

25th September 2026

From Chemistry to Commerce

Ensuring Authenticity and Building
Trust in Africa's Food Systems

Salvatore Parisi, Hon Prof, PhD, PCQI, MRi
President-elect, AOAC Europe Section of AOAC International

25th September 2026



From Chemistry to Commerce

Ensuring Authenticity and Building
Trust in Africa's Food Systems

Salvatore Parisi, Hon Prof, PhD, PCQI, MRi

Overview

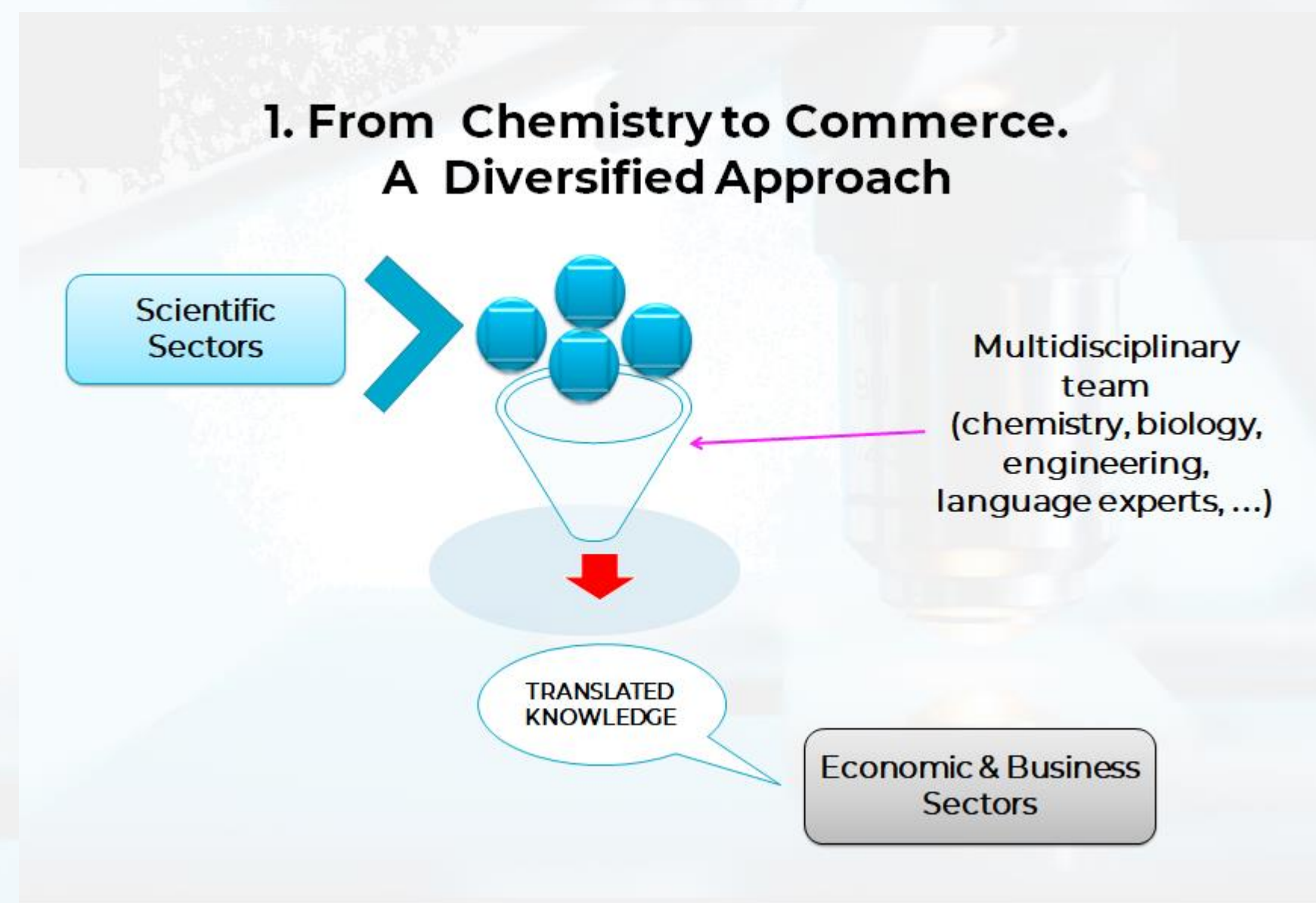
1. From Chemistry to Commerce. A Diversified Approach
2. Chemistry and African Food Systems. A Consumer-oriented Vision
3. African Food Systems. Analysis of Key Drivers and Chemical Interpretation
4. Agricultural Techniques. Main Key-points, Problems, Challenges, and Solutions
 - 4.1 *Soil Health VS Immediate Yield Increase. The Role of By-products for Non-food Applications*
 - 4.2 *Climate Smart Agriculture. A Chemical Viewpoint*
 - 4.3 *Fighting against Drought. Sustainable Management of Water Resources*
5. African Food Systems. Analysis of Commercial Requirements
 - 5.1 *African and International Commerce. How to Cope with Commercial Requests?*
 - 5.2 *African and International Commerce. How to Cope with Quality Requirements?*
6. Conclusions. Chemistry Can Ensure Authenticity and Build Trust in African Food Systems
7. References

1. From Chemistry to Commerce. A Diversified Approach

The relationship between Chemistry and commercial activities requires a **diversified approach**.

In fact, scientific expertise should be **sinergically** linked with business matters, but a **multidisciplinary ability** is required. This duty is a work for a **whole team of different professionals...**

From a general viewpoint (and without specific relation to Chemistry), the “*translation*” of a scientific language and related concepts and knowledge into an idiom for businessmen is not simple.



1. From Chemistry to Commerce. A Diversified Approach

However, chemical innovation is a **key factor** for manufacturing activities. This reflection is globally recognized and surely demonstrated in a number of different human activities, from **food products** to **non-food services**...

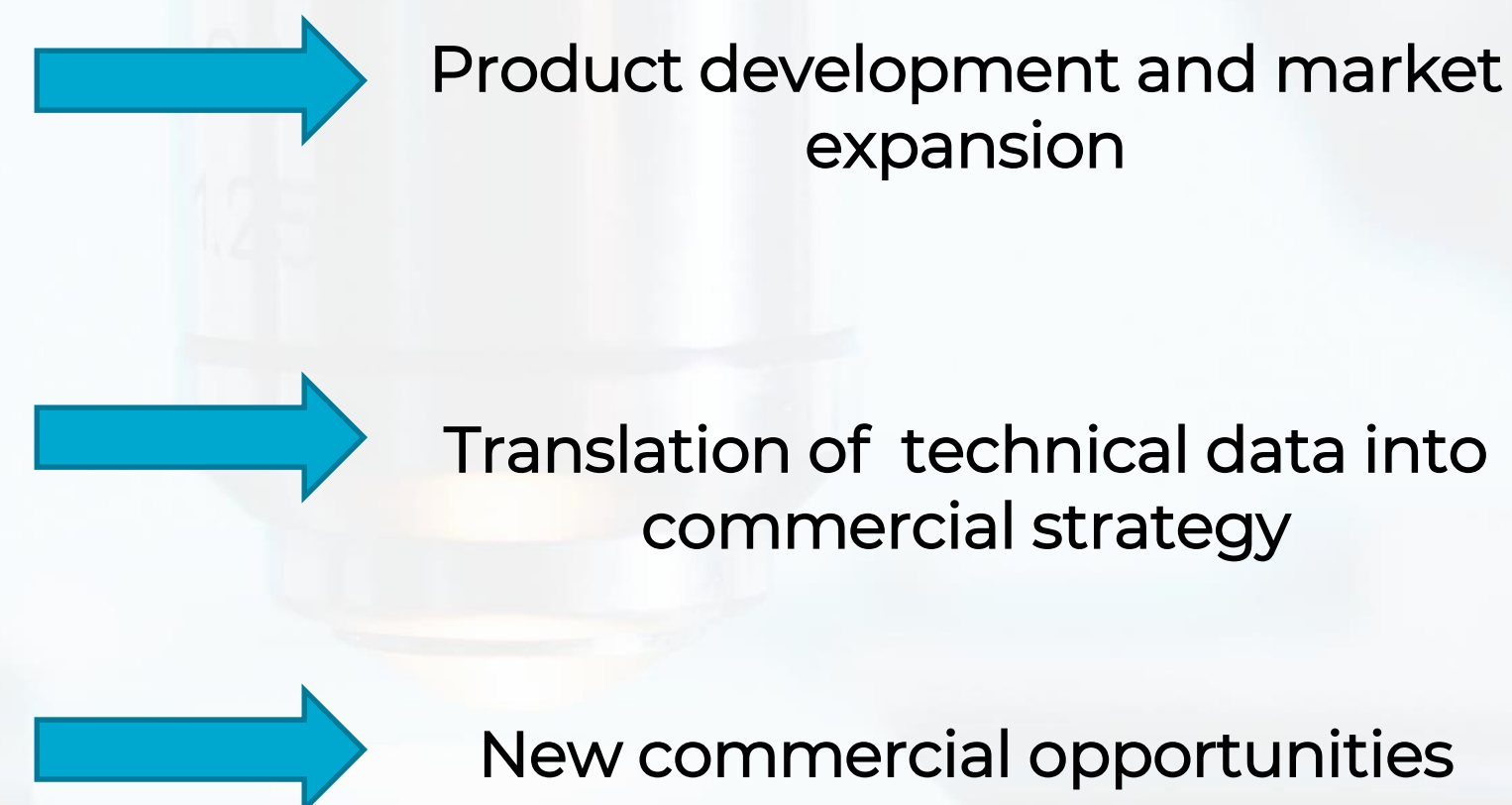
Substantially, Business needs Science (including Chemistry), and different career paths can be available for scientists in industry, finance, and management [1].

1. From Chemistry to Commerce. A Diversified Approach

Business-related environments

- Specialized industries: pharmaceutical, coating/paint, agrochemical, and petrochemical industries
- Corporate & management Firms: patent law, management consulting, and business analysis
- Innovation & entrepreneurship: development of sustainable, "green" chemistry alternatives, and new materials

DESIRED GOALS



1. From Chemistry to Commerce. A Diversified Approach

In particular, chemistry-related know-how can be transformed in a “*Business/Chemistry*” (B/C) culture: adequate training is naturally needed, but specialized chemists working in non-chemical environments can help business enterprises in areas such as:

Technology transfer

Supply chain management

Chemical and non-chemical logistics

(from commodity sales to value-based pricing)

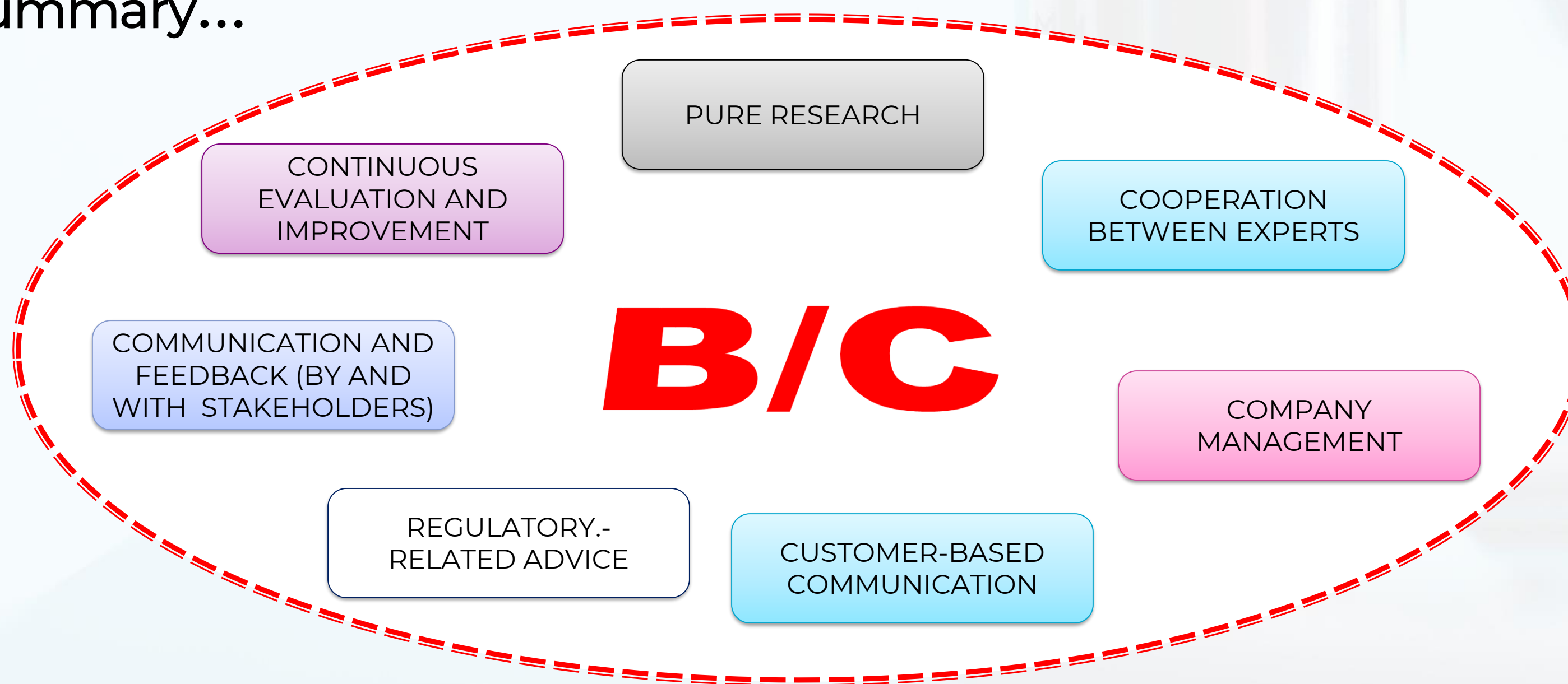
Quality certification

...

And many more sectors !

1. From Chemistry to Commerce. A Diversified Approach

In summary...



2. Chemistry and African Food Systems. A Consumer-oriented Vision

One of the most vibrant, powerful, and certainly “necessary” industrial sectors concerns the production of **food and beverage** products. This reflection involves all economic areas worldwide.

In particular, **Africa** needs a powerful network of food-related enterprises, industries, stakeholders, regulatory agencies, scientific associations, certification bodies, and so on...

2. Chemistry and African Food Systems. A Consumer-oriented Vision

Such a network has to be characterized by the following features [2]:

- **Strong performance** in terms of Gross Domestic Product (GDP), income, and skilled (trained) labor force
- **Innovation and diversity**
- **Resilience and sustainability** against economic shocks and shortness of value commodities
- **High quality of life** (in terms of availability of wages and community-related services)
- **Global integration**

2. Chemistry and African Food Systems. A Consumer-oriented Vision

Basically, the key factor is **the consumer**... and related choices.

Consequently, food systems – in Africa and worldwide – have to develop a **consumer-oriented vision** which has to rely on different aspects and scientific areas, including **Chemistry**.

In detail, food systems are accustomed to focus on the following topics:

2. Chemistry and African Food Systems. A Consumer-oriented Vision

- + Enhancement of **food safety**
- + Assurance of **food legality** and **integrity**
- + Improvement of **durability** (generally named “shelf life”)
- + Enhancement of **nutritional values**
- + Balancing action between **quality** and **affordability**
- + Assurance of **ready access to foods**

... and other topics (**traceability**, **food sharing**, etc.).

2. Chemistry and African Food Systems. A Consumer-oriented Vision

Food safety , legality/integrity, and traceability are the main pillars of food systems, at present. Ready access to foods completes a scheme which can be named in different ways, such as the “Hygiene, Integrity, Traceability, and Sharing” (HITS) approach [3-4].



Basically, these topics correspond to basic and enhanced needs and requests by the food consumer.

Enhanced food processing and productivity (in terms of yield) can help food industries. On the other side, safer, more efficient, and sustainable food supply chains are the current priority at the industrial level.

2. Chemistry and African Food Systems. A Consumer-oriented Vision

Hygiene, Integrity, Traceability, and Sharing” (HITS) areas - How Chemistry can help

Food
Safety
(Hygiene)



Problems

Foodborne
Diseases

Solutions [5-6]

- 1- **Food preservatives** against pathogen agents (example: *Clostridium botulinum* in processed meats) and aflatoxin-producing moulds in groundnuts
- 2- **Natural and synthetic antimicrobials** against foodborne pathogens such as *Salmonella* and *Escherichia coli*
- 3- **Disinfection techniques:**
 - cold plasma uses electricity to turn air into a sanitizing agent by simple electricity, killing over 99.9% of bacteria and viruses on food surfaces (e.g., produce, fruits...)
 - chemical washing systems with chlorine and hydrogen peroxide to reduce bacterial contamination in water and on food
- 4- **New processing technologies** (example: high-pressure processing kills microorganisms while preserving food quality, without using chemical preservatives)
- 5- **Active packaging:** nano-materials or natural antimicrobial compounds (such as chitosan) helps to prevent the growth of pathogens, extending shelf life and increasing safety

2. Chemistry and African Food Systems. A Consumer-oriented Vision

Hygiene, Integrity, Traceability, and Sharing” (HITS) areas - How Chemistry can help

Food
Safety
(Hygiene)



Problems

*Chemical
contamination*

Solutions [7-10]

- 1- **Green Chemistry**: reduction or elimination of hazardous substances during the design, manufacture, and application of chemical products
- 2- **Pollution prevention**: reduction of the need for environmental remediation by acting at the source of waste production
- 3- **Waste reduction**: techniques able to re-use remarkable amounts of raw materials during the process, incorporating them in the final product, instead of creating waste
- 4- **Safer alternatives**: exclusion or replacement of toxic compounds (such as volatile organic solvents or VOCs) with preferable alternatives like water or supercritical carbon dioxide
- 5- **Environmental cleanup**: removal of heavy metals from wastewaters by means of precipitation techniques.

Biodegradable plastics, target-specific pesticides, improvement of energy-efficient processes, use of naturally-generated active principles are simple and practical examples.

2. Chemistry and African Food Systems. A Consumer-oriented Vision

Hygiene, Integrity, Traceability, and Sharing” (HITS) areas - How Chemistry can help

Integrity



Traceability



Solutions [3, 11]

- 1- **Analytical chemistry** (UV and visible spectroscopy, chromatographic systems, mass spectrometry...) can help in this ambit by detecting fraudulent substances, addition, and/or reduction or substitution of undesired compounds.
- 2- Also, **chemometrics** and **predictive modeling** can be used with the aim of “mapping” food and beverage products. In this way, counterfeiting and adulteration (reduction of integrity) can be contrasted, and also the presence of undesired allergens.

Problems

Food Fraud

*Material
Substitution*

2. Chemistry and African Food Systems. A Consumer-oriented Vision

Hygiene, Integrity, Traceability, and Sharing” (HITS) areas - How Chemistry can help

Integrity



Traceability



Solutions [3, 11]

By the way, the main problem is the detection of products which are placed on the market with a well-specified identity or claim related to one or more components, raw materials, geographical origin, ethic reason, or commercial brands.

Should these products be different from the reality, a significant market disruption would occur, resulting in genuine and highly-priced products failing to survive on the market, while sub-standard (low-priced) products would remain. The final outcome would be a **product devaluation**, with long-term disappearance of virtuous companies.

Problems

Food Fraud

*Material
Substitution*

2. Chemistry and African Food Systems. A Consumer-oriented Vision

Hygiene, Integrity, Traceability, and Sharing” (HITS) areas - How Chemistry can help

Food
Sharing



Problems

*Shelf-life
determination*

Solutions [3, 12-13]

Shelf-life extension and food security are concepts strictly linked with food sharing by dedicated non-profit associations.

However, the problem of shelf-life (durability) calculation and definition (Expiration Date? Best Before End?) is still a problem, also because of non-uniform viewpoints (by consumers, producers, etc.) and the multi-factorial nature of the problem itself (is any food safe because of ... **microbial spreading? Pathogen contamination? Undesirable colour, flavor, aroma, aspect...**).

2. Chemistry and African Food Systems. A Consumer-oriented Vision

Hygiene, Integrity, Traceability, and Sharing” (HITS) areas - How Chemistry can help

Food
Sharing



Problems

*Shelf-life
determination*

Solutions [3, 12-13]

One thing is **absolutely sure**: according to the **Parisi's first Law of Food Degradation**, no food product remains unchanged over time; on the contrary, all food items undergo irreversible, progressive changes in their chemical, physical, microbiological, and structural features, without exception.

Consequently, each food or beverage evolves during time with substantial transformations, **turning itself into a different product** (with or without hygienic consequences, but always a sort of **alteration/degradation** if compared with the original and designed food).

So, this problem has to be still solved in a shared way, worldwide.

2. Chemistry and African Food Systems. A Consumer-oriented Vision

Additional problems ...

Enhancement of **nutritional values**
Balancing action between **quality** and **affordability**

Solutions [14-15]

The enhancement of nutritional profiles, product by product, is always possible – it is a matter of food technology, adequate processing, good preservation techniques, and so on. In this ambit, Chemistry plays a critical role.

However, the effect on **quality** has to be evaluated. The higher the consumer approval and sensorial features, the higher the demanded price...

2. Chemistry and African Food Systems. A Consumer-oriented Vision

Additional problems ...

Enhancement of **nutritional values**
Balancing action between **quality** and **affordability**

Solutions [14-15]

A good product should be desirable and available on the market... at the right price, while low-quality products tend to be more affordable than high-quality products.

The quality is the synergic sum of many factors (origin, raw materials, process, nutrition data, extended or reduced shelf-life, etc.).

Consequently, many chemists are always engaged in commercial negotiations, evaluating technical data sheets and technological performances instead of chemical analyses..

2. Chemistry and African Food Systems. A Consumer-oriented Vision

Additional problems ...

Promotion of indigenous products, historical heritage, etc.

Solutions [14-15]

Many products have their own historical reasons, including ethical factors, geography-related or processing-related justifications, etc. Some of these products have a good importance in Africa.

For these reasons, certain foods – generally under-utilized products such as **baobab**, or articles with some specific feature such as **cassava** or **pearl millet** – are promoted in different ways, with the aim of making easier their use in food and beverage sectors, as edible products.

The role of chemists is critical, in the production and also in the world of third-party certification systems.

3. African Food Systems. Analysis of Key Drivers and Chemical Interpretation

African food systems are currently undergoing a rapid, complex transformation, shifting from subsistence-based, local, and diverse traditional diets toward more commercialized, urban-centric systems characterized by increased processing and the prevalence of ultra-processed foods. This evolution is driven by **demographic shifts**, **economic growth**, and **environmental factors**, creating a complex interplay between traditional food cultures and modern nutritional needs [16-17].

Demographic drivers

The urban population in Africa is expected to notably increase with correlated augment of food demand.

This fact shifts demand toward **convenient, processed, and shelf-stable foods**.

At the same time, youth population < 30 yrs will demand for **new, fast**, and, at times, **unhealthy food options**.

Environmental and Climate Drivers

Climate change acts as a significant **disruptor**, with increasing temperatures, erratic rainfall, and extreme weather events impacting agricultural production and, consequently, **food security**.

Economic Drivers Socio-cultural Shifts

Rising, though unequal, incomes are changing purchasing power. Food chains are shifting from short, direct, and local transactions to longer, more complex, and less regulated market networks.

Traditional diets are being replaced by "Western-style" diets high in saturated fats, simple sugars, and salt, particularly in urban areas.

3. African Food Systems. Analysis of Key Drivers and Chemical Interpretation

Chemical interpretation [18]

Nutritional transition (reduced nutrient quality)

The shift from traditional to Western-style diets is causing a "double burden" of malnutrition -simultaneous under-nutrition and increasing obesity.

Reason: **loss of micronutrients** (iron, calcium, magnesium, zinc) found in indigenous crops.

Consequences : The shift towards processed staples results in **lower fiber, higher glycemic index**, and **reduced nutrient density**.

Chemical profiles of ultra-processed foods

The rise of "fast street foods" in urban areas has introduced high levels of **refined fats, sugars**, and **salt** into daily diets, contributing to the rise in **non-communicable diseases** (e.g., cardiovascular disease, diabetes).

Food safety and contaminants

The expansion of the food chain has increased exposure to chemical hazards, including **high levels of pesticide residues** in vegetables and **mycotoxins** (e.g., aflatoxin) in staple crops (maize, groundnuts) caused by improper storage.

3. African Food Systems. Analysis of Key Drivers and Chemical Interpretation

Main challenges and future directions [19-21]

Biofortification and fortification:

There is a growing effort to improve chemical profiles of foods, such as introducing orange-fleshed sweet potatoes (high in **β -carotene/pro-vitamin A**) and fortifying wheat flour to combat **vitamin-A** deficiency.

Food loss and waste

High post-harvest losses (up to 40% in some supply chains) mean a large portion of the produced food—and its nutritional value—is lost.

Need for sustainable intensification

The challenge lies in increasing food production while mitigating environmental degradation and adapting to climate change.

Leveraging indigenous knowledge

Reintegrating, validating, and marketing traditional African crops (like cowpea) is crucial for improving nutritional outcomes, enhancing food system resilience, and preserving cultural identity.

**The transformation of African food systems appears inevitable...
A careful evidence-based approach balancing modernization with nutritional features
of local diets is required.**

4. Agricultural Techniques. Main Key-points, Problems, Challenges, and Solutions

Modern agricultural techniques, including precision farming, AI, and sustainable soil management, focus on optimizing yields while minimizing environmental impact. Key challenges involve climate change, resource scarcity, and high investment costs for new tech. Solutions focus on sustainable practices, digital adoption, and supportive policies...



4. Agricultural Techniques. Main Key-points, Problems, Challenges, and Solutions

How to balance immediate, maximum output and long-term sustainability ?

Immediate yield by means of massive use of synthetic nitrogen, phosphorus, and potassium (NPK), allowing for high yields but increasing the risk of soil acidification, compaction, and nutrient leaching.

Soil health – the challenge is to build soil organic matter (SOM), improving soil structure, and increasing microbial activity, which boosts resilience against climate extremes (drought/flood).

Balanced fertilization would be a good compromise: replacing a good part of mineral fertilizers with organic alternatives (manure, compost, by-products) can sustain high yields while enhancing long-term soil fertility and reducing environmental impact.

4.1 The Role of By-products for Non-food Applications

The valorization of agricultural and industrial by-products offers a sustainable pathway to bridge the gap between soil health and productivity, moving toward a **circular bio-based economy**.

Industrial by-products: (paper mill sludge, fiber sludge, and gypsum waste)can be used to rehabilitate degraded lands, improve soil structure, and increase porosity, especially in non-food crop production like bioenergy, industrial hemp, or non-food potato farming.

Agricultural waste (crop residues, manure, and olive pomace) provide essential macronutrients (N, P, K) and organic carbon, which improve soil aggregation, nutrient retention, and beneficial fungal communities (e.g., arbuscular mycorrhizal fungi).

These solutions can be good for cultivated land designated for non-food biomass (bio-refinery, textiles), allowing consistent yields without risks for the food supply (and with sustainable results...).

4.2 Climate Smart Agriculture. A Chemical Viewpoint

Climate-Smart Agriculture (CSA) from a chemical perspective involves manipulating the biochemical processes within soil, plants, and ecosystems to increase productivity, enhance resilience, and reduce greenhouse gas (GHG) emissions.

Key results: optimization of nutrient use efficiency; improvement of soil health through organic matter management; reduction of synthetic, environmentally damaging inputs [18-22].

Soil nutrient management (fertilization)

Optimization of the chemical composition of fertilizers to reduce nitrogenous emissions.

Solutions: slow-release fertilizers, use of precise application methods to match plant needs, and management of carbon-to-nitrogen (C:N) ratio to enhance nutrient uptake..

Soil Organic Carbon (SOC) sequestration

Chemical improvements to soil involve increasing soil organic matter (SOM) to enhance structure, water retention, and nutrient availability.

Practices like cover cropping and conservation tillage help in the humification process, which locks carbon in the soil.

4.2 Climate Smart Agriculture. A Chemical Viewpoint

Climate-Smart Agriculture (CSA) ... [18-22]

Mitigation of GHG emissions

Chemical approaches aim to reduce agricultural Greenhouse gas (GHG) emissions (methane, nitrous oxide...).

Solutions: reduction of synthetic fertilizer use; optimization of manure management, and reduction of chemical inputs.

Nutrient and pest management

Instead of heavy reliance on chemical pesticides, CSA encourages integrated pest management and the use of natural compounds to improve resistance.

Biofertilizers and soil amendments

The application of bio-based materials and organic amendments is encouraged to improve soil health, enhance microbial activity, and provide nutrients in a more sustainable manner.

4.2 Climate Smart Agriculture. A Chemical Viewpoint

Main results ... [23-25]

Increased productivity: enhancing soil fertility through improved nutrient cycling

Enhanced resilience: drought- and flood-tolerant crops have been developed through advanced breeding and molecular techniques (Moroccan ‘*Jawahir*’ durum wheat, maize hybrids, “Green Super Rice” types, bean sorghum, pearl millet varieties, ..)

Reduced GHG emissions: diminution of carbon footprint of agriculture

Water supply increase: expansion of unconventional resources like desalination (seawater to freshwater) and treating wastewater for agricultural or industrial reuse.

4.2 Climate Smart Agriculture. A Chemical Viewpoint

Additional and synergic results ...

Harvesting and storage: use of rainwater harvesting systems (cisterns, rooftop collection) and management of aquifer recharge to replenish groundwater

Agricultural efficiency: transition towards drip irrigation and - in some regions - adopting of rotational grazing to maximize limited forage and preserve soil moisture

Technological innovation: Use of AI-powered forecasting, satellite monitoring, and sensors to detect infrastructure leaks and optimize water usage

Efficient planning: Implementation of “Drought Management Plans” in vulnerable river basins to ensure water security

Efficient land management: restoration of ecosystems, protection of watersheds, and use of drought-resistant crops to combat desertification

Ameliorated infrastructure investment: upgrading action for treatment plants and improvement of infrastructure efficiency to reduce wastage.

4.2 Climate Smart Agriculture. A Chemical Viewpoint

In summary, the chemical viewpoint of CSA focuses on a shift from conventional, high-input farming to more precise, nature-based, and efficient chemical management strategies...

Fight against drought requires **sustainable water management**, focusing on **increasing availability** and efficiency through desalination, **water reuse**, **rainwater harvesting**, and managed **aquifer recharge**.

Key strategies include upgrading infrastructure to stop water waste, implementing smart agricultural irrigation, and adopting nature-based solutions to enhance soil moisture and restore ecosystems **[18-22]**.

4.3 Fighting against Drought. Sustainable Management of Water Resources

New drought-tolerant crop varieties are being developed and deployed worldwide, combining traditional breeding with modern, rapid technologies like CRISPR gene editing and genetic mapping to combat **climate-induced water scarcity**.

These innovations are crucial for sustaining food security in arid regions by enabling crops to withstand extreme drought, heat, and, in some cases, soil salinity.

Drought- and flood-tolerant crops are currently proposed in this ambit.

These crops are developed through advanced breeding and molecular techniques. Good examples are: Moroccan ‘*Jawahir*’ durum wheat; maize hybrids, ‘*Green Super Rice*’ types; bean sorghum, pearl millet varieties, ... and other solutions.

5. African Food Systems. Analysis of Commercial Requirements

With reference to African food systems, it appears that commercial requirements are shaped by a complex, hybrid, and often fragmented landscape where informal supply chains dominate, alongside a growing but challenging formal sector.

Commercialization is increasingly driven by **rapid urbanization**, a **growing middle class**, and the need for **climate-resilient, nutrient-dense food**, such as traditional crops and livestock.

5. African Food Systems. Analysis of Commercial Requirements

What about main commercial requirements and trends in African food systems?

A - Integration of Supply Chains

While formal, large-scale retail is *growing*, a significant portion of food trade occurs in **informal markets**. Actually, smallholder farmers—who dominate production—should be allowed to access markets through improved infrastructure, such as rural roads, **storage**, and **cold chain logistics**.

B - Quality, safety, and standards

There is a growing demand for **safe and nutritious food**. Commercial requirements in urban areas are increasingly concerned with **visible hygiene**, **safety standards**, and **traceability**, often requiring compliance with both National standards and International regulations.

5. African Food Systems. Analysis of Commercial Requirements

What about main commercial requirements and trends in African food systems?

C- Focus on Indigenous and Traditional Crops

There is a shift towards recognizing the commercial potential of nutrient-dense indigenous crops (e.g., **sorghum**, **cassava**, **millet**, **cowpea**, and traditional vegetables). These crops could help when speaking of reduction of dependency on imported wheat and maize, and increase of the resilience of local food systems

5. African Food Systems. Analysis of Commercial Requirements

What about main commercial requirements and trends in African food systems?

D - Infrastructure and technology

The ability to meet commercial demand is constrained by a lack of infrastructure (**storage, energy, transport**). There is a critical need for investments in **digital technologies**, such as mobile-based platforms for market information, to reduce transaction costs and enhance **traceability**.

E - Value Addition and processing

There is a high requirement for increased investment in local processing and value-added products, especially for indigenous foods, to improve durability (shelf-life), reduce post-harvest loss, and meet the preferences of urban consumers.

5.1 African and International Commerce. How to Cope with Commercial Requests?

Main development drivers and challenges today...

➤ Policy and regulation

The **African Continental Free Trade Area (AfCFTA)** is a major driver, aiming to triple intra-African trade in agricultural products in the next future, provided that food safety regulations and trade policies are enforced

➤ Environmental sustainability, waste reduction, improved recycling of by-products

➤ Diversification of urban consumer preferences (towards convenience, moderately and highly processed foods, improved nutrition, etc.)

➤ New digital platforms for managing **traceability** and **quality management** documentation and reduce costs.

5.2 African and International Commerce. How to Cope with **Quality Requirements**?

Coping with international quality requirements in African and international commerce involves the transition from a reliance on tariff concessions to mastering non-tariff measures with specific concern to :

QUALITY

SAFETY

SUSTAINABILITY

As of 2026, with the extension of trade deals such as the ‘**African Growth and Opportunity Act**’ (AGOA) with reference to the United States of America, these aspects are **crucial**.

5.2 African and International Commerce. How to Cope with **Quality Requirements?**

Chemistry can offer an excellent support when considering:

- **Alignment of National quality systems** (standards, metrology, accreditation, and conformity assessment) with international benchmarks
- **Boosting food testing and certification** (accredited laboratories, compliance with sanitary and phytosanitary measures, and technical barriers to trade)
- **New continental sustainability certification programs** such as **Eco-Mark Africa (EMA)** developed by the **African Organisation for Standardisation (ARSO)**
- **New and improved supply-chain mapping systems**, able to detect food-safety critical areas (examples: contamination in crops; inadequate shelf-life estimation; erroneous traceability; wrong cold-chain management; etc.)
- **Improved training** for food technologists, auditors, regulatory specialists, ...

6. Conclusions. Chemistry Can Ensure Authenticity and Build Trust in African Food Systems

The application of chemical analysis and food chemistry is a vital, transformative tool for establishing **food authenticity**, improving **safety**, and building **consumer trust** within African food systems.

As the continent's food supply chains face challenges regarding **adulteration, contamination**, and **regulatory gaps**, analytical chemistry provides reliable scientific evidence needed to verify quality, origin, and other critical parameters...

6. Conclusions. Chemistry Can Ensure Authenticity and Build Trust in African Food Systems



Detecting food fraud and adulteration

Analytical methods - chromatography, spectroscopy, isotope fingerprinting, etc. – and chemometrics can help when the need is to identify intentional adulteration and erroneous management of processing lines (such as packaging and labelling)



Ensuring authenticity and origin

Chemical techniques can be used to verify geographical origin or organic status, which are critical for high-value export products and local consumer trust



Strengthening regulatory and safety standards on the National and International levels

The use of advanced testing in accredited local labs can improve the ability to detect hazards, which in turn builds consumer confidence

6. Conclusions. Chemistry Can Ensure Authenticity and Build Trust in African Food Systems

➡ Enhancing trust through transparency

The implementation of rigorous chemical testing and traceability systems allows producers to prove safety and quality of their products. This transparency is crucial for building trust, especially in rapidly urbanizing areas where supply chains are complex

➡ Promoting sustainable alternatives

‘**Green chemistry**’ is increasingly applied to produce safer preservatives, natural additives, and biodegradable packaging, offering solutions to both food spoilage and health risks associated with excessive synthetic additives.

Supporting actions for analytical chemistry infrastructure, development, and training can strengthen regulatory frameworks.

Chemistry plays a pivotal role when speaking of the transformation of **African food systems**.

25th September 2026



Thank You for the Attention!

From Chemistry to Commerce

Ensuring Authenticity and Building Trust in
Africa's Food Systems

Salvatore Parisi, Hon Prof, PhD, PCQI, MRi

7. References

1. Parisi S, Liberatore A, Parisi C, Ballantini V (2021) Il comparto agroalimentare. Chimica Industriale Essenziale, 26 maggio 2021.
<https://www.chimicaindustrialeessenziale.org/materiali-e-applicazioni/il-comparto-agrialimentare//>
2. Wang X, Yang X, Zailani S, Rejeb A (2025) How Innovation Capability Drives Sustainable Operational Performance in Practices Within Alternative Food Networks: The Mediating Roles of Business Platforms and Community Building. Sustainability, 18(1), 305
3. Haddad MA, Parisi S (2020) The next big HITS. New Food Magazine 23, 2:4
4. Parisi S, Varghese SM, Parisi C (2021) The HITS Strategy and Chemometrics. Agro FOOD Industry Hi Tech 32, 1:56-58
5. Lynch J (2019) Cold plasma can kill 99.9% of airborne viruses, study shows. Michigan Engineering News, University of Michigan. Available <https://news.engin.umich.edu/2019/04/cold-plasma-can-kill-almost-all-airborne-viruses-study-shows/>
6. Roobab U, Chacha JS, Abida A, Rashid S, Muhammad Madni G, Lorenzo JM, ... Aadil RM (2022) Emerging trends for nonthermal decontamination of raw and processed meat: ozonation, high-hydrostatic pressure and cold plasma. Foods, 11(15), 2173

7. References

7. Núñez-Delgado A, Dominguez JR, Zhou Y, Race M, Domingo JL (2021) New research on reduction and/or elimination of hazardous substances in the design, manufacture and application of chemical products. Environmental research, 201, 111601
8. Wibisono DA S, Saw CY, Wu TY, Chau CF (2025) Advancing industrial food byproduct management: strategies, technologies, and Progress in waste reduction. Processes, 13(1), 84
9. Pena-Pereira F, Kloskowski A, Namieśnik J (2015) Perspectives on the replacement of harmful organic solvents in analytical methodologies: a framework toward the implementation of a generation of eco-friendly alternatives. Green Chemistry, 17(7), 3687-3705
10. Qasem NA, Mohammed RH, Lawal DU (2021) Removal of heavy metal ions from wastewater: a comprehensive and critical review. Npj Clean Water, 4(1), 36
11. Parisi S (2025) AI-based Testing Methods and Food Allergen Detection against Labelling Errors and Frauds. The First International Conference of Artificial Intelligence in Health Sciences, Al Balqa Applied University, Amman – Salt, Jordan, 30th December 2025
12. Pellerito A, Dounz-Weigt R, Micali M (2019) Food Sharing - Chemical Evaluation of Durable Foods. SpringerBriefs in Molecular Science, Subseries: Chemistry of Foods. Springer International Publishing, Cham

7. References

13. Varghese SM, Parisi S, Singla RK, Begum AA (2022) Trends in food chemistry, nutrition and technology in Indian sub-continent, pp. 31-44. Springer International Publishing, Cham
14. Barbieri G, Barone C, Bhagat A, Caruso G, Conley ZR, Parisi S (2014) The Influence of Chemistry on New Foods and Traditional Products. SpringerBriefs in Chemistry of Foods, Springer International Publishing, Heidelberg, Germany
15. Haddad MA, Yamani MI, Abu-Romman SM, Obeidat M (2021) Chemical Profiles of Selected Jordanian Foods. Springer International Publishing, Cham
16. Gashu D, Demment MW, Stoecker BJ (2019) Challenges and opportunities to the African agriculture and food systems. African Journal of Food, Agriculture, Nutrition and Development, 19(1), 14190-14217
17. Noort MW, Renzetti S, Linderhof V, du Rand GE, Marx-Pienaar NJ, de Kock HL, ... Taylor JR (2022) Towards sustainable shifts to healthy diets and food security in sub-Saharan Africa with climate-resilient crops in bread-type products: A food system analysis. Foods, 11(2), 135
18. Assoua JE, Bomdzele Jr E, Omosehin O, Binuomote SO, Osabuohien E, Enwa S, Okunade SO (2024) Integrating climate change, food safety, nutrition, and health outcomes in food systems policies and programs in Africa. World Food Policy, 10(1), 86-110

7. References

19. Barrett CB, Bevis LE (2015) The micronutrient deficiencies challenge in African food systems. The fight against hunger and malnutrition: The role of food, agriculture, and targeted policies, 61-88
20. Ofori KF, Antoniello S, English MM, Aryee AN (2022) Improving nutrition through biofortification–A systematic review. Frontiers in nutrition, 9, 1043655
21. Totobesola M, Delve R, Nkundimana JDA, Cini L, Gianfelici F, Mvumi B, ... Rolle RS (2022) A holistic approach to food loss reduction in Africa: food loss analysis, integrated capacity development and policy implications. Food Security, 14(6), 1401-1415
22. Zougmore RB, Läderach P, Campbell BM (2021) Transforming food systems in Africa under climate change pressure: Role of climate-smart agriculture. Sustainability, 13(8), 4305
23. ICARDA Communication Team (2025) Jawahir Wheat Brings Drought Resilience to Morocco. www.icarda.org. Available <https://icarda.org/media/news/jawahir-wheat-brings-drought-resilience-morocco>
24. Yu S, Ali J, Zhang C, Li Z, Zhang Q (2020) Genomic breeding of green super rice varieties and their deployment in Asia and Africa. Theoretical and Applied Genetics, 133(5), 1427-1442

7. References

25. Gude VG (2017) Desalination and water reuse to address global water scarcity. Reviews in Environmental Science and Bio/Technology, 16(4), 591-609.