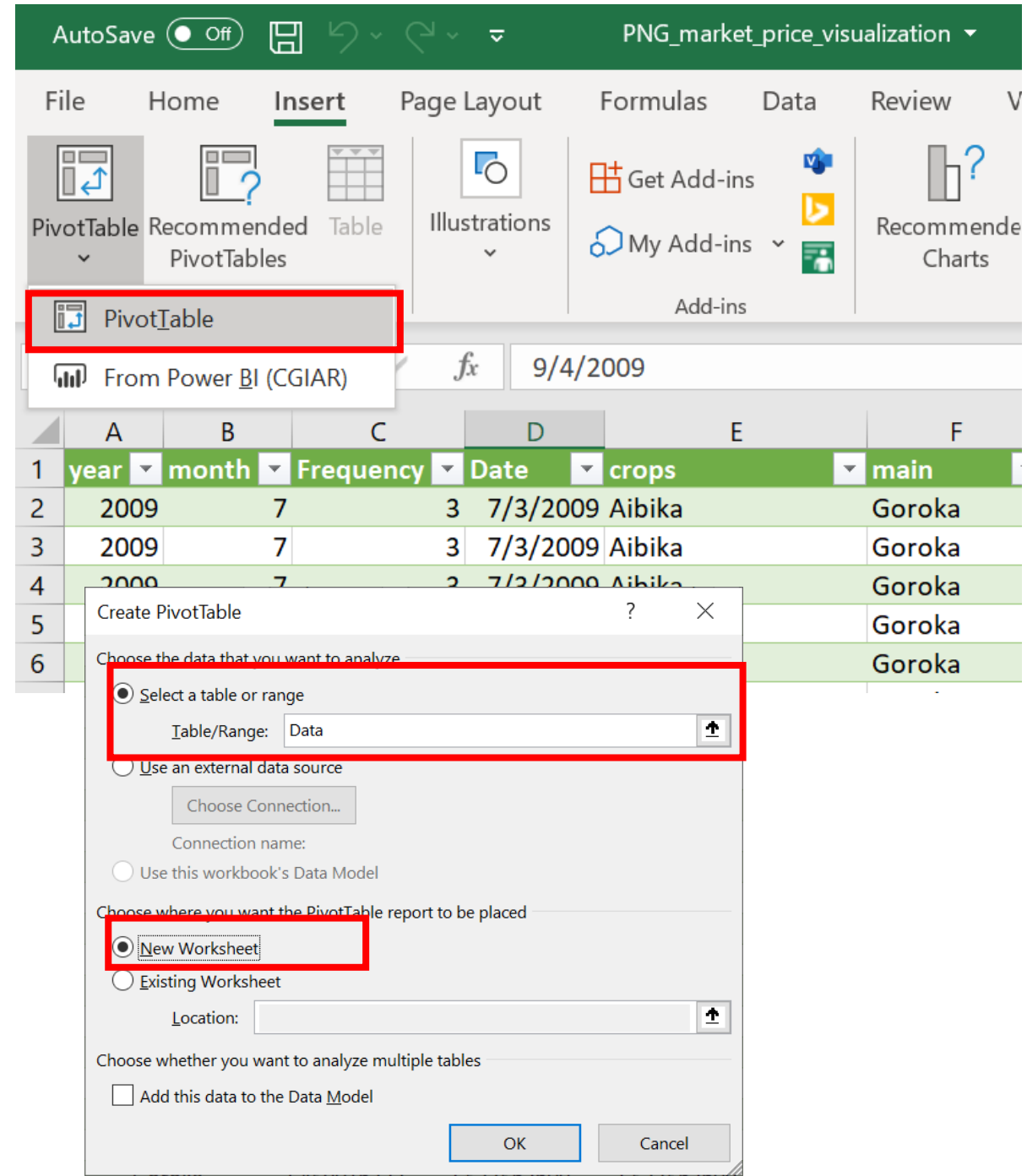
- When you use the **Close & Load To** option it loads the query to a **table**. If **import data** dialog option appears choose **table** to load the data as a table
- Rename the sheet 'Data'
- Outside of the power query editor, to access queries in the workbook go to **Data** tab in the Excel ribbon, then press the **Queries & Connections** command button. It will be docked to the right-hand side of the workbook.

Pivot Tables

- PivotTables helps make worksheets more manageable by summarizing data and allowing you to manipulate it in different ways
- A PivotTable can instantly calculate and summarize the data in a way that's both easy to read and manipulate

Create a PivotTable

- Select the table or cells (including column headers) containing the data you want to use
- From the Insert tab, click the PivotTable command
- The Create PivotTable dialog box will appear. Choose your settings, then click OK.
- In our case, we'll use *Data* as our source data and place the PivotTable on a new worksheet



A blank PivotTable and Field List will appear on a new worksheet

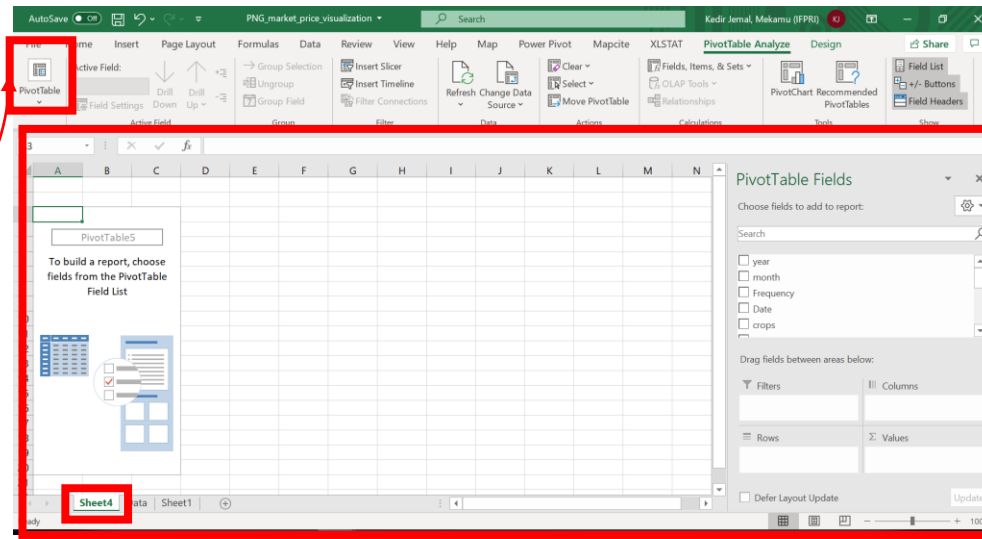
Rename the new sheet 'Crops per market'

Once you create a PivotTable (give a name-crops per market), choose which fields to add.

Each field is simply a column header from the market price data.

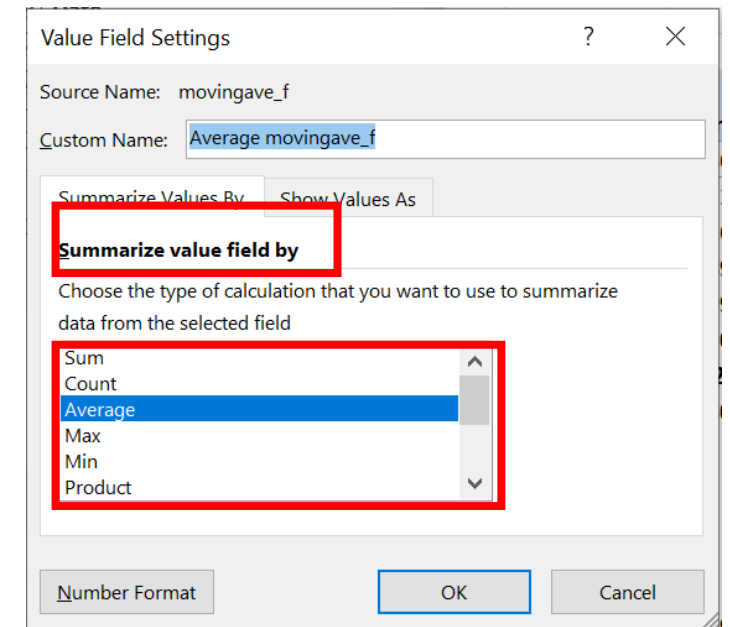
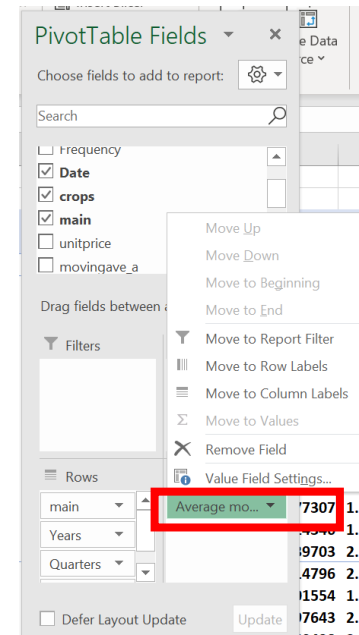
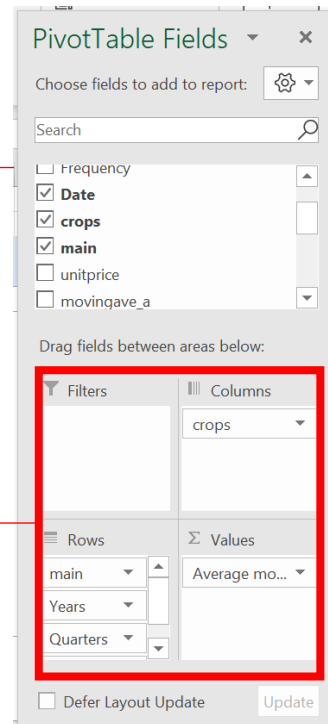
In the PivotTable Field List, check the box for each field you wish to add.

In our example, we want to show crop price for each market over time, so we'll drag *markets (main)* and *date & year* under 'Rows', *crops* to 'Columns' field and drag *price(movingave_f)* to 'Value' field



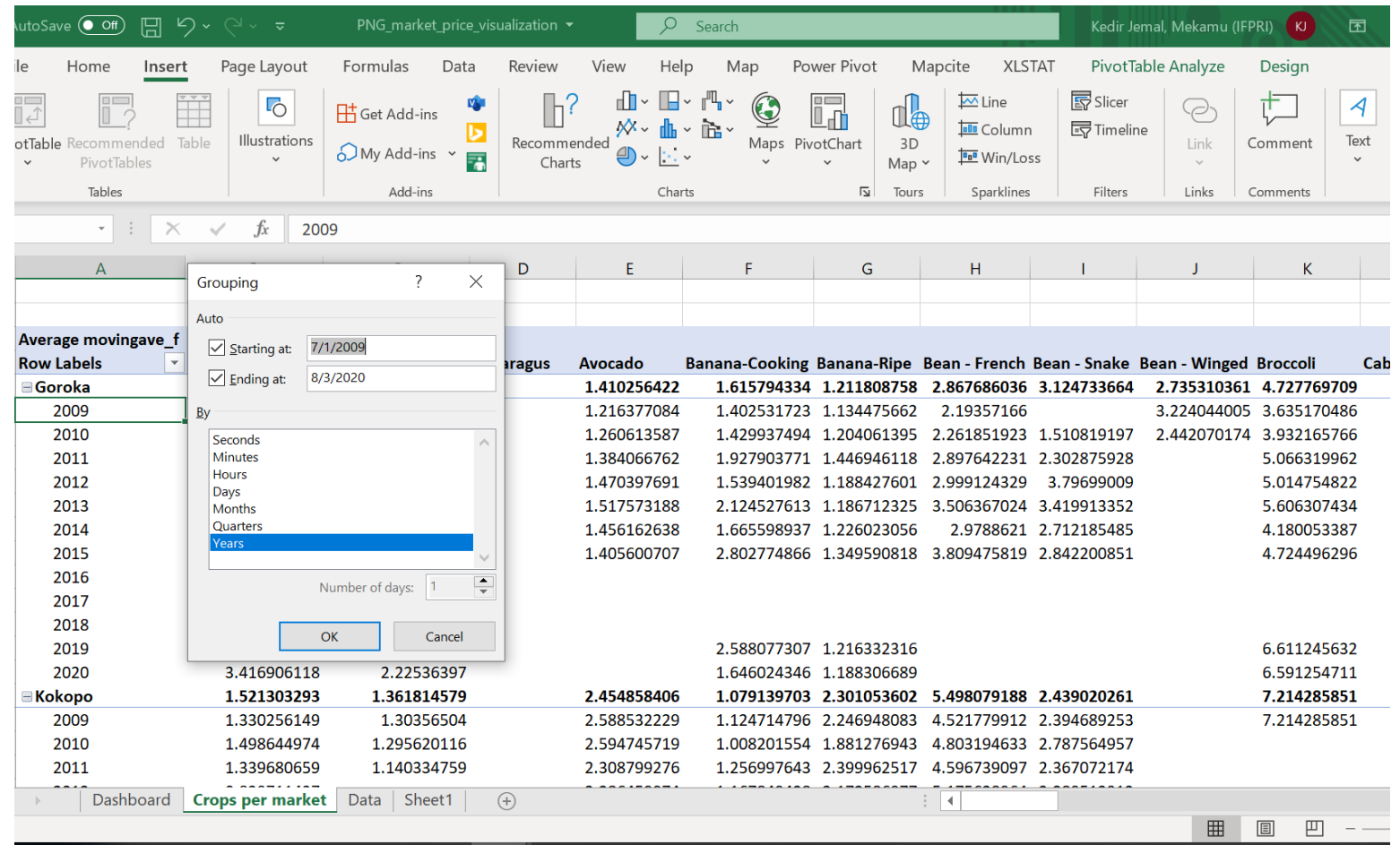
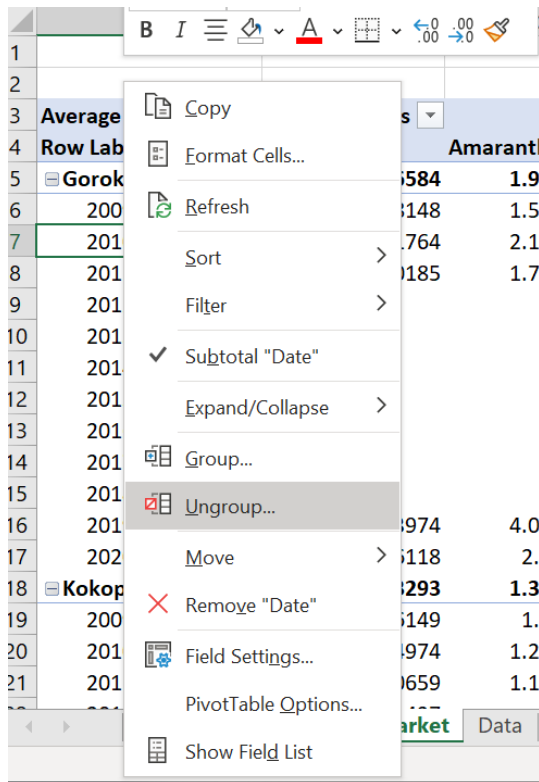
The PivotTable automatically calculate and summarize the selected fields.

To modify the default summary, right click on the price under value field change the "summarize value field by" option to average



- To be able to view monthly average price, group the *date* value to month.
- While selecting a cell from year column, right click and press 'group'

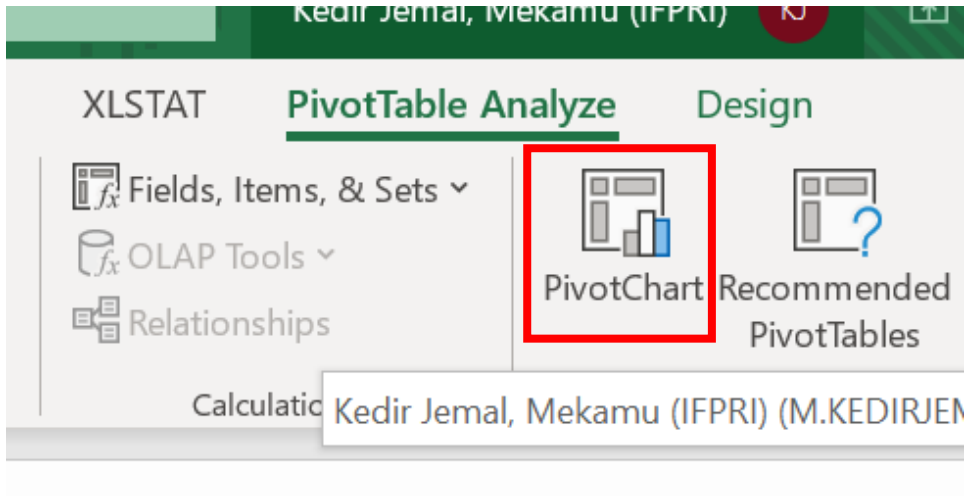
- From Grouping dialog box, select only Month



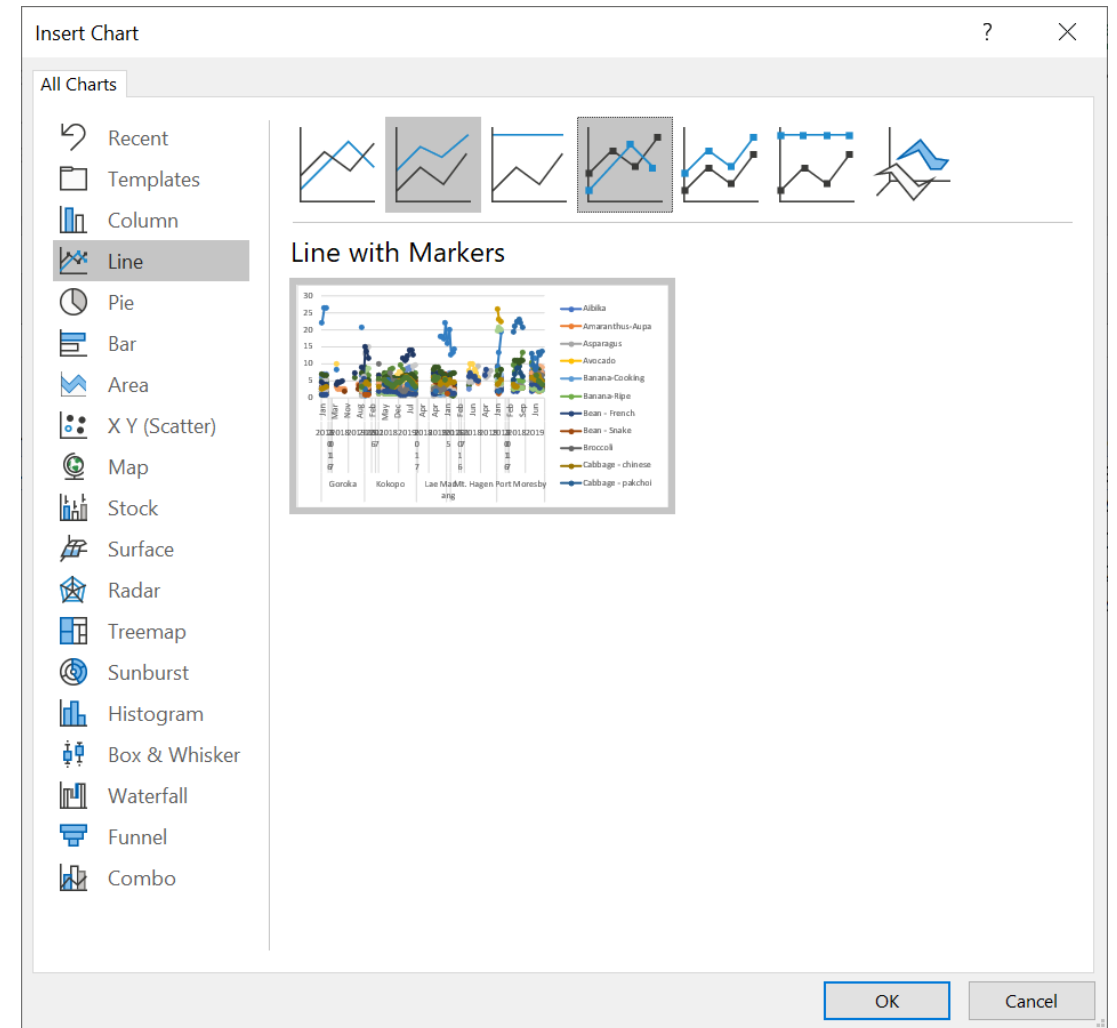
Pivot Charts

- Pivot Charts display data from a PivotTable
- Filters are automatically displayed in the chart to sort and filter the underlying data
- Changes to the field layout and data in the associated PivotTable are immediately reflected in the PivotChart
- Just like regular charts, you'll be able to modify the chart properties

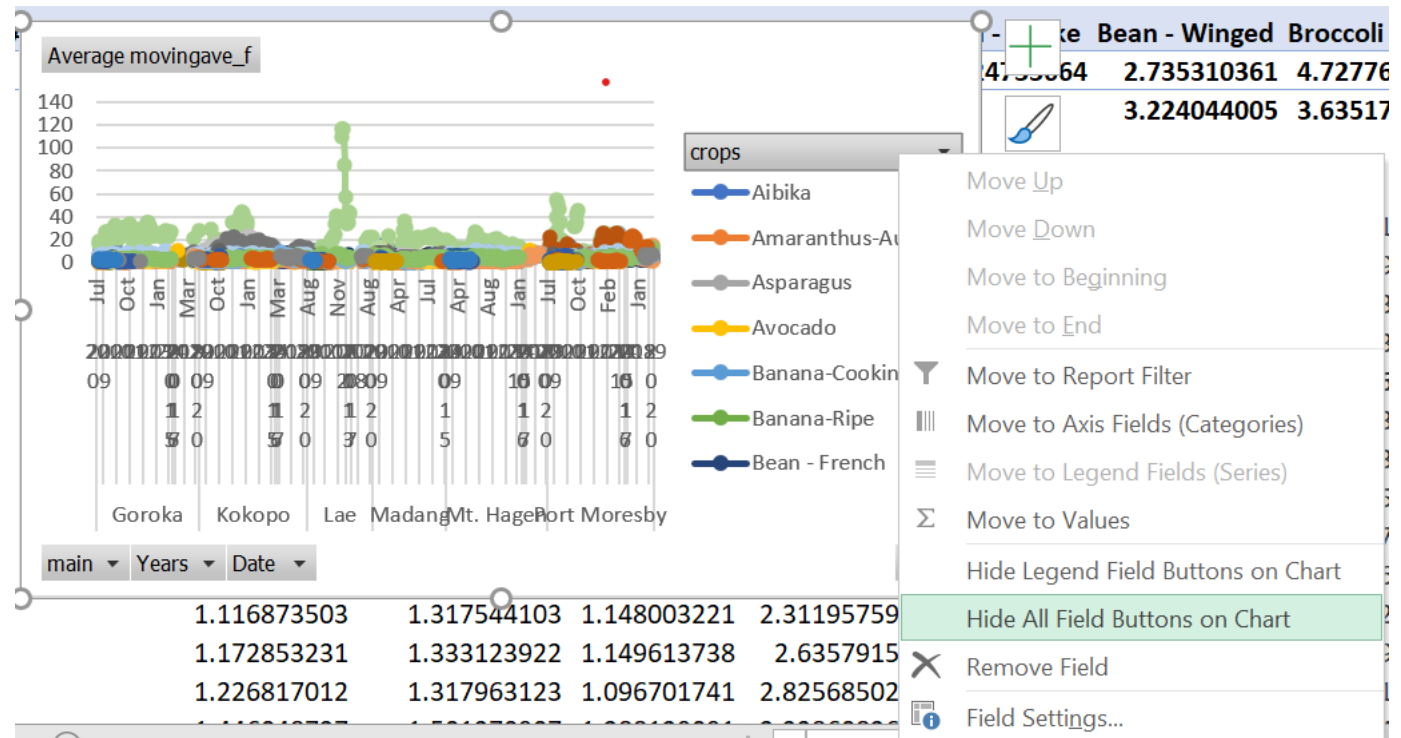
Under **PivotTable Analyze** tab press **PivotChart** select line chart



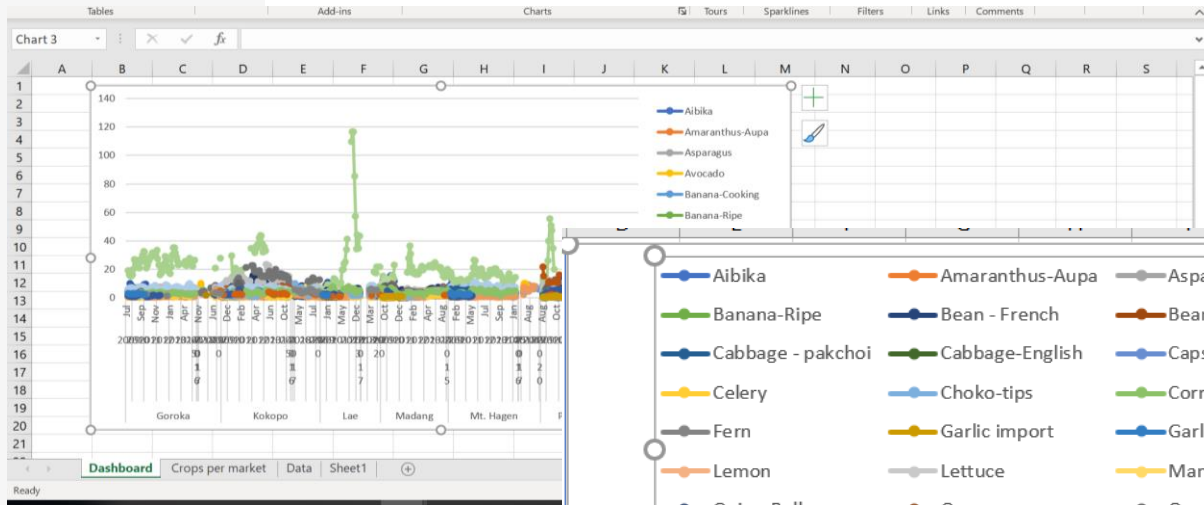
- Under PivotTable Analyze tab press PivotChart
- Select Line with Markers chart, then click OK.



- Instead of the default filter automatically generated with PivotChart, later on this exercise we will create slicer, so for now hide the filters from the chart
- To hide all filters, right click on one of the filter on the chart and press 'Hide All Field Buttons on Chart'
- Cut and paste the chart to a new sheet (rename the sheet 'Dashboard')



Pivot chart on new sheet (dashboard)



Change the legend position to top

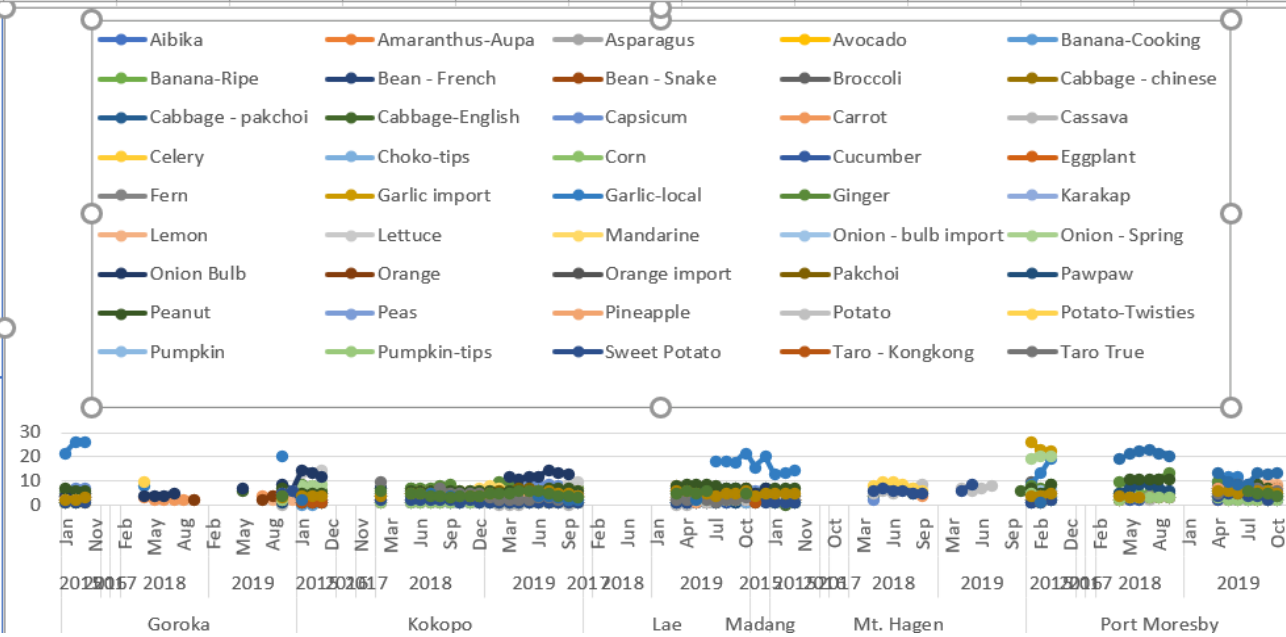


Chart Elements

- Axes
- Axis Titles
- Chart Title
- Data Labels
- Data Table
- Error Bars
- Gridlines
- Legend
- Trendline
- Up/Down Bars

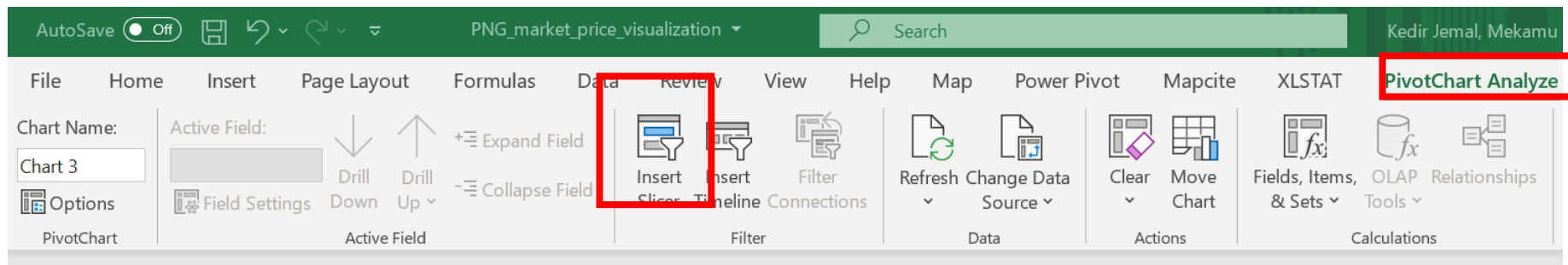
Right
Top
 Left
 Bottom
 More Options...

Create slicer

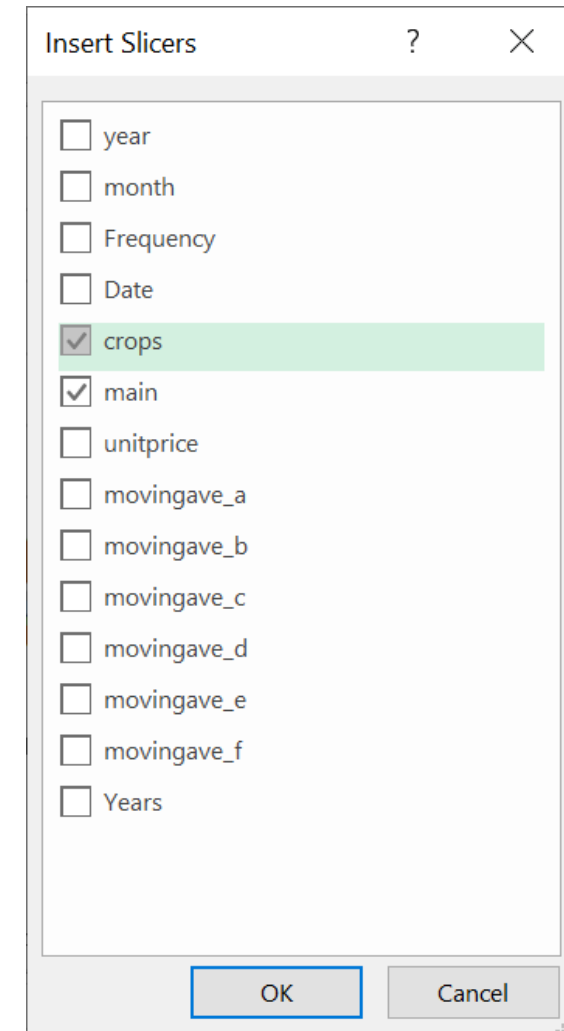
- Slicers make filtering data in PivotTables easier than regular filter
- Slicers are basically just filters, but they're easier and faster to use, allowing you to instantly pivot your data
- Unlike filter, a slicer clearly labels the filter that is applied and provides details to easily understand the data that is displayed

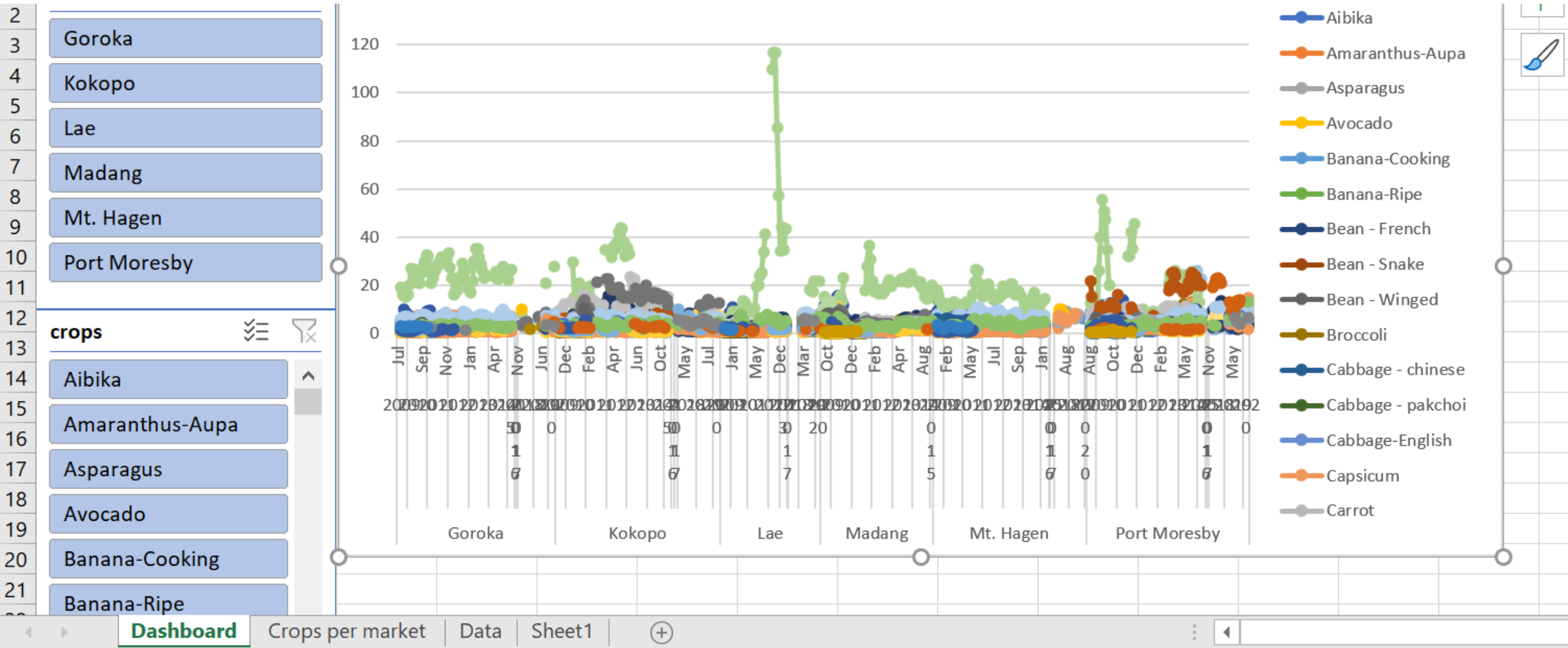
Add slicer

- Select or highlight the pivot chart or any cell in the PivotTable
- From the PivotChart Analyze tab, click the Insert Slicer command.



- A dialog box will appear. Select the *crops* and *main* (market) field, then click OK.

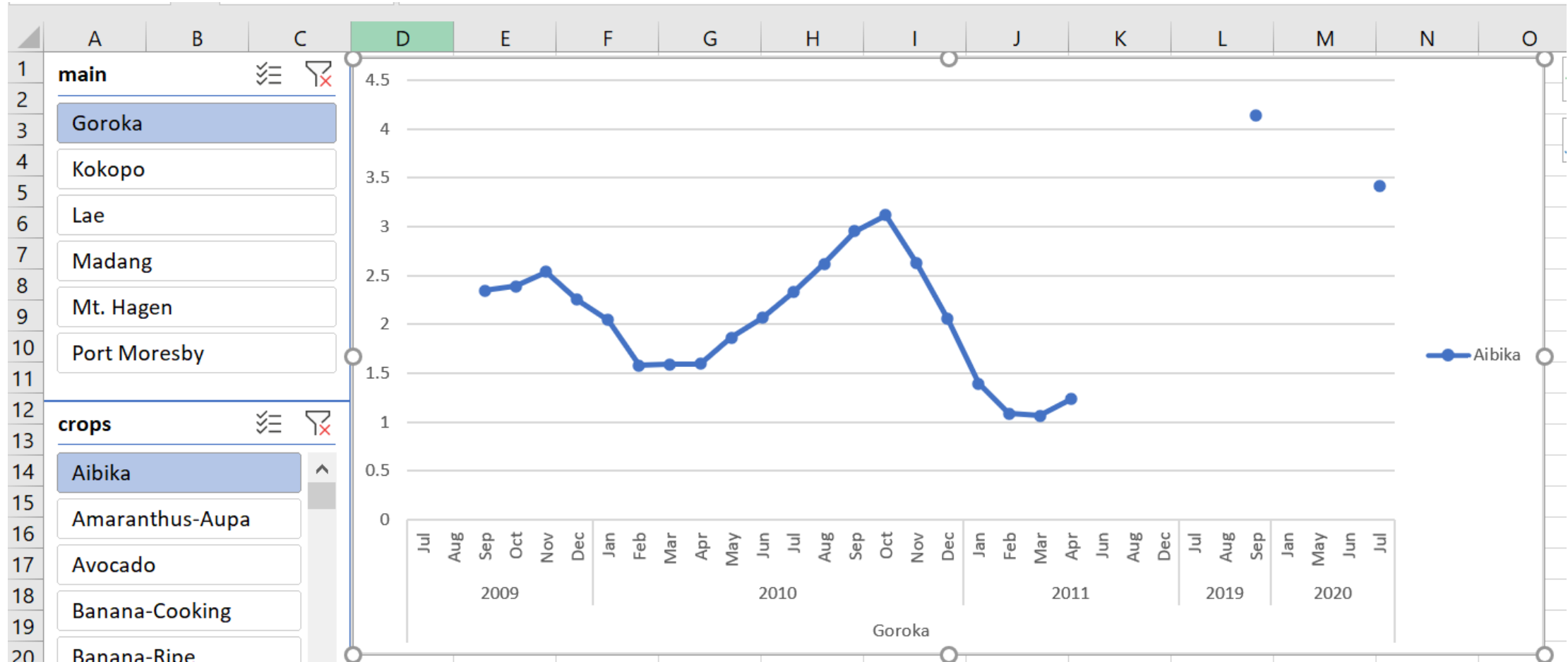




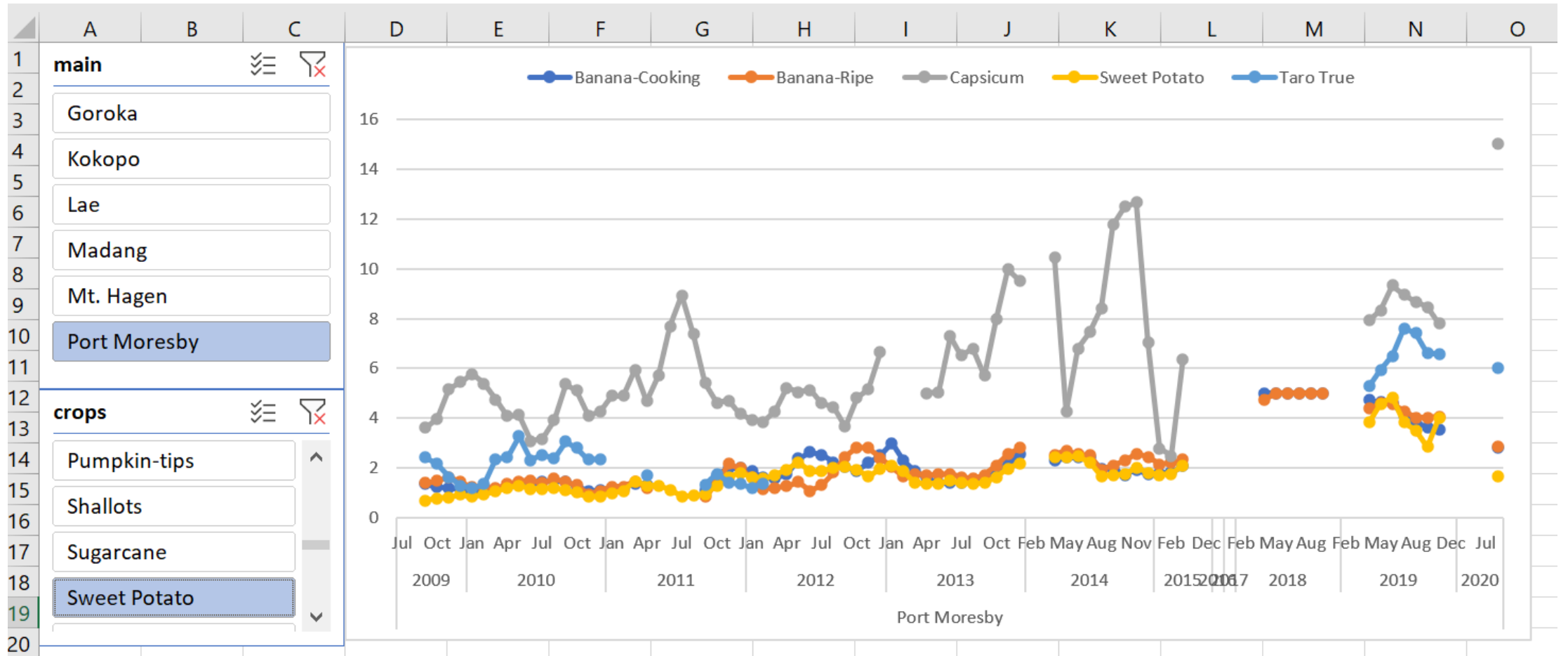
Each selected item will be highlighted in blue. The slicer contains a list of all markets and crops are currently selected.

- Just like filters, only selected items are displayed on the PivotChart
- When you select or deselect items, the PivotChart will instantly reflect the changes
- Since the PivotTable organized to best display multiple crops per market, try selecting one or more crops and a single market. To do so press and hold the Ctrl key on your keyboard to select multiple items from a slicer

Price of Aibika in Goroka market

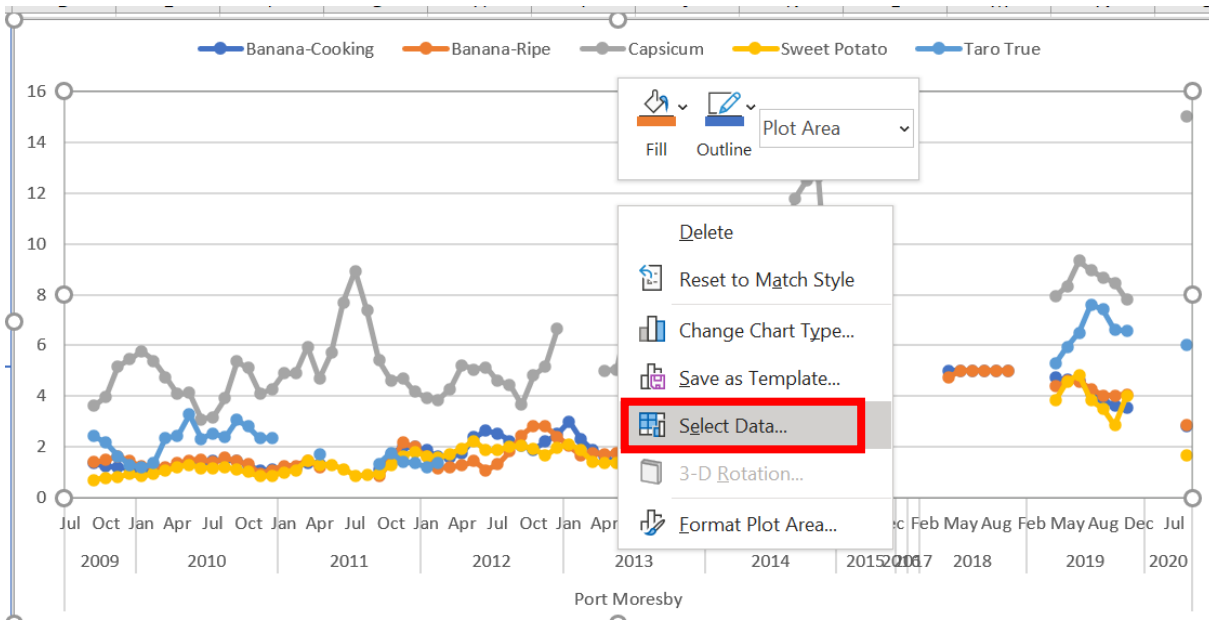


Prices of Banana-cooking, Banana-Ripe, Capsicum, sweet potato and Taro true in Port Moresby

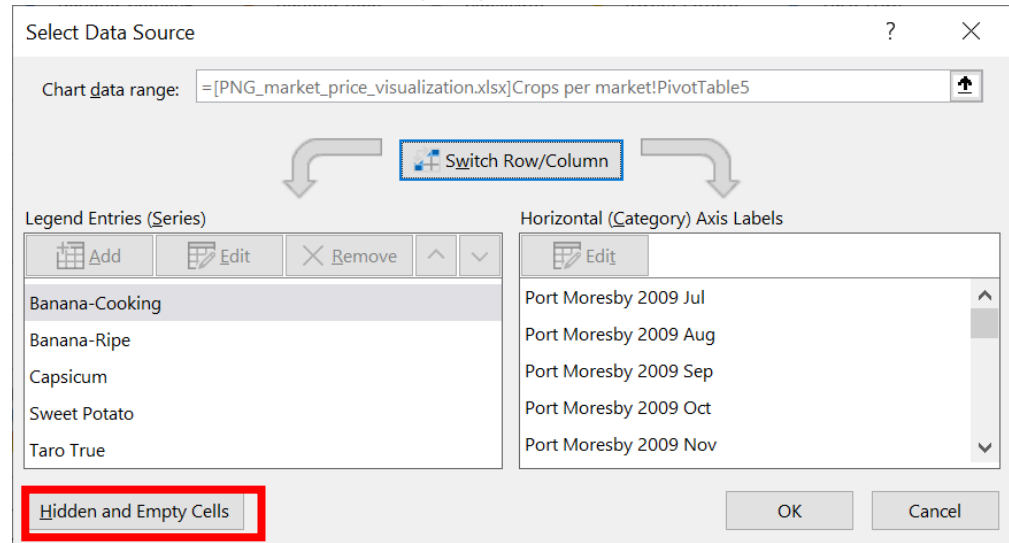


- You may have noticed discontinuity or gaps on the line graph. To connect data point with line change the settings

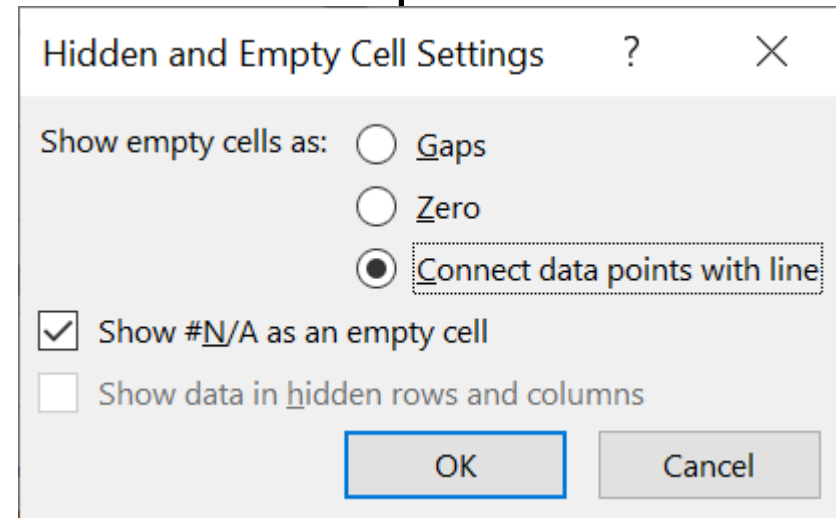
- Right click on the chart, click Select Data



- On Select Data Source dialog box click Hidden and Empty Cells



- On 'Hidden and Empty Cells settings click 'Connect data points with line'

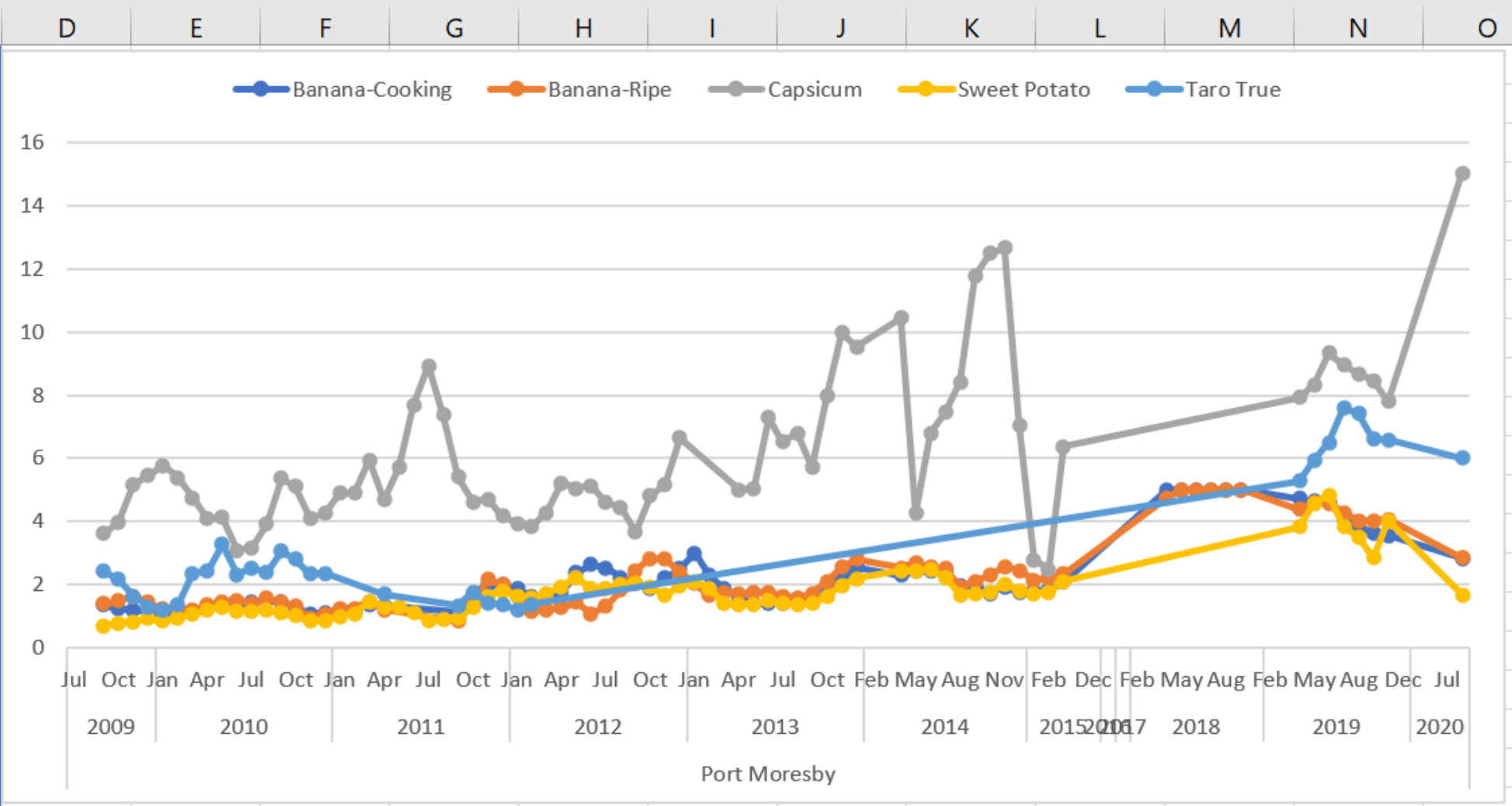


main ☰ 🗑️

- Goroka
- Kokopo
- Lae
- Madang
- Mt. Hagen
- Port Moresby

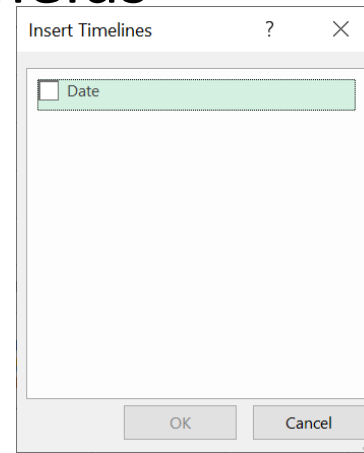
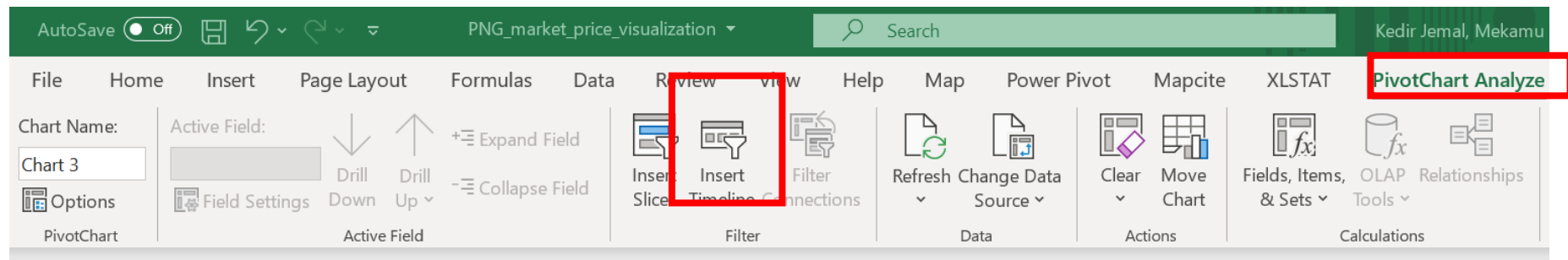
crops ☰ 🗑️

- Pumpkin-tips ↑
- Shallots
- Sugarcane
- Sweet Potato

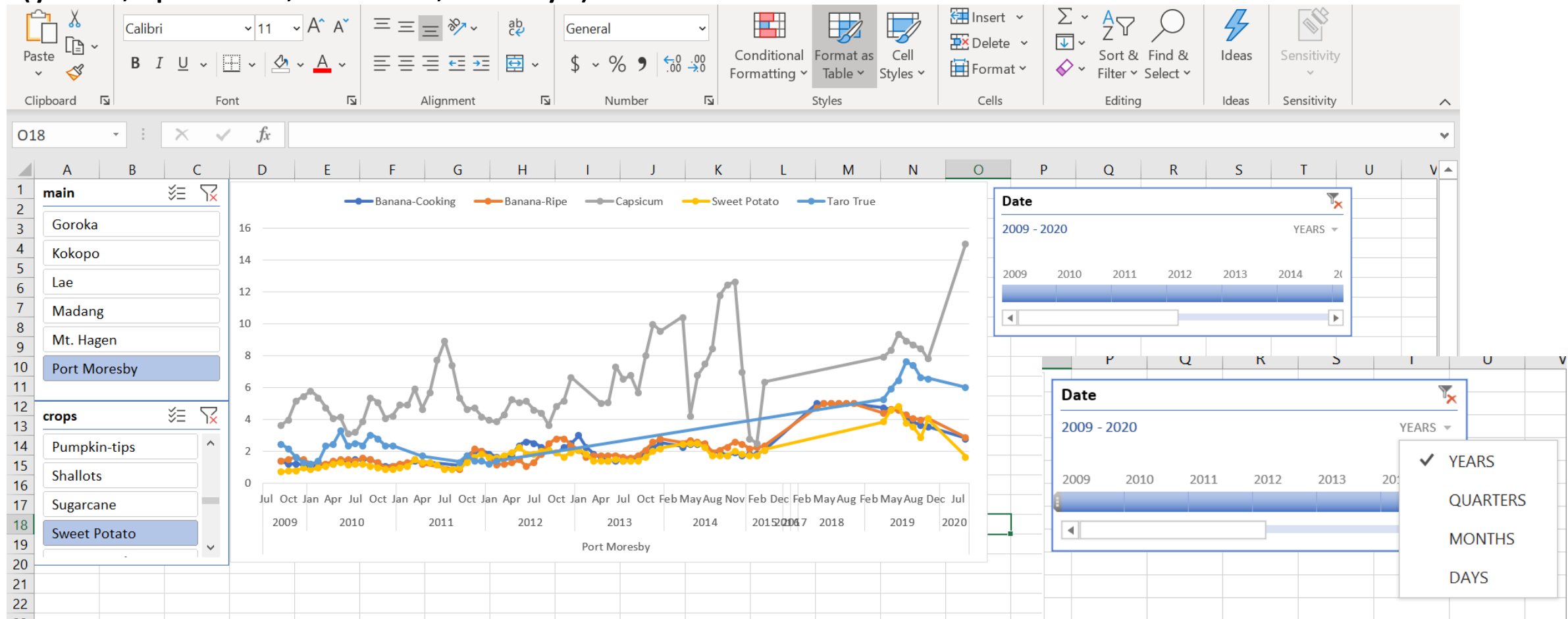


Create time Slicer

- Apart from playing around with filters to show dates, you can now use a PivotTable timeline.
- It lets you filter by time and zoom in on the period you want
- Much like a slicer you create to filter data, you can insert a timeline once and keep it with your PivotChart
- Click anywhere on the pivot chart to show the PivotChart tools
- Click PivotChart Analyze and click on Insert Timeline
- In the Insert Timelines dialog box, check the boxes of the Date fields and click OK



With timeline, you will be able to filter by a time period in one of four time levels (years, quarters, months, or days)



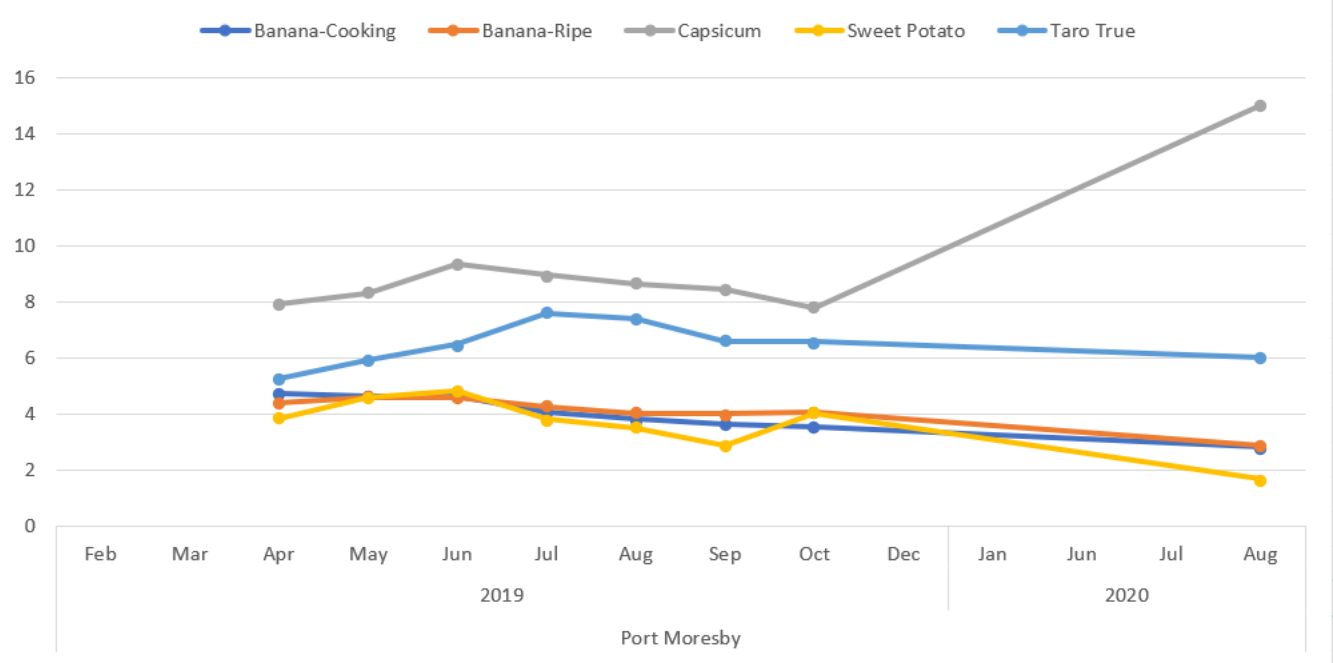
- Drag the timeline scroll bar to the time period you want to display
- In the timespan control, click a period tile and drag to include additional tiles to select the year range you want.
- Use the timespan handles to adjust the year range on either side.

Clipboard Font Alignment Number Styles Cells Editing Ideas Sensitivity

O18

A B C D E F G H I J K L M N O P Q R S T U V

- main
 - Goroka
 - Kokopo
 - Lae
 - Madang
 - Mt. Hagen
 - Port Moresby
- crops
 - Pumpkin-tips
 - Shallots
 - Sugarcane
 - Sweet Potato



Date

2019 - 2020 YEARS

2015 2016 2017 2018 2019 2020

Exercise

So far, we have created PivotChart that shows prices of multiple crops in a single market over time.

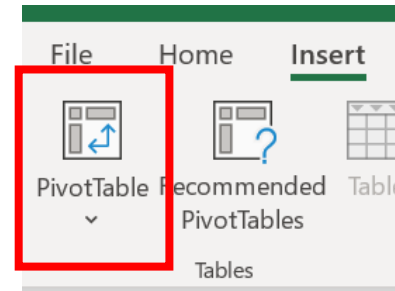
Following similar steps now it is your turn to setup a PivotTable that shows price of a crop across multiple markets.

At the end you will be able to show the following graphs by changing the selection on the slicer and time-line

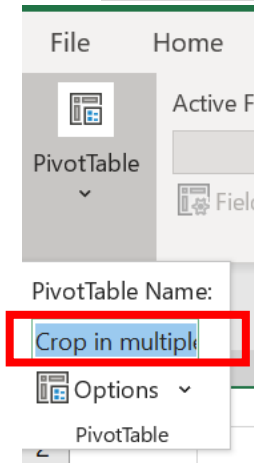
- Price of Sweet potato in POM, Goroka and Lae [
- Price of Pawpaw in Lae
- Price of Taro in POM and Lae

Steps to follow:

- While in Data table sheet click **Insert** from the main ribbon



- Click PivotTable
- Rename Pivot table to “A crop in multiple market”



- Drag *crops*, *date* variables to ‘Rows’ field; *main (market)* to ‘Columns’ and *movingaveg_f* to ‘Values’ field
- Create a line with market from PivotChart, remove the filter from the chart; cut and paste on dashboard
- Select your chart on the dashboard and insert slicer and timeline

