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**TEGEMEO INSTITUTE OF AGRICULTURAL
POLICY AND DEVELOPMENT**

Assessing Costs of Production for Maize, Irish Potatoes & Rice in Kenya, 2018

Implications for Food Security

Intercontinental Hotel, Nairobi

11th October, 2018

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Introduction and Meeting Objectives

Miltone Ayieko, Director, Tegemeo

Intercontinental Hotel, Nairobi

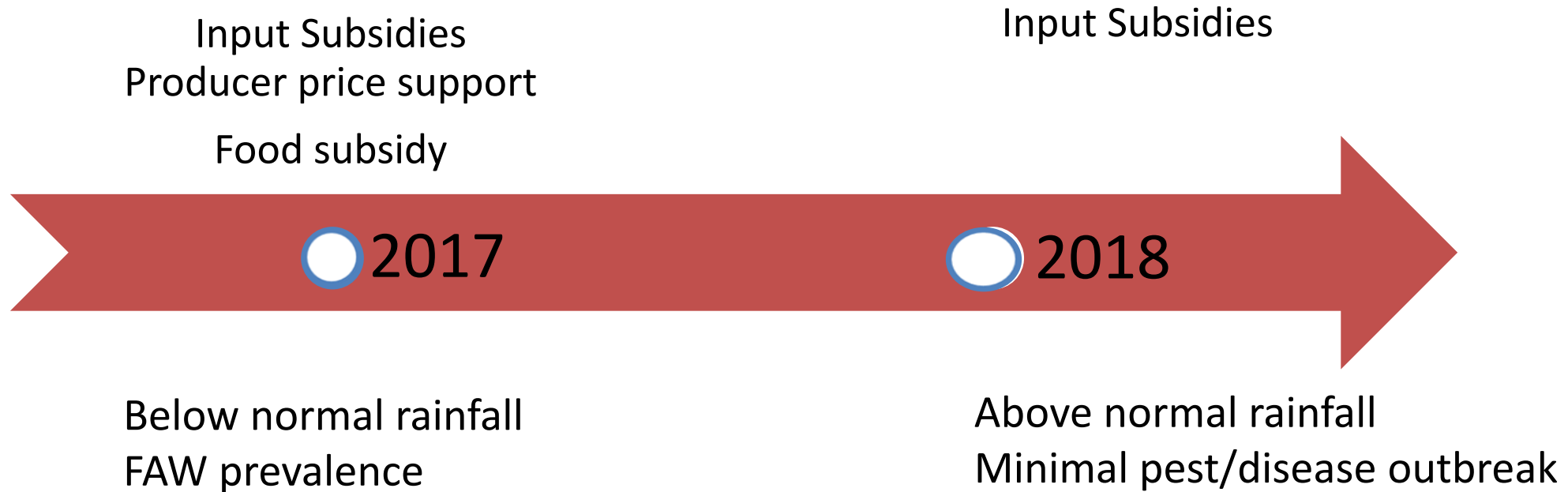
11th October 2018

Introduction../1

- Agriculture continues to be an important sector for the country's economy
 - Direct & indirect source of livelihood
 - Key for poverty reduction
- The Constitution of Kenya guarantees food security for every citizen under the **bill of rights – Article 43**
- Food Security one of the pillars for the ***Big Four Agenda***
- Importance of food security ratified globally
 - SDG #2: ***End hunger, achieve food security and improved nutrition and promote sustainable agriculture***

Introduction../2

- The country continues to be a net importer of key staple commodities



Introduction../3

- Tegemeo recommendations from 2017
 - Reduce costs & enhance competitiveness for famers by
 - Improving productivity
 - Adopt mechanization
 - Enhance soil quality & fertility
 - Adoption of ISFMs
 - Soil testing & use information to inform fertilizer choices
 - Revamp extension services
- Credible & reliable data to inform policy & planning
 - Estimation of per capita consumption, stocks, acreage, production

Introduction../4

- There is need to monitor costs of production for key staples to:
 - Inform government interventions
 - Big Four Agenda strategies & interventions
 - Food & Nutrition Security policy
 - County government policies
 - Track competitiveness for local producers
 - Track progress on attaining food security

This year's assessment

- Tracks the costs of production for maize, Irish potatoes and rice
- Assess the food situation, with emphasis on maize availability
- Implications on food security
 - Availability
 - Affordability
- Data comes from qualitative and quantitative surveys carried out in September 2018 and secondary sources

Workshop objectives

- To share the findings with key stakeholders (public, private and civil society)
 - Discussion and feedback
- Provide a forum for open discussion among stakeholders
 - On appropriate policy options
- Inform policy formulation and decision making

Workshop Program

- Two presentations:
 - Cost of Maize, Irish Potatoes & Rice
 - Food Situation & prospects
- Plenary and Way Forward

THANK YOU

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Cost of Production for Maize, Irish Potatoes & Rice in Kenya, 2018

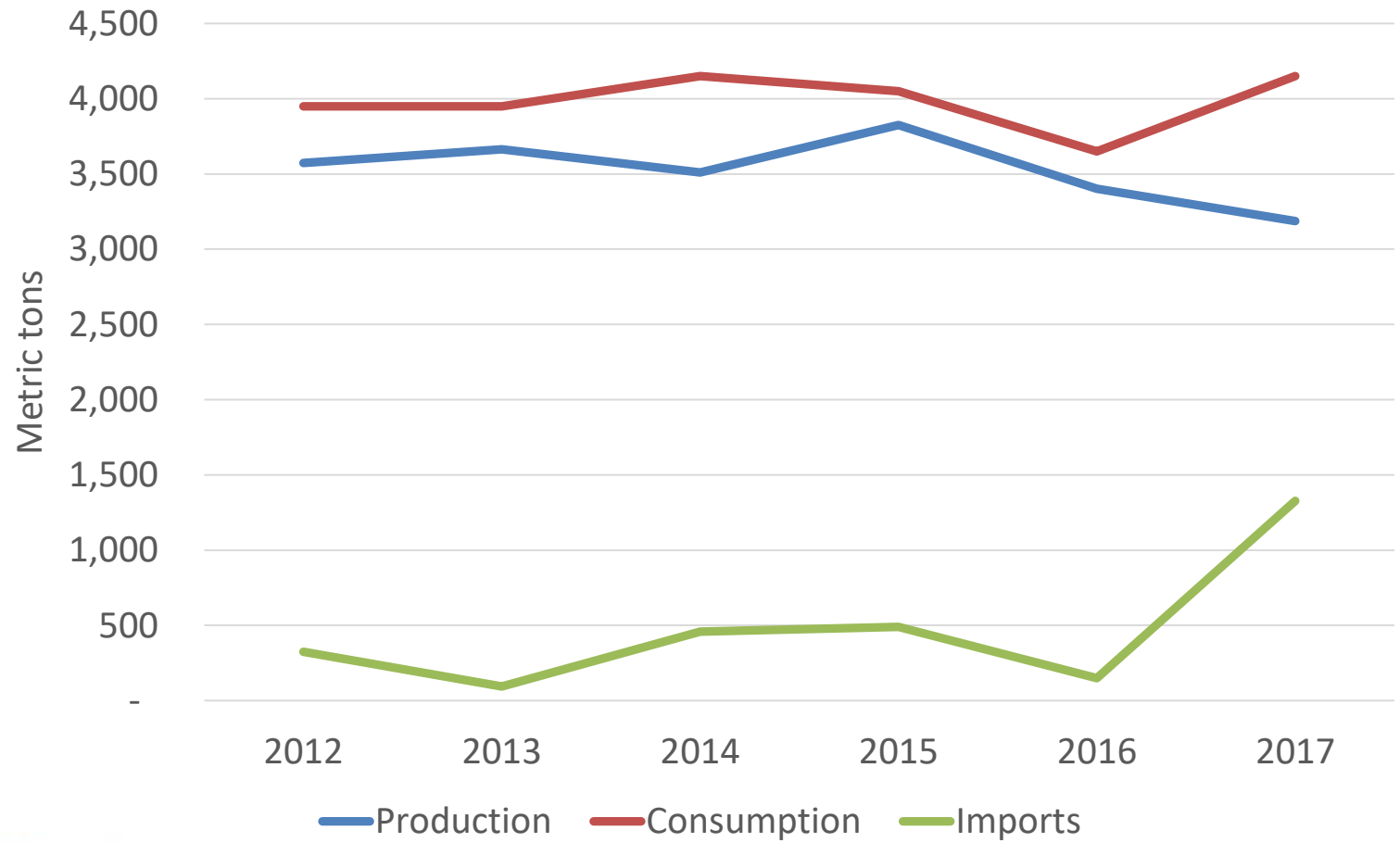
Tim Njagi

Intercontinental Hotel, Nairobi

11th October 2018

Maize production & consumption

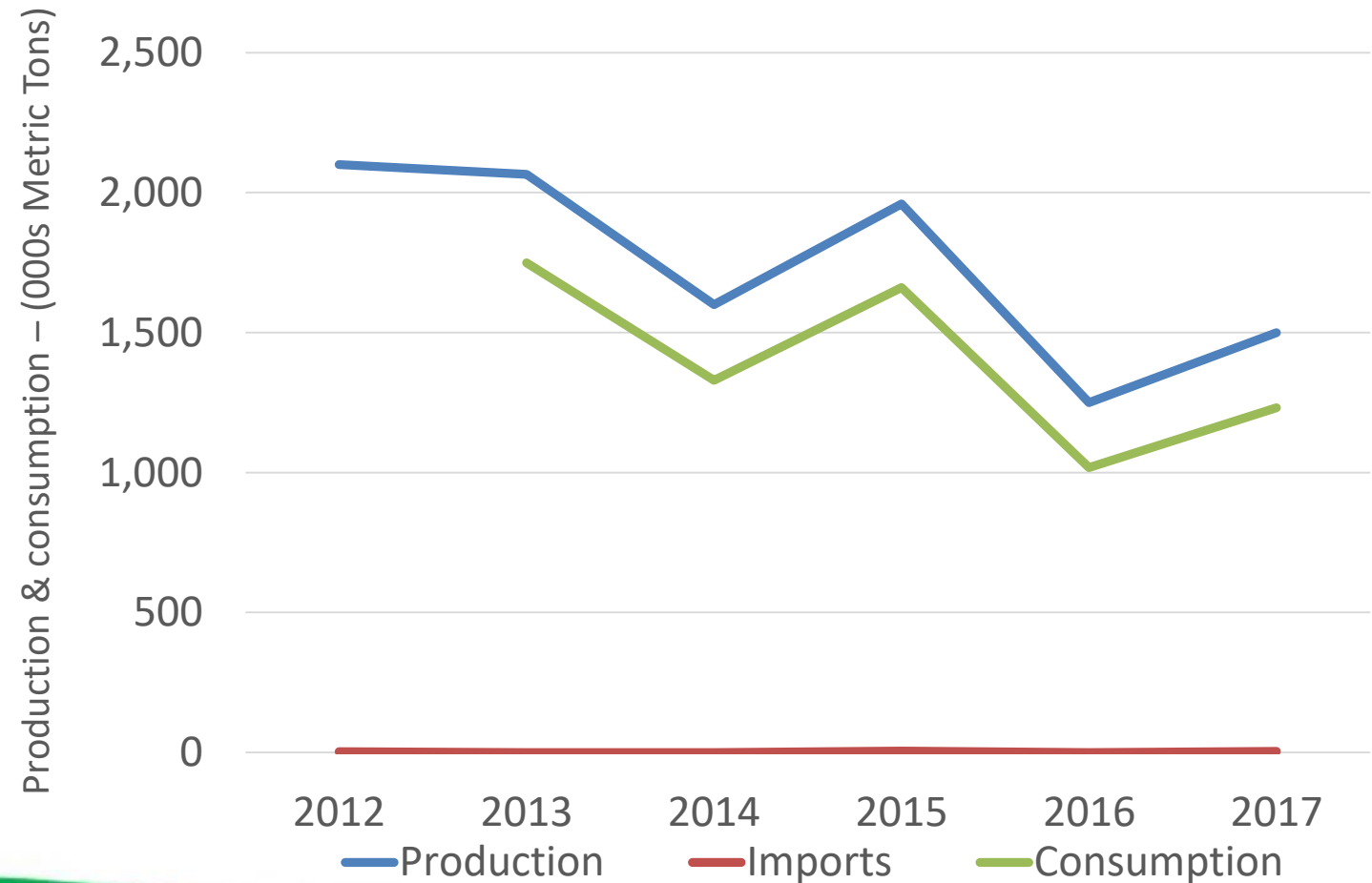
- Maize is the most important cereal grain in the country
 - 65% of staple food calories (Mohajan, 2014)
 - 40% of total crop area in Kenya (ERA, 2015)
 - Produced by a large majority of smallholder farmers



Source: KNBS & USDA, 2018

Irish Potato Production

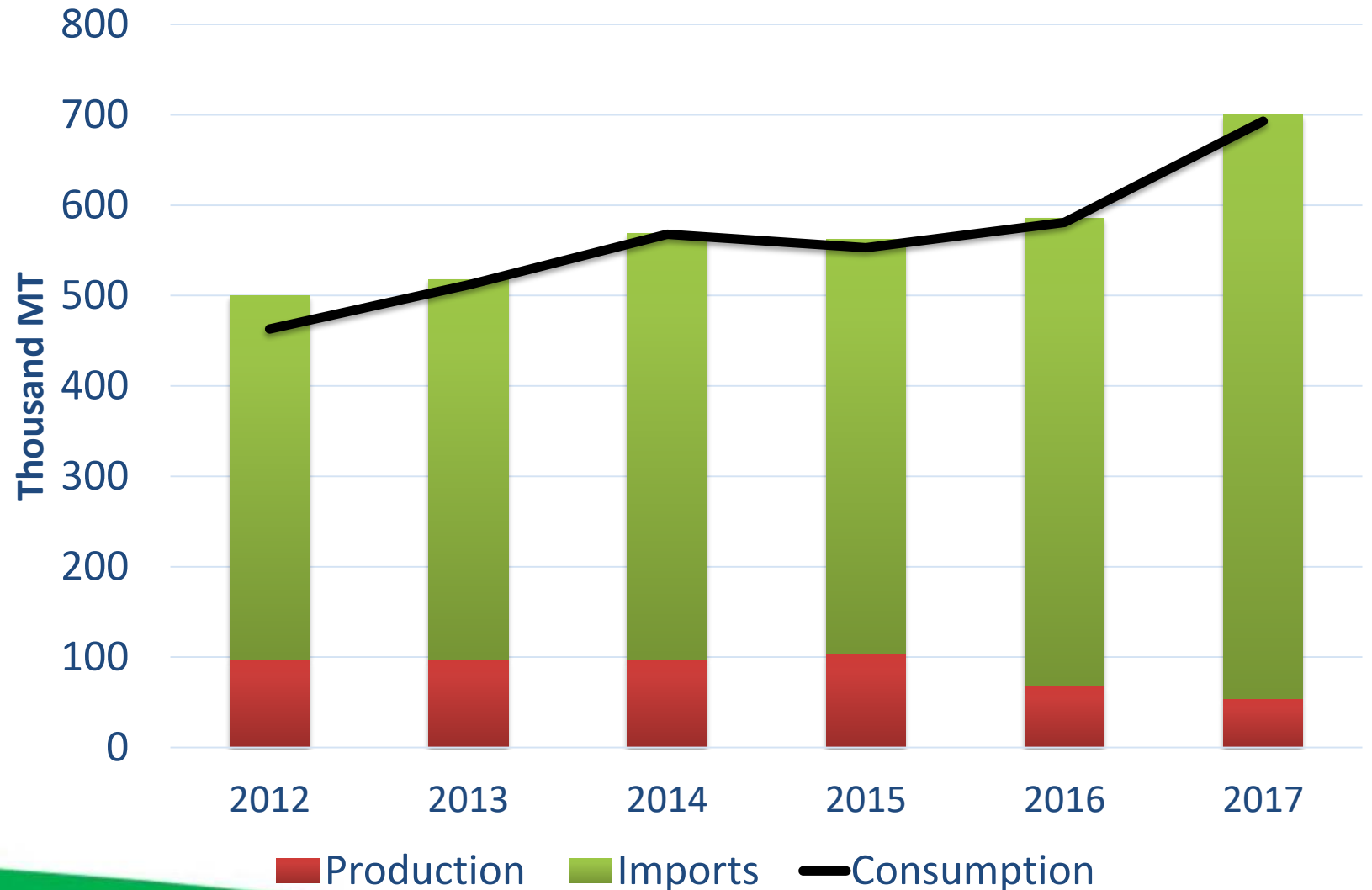
- Irish potato is an important staple food in the country
- Cultivated by about 800,000 smallholder growers in 177,000 ha under rainfed condition (MOAI, 2016)



Source: KNBS, 2018

- Rice has emerged as an important cereal, however, about 90% of total consumption is imported
- About 80% of rice is produced under irrigation in public irrigation schemes

Rice Production



Key Challenges

- Low productivity
- Declining soil quality
- Crop diseases
- Weak linkages btw research-extension-farmers
- Low technology uptake
- Limited access to affordable credit
- Low market participation
- Declining land sizes
- Limited access to water for irrigation
- Effect of climate change & variability
- Poor storage facilities & high post harvest losses
- Market distortion & volatility

Research Questions

- What is the cost of production for maize, Irish potato & rice and in 2018?
- What are the major drivers of these costs?
- What are the policy interventions required to stimulate enhance efficiency?

Methodology

- Typical farm methodology in six counties, purposively selected based on importance in the production of maize, Irish potatoes & rice.
- Data collection
 - Individual maize farmers
 - FGDs
 - Key informant interviews
 - Phone surveys

Findings

Irish Potatoes

Irish Potato Production Systems and Areas

Small-scale Irish Potato Farmers

- Cultivate less than 2 acres of Irish potato
 - Have monocrop and two seasons a year (sometimes three depending on weather patterns)
 - Average of 70% level of commercialization
 - Main buyers are traders
 - Source of fertilizer is mainly commercial
-
- Areas of study; Nyandarua and Nakuru
-

Cost of production

	Nakuru	Nyandarua
Irish Potato yields (110kg/acre)	12.3	13.0
Seed	12,000	24,000
Fertilizer	6,400	6,640
Pesticides	8,300	3,840
Herbicides	500	0
Machinery	4,800	0
Labor	14,350	19,840
Transport	163	0
Other costs	90	0
Working capital	1,631	1,901
Total cost per acre	48,234	56,221
Cost of production per 110kg bag	3,937	4,325
Land rent	10,000	10,000
Total cost per acre with land rent	58,234	66,221
Cost of production per bag with LR	4,754	5,094

Simulation: Good year harvest & prevailing prices

	Nakuru	Nyandarua
Yield(110 kg bag/acre)	40	40
Total cost per acre	48,234	56,221
Production cost per bag	1,206	1,406
Land rent	10,000	10,000
Total production cost with LR	58,234	66,221
Total production cost per bag(WLR)	1,456	1,656

Findings on Irish potatoes

- Challenges in production include:
 - Low yields
 - Water logging & blight due to above normal rainfall
 - Crop protection & management
 - Affected by liquidity constrains
 - Severe shortage of high quality and appropriate seed varieties
 - Lack of storage facilities
 - Low prices during peak production periods
 - Control of marketing channels by middlemen
 - Disregard for packaging standards

Recommendations

- Improve access to quality seed
 - Certified seed (tissue culture)
 - Positive selection
 - Choose the best when using recycled seed
 - Importation of certified seeds
- Uptake of varieties for specific constraints
 - Disease tolerant
- Introduce climate smart practices
 - Use weather advisories
- Support construction of cold room storage in production areas
 - Organize farmers in producer associations
- Resolve laws on packaging standards to protect producer interests

Findings

Rice

Rice Production Systems and Areas

Small-scale Rice Farmers

- Undertake rice farming under irrigation in public irrigation schemes
 - Cultivate less than 2 acres of rice
 - Have monocrop and one season a year (with a ratoon crop)
 - Average of 96% level of commercialization
 - Main buyers are traders
 - Source of fertilizer is mainly commercial
-
- Areas of study; Mwea, Kirinyaga

Cost of production

Rice yields (Kg per acre)	2,520	+12% from 2017
Labour	34,920	
Hired machinery	15,250	
Fertilizer	6,800	
Irrigation water	3,000	
Herbicide	2,400	
Transport	1,670	
Gunny bags	1,500	
Seed	950	
Pesticide	220	
Working capital	4,670	
Total cost of production	71,380	+23% from 2017
Land rent	50,000	
Total cost of production	121,380	
Total cost of production per Kg	48	No change

Findings

- Key drivers cost for rice production
 - Labour contributes the highest proportion of cost
 - There are still opportunities of saving costs by mechanization
 - Increase in adoption of mechanization for harvesting from 2017
 - Land rent & Hire of machinery
- Bird scaring is an expensive activity in rice production (13% of costs)
- Rice production is a profitable enterprise even where land is hired despite high land rates (Cost per Kg is Ksh 48 vs sale price of Ksh 78)
- Above normal rains at harvest led to high field losses (up to 80% in some cases)

Recommendations for policy

- Need to enhance local production of rice
 - Increase area under irrigated
 - Mwea – target to increase acreage to 10,000 Ha after dam construction
 - Explore opportunities for upland rice in non-rice growing areas to boost local production
 - Use revenue from rice tariffs to support development of the sector
- Enhance uptake of innovations to reduce costs
- Enhance bird surveillance and control
- Explore credit facilities for farmers/youth if they are to engage in rice production----high capital requirement (KES 121,380/acre)

Maize Production Systems and Areas

Small-scale Maize Farmers

- Cultivate less than 10 acres of maize
- Have monocrop
- Second season dedicated to other crops
- Average of 83% level of commercialization
- Main buyers are traders
- Source of fertilizer is mainly subsidy

-
- Areas of study; Kakamega, Trans Nzoia, Uasin Gishu, Nakuru

Large-scale Maize Farmers

- Cultivate above 50 acres of maize
- Have a monocrop and one season a year
- Average of 99% level of commercialization
- Main buyers are NCPB and millers
- Source of fertilizer is mainly subsidy

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- Areas of study; Trans Nzoia and Uasin Gishu

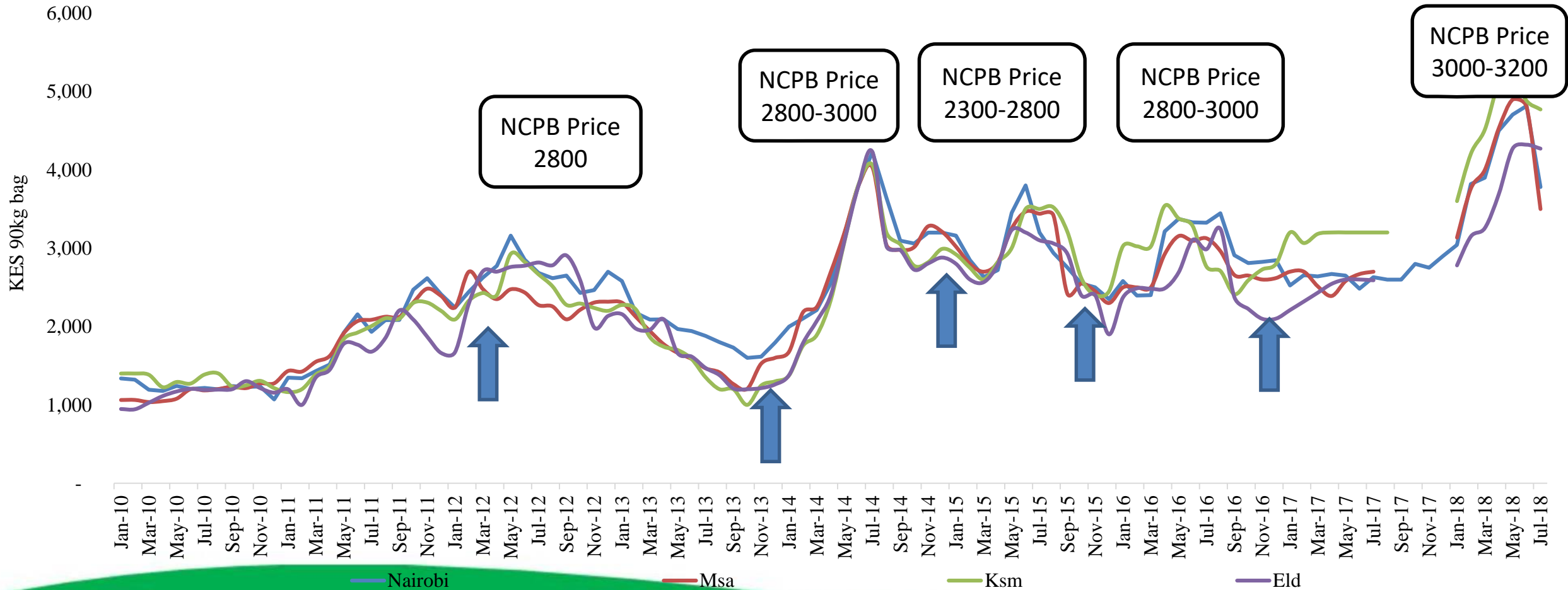
Findings

Maize: Large-scale

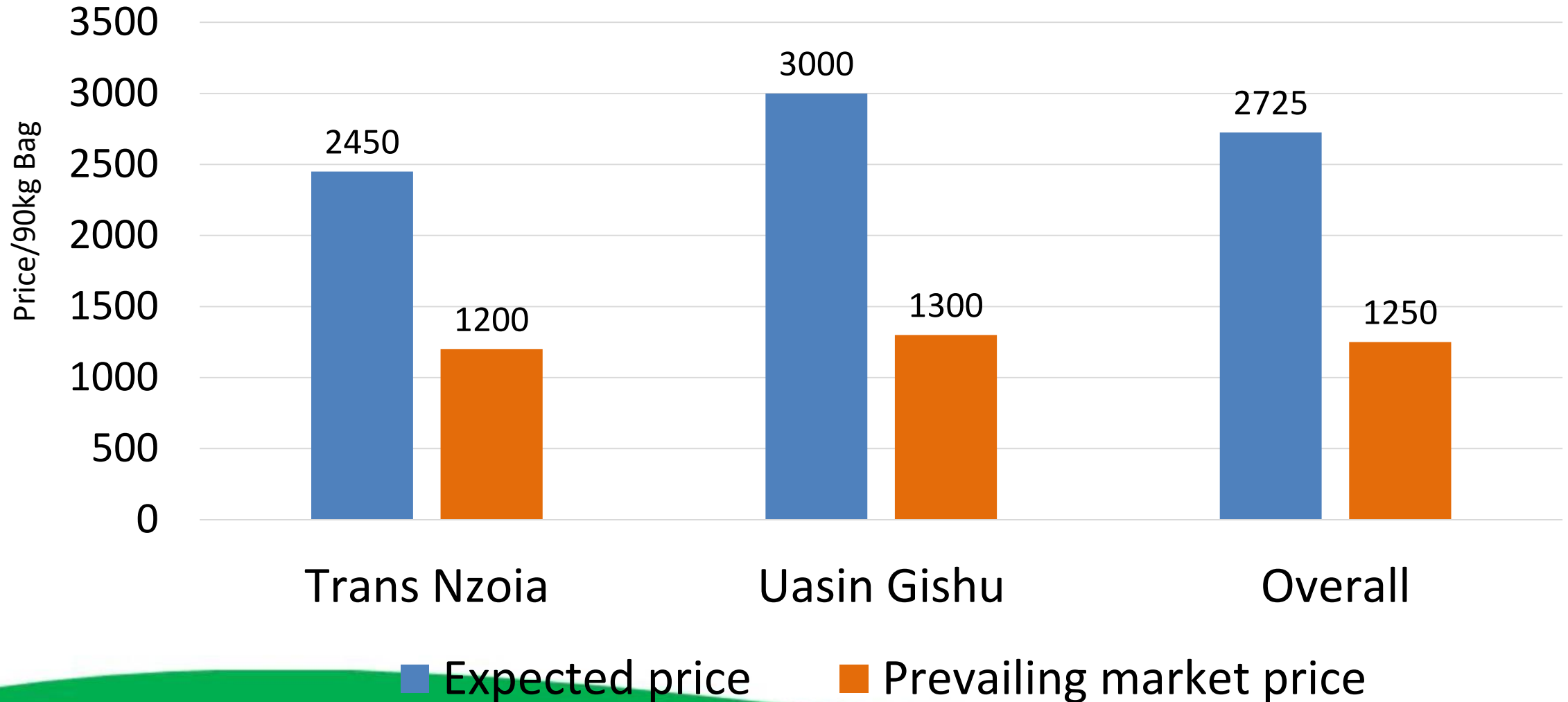
Cost of Production (Ksh): Large Scale

	Trans Nzoia	Uasin Gishu	Overall
Maize yields (90kg bags/acre)	24	24	24
Seed	2,020	1,878	1,949
Fertilizer	4,791	6,313	5,552
Pesticides & fungicides	1,283	1,528	1,406
Herbicides	3,450	2,550	3,000
Machinery	9,903	7,281	8,592
Labor	6,062	6,775	6,419
Transport (crop output)	2,125	775	1,450
Others (gunny bags, sisal twines)	1,483	2,137	1,810
Working capital	2,178	2,047	2,112
Production costs	33,296	31,284	32,290
Production costs per bag	1,387	1,331	1,360
Land rent	10,000	10,000	10,000
Total production costs (with land rent)	43,296	41,284	42,290
Total production costs per bag (with land rent)	1,804	1,757	1,781

Trends in wholesale Market prices



Expected & prevailing prices



What affects the cost of production?

- Productivity
- Inputs
- Farming technology

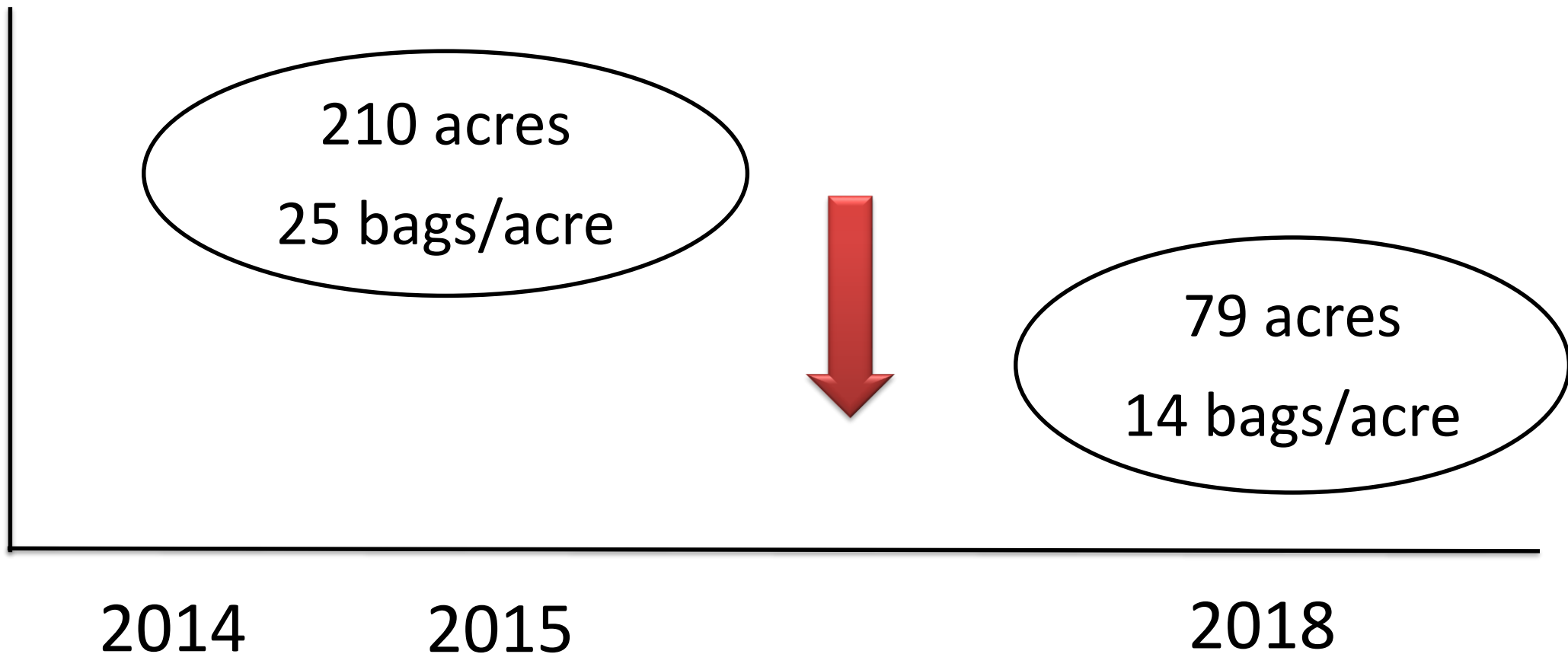
Large-scale yield comparison with 2017

	Trans Nzoia		Uasin Gishu	
Maize yields (90kg bags/acre)	24	19	24	20
Seed	2,020	1,810	1,878	1,810
Fertilizer	4,791	6,800	6,313	6,200
Pesticides & fungicides	1,283	1,500	1,528	1,010
Herbicides	3,450	1,100	2,550	1,500
Machinery	9,903	10,150	7,281	9,500
Labor	6,062	5,946	6,775	6,042
Transport (crop output)	2,125	1,200	775	840
Others (gunny bags, sisal twines)	1,483	777	2,137	820
Working capital	2,178	2,050	2,047	1,941
Production costs	33,296	31,332	31,284	29,662
Production costs per bag	1,387	1,649	1,331	1,483
Land rent	10,000	12,000	10,000	12,000
Total production costs (with land rent)	43,296	43,332	41,284	41,662
Total production costs per bag (with land rent)	1,804	2,281	1,757	2,083

Simulation: Effects of fertilizer subsidy

	Without subsidy	With subsidy
Maize yields (90kg bags/acre)	23	25
Seed	1810	1677
Fertilizer	10200	7975
Pesticides & fungicides	4155	1150
Herbicides	2400	3900
Machinery	11602	8738
Labor	6306	6430
Transport	288	3614
Others	2420	1225
Working capital	2743	2430
Production costs	41924	37137
Production costs per bag	1823	1485
Land rent	10000	10000
Total production cost (with land rent)	51924	47137
Total production costs per bag (with land rent)	2258	1885

Case study: Effects of late payments by NCPB



Maize: Small-scale

Small-scale maize farmers

	Trans Nzoia	Uasin-Gishu	Nakuru	Overall
Maize yields (90kg bags/acre)	17	18 +29%	19 (5%)	18 +6%
Seed	1,850	1,830	1,800	1,620
Fertilizer	5,425	6,400	3,100	4,831
Pesticides & fungicides	1,490	147	-	503
Herbicides	-	1,800	-	450
Machinery	5,810	7,400	3,540	5,288
Labour	9,112	6,507	11,285	8,938
Others (gunny bags, sisal twines)	1,065	1,367	1,729	1,140
Working capital	1,980	2,036	1,716	1,822
Production costs	26,732	27,486	23,170	24,592
Total production costs per bag	1,572 (13%)	1,527 (20%)	1,219 (1%)	1,366 (15%)
Land rent	10,000	10,000	10,000	9,000
Total production costs (with land rent)	36,732	37,486	33,170	33,592
Total production costs per bag (with land rent)	2,161	2,083	1,746	1,866

Findings on maize

- Increase in maize production for both large & small scale
 - Yield increased from 2017
 - Large-scale - 23%
 - Small-scale - 6%
- Production costs per bag for large & small scale declined
 - Large scale - 18%
 - Small scale – 15%
- Costs reduction strategies
 - Improved yields in some areas due to good weather & minimal pests/disease prevalence
 - Technology – mechanization for harvesting can further lower cost

Findings on maize

- Fertilizer subsidy
 - Large scale – reduced costs by 16.5%
 - Small scale - would lower the costs by 11%
- Currently market price is low
 - Market distortion in 2017 & incentives for imports
 - Unrestricted imports
- Farmers expect higher prices than prevailing market prices
- Acreage under maize grain is likely to go down
 - Farmers harvesting maize as silage
 - Farmers planning to reduce acreage under maize – long term impacts?

Recommendations for policy

- To reduce costs
 - Improve productivity
 - Use labor-saving technologies/mechanization
- Reduced role of government in maize markets
 - Restructure NCPB to focus only on SFR
 - Enact warehouse receipts system bill
- Which model should be used for SFR purchases?
 - Buy directly from warehouse/market
 - Virtual stocks
 - Contract farmers
 - Producer price support lead to market distortion
- Enhance adoption of climate smart agricultural practices

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Food Situation Assessment, 2018

Lilian Kirimi

Intercontinental Hotel, Nairobi

11th October 2018

Objectives of the assessment

- Establish general food situation in the country with emphasis on maize
- Evaluate performance of the 2018 LR season
- Assess the prospects of the SR season
- Establish the food security status in the country
- Draw lessons and relevant policy recommendations

Methodology

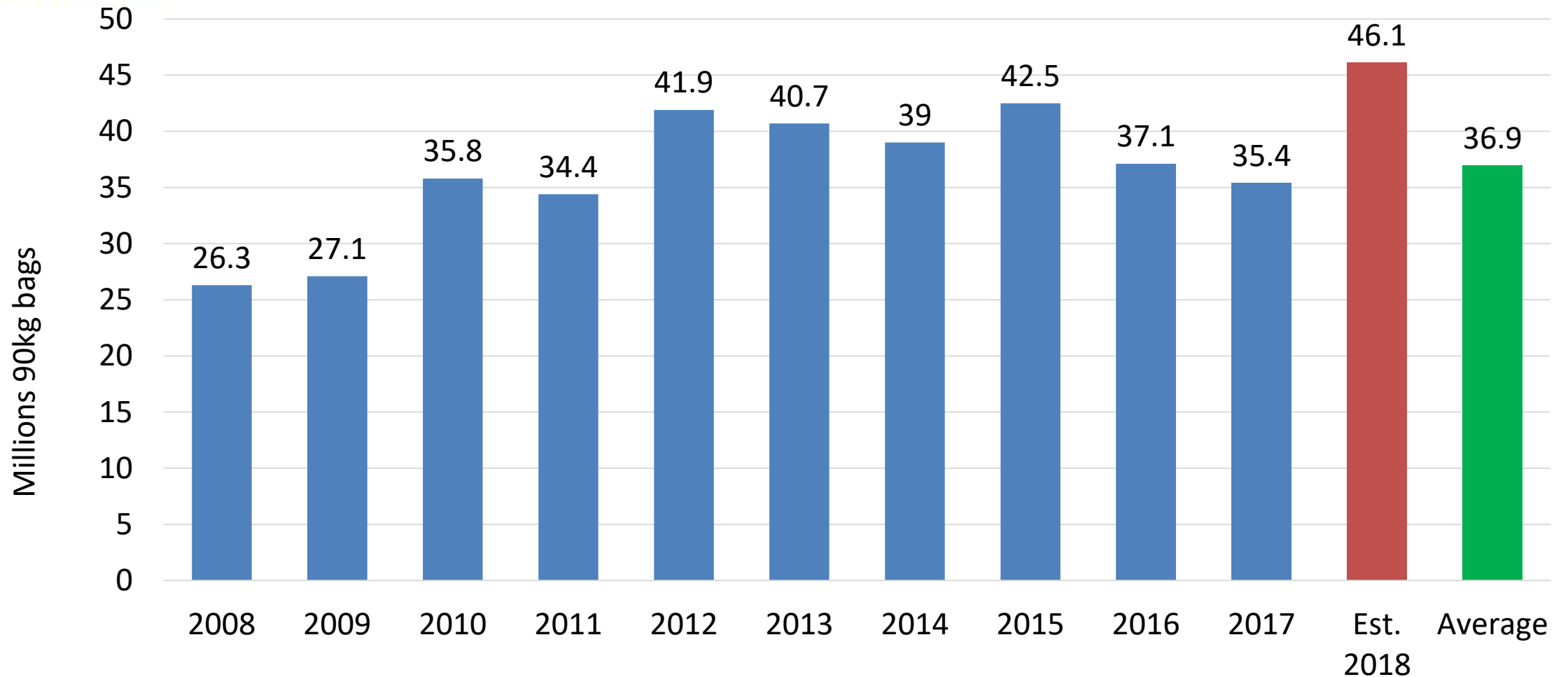
- Rapid assessment carried out in four counties, purposively selected because of their importance in the production of maize
- Data collection
 - Individual maize farmers
 - FGDs
 - Key informant interviews
 - Review of secondary data

Trends in production of key staples (million bags/tons)

Crop	Unit	2012	2013	2014	2015	2016	2017
Maize	90 kg	41.9	40.7	39	42.5	37.8	35.4
Beans	90 kg	6.8	7.9	6.8	8.5	8.1	9.4
Irish							
Potatoes	Tons	1.5	2.1	2.3	2.0	1.3	1.5
Sorghum	90 kg	1.9	1.7	1.9	2.1	1.3	1.6
Millet	90 kg	0.8	1.4	1.4	1.1	0.6	0.6

Source: MOAI, FSA August 2018 Report

Maize Production Trends



Source: MOAI, FSA Reports

Rainfall performance, 2018

- **March-April-May**

- Early onset of rains
- Majority of areas received above average rainfall
- Well distributed in time and space
- Water logging & crop submersion experience in some areas
- Favorable for both crop & livestock production

- **June-July-August**

- Near to above normal average rainfall in parts of Western & Rift Valley
- Warmer than average temperature for most parts of the country
- Moisture stress for short season crops e.g. beans & potatoes

2018 maize production overview

- The region experienced favourable weather in 2018 compared to 2017
 - Improved maize performance in the country and the region
 - However, above average rains affected production in some regions
 - Minimal diseases or pest prevalence reported

Maize production overview

- The effects of government interventions in 2017 are still being felt in 2018
 - Farmers are holding stocks in anticipation of price increases
 - Consumer prices still high in some areas
- High imports in 2017 & early 2018 plus good production in 2018 have led to abundant supply & low wholesale market prices

Challenges in 2018 LR season

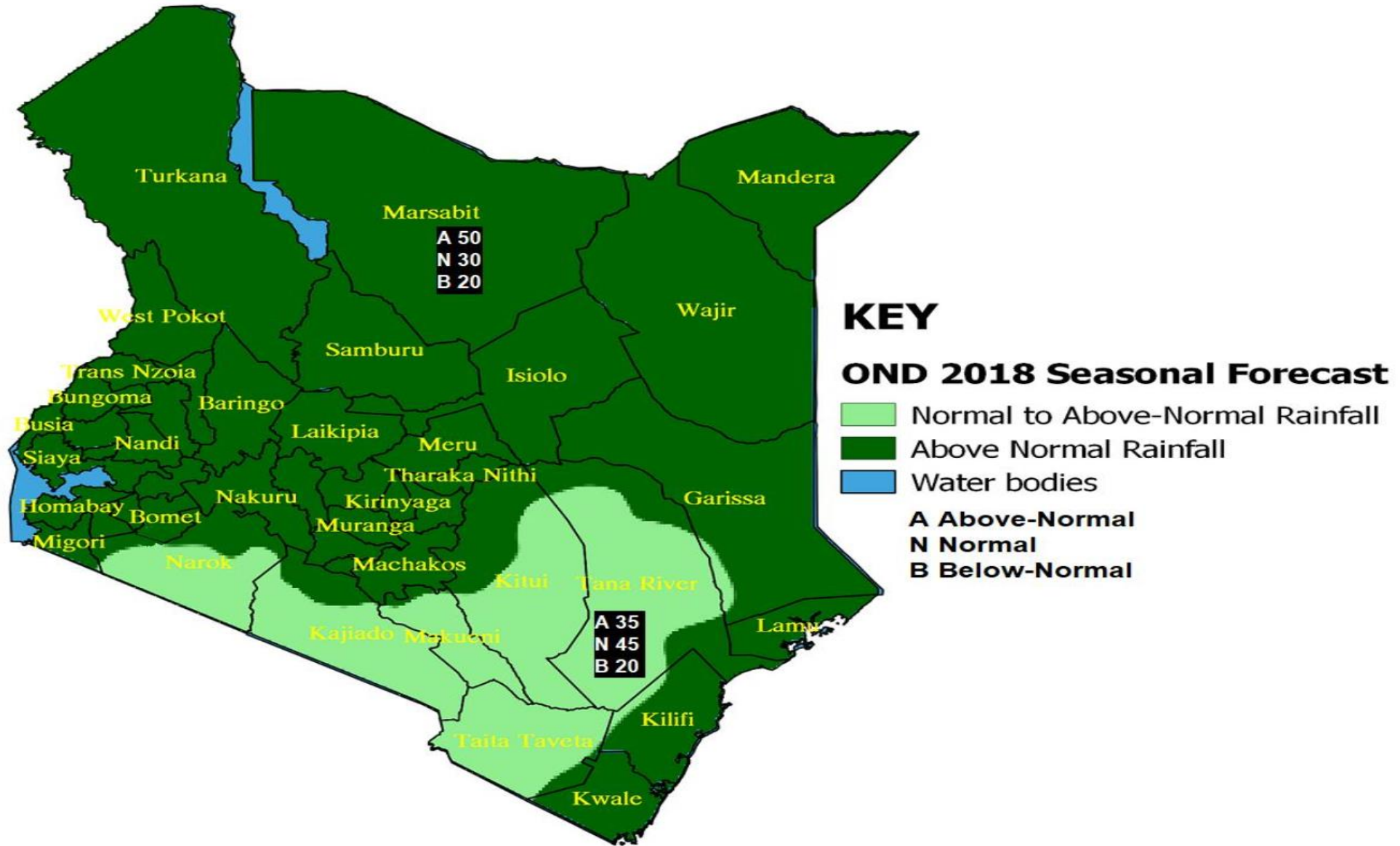
- Early onset of rains
 - Labour shortages in peak periods of crop establishment
- Water logging
 - Recorded in Western regions, submerged crops in other areas in the region
- Late delivery of subsidized fertilizer
 - Both county & national governments subsidized fertilizer received late
- Low wholesale market prices for maize
- Storage & post harvest management
 - Farmers still have last season's crop in their stores

LR maize performance in selected counties

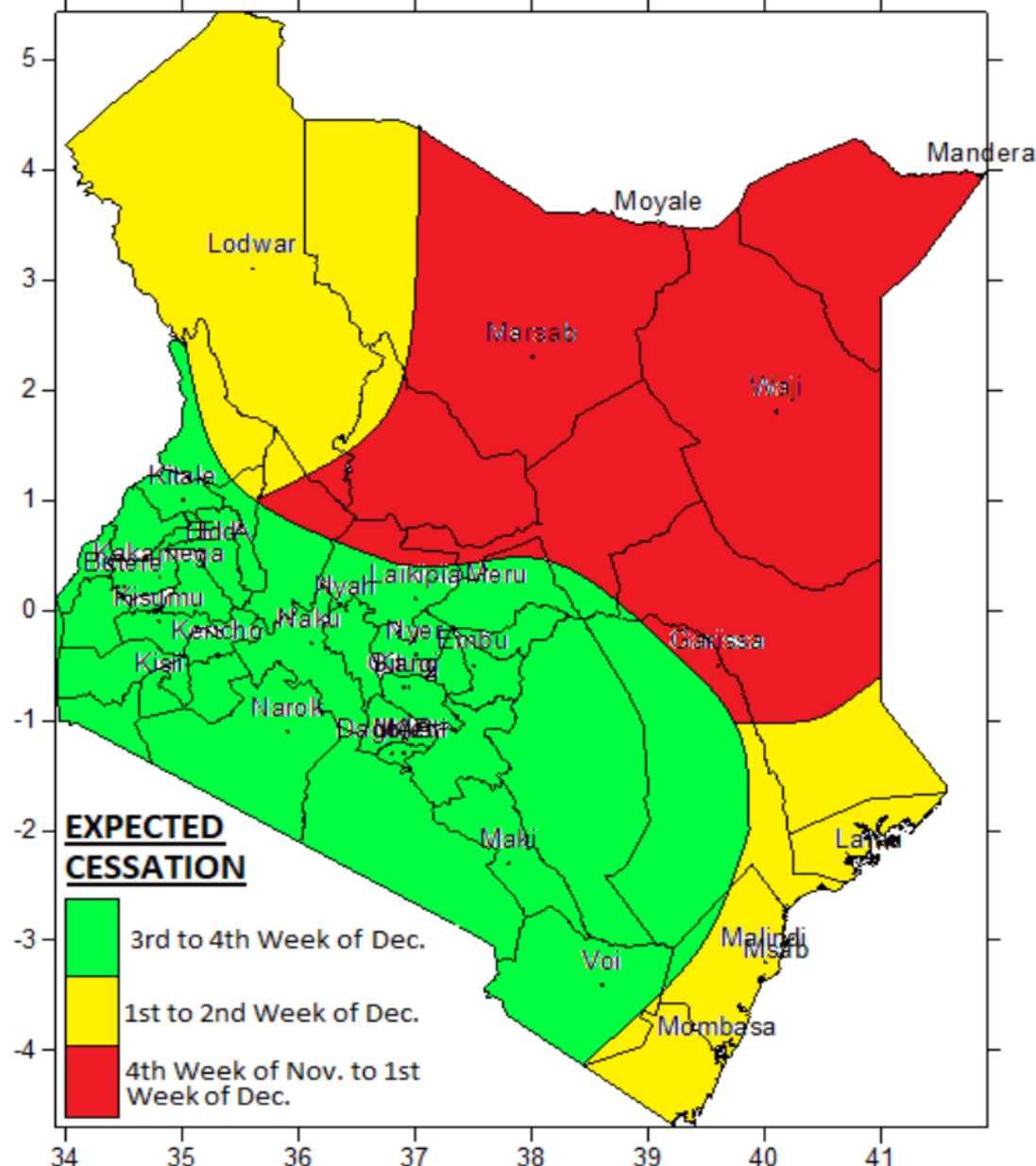
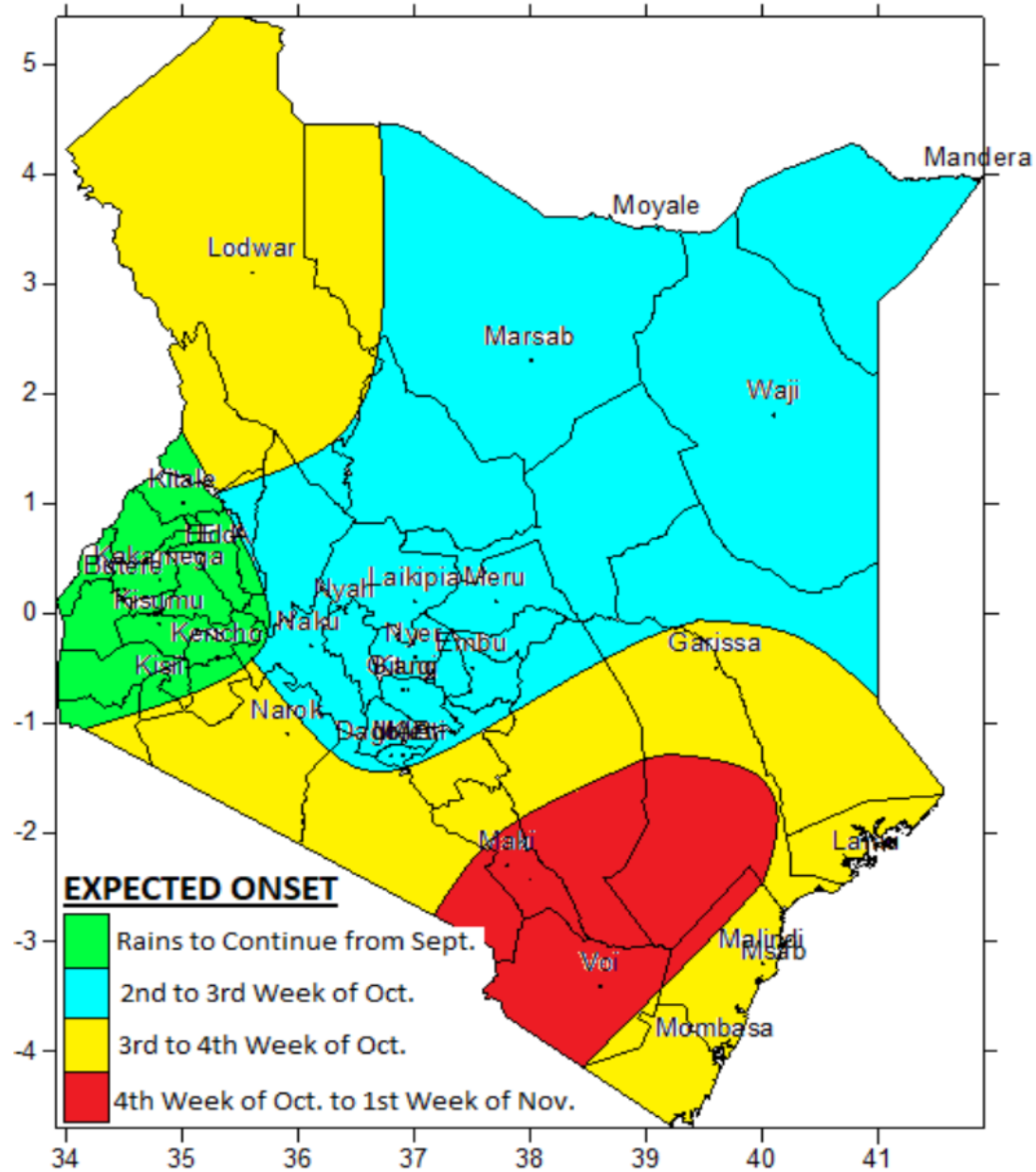
	Area (ha)		Production (90 kg Bags)		% change from 2017
	2017	2018	2017	2018	
Trans Nzoia	106,951	106,800	4,848,795	5,300,000	9%
Uasin Gishu	103,335	100,179	3,600,000	4,500,000	25%
Nakuru	86,690	85,217	1,432,820	2,754,777	92%
Narok	85,720	83,178	985,978	2,079,450	111%
Kakamega	73,750	70,000	2,457,950	2,400,000	-2%
Kisumu	32,679	43,650	493,712	1,091,244	121%
Nandi	67,600	67,500	1,995,509	2,109,375	6%
Elgeyo Marakwet	31,373	30,385	945,250	1,000,000	6%

Source: County Monthly Reports, August 2018

Short Rains Forecast



Source: KMD, OND Forecast, August 2018



Expected Onset for OND 2018 Rains

Expected Cessation for OND 2018 Rains

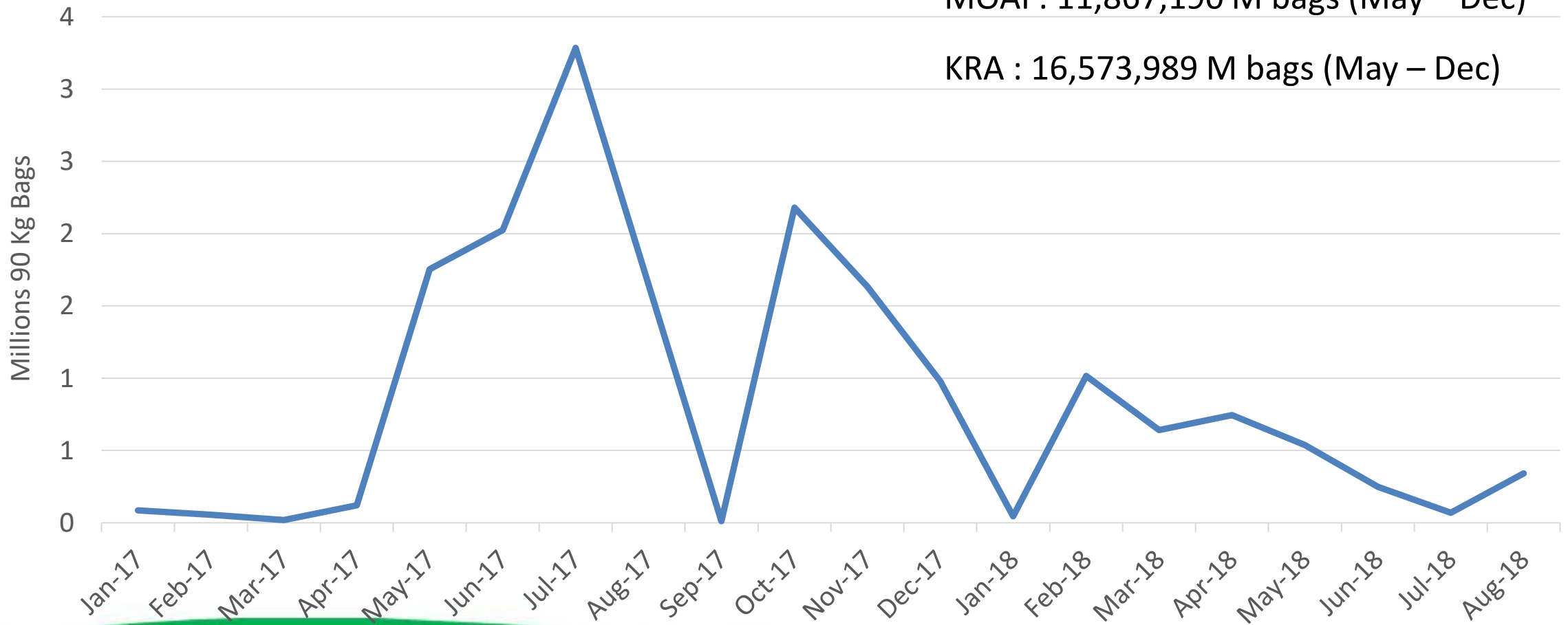
Current Stocks (90 kg bags)

	Farmers	Millers/Traders	NCPB	Total stock
Maize	15,873,089	383,612	3,857,301	20,114,002
Beans	2,868,194	2,086,619	0	4,954,813
Wheat	1,534,930	3,169,474	0	4,704,404

Maize Imports

MOAI : 11,867,190 M bags (May – Dec)

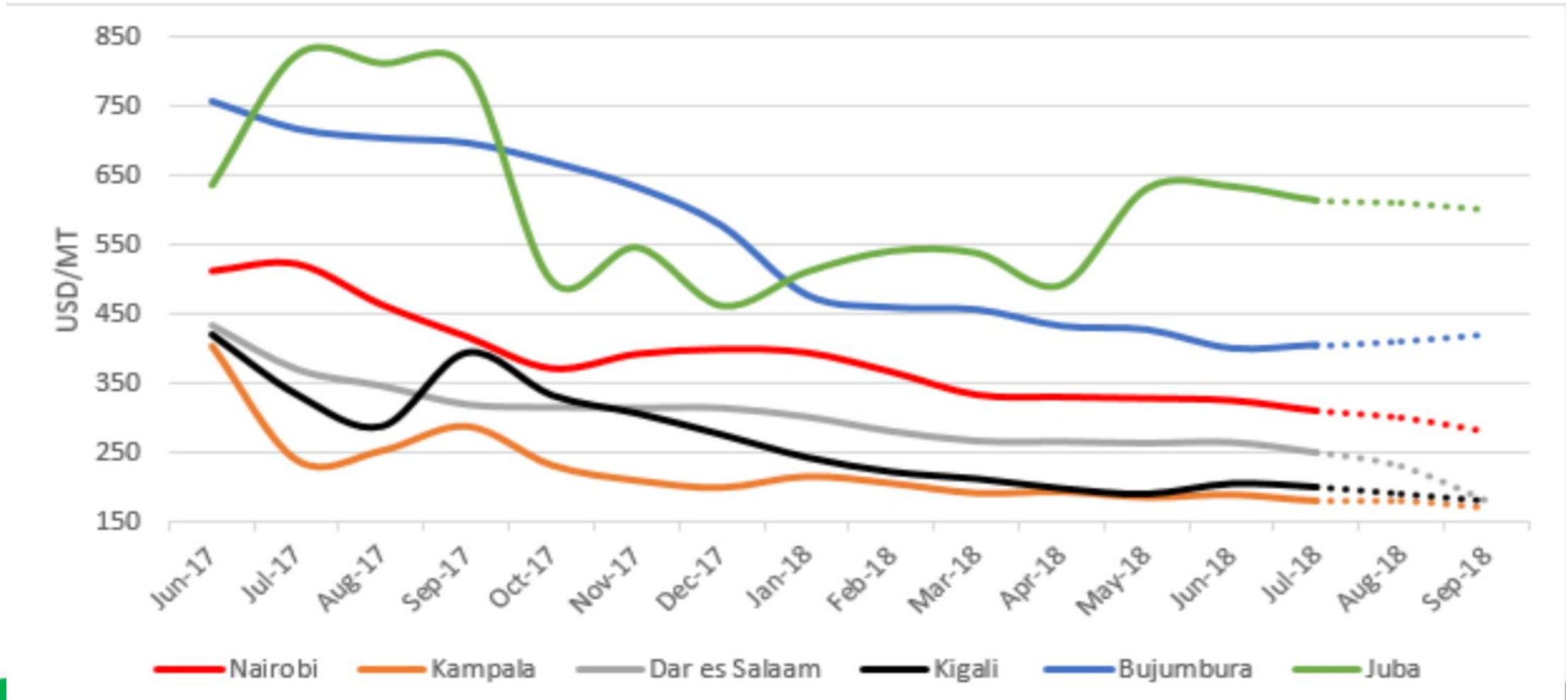
KRA : 16,573,989 M bags (May – Dec)



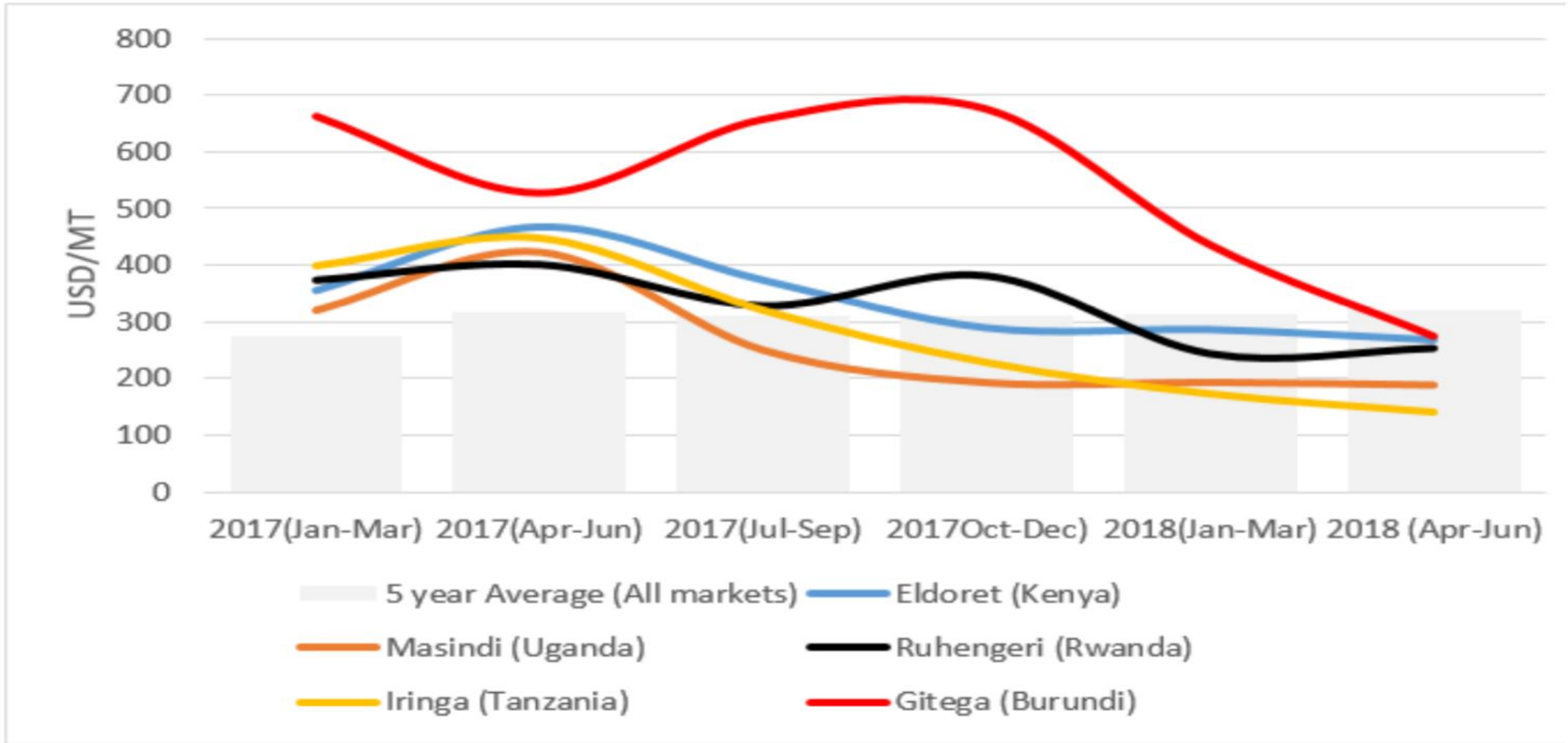
Maize Balance Sheet (Stocks in Million bags)

Maize Balance Sheet (September 2018 to July 2019)	Base (MoA)	Pessimistic (SR)	Optimistic (SR)	Optimistic with KRA Figures)
Stocks as at August 2018 in 90kg bags	20.11	20.11	20.11	24.82
Estimated Imports between September 2018 to March 2019				
i) Private sector/ Relief agencies estimated imports	1.20	1.20	1.20	1.20
Estimated Harvests (September to November 2018)				
i) Estimated L.R Harvests	18.44	18.44	18.44	18.44
ii) Estimated S.R Harvests	6.00	3.00	4.50	4.50
Available stocks (September 2018 and July 2019)	45.76	42.76	44.26	48.96
Expected total exports to EAC region	0.20	0.20	0.20	0.20
Post – harvest storage losses estimated at 12%	5.49	5.13	5.36	5.92
Amount used for Manufacture of livestock feeds (1%), seed (1%), other products (2%)	1.84	1.72	1.78	1.98
Net available stocks by July 2019	38.24	35.72	36.91	40.87
Consumption @3.39 million bags/Month for 47 million people for 11 months	37.34	37.34	37.34	37.34
Forecast Balance at at 31st July 2019	0.90	-1.62	-0.43	3.53

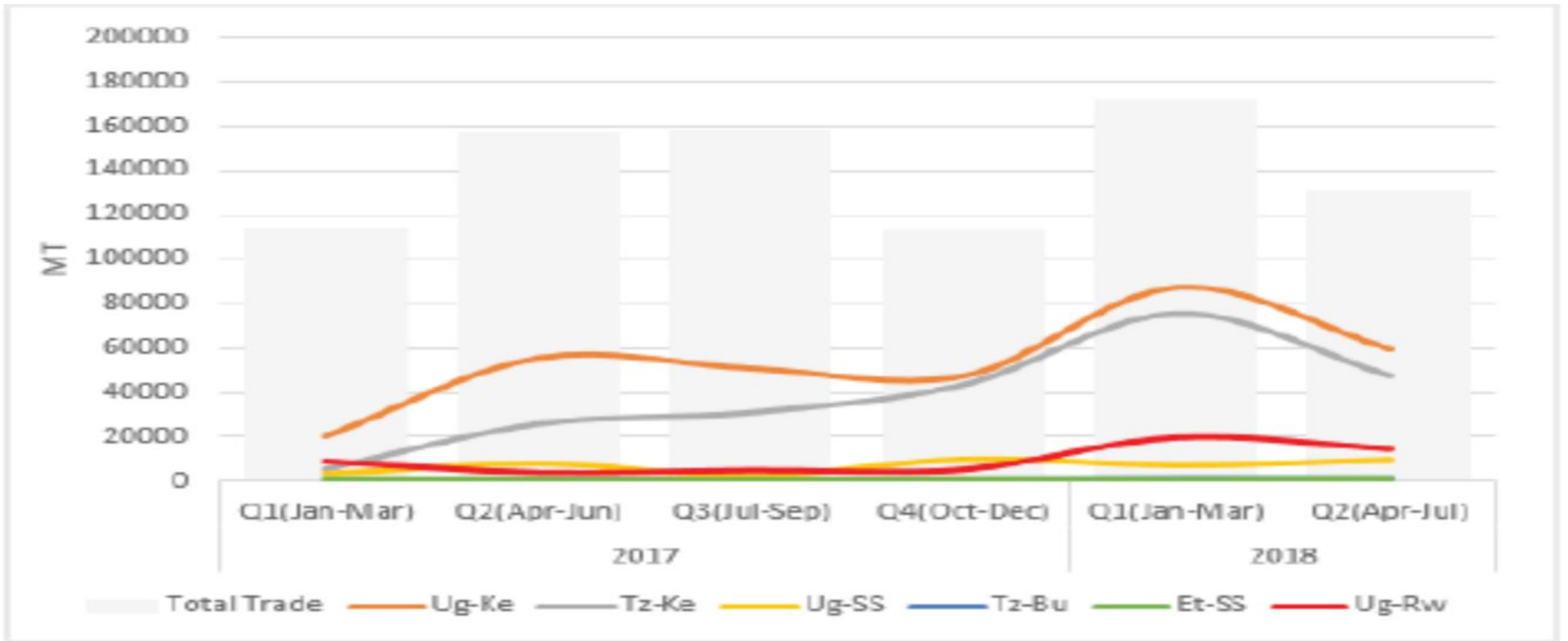
Maize prices for urban markets in the region



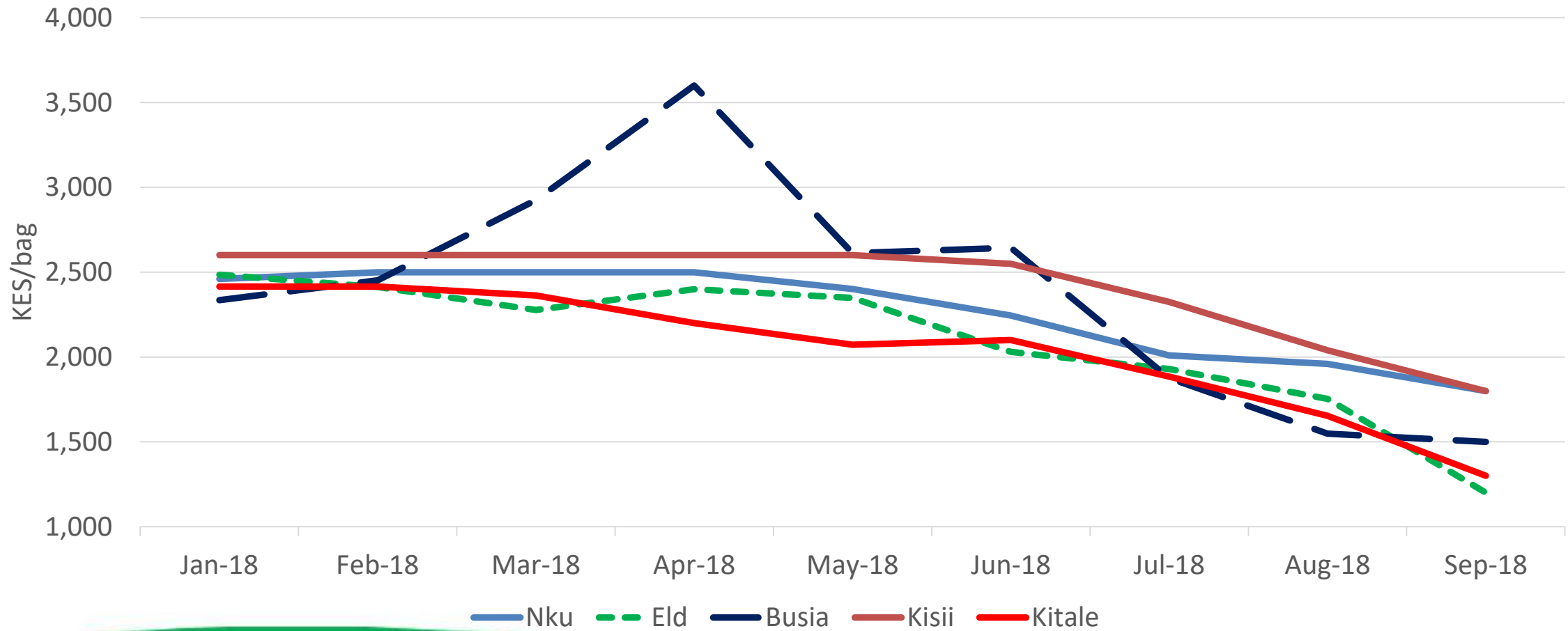
Maize Prices for production markets in the region



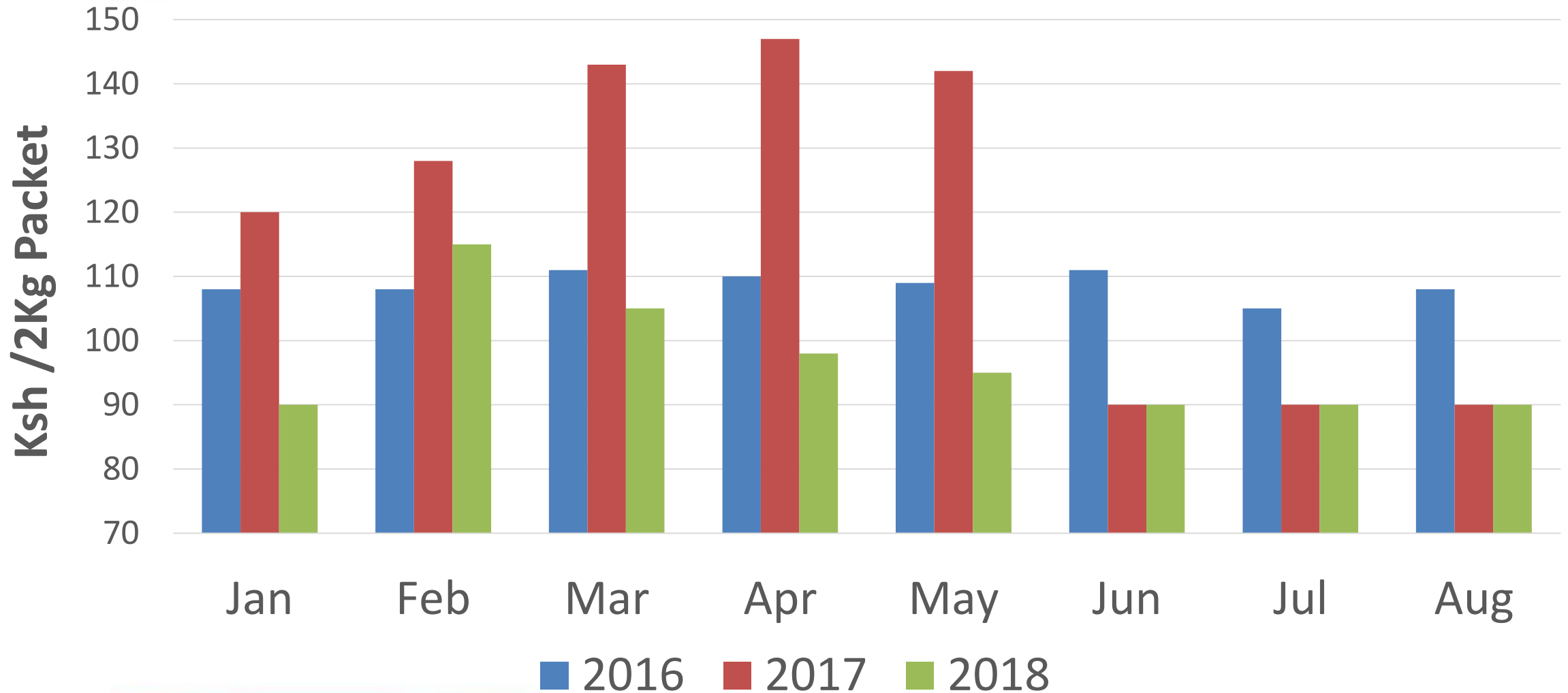
Maize flows in the region



Maize prices in local markets



Prices of sifted maize flour



Conclusion

- 2018 year harvest is projected to be good
 - LR harvest improved due to good rains, minimal disease/pest prevalence
 - SR harvest expected to be good due to normal to above normal & well distributed OND rains
- However, need to track post-harvest losses
 - Some farmers are harvesting during rainy season
 - Storage a challenge – raising concerns on food safety

Conclusion

- Prices expected to go down and stabilize after long rains harvest
- Current and expected stocks are adequate to cover the country up to start of 2019 LR harvest
- Need to collect credible & timely data for planning & informing decisions

Recommendations for policy

- No need of tariff waiver on maize imports
 - But given the market dynamics (higher prices in some countries in the region) we need to monitor the stocks very closely
- Interventions on post-harvest handling, storage & management through provision of driers and warehouse receipt system--Private sector involvement

Recommendations for policy

- There is need to promote alternative staples--rice and potatoes
- Fast track the blending of key staples
 - Reduce heavy reliance on maize & improve nutrition