



FOOD CROPS DIRECTORATE
WHEAT VALUE CHAIN SURVEY REPORT
(8th February to 19th March 2021).



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EXECUTIVE SUMMARY

Agricultural growth and development is crucial for Kenya's overall economic and social development. Agriculture directly contributes 24% to the Gross Domestic Product (GDP), about 75% of industrial raw materials and 60% of the export earnings. The food crops subsector contribution to GDP is about 30%.

Wheat is the second most important cereal in Kenya after maize and contributes substantially to food security, poverty reduction and employment creation. The national demand for wheat and wheat products is on the increase, partly due to the high population growth, increased urbanization, and related changing trends in food consumption patterns. A growing preference for wheat products is evident across the income groups in both rural and urban areas with both commercial and home-baking becoming common. Demand for wheat products is also evident in the growth of pasta, confectionery and breakfast cereals sectors, while a limited amount of wheat is also used in the manufacture of animal feeds.

Local wheat production has not been able to meet this demand leading to importation of large quantities to plug the gap between supply and demand. Increased imports have led to a further decline in wheat production because imports dampen domestic prices which is a disincentive to production. Other factors that have contributed to low production include diseases, pests (especially quelea birds), inadequate access to certified seeds, inadequate extension and research services, poor infrastructure, erratic weather and high cost of farm inputs.

The wheat subsector is a source of employment in primary production, milling and baking industry. The subsector employs over 500,000 people and contributes Kshs 20 billion to GDP. Improving wheat production will help the country save foreign exchange by reducing the amount of wheat imports.

In view of the importance of the wheat subsector, the Food Crops Directory in the Agriculture and Food Authority (AFA) conducted a wheat value chain survey with a key objective of identifying factors that have led to a decline in wheat production and develop a wheat improvement action plan.

KELLO HARSAMA.
Ag. Director General,(AFA)

1.0 Introduction.

1.1 Background

Kenya's agriculture is key to meeting the challenges of feeding a growing population, creating wealth, reducing poverty and managing the degradation of natural resources. The agricultural sector continues to be a key economic and social driver of development. Overall, the sector directly contributes about 25% of Kenya's GDP and about 27% indirectly through linkages to agro-based industries and the service sector. The sector accounts for over 65% of exports, provides about 75% of total employment and supports over 80% of the rural population. (Kenya Climate smart Agriculture Strategy 2017-2026).

Farming in Kenya is generally consigned to the older members of society with the youth generally shunning farming as a low income and risky venture. Wheat is second among cereal crops in Kenya in terms of production and consumption after maize. The wheat sub sector contributes Ksh. 20 billion to the GDP and employs over 500,000 people. On average the area under wheat is 146,800 Ha with an estimated production of 365,600 MT (4.05 million 90Kg bags). The estimated wheat annual consumption is 1,658,000 MT (18.4 million (90kg) bags) and this gap is filled by imports. Per capita wheat consumption has been increasing by 4% per annum. (Source: statistics unit, Ministry of agriculture) The rise in demand for wheat products is driven by an expanding middle class and an increasing preference for wheat products.

Wheat production in the country is mainly practiced by large scale farmers who produce 80% of the national production, while the small-scale farmers produce 20%. Farmers generally attain yields of less than 1.9 metric tons per hectare (21 bags/hectare) while large scale farmers get above 5 metric tons per hectare (40 bags/hectare). The crop is grown mainly in Narok, Nakuru, Uasin Gishu, Laikipia, Meru, Nyandarua and Nyeri Counties. The Figure below is a map of wheat producing counties Kenya.

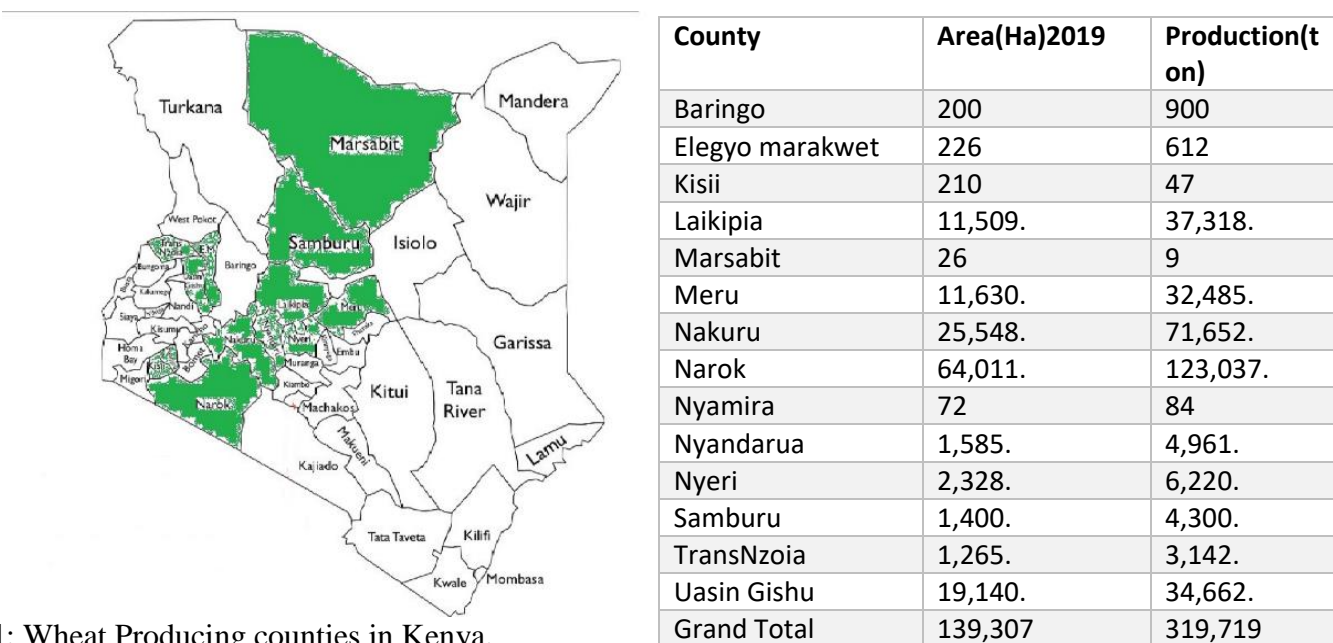


Figure 1: Wheat Producing counties in Kenya.

Source: Ministry of agriculture

1.1.1. Wheat Value Chain Map, Actors and functions.

Key actors involved in the wheat value chain include Researchers, Input suppliers,producers,traders,processors and consumers. The figure below is a wheat value chain map in the country.

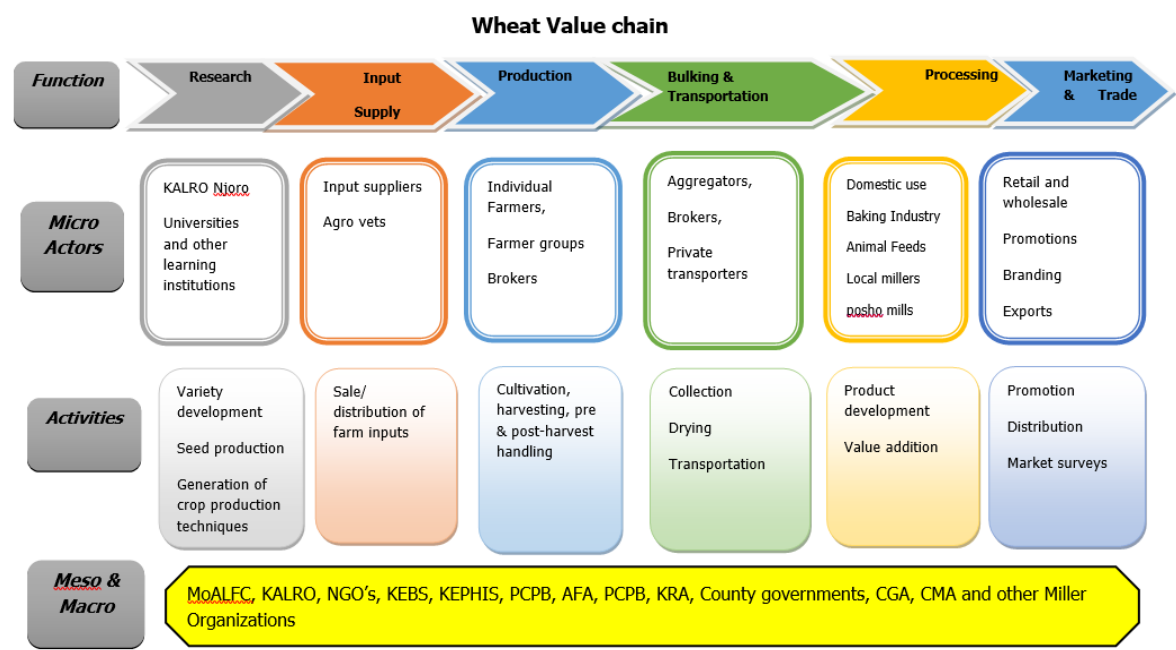


Figure 2: The wheat value chain map

1.1.2 Trends in production, consumption and Importation of wheat.

There has been a general decline in production while consumption has been increasing. The widening gap between production and consumption has been bridged by importation of wheat into the country. The figure below shows a 10-year trend in wheat production, importation and consumption in the country.

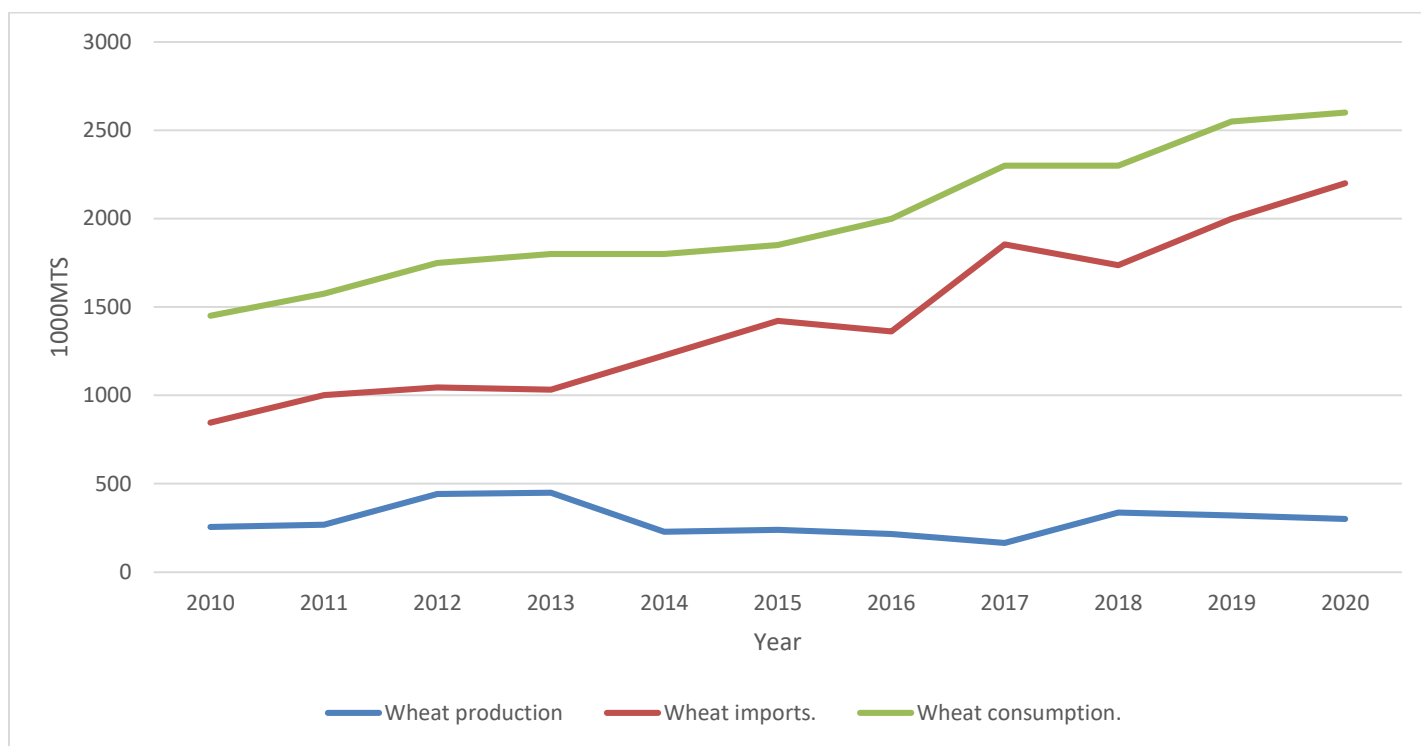


Figure 3: Wheat production, imports and consumption (2010-2020)

1.1.3 Current Initiatives in promotion of the wheat value chain.

1.1.3.1 The wheat purchase programme(WPP)

To address the declining production of wheat in the country the National Treasury on 8/1/2010 through engagement of the Cereal Millers Association (CMA) and Cereal Growers Association (CGA) agreed on a wheat buying programme dubbed C60, with an aim of protecting and encouraging farmers to produce more wheat to bridge the gap between production and consumption. Millers gazetted under the East Africa Customs Management Act (EACMA) pay 10% Import Duty instead of the 35% subjected to sensitive products under the Common External Tariff (CET) of EAC. This is on condition that they also mop up the local wheat to support local production. Initially, millers used to procure wheat individually from local farmers. However, in 2016/17 a better mechanism was put in place with millers and growers participating through their associations, whereas wheat was aggregated by NCPB. Aggregation through NCPB experienced challenges and so in 2017/18 the stakeholders agreed to bring on board a private company, Cargill Supply Chain Ltd as an aggregator.

At the beginning of each financial year, the Ministry would convene wheat stakeholders' meetings comprising of CMA, CGA, National Treasury, NCPB and Aggregators to plan for wheat buying, and agree on price and quality parameters. The CGA would provide a list of large-scale farmers opting to sell directly to millers. CMA would use the list to match the farmers with individual millers for purchase of their wheat. A database would be developed through registration of wheat farmers by CGA's and the register would be used to verify the details of farmers selling wheat. 6, millers used to participate individually in local wheat purchasing.

The Ministry of agriculture in conjunction with National Treasury has been facilitating millers to participate in this scheme through giving recommendation based on performance of each miller in purchasing of wheat in the regions to National Treasury for issuance of C60 for imports. In 2020/2021 financial year, 36(28 CMA members; 8 non-CMA) millers were gazetted and participated in the scheme. For purposes of managing the Wheat Purchase Programme, the wheat growing areas are divided into five regions namely; Lower Narok, Upper Narok, Nakuru, Eldoret and Timau (1 & 2). Starting July 2020, the programme was transferred to Agriculture and Food Authority (AFA) within the Food Crops directorate, one of the specialized units in the Authority.

1.1.3.2 Research programmes

The national mandate for wheat research is vested in KALRO Njoro. Other research institutions involved in wheat improvement programs include CIMMYT, ICARDA and Universities. Some of the programs include development of wheat varieties, capacity building and development of technical materials.

2.0 The wheat value chain survey

Despite the previous initiatives to promote the wheat value chain, production has not been in tandem with consumption. This survey was intended to establish factors constraining wheat production in the country.

2.1 Problem Statement.

Wheat production has been declining over the years while consumption has been increasing. The declining production has generally been attributed to increased input prices, climate change, land subdivision and competition from other enterprises. The increase in consumption is attributed to change in eating habits among Kenyans. The widening gap between consumption and production has led to over reliance on imports, subsequently draining foreign exchange earnings.

2.2 Objectives of the study

The broad objective of the study was to comprehensively understand activities in the nodal operations within the wheat value chain in production, produce trading, milling, processing, retailing and import/export.. The specific objectives were:

1. To establish factors that have led to the declining wheat production in the country
2. To identify sustainable initiatives that can support wheat farming in kenya
3. Develop a comprehensive wheat improvement action plan.

3.0 Survey Methodology

The Wheat Value Chain study was broken into 2 broad categories:

- Data collection.
- Data analysis using survey 123 tool.

3.1 The study area

The study was conducted in Narok, Uasin Gishu, Nakuru, Laikipia and Meru counties selected from five major wheat-producing regions. The criteria for county selection were production volumes, Scale of production (Small/large scale) acreage under wheat and number of producers.

3.2. Data collection and target groups

A combination of different approaches were employed to gather pertinent information and data from different target groups. These included desk reviews, qualitative and quantitative data collection methods. To understand and conceptualize the wheat value chain, desk review were conducted using different published and unpublished sources, electronic and print media.

Apart from collecting secondary information, both qualitative and quantitative approaches were engaged to collect primary and quantifiable data from relevant value chain actors. The tools and techniques adopted in qualitative approach included focus group discussion (FGD), key informant interviews (KII), and observations during field survey. A checklist was used as a tool during qualitative stages and templates used to gather quantifiable data from wheat producers, millers, traders, input suppliers, and other actors through a structured questionnaire. Information and data was collected from all relevant value chain actors including input suppliers, producers, traders, processors, and consumers.

Wheat farmers were clustered into the six main growing regions of Lower Narok, Upper Narok, Nakuru, Eldoret, Timau 1 and Timau 2. Each cluster was further stratified into large (over 100 acres), medium (50 - 100 acres) and small producers (less than 50 acres). Focused group discussion approach was used to interview the small and medium farmers while large scale farmers were interviewed individually. Key informants were also identified and interviewed.

The millers who were visited were:

- Mombasa - Grain Industries Limited, Atta Limited, Ustawi millers, Karibu millers, Mombasa maize millers.
- Nairobi- Baraka millers, Shree sai Industries, Pembe millers, Unga millers, Spice world millers, Rafiki millers, Kabansora millers, Weetabix Limited, Uzuri millers, Alpha grain millers.
- Thika – Bakex millers, Capwell industries, Mama millers,
- Eldoret - Buffalo Millers, Eldoret Millers
- Kisumu - United Millers Ltd; Mombasa Maize Millers (Kisumu)

3.2.1 Data Analysis

Quantitative data collected included yields, acreages, number of actors in the value chain, prices while qualitative data included age, input types, gender, level of education, grading. This data was analyzed using survey 123 tool and Microsoft excel.

4.0 Findings

4.1 Factors that have contributed to the declining wheat production in the country

4.1.1 Research and Development

Research organizations in the Country generate, validate and release technologies. Research institutions interviewed were KALRO Njoro, Egerton University, KALRO Oljoro Orok and Eldoret University. The services provided by research institutions in promotion of the wheat subsector include; Development of improved wheat varieties for different Agro-ecological zones of the Country, Bulking and distribution of seeds of improved varieties to farmers, Provision of technical information and services ,training of stakeholders and provision of breeders` seed to marketing agents.

Whereas superior varieties with potentials of 7-8.5 tons/ha have been released in Kenya, generally there is low adoption of these varieties by farmers except Njoro 2 whose yield is not as high as other developed varieties this is attributed to low technology transfer from the research stations to the farmers(Research-extension-farmer linkages).Additionally crop management is still poor

A host of wheat varieties have been released from research institutes (Annex 14).

It was also noted during the survey that there is low funding to research and extension which led to obsolete research facilities, reduced effective workforce and inadequate research especially on emerging pests and diseases.

4.1.2 Input supply

The farm inputs include seed, fertilizer, herbicides, fungicides, insecticides and various farm implements. Smallholder farmers procure most of their inputs from local agro vets and rely on technical advice provided by the vendors. Large scale farmers, on the other hand, procure their inputs in bulk from source, or accredited wholesale distributors. One of the biggest challenges reported by both small and large scale farmers, is the high cost of inputs. Additionally, and particularly for small scale farmers, there is the challenge of accessing quality inputs due to sale of counterfeit and substandard goods. Over reliance on recycled seed was recorded and this compromised productivity.

4.1.3 Production

Wheat farming is mainly undertaken in six counties Narok, Uasin Gishu, Meru, Nakuru, Laikipia and Nyandarua and mainly contributes 20% and 80% production from small scale and large scale farmers respectively. Most of the farmers involved had at least secondary level education. On gender involvement in farming, low involvement of women was strikingly noticeable at 21%. This was mainly attributed to land ownership where men are the land owners and have better access to resources. Below is a figure depicting gender distribution in wheat farming.

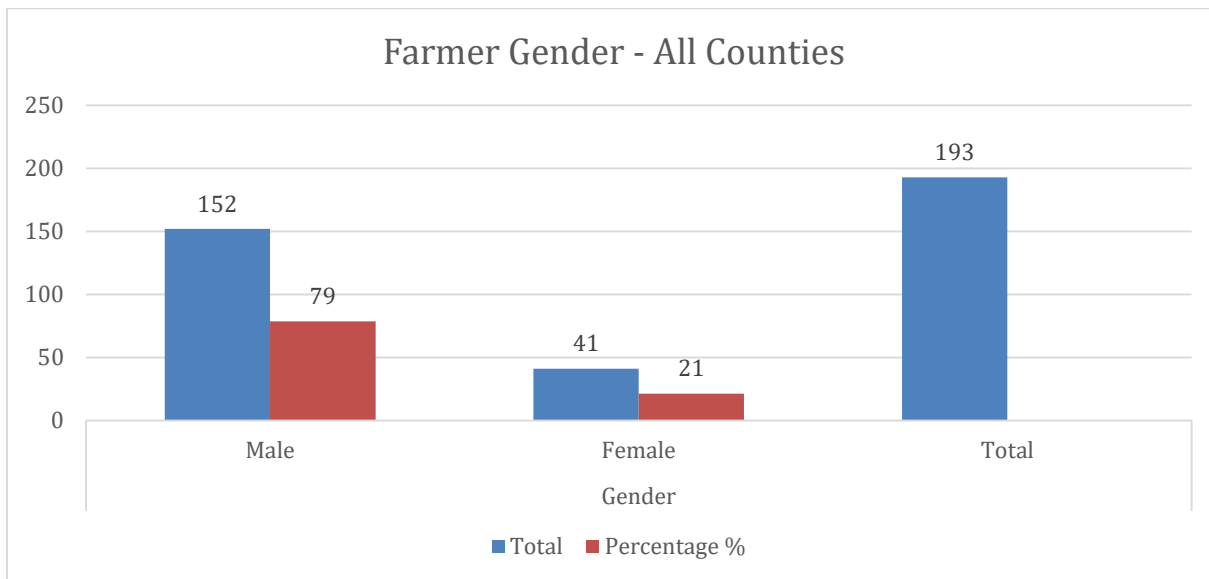


Figure 4: Gender distribution in wheat farming.

4.2 Wheat Production and productivity.

The study results showed that in the 7 wheat producing regions visited there are about 1,646 farmers farming about 167,000 acres of land. The total production from this area is about 2 million bags with large scale farmers who constitute only about 15% of the wheat farmers` population producing about 1.6 million bags (80%). Land productivity ranges from 7-20 bags per acre with the average being 12 bags per acre. The table below shows wheat production and productivity across the wheat producing regions visited.

Table 1: Wheat production and productivity across regions.

S/No	County(region)	Estimated production(90 kg bags)	Production scale(acres)	Yield(90 Kg bags/acre)	Mean productivity per region(90 Kg bags/acre)
1.	Narok	970,000	1-50	10	11
			51-100	14	
			Over 100	10	
2.	Nakuru	392,000.00	1-50	15	14
			51-100	14	
			Over 100	13	
3.	Nyandarua	190,000.00	1-50	12	12
			51-100	14	
			Over 100	10	
4.	Uasin Gishu	398,000.00	1-50	10	11.
			51-100	12	
			Over 100	12	
5.	Timau	102,000.00	1-50	20	12.
			51-100		
			Over 100		

The above table shows that Narok County is the highest producer of wheat. This is attributed to relatively lower population density and availability of large tracts of land for large scale wheat farming. Average yield in 90 Kg bags was highest in Nakuru at 14 bags per acre and highest among farmers holding between 50 to 100 acres. Productivity was higher for medium and small scale farmers compared with the large scale farmers.

4.3 Cost of Production of wheat for the 2019/2020 season.

Costs of wheat production in the 6 wheat production regions were computed for small, medium and large scale farmers in the regions. Yield per acre ranged from 7 to 20 bags while production costs ranged from shillings 32,000 to 50,800 per acre. The cost of producing one bag of wheat ranged from 2,550 to 4,244 shillings. Average yield was 12 bags per acre. The average cost of wheat production in different regions per acre was kshs 39,895 while the cost of production per bag was ksh 3,399(Annex 12).

Different cost items contribute differently to cost of production with land leasing being highest at 23% while bagging, loading and drying is the lowest at 1 %(Annex 13)

4.4 Post-harvest Handling

Farmers carry out recommended practices in production and storage to ensure that they produce wheat that meets the required safety and quality standards. This include drying, grading, packaging and storage.

Drying is done at farm level in the open fields mainly close to urban centers on tarpaulins. This may often lead to potential contamination of the grains with dust and other foreign matter.. Grading is done by the aggregators who test for foreign matter, moisture content and bushel weight. The farmers lack knowledge and equipment's at the farm level. Additionally, only one aggregator had equipment for testing foreign matter while most of the respondents did visual assessment often leading to disputes between the farmers and the buyers. Testing for safety was largely missing and this could lead to contamination of the final product.

Packaging is done both at the farm level and aggregators. Most farmers lack storage facilities and mainly offload the wheat to the buyers immediately after harvest.

4.5 Challenges in production

The main challenges facing small holder wheat farmers include;

- Inadequate information. This is significantly compounded by poor extension services. Most of them rely on information by neighbors and agro-dealers.
- Increased incidences of pests such as brome grass, wild oats, rust and fusarium head blight .The control of these pests constitutes about 32% of the total production costs which is quite substantial.
- High cost of inputs, their accessibility and quality constrained production.
- Erratic rains during harvesting which leads to sprouting of the grains lowering of the grade.
- Quelea bird menace.
- Poor enforcement of the contracts between farmers and buyers/millers.
- Increased land sub division leading to reduced production, productivity and low economies of scale

As a result of the above challenges some farmers have stopped wheat farming. During the survey it was noted that in the Narok region about 40 per cent of farmers have stopped wheat farming. Some of these farmers have moved to Uganda which is said to offer better incentives while others have switched to alternative enterprises mainly maize, potatoes and pasture.

4.6 Marketing

Wheat is marketed through Marketing agents/ aggregators to millers, however some large scale farmers sell directly to millers. At the aggregation centers, the wheat is cleaned, tested for moisture content, bushel weight, dried and temporarily stored before being transported to the millers. Some Marketing agents buy wheat in specific regions while others buy across all regions. During this study a total of 6 aggregators were interviewed.

The following are the challenges constraining marketing that negatively impacted on production;

- Double taxation of cess – this has been notable for wheat supplies to millers based in Mombasa, i.e a trader pays cess to county government of Narok in Narok and in Mombasa as they deliver to miller. Eventually this cost is passed to farmers through lower prices.
- Poor infrastructure in the wheat production areas limiting accessibility to markets, input suppliers and extension agents.
- Lack of equipment for quality determination leading to conflicts between buyers and sellers.

The price of local wheat for the last 5 years has been unfavorable to farmers. While International prices have increased by 33% in between the year 2016 and 2020 the local prices have increased marginally by only 7% during the same period (Table 13). A proportionate increase in price for local wheat could translated to Ksh 4,528 per 90kg bag in the year 2021. On the other hand, the cost of production over the same period has substantially increased from about kshs 2,000 per bag in the year 2016 to Ksh 3500 per bag in year 2021. Coupled with influx of cheap imports the prices of local wheat were depressed in the same period.

Table 2. Comparative price trends for wheat.

Year	CNF Mombasa (as at 1st August)	USD rate (as at 1st August)	KES price CNF Mombasa	Price per Bag		% difference from 2016	Inflation for previous year(%)	Cumulative Inflation(%)	Actual Agreed Grade 2 Price (ex transport)	% difference from 2016
2016	194.00	101.30	19,652.	1,769.					2,940.	0
2017	227.00	103.87	23,578.	2,122.	19.98%	20	6.32	6.32	3,100.	5.44
2018	262.00	100.40	26,305.	2,367.	11.56%	34	7.99	14.81	3,100.	5.44
2019	225.00	103.25	23,231.	2,091.	-11.68%	18	4.69	20.20	3,100.	5.44
2020	240.00	108.50	26,040.	2,344.	12.09%	33	5.20	26.45	3,150.	7.14
2021	280.00	107.80	30,184.	2,717.	15.91%	54	5.29	33.14		
						4,516.		3,914.		

The depressed prices over a period of time contributed to many farmers abandoning wheat production for other enterprises as observed in Narok (40%). Subsequently, local production has contributed only 8% of the total wheat consumed in the country.

4.7 Processing

Wheat is mainly processed into flour for human consumption with bran and pollard being by products that are sold as livestock feed. A total of 22 millers were visited during the survey mainly concentrated in major urban centers away from production regions.

The total processing capacity of millers isMTs of which is of which 92% is utilized by imported wheat and 8% by locally produced wheat. The main challenge faced by millers is high cost of milling as indicated in table 14 below. Of the total mill operations costs, raw materials contribute the highest to total costs at seventy six to eighty percent while marketing and maintenance contribute the lowest at one percent.

Table 3. Cost of milling

Mill Operation Costs	Percentage
Raw Materials	76-80%
Production	5-8%
Energy	3-4%
Staff	2-3%
Maintenance	1%
Distribution	4-7%
Packing	2%
Transportation	2%
Marketing	1%
Capital Cost	4-8%
Amortization	4%
Interest	4%

The cost of milling 1ton of wheat is ksh 2000 translating into ksh 180 per bag. The cost of raw material is ksh 3300 per bag, therefore the cost of production is ksh 3480 per bag. At a conversion rate of grain to flour of 75 percent, a 90 kgs bag of wheat gives 67kgs of flour and 23kgs of bran and pollard. At a price of kshs 60 per Kg of flour and a price of kshs 15 per kg of bran or pollard, the 90 kgs bag of wheat will fetch kshs 4,365 giving a gross profit of kshs 885 per bag.

From the survey, it was established that millers had the potential of processingMT per day. The total annual production currently is at 2000 million 90kg bags (180, 000 MT) which could be milled fordays. This therefore implies there is enough capacity to spur more production.

4.8 Consumption

Average wheat consumption in the country is about 18 million bags per year. Demand in wheat consumption has been increasing due to a change in eating habits leading to a preference of wheat products. Between 2010-2020, wheat consumption increased wheat consumption increased from 1.4 to 2.6 million metric tons. About 75% of wheat is processed into flour for domestic and commercial use. 25% of wheat grain produces bran and pollard for the livestock industry. In spite of the increased wheat consumption, wheat flour prices for the last 5 years have had a general decline probably due to the government subsidy on imported wheat. The figure below is a 5 year trend in wheat prices.

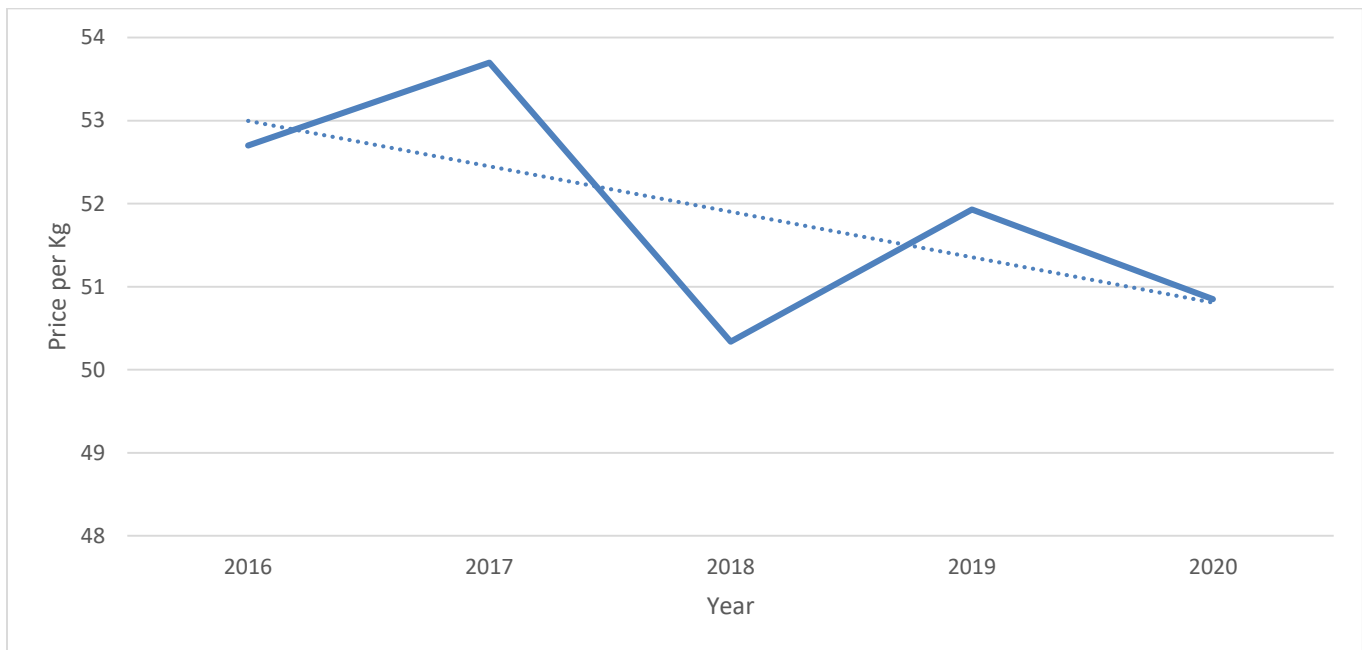


Figure 5: Five year trend in wheat flour price.

5.0 The Pricing Formula for Wheat

Wheat price negotiations under the wheat Purchase program have been unnecessarily lengthy and tedious. A more objective price determination mechanism is therefore needed to reduce acrimony that has characterized price negotiations between farmers and millers and assist in coming up with a fair price for all the value chain actors. Taking into account the importance of production as a foundation function in the wheat value chain, it is imperative that a pricing formula that ensures a fair return for farming should be developed. Such a formula should capture the following parameters:

- a. Average cost of production per bag.(3,400)
- b. Average yield in 90 kilograms bag per acre.(12)
- c. Average acreage under wheat.(10)
- d. Average length of cropping season (120 days).
- e. Recommended minimum daily wage (Kshs 600).

The price of wheat offered to farmers (P) should be;

$$P=(ed+abc)/bc.$$

Using the above formula a commensurate price of wheat for the 2019/2020 season should have been Kshs 4,000 per 90 kilograms bag.

6.0 Conclusions

The wheat value chain survey was conducted under a backdrop of falling wheat production and rising consumption that necessitated the increasing wheat importation into the country. The rise in demand for wheat products is driven by an expanding middle class and an increasing preference for wheat products. Wheat being the second most important cereal crop after maize in terms of production and consumption is critical towards ensuring food and nutrition security in Kenya.

Several initiatives have been carried out including the wheat purchase programme and research programmes but the gap between production and consumption keep, widening. The survey sought to establish factors that have led to the declining wheat production in the country, identify sustainable initiatives that can support wheat farming in Kenya and develop a comprehensive wheat improvement action plan.

Some of the factors contributing to the declining wheat production included low funding to research and extension services which led to minimal research programmes and obsolete research facilities, reduced effective workforce and inadequate research especially on emerging pests and diseases, the high cost of inputs and the existence of counterfeit and substandard farm inputs in the market. Other factors included the inadequate technical information due to poor extension services and the death of the research-extension- farmer linkage programmes. Pests and diseases including wheat rust and quelea quelea birds were found to be major contributors to the decline in wheat production.

This study of the wheat value chain has revealed weaknesses which if addressed can improve the value chain and bring equity among the value chain actors. There is a potential of improving production efficiency at farm level that can improve profitability of wheat farming

7.0 Recommendations

Based on the study findings, the following recommendations are made:

1. A more accurate determination of the number of wheat farmers and acreage so as to arrive at a more accurate determination of the quantity of local wheat production. This coupled with a realistic estimate of local consumption is useful for determination of required import quantities.
2. Subsidization of farm input prices to make it easy for farmers to do wheat farming.
3. Timely negotiations of the seasonal wheat price so as to determine and communicate a price that ensures equity to all value chain players.
4. Research institutions should focus on research for development of suitable higher yielding and disease resistant wheat varieties.
5. The county government should improve their extension services to wheat farmers so as to ensure that farmers benefit from superior production technologies developed by research institutions.
6. Government should provide drying and storage facilities for farmers to enable them capture better prices. In Narok county there is an idle NCPB facility that can be revived for use by farmers.
7. Charging of multiple cess should be banned and cess money should be used to improve the wheat subsector especially improvement of rural access roads.
8. There should be a strong linkage between research-extension-farmer linkages. The linkage will bring about timely sharing of information and transfer of developed technologies for improved wheat production under good wheat management practices.
9. Build capacity of farmers on wheat grading and safety issues for improved income. Farmers lack knowledge on grading and basic equipment.
10. Regular surveillance on the quality inputs used in order curb sale of counterfeit and substandard goods.
11. Capacity building of farmers to avoid over reliance on recycled seed and provide information on wheat agronomy for increased production.
12. Better collaboration between the County and National governments for effective management of quelea birds invasions.

8.0 Wheat Value chain Improvement Action Plan

Constraint	Action	Responsibility	Time frame
High cost of farm inputs.	Organize 6 meetings between farmers and input suppliers to promote collective purchase of inputs	-County governments. -Cereal growers association. -AFA	By December 2021.
Quelea birds menace	Organize meetings between the Crop protection unit at Kilimo and county departments of agriculture to discuss modalities of reporting quelea bird invasion.	-County governments. -AFA. -Crop protection unit. -CGA	By December 2021.
Inadequate extension services	Organize a high level meeting between CS Agriculture and governors of wheat producing counties to discuss extension support.	-MOALFC. -County governments. - AFA.	By June 2022.
Poor access to certified seeds.	Train farmers in seed bulking	-KARLO. -County governments. -CGA -AFA	By June 2022.
Poor road infrastructure.	Organize 2 meetings between farmers and county administration to discuss improvement of road infrastructure.	-County governments. - CGA -AFA.	By march 2022.
Inadequate capacity for quality determination among farmers.	Train farmer groups in Wheat quality determination.	-NCPB. -Cargill. -County governments. -CGA	By June 2022
Lack of contract farming arrangements	Organize 3 meetings between farmers and millers to discuss contract farming arrangements.	-County governments. -CGA. -AFA	By December 2021.
Poor market prices	Organize 3 meetings to sensitize farmers on group marketing to increase bargaining power.	-County governments. -CGA. -AFA	By December 2021.

9.0 Annexes.

Annex 1.Survey Teams

Team No	Areas Visited	Team Members
1	Timau Laikipia West Thika	Patricia Njeru. Patrick Kiriimi. Mukami Njuguna.
2	Narok Nairobi	John Waithaka. Elizabeth Langat. George Ongoro.
3	Nakuru. Nyandarwa	Milton Munialo. Grace Wanjau. Ruth Chepkasi.
4	Eldoret. Kisumu. Mombasa.	C. Wekesa. Agnes Wainaina. Arnold Omonya.

Annex 2: Photographs of common wheat diseases and pests.



Wild Oats



Wheat Rust



Fusarium

Head Blight



Brome grass

Annex 3: Cost elements of imported wheat.

- 1 . CNF- Depends on source.
2. Insurance -0.5% per ton.
3. GBHL- 13.5 USD per ton.
4. Customs- 47 USD per ton.
5. Stevedoring- 1.65 USD per ton.
6. Wharfage - 2.2 USD per ton.
7. Clearing - 25 USD per ton.

Annexe 4: Wheat flour products from a miller in Nairobi.





AGRICULTURE AND FOOD AUTHORITY

Wheat Value Chain Research Questionnaire

Farmers

The management of the Agriculture and Food Authority has commissioned a baseline survey to assess the value chain of wheat in Kenya. The institution will use the results of this study to draw short and long term intervention measures to upgrade the Wheat value chain in Kenya.

Introduction

Confidentiality: Your answers to the questionnaire will be completely confidential and will go a long way in assisting the Agriculture and Food Authority realize its national mandate to regulate, develop and promote scheduled crops in Kenya.

GENERAL INFORMATION

County:

Sub county:

1. Demographics

(Tick appropriately)

Please indicate your:

i. Gender

Male ☐

Female ☐

ii. Age

Below 20 years ☐

20 – 30 years ☐

30 – 40 years ☐

40 – 50 years []

Over 50 years []

iii. Highest level of education

No formal education []

Primary education []

Secondary education []

Tertiary education []

iv. Occupation

Civil servant []

Private sector []

Self-employed []

Any other profession please indicate

FARMING OF WHEAT

1. What area of land is under wheat farming?

0 – 5 acre []

5 – 10 Acres []

10 – 50 Acres []

50 – 100 Acres []

Over 100 Acres []

2. How many harvests do you have in a year?

One []

Two []

3. Yield - 90 Kg Bag per acre?

Season One []

Season Two []

Inputs and Source

Seed []

SEED VARIETY	BRAND	UNIT PRICE	QUANTITY PER ACRE

Fertilizers []

FERTILIZER TYPE	BRAND	UNIT PRICE	QUANTITY PER ACRE

Herbicides []

TYPE	BRAND	UNIT PRICE	QUANTITY PER ACRE

Fungicides []

TYPE	BRAND	UNIT PRICE	QUANTITY PER ACRE

Pesticides []

TYPE	BRAND	UNIT PRICE	QUANTITY PER ACRE

4. Length of cropping period (Months)? []

5. Where do you take your produce?

NCPB []

Miller []

Aggregator []

Own Store []

Other []

6. At how much did you sell at the farm gate (Ksh/90 Kg Bag)?

GRADE	PRICE

7. How did you get into Wheat/business?

Through community initiatives []

Government promotion []

NGOs and CBOs []

Family inherited []

Other []

8. What are the challenges you encounter in wheat farming?

High cost of inputs []

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Unaffordable Credit []

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Pests and Diseases []

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Unavailability of grading facility []

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Unattractive farm gate prices []

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Delay in payment by aggregators []

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Cess and Levies []

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Unpredictable weather patterns

[]

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.....
Post harvest management

[]

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.....
Other (specify)

[]

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9. What can be done to facilitate development of Wheat farming?

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.....
10. What are your general thoughts on Wheat farming?

.....
..
Thank You for Participating. We value

Annex 6: Aggregator questionnaire.



AGRICULTURE AND FOOD AUTHORITY

Wheat Value Chain Research Questionnaire

Aggregator

The management of the Agriculture and Food Authority has commissioned a baseline survey to assess the value chain of wheat in Kenya. The institution will use the results of this study to draw short and long term intervention measures to upgrade the Wheat value chain in Kenya.

Introduction

Confidentiality: Your answers to the questionnaire will be completely confidential and will go a long way in assisting the Agriculture and Food Authority realize its national mandate to regulate, develop and promote scheduled crops in Kenya.

GENERAL INFORMATION

County:

Sub county:

2. Demographics

(Tick appropriately)

Please indicate your:

v. Gender

Male []

Female []

vi. Age

Below 20 years []

20 – 30 years []

30 – 40 years []

40 – 50 years []

Over 50 years []

vii. Highest level of education

No formal education []

Primary education []

Secondary education []

Tertiary education []

viii. Occupation

Civil servant []

Private sector []

Self-employed []

Any other profession please indicate

AGGREGATOR/ TRADER/ MARKETING AGENT

1. How do you source your wheat

Delivered []

Collected []

2. Which region do you get most of your wheat from?

Eldoret []

Nakuru []

Narok []

Timau []

Laikipia/Nyandarua []

3. What services do you provide for wheat growers and unit costs?

Cost (Ksh/ 90Kg bag)

Drying []

Cleaning []

Grading []

Weighing ☐

Bagging ☐

Storage ☐

Others (specify) ☐ `

.....

4. what is your storage capacity (90 Kg Bags)

Own ☐

Leased ☐

5. What do you do to maintain quality standards?

Compliance to EAS 51/2017 ☐

Grain Industry Code of Practice ☐

County Hygiene Certificate ☐

OSHA ☐

Other ☐

6. Do you have a product traceability system

Yes ☐

No ☐

7. If yes, what details are captured in your system

Farmer contact details ☐

GPS Coordinates/ Farm location ☐

Quantity delivered ☐

Others (specify) ☐

8. Who buys your wheat?

Millers ☐

Animal Feeds Processors ☐

Others (specify) ☐

9. Costs incurred by the Aggregator per 90 Kg/bag

Handling ☐

- County cess []
- Transportation []
- Storage (leased) []
- Other (specify) []

10. What are the challenges you encounter in wheat Aggregation/ trading?

- Political interference []
- Price fluctuations []
- Delayed payment by millers []
- Uncontrolled imports []
- Inadequate knowledge on post-harvest handling []
- Inadequate credit facilities []
- Other (Specify) []

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Thank You for Participating. We value your feedback

Annex 7: Transporter Questionnaire.



AGRICULTURE AND FOOD AUTHORITY

Wheat Value Chain Research Questionnaire

Transporter

The management of the Agriculture and Food Authority has commissioned a baseline survey to assess the value chain of wheat in Kenya. The institution will use the results of this study to draw short and long term intervention measures to upgrade the Wheat value chain in Kenya.

Introduction

Confidentiality: Your answers to the questionnaire will be completely confidential and will go a long way in assisting the Agriculture and Food Authority realize its national mandate to regulate, develop and promote scheduled crops in Kenya.

GENERAL INFORMATION

County:

Sub county:

3. Demographics

(Tick appropriately)

Please indicate your:

ix. Gender

Male ☐

Female ☐

x. Age

Below 20 years ☐

20 – 30 years ☐

30 – 40 years ☐

40 – 50 years []

Over 50 years []

xi. Highest level of education

No formal education []

Primary education []

Secondary education []

Tertiary education []

xii. Occupation

Civil servant []

Private sector []

Self-employed []

Any other profession please indicate

Wheat Transporters

1. Why did you get into Wheat transportation business?

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2. What other products do you transport?

Dry foods []

Vegetables []

Non food []

Other []

3. What are your transportation charges/rate?

.....

4. Apart from ordinary vehicle operation expenses, what costs do you incur in transporting that are specific to wheat?

	Amount
Cess and Levies	[]
Bribes	[].....
Others (specify)	[].....

5. What mode of transportation do you use?

Lorry/trailer	[]
Pick up	[]
Tractor drawn wagon	[]
Other	[]

6. What hygiene measures do you undertake to safeguard product quality in transit?

Provisions of the Standards Act 496	[]
Waterproof tarpaulin	[]
Exclusive wheat transportation	[]
Others (specify)	[]

7. Who are your main clients?

Farmers	[]
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Millers	[]
---------	-----

Traders/ Aggregators	[]
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8. Do you have a client traceability system?

Yes	[]
-----	-----

No	[]
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9. If Yes, what details are captured by your system

Client contact details []

Quantity of wheat delivered []

Other (Specify) []

10. What are the challenges you encounter in wheat transportation?

Poor infrastructure []

Bribes []

Theft []

Quality deterioration []

High cost of operations []

Others []

11. What do you think can be done to improve wheat transportation?

.....

.....

Thank You for Participating. We value your feedback

Annex 8;Millers Questionnaire.



AGRICULTURE AND FOOD AUTHORITY

Wheat Value Chain Research Questionnaire

MILLERS QUESTIONNAIRE

The management of the Agriculture and Food Authority has commissioned a baseline survey to assess the value chain of wheat in Kenya. The institution will use the results of this study to draw short and long term intervention measures to upgrade the Wheat value chain in Kenya.

Introduction

Confidentiality: Your answers to the questionnaire will be completely confidential and will go a long way in assisting the Agriculture and Food Authority realize its national mandate to regulate, develop and promote scheduled crops in Kenya.

MILLERS QUESTIONNAIRE

GENERAL INFORMATION

Company Name:

County:

Sub county:

When did the Company start operating.....

1. How much local wheat did you purchase in 2019/2020 season (90KG BAGS).

Region	Allocation by CMA/MO ALF	Amount Purchased	Quantity swapped	Miller swapped
Timau 1				
Timau 2				
Lower Narok				
Upper Narok				
Laikipia				
Nakuru				
Eldoret				

2. How do you procure your local wheat?

Direct contract with farmers []

Agents []

3. If direct contract, give a list of your contracted farmers

FARMER	REGION	QUANTITY	GRADE	PRICE PER 90 KG

4. If agent, which agents do you procure your local wheat through?

NCPB []

Cargill []

Marketing Agent []

Other

AGENT	REGION	QUANTITY	GRADE	PRICE PER 90 KG

5. How was the local wheat utilized? (milling, resale, feeds, other)

	QUANTITY	GRADE
Milling		
Resale		
Feeds		
Others		

6. How would you rate the recommended price for the last season (July 2019 to June 2020)?

Fair/ balanced []

Not fair/biased []

Not comment []

7. What are the cost elements of moving wheat into the milling plant from the different sources

Region	Purchase cost (per 90kg) bag	loading	transport	county Cess	illegal fee	
Timau 1						
Timau 2						
Lower Narok						
Upper Narok						
Laikipia						
Nakuru						
Eldoret						

8. What are your parameters for quality check on wheat grain? what is your sample size per tonne?

9. Which grade of wheat did you mainly use for milling (July 2019 to June 2020)

BUSHEL WEIGHT	Quantity	

10. What is your milling capacity (July 2019 to June 2020)

Unit	Location	Milling capacity

11. What is the extraction rate for your mill(s)

Unit	Extraction rate	Age of machinery	Name of machinery

12. How much wheat did you import from July 2019 to June 2020 under the remission scheme?

Country of origin	Quantity	Grade	CNF	Month cleared

13. How much wheat away from the remission scheme did you import from July 2019 to June 2020?

Country of origin	Quantity	Grade	CNF	Month cleared

14. What are the cost elements of shipping from the different sources to Mombasa

Country	Cost	Freight and Insurance	Port handling	Grain Bulk handling	Others
Ukraine					
Russia					
Argentina					
Australia					
Canada					
Brazil					
Germany					
USA					

15. What are the cost elements of moving wheat into the milling plant from Mombasa

Region	Nairobi	Mombasa	Thika	Eldoret	Kisumu	Nakuru	Meru
Loading							
Transport							
County Cess							
Illegal Fee							
Others							

14. What is the proportion of wheat in the final brands

Brand	proportion of wheat	other element used in blending

16. What is the ex- factory price for your wheat product?

Brand	Unit	price	

17. What challenges do you face in the wheat milling industry?

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18. What opportunities exist in the wheat industry which are yet to be exploited?

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Thank You for Participating. We value your feedback

Annex 9: Researchers Questionnaire.



AGRICULTURE AND FOOD AUTHORITY

Wheat Value Chain Research Questionnaire

KARLO AND OTHER RESEARCH INSTITUTES

The management of the Agriculture and Food Authority has commissioned a baseline survey to assess the value chain of wheat in Kenya. The institution will use the results of this study to draw short and long term intervention measures to upgrade the Wheat value chain in Kenya.

Introduction

Confidentiality: Your answers to the questionnaire will be completely confidential and will go a long way in assisting the Agriculture and Food Authority realize its national mandate to regulate, develop and promote scheduled crops in Kenya.

KARLO AND OTHER RESEARCH INSTITUTES

GENERAL INFORMATION

Research Institution.....

County:

Sub county:

Officer

Mobile and email:

1. What services do you provide to Wheat Farmers?

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2. What services do you provide to other wheat stakeholders?

Category	Services
Millers	
Aggregators	
Marketing agents	

3. How many wheat varieties have been released by your institution

Name	Year released	Yield	Superior parameters

4. What are the challenges faced in the uptake and adoption of the new varieties?

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5. What interventions are underway to mitigate the emerging wheat diseases and pests

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How can the uptake the new varieties be improved by supporting agencies (AFA, MOLFAC, NGOs, FAO)?

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6. How do you compare the performance of wheat varieties grown in Kenya with wheat varieties in major world exporters (Canada, Ukraine, Australia, USA, Russia, and Argentina)?

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7. What research plans are in place to ensure the wheat industry is sustainable and competitive?

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8. What challenges do you face in wheat research?

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9. What research plans are in place to ensure the wheat industry is sustainable and competitive? (Especially due to the high demand of wheat in the country that leads to a lot of importation of the same).

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10. Have you developed wheat varieties that can be introduced in the Arid and Semi-arid areas of the country? (the country has huge tracks of land in these areas that could be utilized).

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11. Which institutions have you collaborated with to improve research of wheat in Kenya?

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12. What collaboration programmes exist between your institution and the county government (s).

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Thank You for Participating. We value your feedback

Annex 10: County governments Questionnaire.



AGRICULTURE AND FOOD AUTHORITY

Wheat Value Chain Research Questionnaire

COUNTY GOVERNMENT

The management of the Agriculture and Food Authority has commissioned a baseline survey to assess the value chain of wheat in Kenya. The institution will use the results of this study to draw short and long term intervention measures to upgrade the Wheat value chain in Kenya.

Introduction

Confidentiality: Your answers to the questionnaire will be completely confidential and will go a long way in assisting the Agriculture and Food Authority realize its national mandate to regulate, develop and promote scheduled crops in Kenya.

COUNTY GOVERNMENT

GENERAL INFORMATION

County:

Sub county:

County officer name

Email and mobile numbers.....

1. What is the acreage of wheat in the county?
2. How much wheat was produced in the county in July 2019 – June 2020 period?
.....
3. How many wheat farmers are in the county?
4. What prices were paid to wheat farmers for their produce in the period?
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5. Are you familiar with the Wheat Purchase Programme scheme?.....
6. What services do you provide to Wheat Farmers?
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7. What services do you provide to wheat Millers/aggregators/marketing agents?

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8. What levies and fees are charged to wheat farmers, Aggregators, transporters, marketing agents and millers?

Levy/fee	Categories of stakeholders	Amount	Related service

9. What wheat varieties are grown in the region?

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10. Are there new varieties introduced in the last one year

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11. What are the challenges faced in the uptake and adoption of the new varieties?

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12. What infrastructure have you established to support wheat value chain actors

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13. What input subsidy do you give wheat farmers, if any.

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14. What county plans are in place to ensure the wheat industry is sustainable and competitive?

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15. What challenges does the wheat value chain actors face?

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16. What opportunities are there for external investors participating in the wheat value chain in the county?

Thank You for Participating. We value your feedback

Annex 11: Common Farm input brands used by wheat farmers.

S/No	Farm Input	Common Brand/variety
1.	Seed	Njoro 2, Saved seed.
2.	Planting Fertilizer.(DAP)	MEA, YARA,FALCON.
3.	Herbicides.	Hussar,Roundup,Buctril,
4.	Fungicides	Folicur,Daconil
5.	Insecticides	Duduthrin,Thunder.

Annex 12. Cost of wheat production in different Regions

	Narok County(Over 100 Acres)	Narok County(51-100 Acres)	Narok County(1-50 Acres)	Nakuru County(Over 100 acres)	Nakuru County(51-100)	Nakuru(1-50 acres)	NYANDARUA COUNTY (1-50 acres)	NYANDARUA (51-100 acres)	Nyandarua(over 100 acres)	UASIN GIS HUCOUNTY (1-50 acres)	UASIN GIS HUCOUNTY (51-100 acres)	UASIN GIS HUCOUNTY (over 100 acres)	Tima u(1-50 acres)
Average Yield (90 Kgs bags/ Acre)	10	14	10	13	14	15	12	14	10	10	12	12	12
Variable costs (shs/ acre)													
Leasing land	5,100	5,500	8,500	12,000	10,000	12,000	10,000	8,000	4,000	10,000	10,000	15,000	5,000
Ploughing	2,040	1,950	2,400	2,500	2,000	2,500	3,000	2,500	2,500	2,000	3,000	2,500	2,500
Harrowing	1,760	1,900	1,700	1,500	1,000	1,500	1,500	1,500	2,500	6,000	3,000	1,500	2,000
Planting	1,400	1,600	1,700	1,500	1,500	1,500	1,500	1,500	2,000	1,500	1,500	1,500	1,000
Seed Njoro 2 at 50kg bag	3,290	3,725	3,700	3,900	3,600	3,900	4,000	4,000	3,000	6,000	3,800	4,700	4,000

Fertilizer	3,310	2,963	4,200	3,200	3,000	3,000	3,100	3,200	3,100	4,800	3,200	3,000	3,200
Herbicides	7,865	6,536	7,290	10,300	9,676	6,000	5,700	9,220	4,000	7400	8000	5,200	1,500
Fungicides	4,888	6,063	5,700	6,000	2520	1160	6,120	3,800	6,200	4500	4,500	4,600	4,000
Labour (Spraying) costs 6 times	2,000	2,625	1,950	2,500	1,500	2,000	2,000	1,000	1,200	1,000	1,500	1,000	2,000
Pesticides	1,250	925	500	1,400	456	700	600	500	700	1,000	975	900	1,500
Top dressing	3,110	1,700	2,700	4,000	2500	2300	3000	2500	2300	4950	2500	4000	1,450
Combine Harvester	2000	2000	1800	2000	2,000	2,000	1,500	1,500	2,000	2,000	2,000	2,000	2,500
Bags (@ shs 30)	390	420	450	600	540	450	450	420	450	450	510	540	400.
Kute ga(bagging)(ksh 30 per bag)	390	420	450	600	540	450	450	420	450	450	510	540	
Load ing& off loading(ks h 20 per bag)	260	280	300	400	340	300	300	280	300	300	340	360	

Drying(Ksh 30 per bag)	390	420	450	600	540	450	450	420	450	450	510	540	
Transport(ksh 100-per bag)	1,300	1,400	1,500	2,000	1,800	1,500	1,500	1,400	1,500	1,500	1,700	1,800	4,000
County Cess (40 shs per bag)	520	560	600	800	720	600	600	560	600	600	680	720	
COST OF PRODUCTION PER ACRE	37,833	37,447	42,440	50,800	37,696	38,250	40,520	38,400	32,000	37,750	36,750	46,400	35,050.
COST OF PRODUCTION PER BAG	3,783	2,675	4,244	3,908	2,693	2,550	3,377	2,743	3,200	3,775	3,063	3,867	2,921

Annex 13. Contribution of various cost items to total cost of production.

COST ITEM	Average Cost/acre.	% of total cost
Leasing land	9315	23
Ploughing	2376	6
Harrowing	2066	5
Planting	1554	4
Seed Njoro 2 at 50kg bag	3933	10
Fertilizer	3329	8
Herbicides	7410	19
Fungicides	5319	13
Labour (Spraying) costs 6 times	1698	4
Insecticides.	864	2
Top dressing	3162	8
Combine Harvester	1867	5
Bags(@ shs 30)	498	1
Kutega(bagging)(ksh 30 per bag)	498	1
Loading& off loading(ksh 20 per bag)	320	1
Drying(Ksh 30 per bag)	498	1
Transport(ksh 100- per bag)	1608	4
County Cess (40 shs per bag)	613	2

Annex 14: Wheat varieties released from research institutes.

Name	Year released	Yield(Tons/Ha)	Superior parameters
K.Kasuku	2019	7-8	High yield, resistant to lodging
K.Jacana	2019	6.5-8	Moderate resistance to stem rust
K. Impala	2020	7-8	Good milling quality, resistant to stem rust
K. Hyrax	2020	6.5-7.5	Resistant to yellow rust
Eagle 10	2011	6-7	Early maturing, good baking qualities
Njoro Bw 2	2002	3.7-8	Tolerant to acidic soils, resistant to lodging
Eldo Baraka	2013	20-35 Bags/acre	Resistant to stem rust
Eldo Mavuno	2014	25-35 Bags/acre	Resistant to stem rust and moderate tolerance to drought

Annex 15: Survey gaps.

- Milling capacity per miller.
- Total milling capacity.

These need to be established in order to avoid unnecessary importation.