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The Determinants of Low Wheat Productivity in Kenya

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Abstract:- Agriculture contributes 24% directly to the Gross Domestic Product (GDP), 60% of the export earnings and about 75% of industrial raw materials. Food crops subsector contributes about 30% to the Kenyan GDP. Among the cereals in Kenya, wheat is the second most important after maize. Wheat has a substantial contribution to poverty reduction, food security and creation of employment. Due to the high growth in population, increased urbanization, and related changing trends in food consumption patterns, the demand for wheat and wheat products is on the increase. Demand for wheat products is apparent in the preference of confectionery, pasta and breakfast cereals. Wheat demand in Kenya has been swelling hence production has not been able to certify it leading to importation of huge quantities to fill the gap between demand and supply. Increased imports diminish local prices. This becomes a disincentive leading to decline in wheat production. In regard to the importance of wheat enterprise in the country, a survey was conducted to determine factors that have led to decline in wheat production and there after give recommendations for future research. Primary data was collected by use of structured questionnaires to a sample size of 344 wheat farmers in selected wheat producing counties of Kenya. Results of the survey reveal that factors contributing to low wheat production consists of: pests, diseases and Shortage of improved wheat variety seed, droughts, heavy rains, and high cost of farm inputs. Through wheat research, the country will increase production, reduce the amount of wheat imports hence save the country's foreign exchange. The study was undertaken in Narok and Nakuru Counties of Kenya. A sample size of 344 farmers was involved in the survey. Njoro BWII the most famous variety accounting for 30.4% of the total wheat varieties cultivated followed by Kwale (10.41%), Kenya Korongo (10.28%), Eagle10 (6.17%), and Kenya Kingbird (5.21%). All these (5) varieties collectively account 55.71% of the total varieties cultivated by the farmers in the study areas. Some of the varieties are more than 20years old. This indicates that wheat varietal turnover is very low. As a recommendation, to improve wheat production in Kenya, adoption of the new improved technologies should be accelerated to reduce the adoption lag period, varietal turnover rates should be increased and wheat production risks eliminated or minimized. Additionally, appropriate development programmes and policies promoting new technologies should target disease and pest management, input and output distribution, seed multiplication and diffusion.

Keywords:- *Determinants, Low Productivity, Consumption, Imports, Wheat.*

I. INTRODUCTION

Agriculture is basic to combating challenges of creating wealth, feeding an expanding population, and minimizing deterioration of natural resources in Kenya. Generally, the sector contributes about 26% directly to Kenya's GDP and indirectly about 28% through linkages to service sector and agro-processing industries. The sector supports about 82% of the rural population, provides about 76% of total employment and accounts for over 60% of exports, (Kenya Climate smart Agriculture Strategy 2017-2026).

In terms of production and consumption, wheat is second most important after maize in Kenya. The enterprise contributes cross to 21 billion Kenya shillings to the Gross Domestic Product (GDP) and offers employment to more than half a million people. Mean area under wheat is about 147,800 Ha and an estimated production of 4.05 million 90Kg bags (365,600 MT) with an estimated wheat annual consumption of about 18.4 million 90kg bags (1,658,000 MT) with the divergence filled by imports. Wheat consumption per capita has been increasing by about 4% per year.(MOA, 2021). Expanding middle class and an increasing preference for wheat products has caused the demand for wheat products rise (Gichangi *et al*. (2022).

About 80% of the national wheat production is mainly practiced by large scale farmers, while 20% is produced by the small-scale farmers (Gichangi *et al*. (2022). The main wheat producing Counties are: in Nakuru, Narok, Laikipia, Uasin Gishu, Nyandarua, Nyeri and Meru Counties. Table 1 depicts Kenya wheat Area, Production and Yields (2014-2023).

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Table 2: Kenya Wheat Area, Production and Yields (2014-2023)

Market Year	Area (1000 Ha)	Production (1000 Tons)	Yield (T/Ha)
2014/2015	147	229	1.6
2015/2016	120	239	2
2016/2017	153	215	1.4
2017/2018	131	165	1.3
2018/2019	133	337	2.5
2019/2020	139	366	2.6
2020/2021	132	405	3.1
2021/2022	134	245	1.8
2022/2023	140	275	2
2023/2024	150	310	2.1
5-year Average 2018/19 - 2022/23	**136**	**326**	**2.4**
Percent Change Year Average (%)	**11**	**-5**	**-14**

Source: USDA, 2024

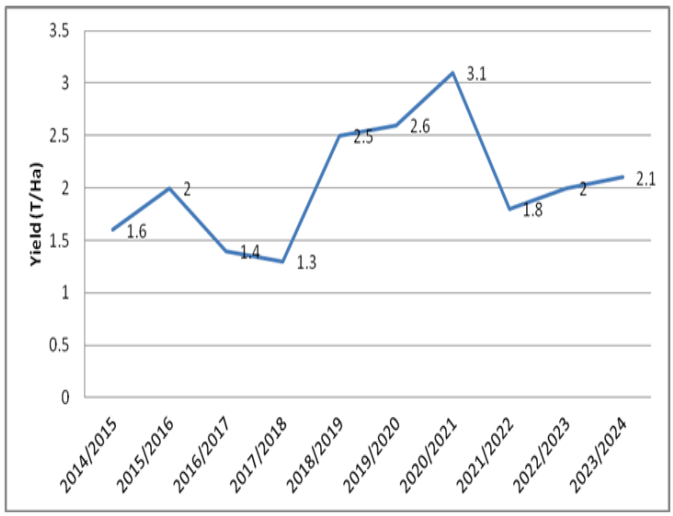

Fig 1: Kenya Wheat Yields 2014/2015-202/2023
Source: USDA, 2024

II. WHEAT PRODUCING COUNTRIES

As depicted in Table 2, the major wheat producing Counties are Narok (64,011 Ha) (Nakuru (25,548 Ha) , Laikipia (11,509 Ha), Meru (11,630 Ha) and Uasin Gishu (19,140).

Table 3: Counties that Produce Wheat in Kenya (2021).

County	Area(Ha)2019	Production(ton)
Nyeri	2,328.	6,220.
Elegyo Marakwet	226	612
Uasin Gishu	19,140.	34,662.
Laikipia	11,509.	37,318.
Marsabit	26	9
Meru	11,630.	32,485.
Baringo	200	900
Nakuru	25,548.	71,652.
Narok	64,011.	123,037.
Nyamira	72	84
Nyandarua	1,585.	4,961.
Kisii	210	47
Samburu	1,400.	4,300.
Trans-Nzoia	1,265.	3,142.
Grand Total	139,307	319,719

Source: Ministry of agriculture, 2021

- *Wheat Production, Consumption and Importation Trends in Kenya.*

A universal decline in production and an increasing demand is currently being realized. The broadening disparity between production and consumption has been cushioned by the country importing wheat. The inclination in production, consumption and imports of wheat from 2014 to 2023 is depicted in Figures 2. It reveals that apparent consumption has been rising at an average of about 4 percent per annum.

Benefit from new improved varieties can only be realized if these varieties are rapidly adopted by farmers (Joshi and Braun,2022). For rapid varietal turnover rates, continuous breeding of new improved wheat varieties produced by breeding programs is a prerequisite that eventually improves productivity as well as addressing the challenge of food in-security. Nevertheless, producing and releasing improved wheat varieties does not warrant that they will certainly be adopted by farmers. Research has shown that new varieties high yielding attribute is regarded as the most important trait by smallholder farmers (Worku *et al* 2020). According to (González Guzmán *et al.* 2021), expansion in production and productivity, easing in biotic and abiotic stresses lead to the adoption of improved varieties. Similarly, some particular varietal attributes such high yield and superior quality can guide to farmer adopting specific varieties, (Madalla *et al* 2023).

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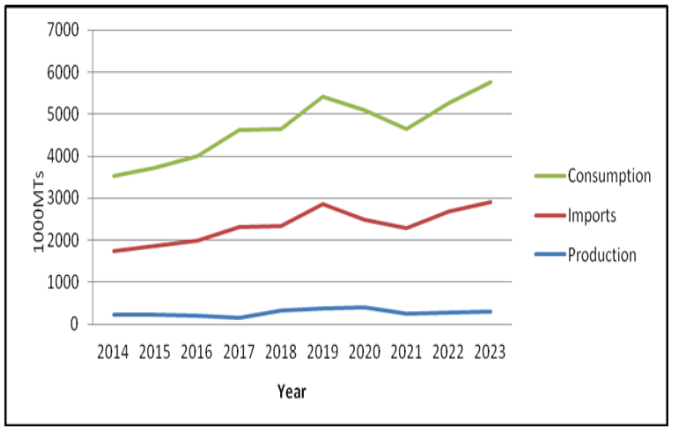

Fig 2: Wheat Production, Imports and Consumption (2014-2023)

➢ *Problem Statement*

For years, wheat production has been on the decline while consumption has been increasing. The decline in production has mainly been attributed to climate change, increased input prices, competition from other enterprises and land sub-division. Change in eating habits among Kenyans has contributed to the increase in consumption. The expanding gap between production and consumption has contributed to over-reliance on imports, eventually depleting he countries foreign exchange earnings. The database on varieties released by KALRO since 1927 contains more than 100 varieties (Gichangi *et al* 2022). A lot of investment has been allocated for wheat research, but there has been little or no improvement in production. Regardless of the initiatives undertaken by the government to stimulate wheat production, supply has not been able to coup with wheat demand. To establish factors constraining wheat production in the country a survey was undertaken.

III. THE STUDY AREA

From five major wheat-producing Counties in Kenya, two counties (Narok and Nakuru) were selected for this study. The basis for selection was scale of production (Small/large scale) acreage under wheat and number of producers and production volumes.

➢ *Data Collection and Target Groups*

Different approaches were used to collect data from different common interest groups. Data collection approaches included qualitative and quantitative data collection methods. Use of different published and unpublished sources, electronic and print media were used to understand and conceptualize crop value chain. Focus group discussion (FGD), key informant interviews (KII), and observations during field survey were some of the tools that were adopted in qualitative data collection. To gather quantifiable data from wheat producers, a structured questionnaire was used.

IV. RESULTS

➢ *Varieties of Improved Wheat Varieties Grown in the Study Area*

Sampled wheat farmers grew various wheat varieties (Table 3). In the 2020-2021 production years, the wheat varieties found in the study area included Mwamba, Njoro BW2, Kwale, Eagle10, Duma, Kenya Kingbird, Kenya Heroe, Robin, Kenya Korongo, and Kenya Hawk. The most popular variety which accounted for 30.4% of the total wheat varieties cultivated by the sampled farmers was Njoro BWII followed by Kwale (10.41%), K.Korongo (10.28%), Eagle 10 (6.17%), and K.Kingbird (5.21%). All these five varieties accounted for 55.91% of the total varieties cultivated in the study areas. Njoro BWII which is considered as old variety which was released in the year 2001 is still popular among the famers.

Table 4: **Popular Wheat Varieties Grown in the Study Area Across Scale of Production and Counties**

Characteristics	Njoro BWII %	Kwale %	Korongo %	Eagle 10 %	K.Kingbird %	Others %	Total %	Varietal age(in years)
Scale of Production								
Large-holder	20.75	9.82	7.33	1.98	11.7	52.71	5.11	25.9
Medium-holder	24.16	13.71	10.33	2.89	10.2	44.87	12.36	27.84
Small -holder	25.27	11.89	10.71	4.22	6.29	47.83	26.21	29.38
Counties								
Narok	46.26	2.28	4.22	15.3	2.32	42.31	33.29	32.82
Nakuru	29.33	25.28	2.33	1.81	7.91	40.31	38.51	25.31
Sub-Counties								
Narok South	47.15	6.78	4.11	13.78	7.25	27.21	27.22	31.22
Narok North	9.87	13.22	8.33	4.69	4.82	51.34	30.42	29.11
Rongai	23.27	8.67	16.77	5.32	7.22	50.51	35.77	34.73
Njoro	28.64	11.79	9.30	6.71	3.72	45.31	23.41	29.81
Total	30.4	10.41	10.28	6.17	5.21	43.79	100	30.66

Key: Large- scale (n= 88); Medium -scale (n= 93) ; Small scale (n= 163)
Land- size (Acres): small scale farms<20ha; medium scale farms 20–50ha; large scale farms >50ha

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- *Factors Contributing to Low Wheat Productivity During 2022*

The Table 3 depicted that a significant proportion of small farmers (33.40 %), (31.20 %), (44.60 %), (12.20%) and (6.00 %) reported droughts, high cost of inputs, wheat diseases (Stem rust), attack of aphids (Russian wheat aphids) and heavy rains respectively as the causal factors to low wheat productivity during 2022. A significant proportion of medium farmers (70.10 %) reported that shortage of improved wheat variety seed was the main factor responsible for low wheat productivity in Kenya. The data also depicted that large farmers (25.10 %) reported that late sowing was also the cause of low wheat productivity.

Table 5: Contributing Factors to Low Wheat Productivity During 2022

Factors	Farm Size Groups			
	Small	**Medium**	**Large**	**All**
Droughts	33.40	16.20	8.20	22.30
High cost of farm inputs	31.20	34.40	25.10	27.30
Wheat Diseases (Stem Rust)	44.60	55.30	18.40	42.43
Shortage of improved wheat variety seed	25.00	70.10	35.60	44.70
Pests (Aphids and quelea birds)	14.30	15.30	17.90	17.33
Heavy rains	14.30	12.30	00.00	5.70

Source: Survey 2022

V. CONCLUSION

Agriculture contributes 24% directly to the Gross Domestic Product (GDP), 60% of the export earnings and about 75% of industrial raw materials. Wheat is the second most important after maize. Wheat has a substantial contribution to poverty reduction, food security and creation of employment. Due to the high growth in population, increased urbanization, and related changing trends in food consumption patterns, the demand for wheat and wheat products is on the increase. Demand for wheat products is apparent in the preference of confectionery, pasta and breakfast cereals. Wheat demand in Kenya has been swelling hence production has not been able to certify it leading to importation of huge quantities to fill the gap between demand and supply. Increased imports diminish local prices. This becomes a disincentive leading to decline in wheat production. In regard to the importance of wheat enterprise in the country. From survey results it shows that factors contributing to low wheat production consists of: pests, diseases and Shortage of improved wheat variety seed, droughts, heavy rains, and high cost of farm inputs. Njoro BWII was the most famous variety accounting for 30.4% of the total wheat varieties cultivated followed by Kwale (10.41%), Kenya Korongo (10.28%), Eagle10 (6.17%), and Kenya Kingbird (5.21%). All these (5) varieties collectively account 55.71% of the total varieties cultivated by the farmers in the study areas. Some of the varieties are more than 20years old. This indicates that wheat varietal turnover is very low. As a recommendation, to improve wheat production in Kenya, adoption of the new improved technologies should be accelerated to reduce the adoption lag period, varietal turnover rates should be increased and wheat production risks eliminated or minimized. Additionally, appropriate development programmes and policies promoting new technologies should target disease and pest management, input and output distribution, seed multiplication and diffusion.

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