Strengthening Georgia's Wheat Supply Chain: Quality Assessment and Strategies for Reducing Import Dependence

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Georgia's Agricultural Landscape

Located between the Greater and Lesser Caucasus mountains along the Black Sea, Georgia's small and diverse geography creates unique agricultural opportunities. Despite limited arable land due to mountainous terrain, the country's fertile soil and varied climate zones support a wide variety of high-value agricultural products (grapes, berries, nuts, citrus fruits, apples, peaches, and apricots).

Rugged and mountainous landscape limits total arable acreage, especially for field crops. Farmland is fragmented.

Significance: Wheat's Role in Georgian Culture and Economy

1 Wheat Production

Wheat has been cultivated in Georgia for thousands of years, playing a central role in the Georgian culture and the development of its agricultural practices.

2 National Staple

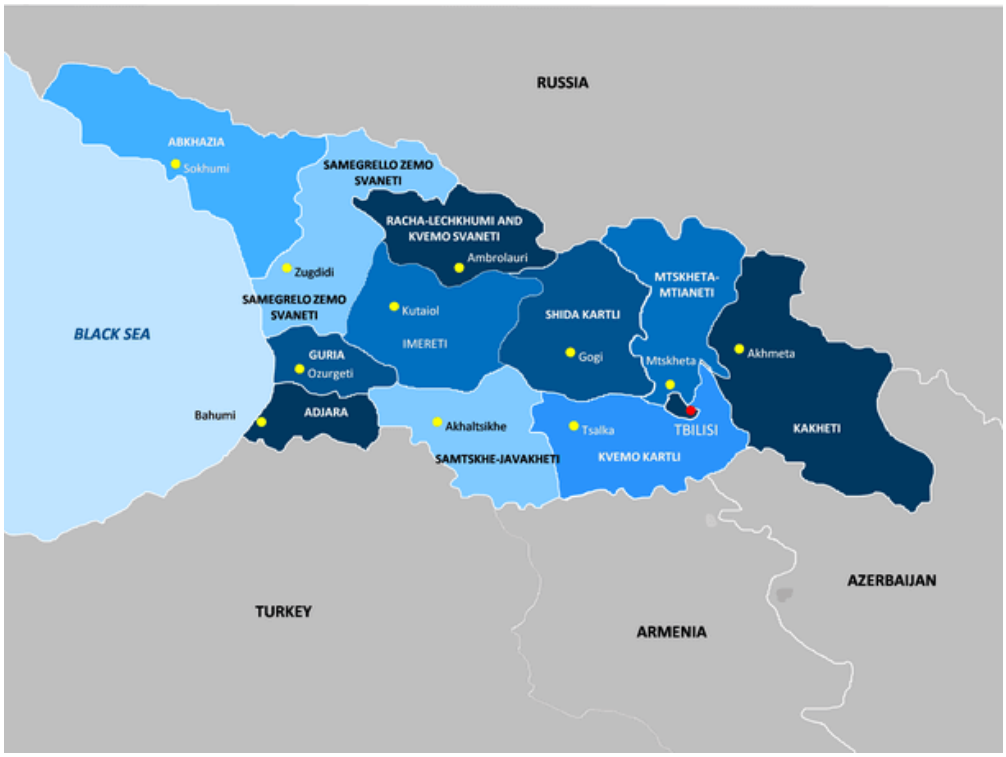
Bread is a cornerstone of Georgian diet. It contributes to a significant portion of an individual's daily caloric intake.

3 Self-Sufficiency

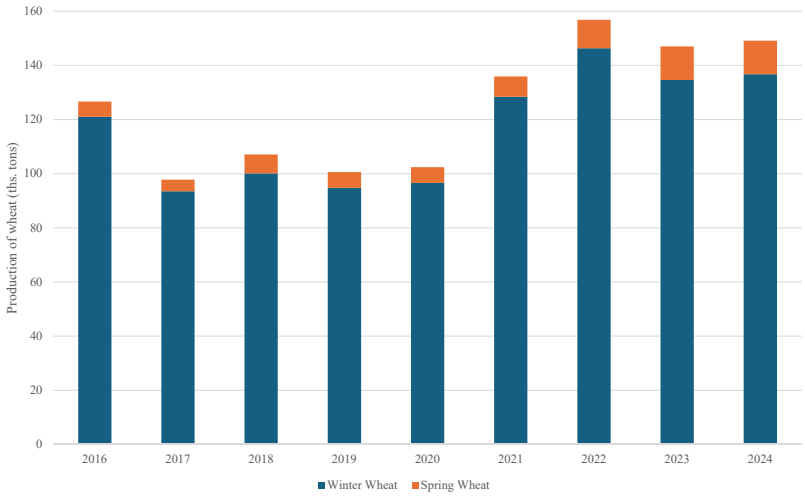
Despite increase in wheat production over recent years, Georgia's wheat self-sufficiency remains very low due to high demand.

Map of Georgia

Three regions (Shida Kartli, Kvemo Kartli, & Kakheti) represent 93% wheat cultivation area

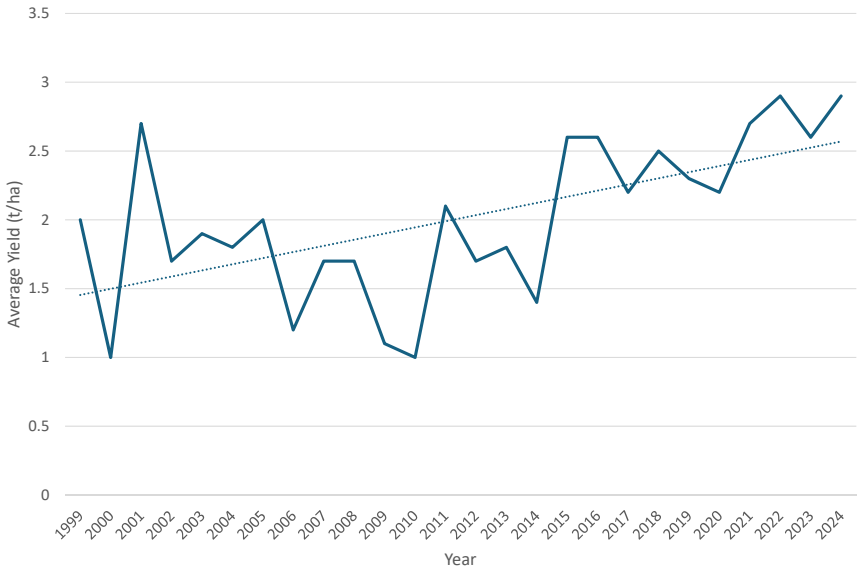


Production of wheat in Georgia, 2019-2024



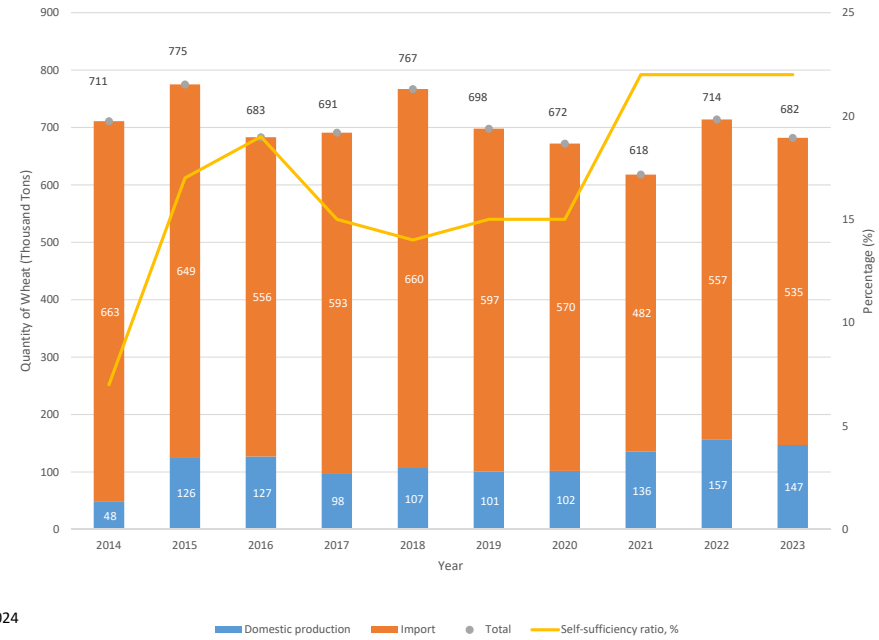
Source: Geostat, 2024

Average Yield of Wheat Harvested, 1999-2024



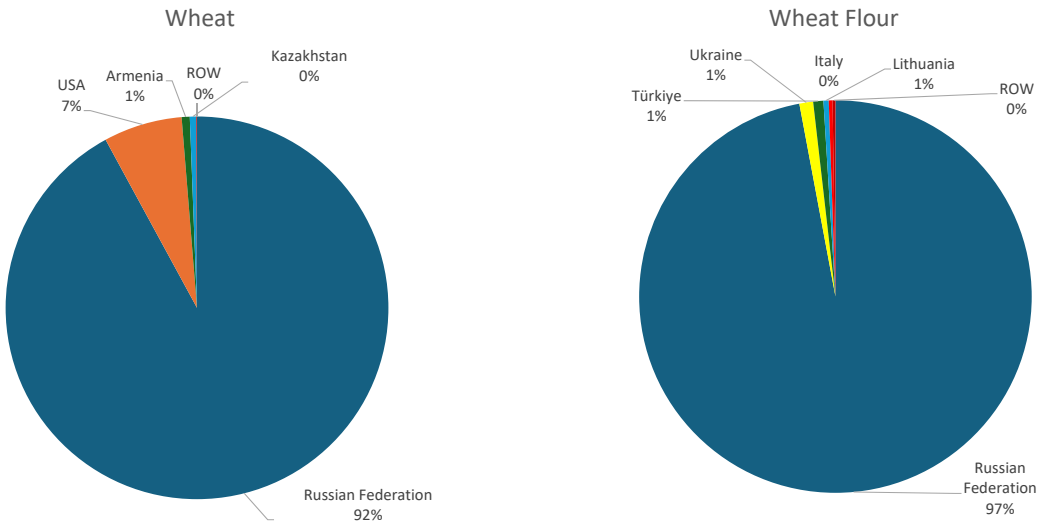
Source: Geostat, 2024

Georgia's Domestic Wheat Production, Imports, and Self-Sufficiency Ratio, 2014–2023

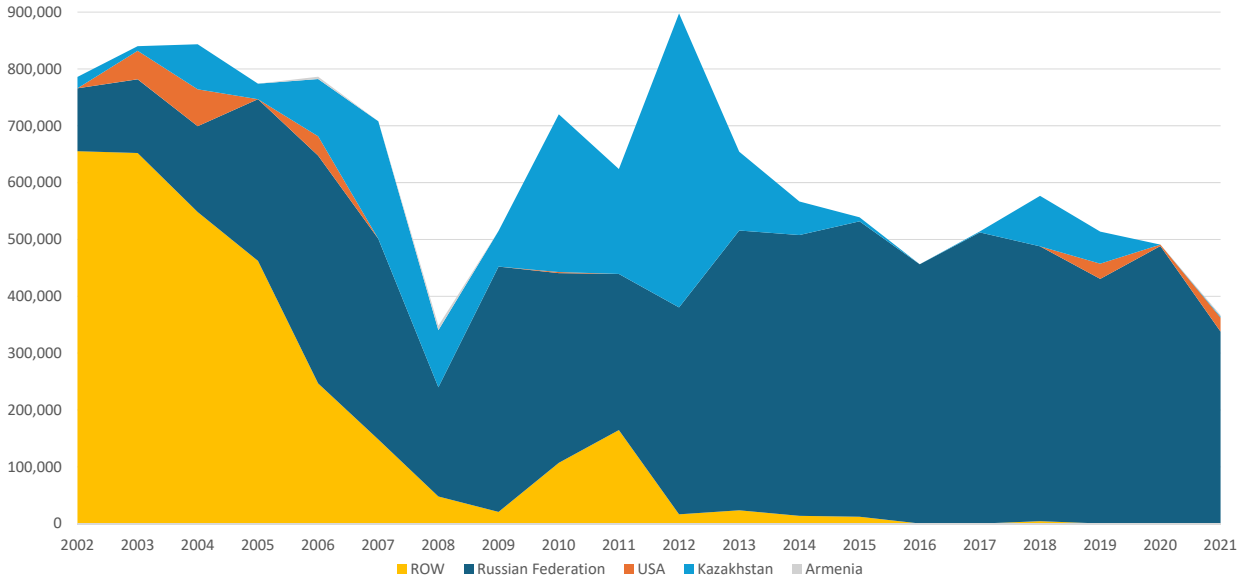


Source: Geostat, 2024

2021 Share of Wheat and Wheat Flour Imported



Wheat Imports by Country into Georgia (Tonnes)



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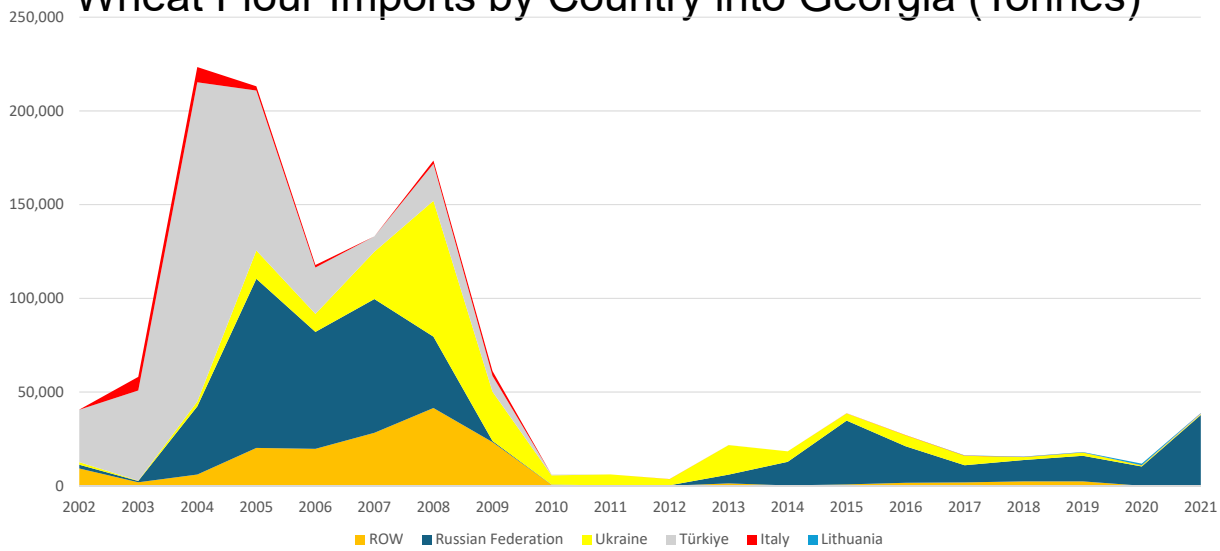


Food Security Risk: Georgia's Reliance on Imports

Russia Imports

Georgia relies heavily on imports from Russia. In 2022, wheat and wheat flour imports were almost solely from Russia. This dependency poses serious food security risks for Georgia.

Russia Tariffs

Russia has a history of implementing export restrictions on wheat. Since the 2007/08 trade year, Russia has imposed several export restrictions.

Russia Wheat Export Restriction Evolution, 2007/08-2021/22

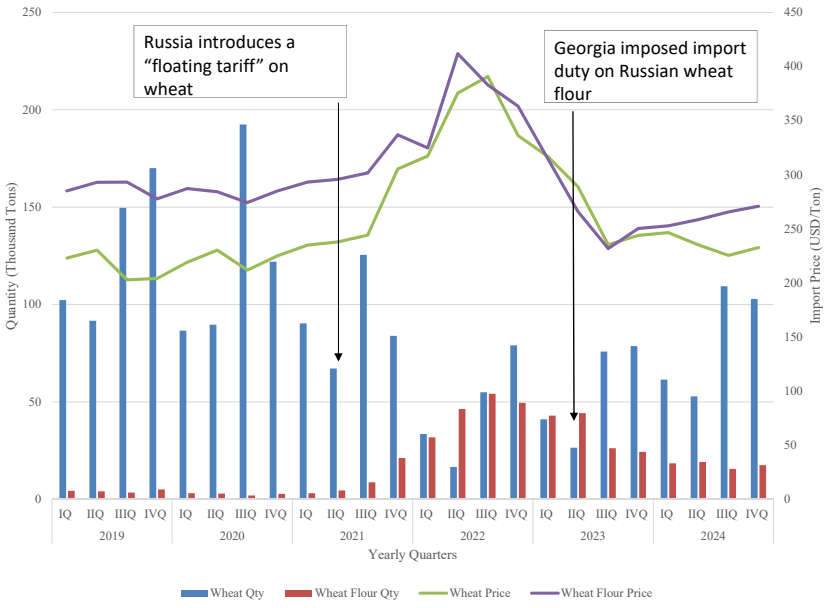
Trade year (July/June)	Type	Description
2007/08	Export tax	Started at 10%, increased to 40% in early 2008 and continued until July 2008
2010/11	Export ban	Complete ban from August 2010 through June 2011
2014/15	Export tax	15% of customs price (February-May 2015)
2015/16	Export tax	50% of the contract price minus $99
2019/20	Export quota	7.0 million MT quota (April-June, 2020)
2020/21	Export tax & quota	Variable tax rates and 17.5 million MT all-grain quota
2021/22	Floating tax & quota	Weekly calculated tax and 8.0 million MT wheat quota
2023	Black Sea Grain Initiative Ended	Russia withdrew from the Black Sea Grain Initiative, a deal that allowed Ukraine to safely export grain and other agricultural products from its Black Sea ports.

Sources: USDA, Economic Research Service; Food and Agriculture Organization of the United Nations, Food Price Monitoring and Analysis.

Recent Trade Restrictions: Georgia's Response

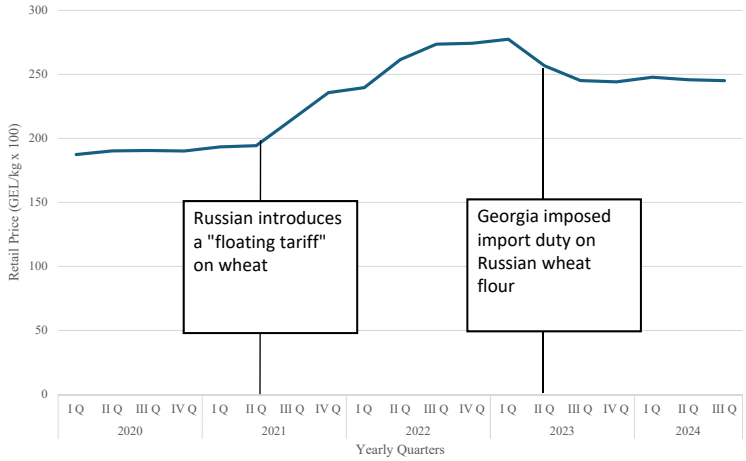
1. June 2023, Georgia imposed a temporary import duty on Russian wheat flour, barely and bran. Set to expire November 1, 2023
2. Georgia extended import duty three times. It was set to expire March 1, 2025. Now, it is extended for an indefinite period.
3. July 2025, Russia cut the wheat export duty to zero for the first time since June 2021

Wheat and Wheat Flour Imports and Import Prices, 2019 to 2024



Source: Geostat, 2024; Adapted from: Gelashvili and Seturidze, 2024

Retail Price of Wheat Bread in Georgia (GEL/kg x 100), 2020 to 2024



Source: Geostat, 2024

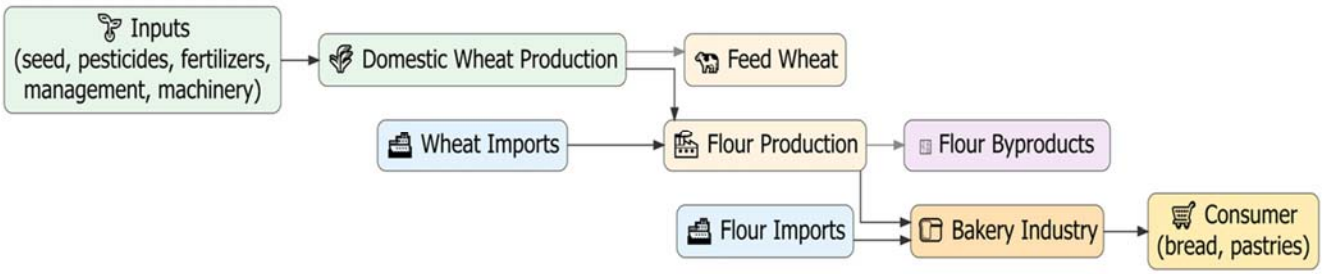
Purpose of the Research

To identify strategies for Georgia to enhance the quality of domestically produced wheat and wheat flour, which will strengthen its wheat supply chain, reduce dependence on imports, and improve food security.

Objectives:

1. Assess the current state of the Georgian wheat and milling industry
2. Evaluate the quality of Georgian wheat and wheat flour relative to imported Russian wheat and wheat flour using laboratory testing to compare grain quality characteristics, milling performance, and baking properties
3. Develop strategies to improve the quality and market competitiveness of Georgia wheat and wheat flour

Georgia Wheat Supply Chain




Research Project Activities

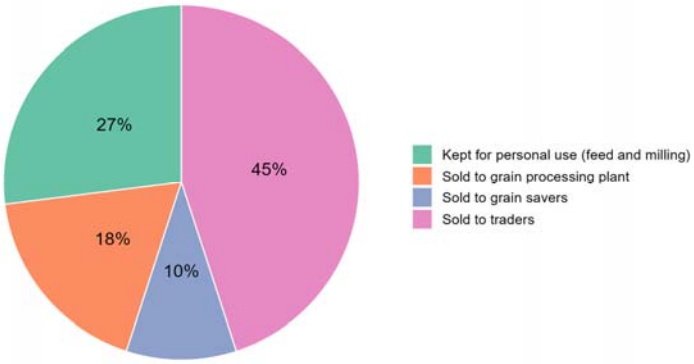
1	2	3
Interviews and Site Visits to Wheat Producers, Input Suppliers, Feed and Flour Mills, Bakeries and Land Border and Port Officials across the country	Collect flour samples from commercial mills	Wheat and Flour analyses managed by KSU working with different organizations. Approved methods of AACC International

Wheat Samples

- Collected 20 kg wheat samples from various regions in Georgia
  - 3 samples of wheat grown in Georgia using Russian sourced seed
  - 3 samples of wheat imported from Russia by Georgian entity
  - Conduct full quality analysis of the wheat and flour
  - Compared to 5-Year average of U.S. HRW



Wheat Milling and Grain Processing



Challenge: Shortage of Storage Facilities

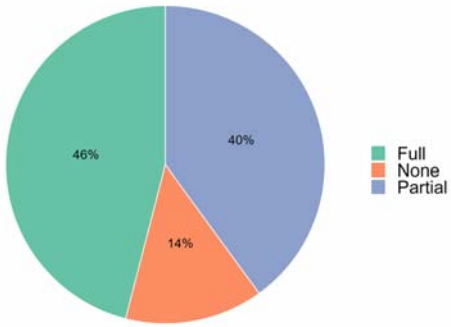
Producers are not able to store wheat and take advantage of higher selling prices

Grain is mostly stored in flat storage rather than silos

Wheat Milling and Grain Processing

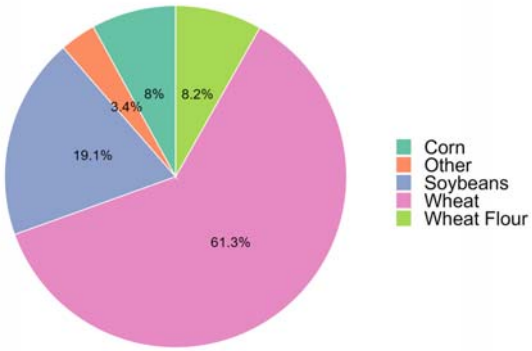
- In 2022, 67 out of the 70 flour mills in Georgia stopped production due to flour shortage (Tanchum, 2023)
- As of 2024, there are 39 active elevators in Georgia
  - Mostly in Kvemo Kartli (10) and Kakheti Region (9)

Elevators Equipped with Modern Technology



Wheat Milling and Grain Processing

Products Stored in the Elevators



- Of the 280.1 tonnes of products sold by elevators, 32.9% is locally produced.
  - 81.8% of local production was wheat flour and 11.9% was bran.

Wheat Milling and Grain Processing

- Many mills operating at 30% to 60% capacity, others are not operating
- Domestic wheat production meets only 15% of milling industry's total demand
  - Mostly supplied by smaller mills
- Most mills blend 10-15% of Georgian wheat into their production mix
- Medium and large-scale millers face challenges:
  - Georgian wheat often fails to consistently meet the quality and quantity requirements for efficient operations
  - Millers have mixed perception of Georgian wheat
    - Some say wheat is excessively dirty or of lower quality vs. others have a favorable perception
  - Fragmented farmland and small plot sizes thought to have negative impact on wheat quality and consistency

Wheat Milling and Grain Processing

- Industry lacking defined quality standards for incoming wheat
- Minimal established procedures or monitoring to evaluate quality
- Mills are not fully utilizing labs equipment.
- Import wheat entering the country via rail or ports is *expected* to meet international standards.

Limited quality testing performed on incoming wheat or flour results in no clear understanding of its actual quality

Wheat Milling and Grain Processing

- Increased wheat flour imports led to decline in domestic wheat flour production
  - Impacted feed industry too
- Lower domestic flour production = Lower supply of bran
  - Impact: Higher demand of feed wheat for livestock feed, importing cracked wheat from Russia
- Most Georgian feed mills favor Russian feed wheat
  - Cleaner and has less non-wheat contamination

Feed Manufacturing

- Local feed-grade wheat Observations
  - Poor protein content, excessive seed and insect contamination and high moisture levels (>15%)
- Feed mills face a 18% VAT on local wheat
  - Avoid VAT on importing crushed feed-grade wheat from Russia
- When Georgian mills operating at full capacity, 90% of bran used in feed production is locally sourced
  - Unable to source the required quantity of bran locally, some stopped using it in feed
- Approximately 55% of local feed production is consumed within domestic market

Bakeries

- In 2020, approximately 2,700 bakeries in Georgia
- Finding skilled and experienced bakers is a challenge
  - Limited training opportunities
- Since 2023, HACCP has been mandatory
  - Bakeries are requesting initial or additional HACCP and food safety training

Bakeries

- Little to no instrumentation available for testing flour quality
  - Also, lacking awareness of the different flour and dough testing processes
- Rely on baking tests and visual color assessments
- Bakeries do not allocate time or resources to lab testing
  - Limited supply, bakers will use whatever flour they have




Bakers' Perception – Georgian Wheat vs Russian Wheat

Georgian Wheat	**Russian Wheat**
Better color	Higher ash content
Higher loaf volume	Darker color
Improve elasticity	Coarser granulation
Improved fermentation properties	Lower water absorption
Greater stability	Packaging labels are misleading
Better Gluten quality	Greater consistency in quality and quantity
Inconsistent quality and quantity	

Bread

- Traditional Georgian bread is baked either in a tone or pourne oven
  - Lavashi and shoti are the most common traditional breads
    - Requires sufficient gluten content and gluten quality to stick to the walls of the oven
- Over half of the bread produced is social bread – poor people's bread
  - Most necessary and in-demand product
  - Has a fixed price to ensure this bread remains affordable
  - Flour pricing cannot be adjusted in response to wheat price fluctuations

Wheat and Flour Quality Assessment

Wheat Grade Data

Measurement	G1	G2	G3	R1	R2	R3
Test Weight	Below acceptable test weight	Met the recommended test weight	Met the minimum acceptable test weight	Below acceptable test weight	Below acceptable test weight	Met the minimum acceptable test weight
Damaged Kernels	<1% damaged kernels	No damaged kernels	<1% damaged kernels	<1% damaged kernels	<1% damaged kernels	>1% damaged kernels
Odor	Foreign Odor	None	None	None	None	None
Grade	Sample Grade	1 HRW	2 HRW	3 HRW	3 HRW	2 HRW
Milling Quality	No	Yes	Yes	No	No	Yes

Wheat Non- Grade Data

Measurement	G1	G2	G3	R1	R2	R3
Dockage	Higher percentage (Dirty sample)	Lower percentage	Lower percentage	Lower percentage	Higher percentage (Dirty sample)	Higher percentage (Dirty sample)
Moisture Content	Average	Average	Average	Lower	Lower	Lower
TKW	Slightly below target	Excellent	Excellent	Met the target	Met the target	Excellent
Protein Content	Good	Lower	Average	Good	Average	Good
Ash	Average	Lower	Average	Lower	Lower	Lower
Sedimentation Test	Fair	Poor	Very Poor	Good	Very Poor	Good
Falling Number	Above recommended target	Above recommended target	Above recommended target	Above recommended target	Above recommended target	Below recommended target
SKCS	Classified as mixed	Classified as soft	Classified as mixed - Comparable to 5 yr US Avg except has softer proportion of wheat kernels and poor sedimentation values	Classified as mixed	Classified as hard wheat - Comparable to 5 yr US Avg except has high dockage and poor sedimentation values	Classified as hard wheat

Wheat Flour Data

Measurement	G1	G2	G3	R1	R2	R3
Falling Number	Above Average	Average	Above Average	Above Average	High	Low
Color	Slightly darker	Very good color and brightness	Acceptable	Slightly darker	Acceptable	Acceptable
Wet Gluten and Protein Content	Within baseline expectations	Acceptable wet gluten content; slightly lower protein content	Within baseline expectations	Within baseline expectations	Within baseline expectations	Within baseline expectations
Ash content	Acceptable for high grade bread	Acceptable for high grade bread	Acceptable for high grade bread	Lower	Acceptable for high grade bread	Lower
SRC	Suitable for pan bread	Above maximum SCSCR target	LASCR indicates weaker gluten Above maximum SCSCR target	Above maximum SCSCR target	Above maximum SCSCR target	Within baseline expectations
GPI	Exceed GPI threshold	Relatively poor GPI values	Relatively poor GPI values	Exceed GPI threshold	Relatively poor GPI values	Exceed GPI threshold

Dough Properties Data

Measurement	G1	G2	G3	R1	R2	R3
Farinograph	Low peak times and short stability	Low peak times and short stability	Stability time shorter than expected	Acceptable values	Acceptable values	Stability time shorter than expected
Alveograph	Lower P and W values indicate weak gluten flour	W values are below target and P/L above target level	W values are below target and P/L above target level	Better suited for bread-making (based on W and P/L)	Better suited for bread-making (based on W and P/L)	Better suited for bread-making (based on W and P/L)
Extensograph	Good extensibility but little strength	High extensibility values	Low extensibility values	Acceptable values	Acceptable values	Less than desired resistance
Overall	Indicate weak gluten	Adequate –not fully validated	Indicate weak gluten	Acceptable results	Adequate –not fully validated	Indicate weak gluten

Baking Evaluation Data – Pan Bread

Measurement	G1	G2	G3	R1	R2	R3
Loaf Volume	Fair	Small	Small	Fair	Small	Fair
Specific Volume	Fair	Lower	Lower	Fair	Lower	Fair
Hardness	Borderline hard	Slightly hard	Hard	Hard	Hard	Slightly hard
Color	Darker bread	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
Across three end-products	Fair to poor	Poor	Poor	Fair to poor	Poor	Fairly well

Overall Assessment of the Samples

- All three Georgian samples indicate weak or weaker gluten flour
- Russian sample R3:
  - Met the baseline expectations for HRW in key criteria, including lab extraction rate, color, protein content, wet gluten content, starch damage, and SRC.
  - End-product performance was only fair due to the higher levels of enzyme activity.
    - Pan breads had fair volumes and slightly hard texture.

Overall Assessment of the Samples

- None of the six samples demonstrated optimal performance across all categories.
- Without the sprout damage, R3 has the best overall qualities.

Recommendations

- Need to focus on increasing quantity AND quality
- Mills and bakeries can gain a better understanding of wheat quality through proper testing methods and practices

Recommendations in Bakery and Milling Practices:

Advancements in Georgian Flour Production

Quality

Georgian wheat quality was unknown. Need to understand the current wheat milling quality. Mills did not have instrumentation for flour quality testing. Need to establish quality specifications and implement testing for quality verification.

Equipment

Adequate and updated equipment is needed.

Training

Training in employee safety, food safety, HACCP, and equipment maintenance and efficiency is needed.

Recommendations in Milling Practices:

Advancements in Storage

Increased Storage

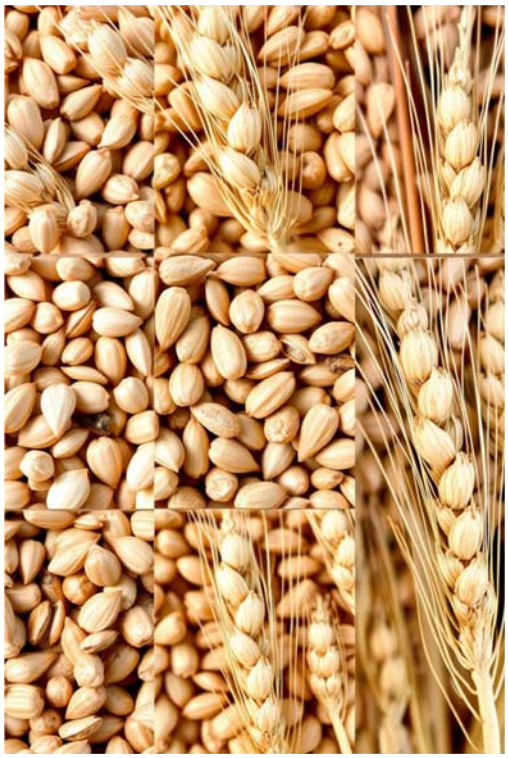
More wheat storage for the mills is needed. Increased storage capacity would allow for stable wheat supply and can produce flour on demand. Allows for segregation of different quality wheats, for cleaning the wheat, and for food security.

Investments

Georgian government investing in infrastructure to meet international standards.

Quality Assurance

Need to follow proper storage practices to maintain quality for millers.



Recommendations in Farming Practices:

Advancements in Georgian Wheat Production

Combine Harvester

Timely harvest to prevent post harvest sprouting. Harvest is done by shared combines that cause delay in harvest and some smaller producers wait longer than bigger farmers.

Optimal Timing of CPP and Fertilizer

Many producers apply CPP based on calendar and not crop needs. Controlling Fusarium head blight is a challenge. Late season nitrogen application can increase protein content.

Irrigation

Redevelopment of existing irrigation systems. Irrigation systems would: (1) increase yield and likely wheat quality, (2) add more crop rotation, and (3) increase profits.

Seed

Develop a strategy to provide high quality seed of known origin and allow access to certified seed can improve yields in the country. Select ideal wheat varieties with stronger gluten properties and protein content.

Thank You

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