



# Africa-UAE agribusiness and food security

Dr Sylvanus Kwaku Afesorgbor

**Disclaimer:** The views expressed in this publication are solely those of the author(s) and do not necessarily reflect the views of the Anwar Gargash Diplomatic Academy, an autonomous federal entity, or the UAE Government.

**Copyright:** Anwar Gargash Diplomatic Academy 2024.



**Dr Sylvanus Kwaku Afesorgbor**

is an Associate Professor, Department of Food, Agricultural and Resource Economics, University of Guelph, Canada.

He is currently the Jean Monnet Fellow at the Robert Schuman Centre for Advanced Studies, European University Institute, Florence, Italy. His research and teaching focus on the areas of international trade, political economy, international development, energy and environment, food and agriculture, and meta-analysis. Apart from his academic work, he is the Executive Founder of the international think tank Centre for Trade Analysis and Development (CeTAD Africa) based in Ghana.

## Summary

- Food security is a pressing issue worldwide and holds significant importance for the government of the United Arab Emirates (UAE) too. Despite being deemed food-secure, the UAE faces persistent concerns regarding food insecurity primarily because it relies on imports to meet 90% of its domestic food needs. Limited arable land and inadequate water resources hinder agricultural production in the UAE, exacerbating the challenge as the population's consumption demands continue to rise.
- This Insight argues that deepening food trade relations between sub-Saharan Africa (SSA) and the UAE will be mutually beneficial due to the differing comparative advantages of both regions.
- Africa's vast agricultural land and abundant labour grants it a strong comparative advantage in the production of food and agricultural products, which could be exchanged for UAE's agricultural investments in Africa.
- Food trade between Africa and the UAE carries substantial implications for food security for both parties. The Insight argues that the UAE's dependency on food imports to meet its domestic food consumption presents an excellent opportunity for Africa to emerge as a primary food source for the UAE considering its proximity to the UAE in exchange for investments in agribusiness across the continent.
- The Insight concludes with the policy recommendations that will further strengthen agricultural trade and cooperation between the UAE and Africa. The recommendations include:
  - The UAE should enhance agricultural economic diplomacy by intensifying collaboration with African nations through strategic investment to cultivate food items for the UAE.
  - The UAE should leverage its comparative advantages in agricultural commodity production in exchange for food products in sectors where it faces comparative disadvantages.
  - Signing free trade agreements with African nations could prove crucial in reducing tariffs and non-tariff barriers for the trade of agricultural commodities.
  - Food production in urban and peri-urban areas using advanced technologies stands out as a transformative innovation capable of bolstering food security and mitigating climate change.
  - Finally, the UAE government must prioritise the development of agricultural methods resilient to the adverse impacts of climate change.

## The Issue

The UAE has been forging robust economic and diplomatic relationships with Africa, aiming for mutual benefits. This commitment to strengthening ties was highlighted by the UAE Ministry of Foreign Affairs with the launch of the UAE Africa Connect platform in 2022. This initiative seeks to bolster the UAE partnership with sub-Saharan Africa (SSA) by building communication and cultural understanding bridges and fostering economic exchanges across diverse sectors.<sup>1</sup>

Earlier, the establishment of the UAE-Africa Government Experience Exchange Programme in 2021 marked a significant collaborative effort among the United Nations Development Program (UNDP), the African Union (AU), and the UAE government. This programme identifies emerging global trends and development opportunities for Africa.<sup>2</sup>

One possible way to effectively strengthening the economic ties between the UAE and Africa could be through bilateral trade, given the differing comparative advantages of both regions. Africa's vast agricultural land and abundant labour grants it a strong comparative advantage in the production of food and agricultural products. Although Africa has arable land to become the world major producer of food, the region is plagued with low agricultural productivity because of low investment and lack of research and development (R&D) within the agricultural sector.<sup>3</sup>

Conversely, the UAE's strengths lie in the production of energy-related and manufactured goods. The contribution of agriculture to the UAE's total GDP in 2022 was less than 0.1%.<sup>4</sup> This compares to the contributions of 27.6% for the energy-related sector and 11% for manufacturing.<sup>5</sup> These distinct comparative advantages present a significant opportunity for mutual benefits through trade between the UAE and African nations.

Food trade between Africa and the UAE carries substantial implications for food security for both parties.<sup>6</sup> First, the UAE relies on food imports to fulfil 90% of the domestic food requirements.<sup>7</sup> Depending on the global market to cover its domestic food needs implies that any surge in food prices globally could swiftly lead to escalated food prices in the UAE. This presents an excellent mitigating opportunity for Africa to emerge as a primary food source for the Gulf states considering its proximity to the UAE in exchange for investments in agribusiness across the continent.

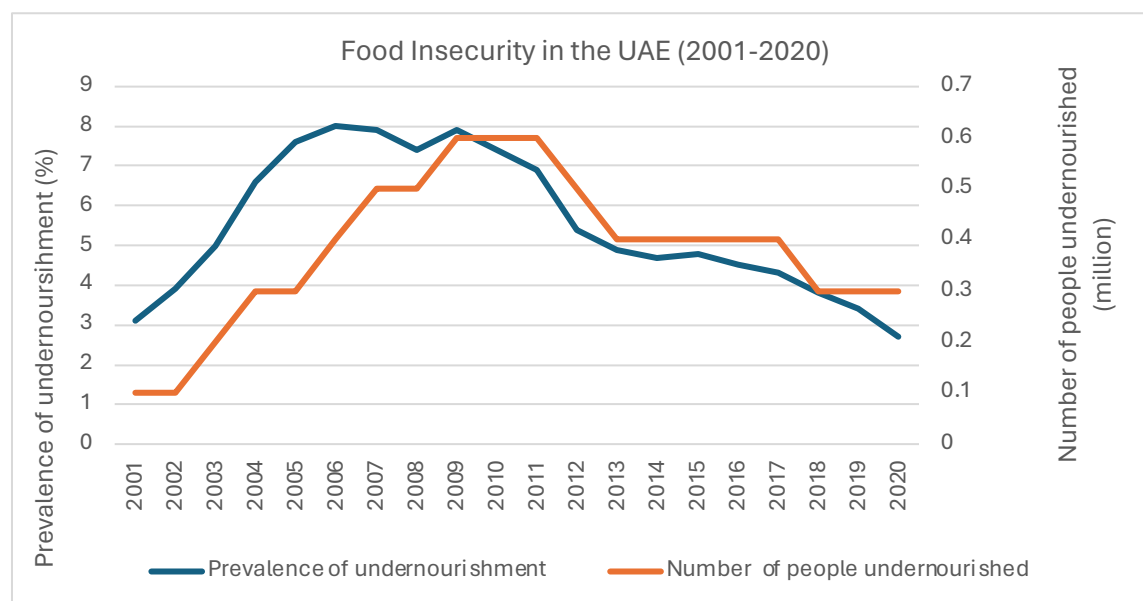
Second, through UAE investments in agribusiness, African farmers can enhance their productivity and the value of their agricultural products by participating in the global value chains (GVCs). There are similar projects initiated in countries such as Pakistan, in which Qatar funded infrastructural projects in return for access to agricultural ventures.<sup>8</sup>

### Food Security in the UAE

While the UAE is considered a food-secure nation, concerns about food insecurity persist due to limited arable land resources, insufficient water resources, and increasing consumption demands of the population.<sup>9</sup> In addition, the intensifying pace of climate change further threatens the supply of food and water in the Middle East.<sup>10</sup>

Figure 1 illustrates the measurement of food insecurity in terms of the prevalence (number) of undernourishment (PoU) over time. As defined by the Food and Agricultural Organization (FAO), PoU represents the likelihood that a randomly selected individual from the population consumes an insufficient number of calories to sustain an active and healthy lifestyle. The graph indicates an upward trend prior to the global financial crisis (GFC) of 2008, followed by a sustained decline in the long term after the GFC. The rising global food prices in 2007 caused the UAE to struggle in meeting its domestic food demand before the GFC.<sup>11</sup>

**Figure 1: Prevalence (number) of People Undernourished**



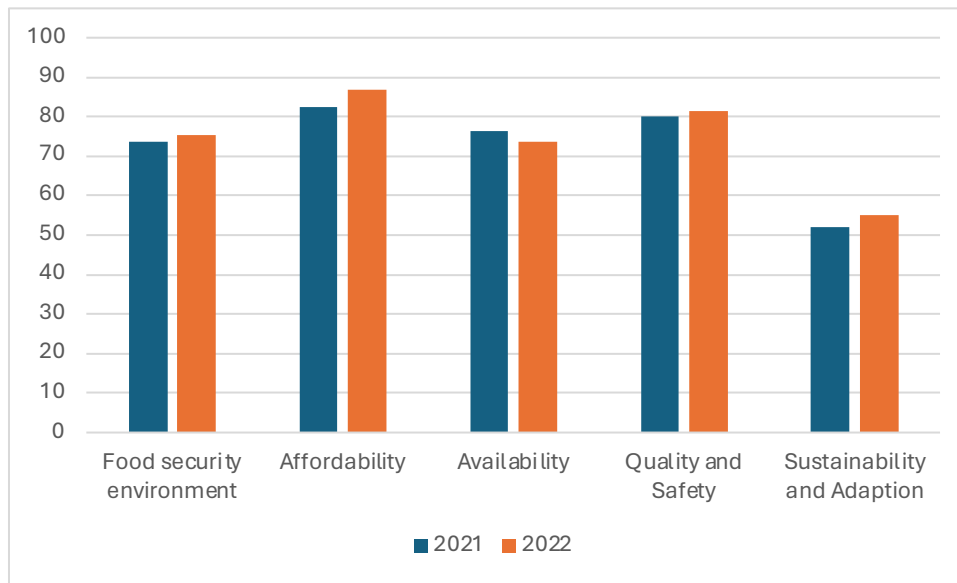
Source: Data obtained from FAOSTAT

The Global Food Security Index 2022 (GFSI) report highlights a worsening global food situation.<sup>12</sup> This is exacerbated by escalating food prices linked to the COVID-19 pandemic and the conflict between Russia and Ukraine. The GFSI assesses the factors influencing global food security through four primary dimensions: affordability, availability, quality, and safety, and sustainability and adaptation, covering 113 countries. Scores on the index range from 0 to 100, with higher scores denoting a more secure food environment.

Figure 2 presents the latest GFSI for the UAE in 2022 (and 2021 for comparison). A peculiar observation based on the data is that while the UAE has improved its scores overall and on three of the four dimensions (except on availability), the country’s ranking in the world has worsened between 2021 and 2022. This decline in the UAE’s rankings may be attributed to a general improvement in the scores of other countries relative to the UAE. The UAE achieves an overall food security score of 75.2, positioning it 23<sup>rd</sup> globally (as compared to 20<sup>th</sup> in 2021). According to the GFSI Report 2022, there is also a strong correlation between the overall GFSI score and political commitment to adaptation. However, the UAE has a low score in political commitment to adaptation, with a score of 45.5 compared to the average of 55.8 for all countries.

In terms of the four pillars, the UAE scores 86.7 for affordability, ranking 31<sup>st</sup> worldwide (down from 19<sup>th</sup> the previous year despite an improved score). Affordability assesses consumers’ ability to purchase food and their vulnerability to price fluctuations. For availability, the UAE scores 73.8, securing the 7<sup>th</sup> position (while the country had the 8<sup>th</sup> position in 2021 with a better score of 76.2). This pillar evaluates agricultural production, on-farm capabilities, and the risk of supply disruptions. Regarding quality and safety, the UAE ranks 16<sup>th</sup> with a score of 81.3 (down from 13<sup>th</sup> in 2021). This dimension measures the variety and nutritional quality of diets as well as food safety.

**Figure 2: UAE Global Food Security Index performance**



Source: Data obtained from Economist Intelligence Unit (EIU)

The UAE obtains the lowest of its five scores for sustainability and adaptation dimension of the GFSI, scoring 55.2 and ranking 53<sup>rd</sup> (down from 45<sup>th</sup> the previous year). This dimension scrutinises a country's exposure to climate change effects and its adaptation strategies, along with susceptibility to natural resource risks. The sustainability aspect is crucial in ensuring the production of food is not at the expense of the environment. The UAE has a long-term goal of attaining food self-sufficiency, however, this may come at a higher environmental cost considering the desert nature of the country.

### Climate Change and Food Production in the UAE

The escalation of climate change impacts heightens the vulnerabilities concerning domestic food supply and food security in the UAE. The UAE faces considerable potential food security challenges as the country is lacking in water and arable land. Yet, leveraging international trade can enable countries to capitalise on the regional variations in climate change effects.<sup>13</sup> While trade liberalisation holds potential for enhancing food availability and mitigating food insecurity, there exists a potential trade-off between promoting nutrition-conscious trade liberalisation and addressing climate change. This dilemma arises when agricultural and food trade practices inadvertently promote land use change and contribute to increased greenhouse gas (GHG) emissions.<sup>14</sup>

The effects of climate change on food production are particularly acute in the Gulf region, more than in other regions like Africa. The Gulf is experiencing a rise in ambient temperatures, and rainfall is usually infrequent.<sup>15</sup> Extended dry periods in the region make agriculture challenging as the rising temperature depletes the freshwater resources that could help agriculture. This issue is critical as farming in arid conditions demands increased water usage, potentially resulting in the exhaustion of water supplies.

For context, SSA received an average annual rainfall of 1,114 mm in 2020, whereas the UAE saw a significantly lower average of just 78 mm per year.<sup>16</sup> Recently though, the UAE experienced significant precipitation leading to severe flooding nationwide. Scientists attributed this heavy rainfall to climate change,<sup>17</sup> and unfortunately this is not positive for the UAE agriculture sector because floods cause erosion of the topsoil and wash away both seeds and crops.

To reduce the environmental impact of food production, it is crucial for the UAE to expand and deepen its trade connections with Africa, where the environmental costs of food production are notably lower. Moreover, Africa's ample potential in terms of arable land and water resources suggests that with technological support and agricultural investment, food production in the region could become more cost-effective and environmentally efficient. The UAE can assist Africa in bridging the investment gap in the agricultural sector, thereby enhancing agricultural productivity, and consequently increasing food exports to the UAE.

Numerous Gulf states have already made substantial investments across various African nations. For example, in the past decade, the UAE has committed over \$59 billion to diverse projects in Africa, making it the fourth largest foreign direct investor on the continent.<sup>18</sup>

Agricultural innovation is crucial for increasing food production and ensuring food security. However, the latest GFSI report indicates that the UAE has limited agricultural R&D, ranking low in the composite index measuring this component of food availability, with a score of 38.4 compared to the average of 47.1 for all countries.<sup>19</sup>

Innovative approaches like urban farming could significantly boost food production in the highly urbanised UAE. Urban farming, which involves cultivating food and agricultural products in urban and peri-urban areas using advanced technologies, has immense potential.

## Food Trade

Table 1 displays the values of food trade between the UAE and various global regions. Concerning exports, the UAE maintains a trade surplus solely with the Middle East and North Africa (MENA) and SSA. MENA constitutes over half of the UAE's food exports, amounting to 55% of the total. This aligns with the empirical gravity model which is typically utilised to explain the volume of trade between partners. Given the proximity of the MENA region to the UAE, coupled with similar consumer preferences and minimal trade costs, trade between them is poised to surge. As for SSA, it ranks as the third-largest destination for UAE's food exports, with a small surplus.

**Table 1: UAE Agriculture Export and Import from Different Regions (2021)**

Partner Region	Export (US\$ million)	Import (US\$ million)	Trade Balance (US\$ million)	Region Export Share (%)	Region Import Share (%)
East Asia & Pacific	1,701.16	3,730.23	(2,029.07)	11.35	20.10
Europe & Central Asia	966.03	4,706.73	(3,740.71)	6.44	25.36
Latin America & Caribbean	186.40	2,240.10	(2,053.70)	1.24	12.07
Middle East & North Africa	8,273.68	2,167.76	6,105.91	55.19	11.68
North America	245.04	2,090.62	(1,845.58)	1.63	11.27
South Asia	1,487.47	2,601.11	(1,113.64)	9.92	14.02
Sub-Saharan Africa	1,616.59	894.08	722.51	10.78	4.82
World	14,989.94	18,558.26	(3,568.32)	100.00	100.00

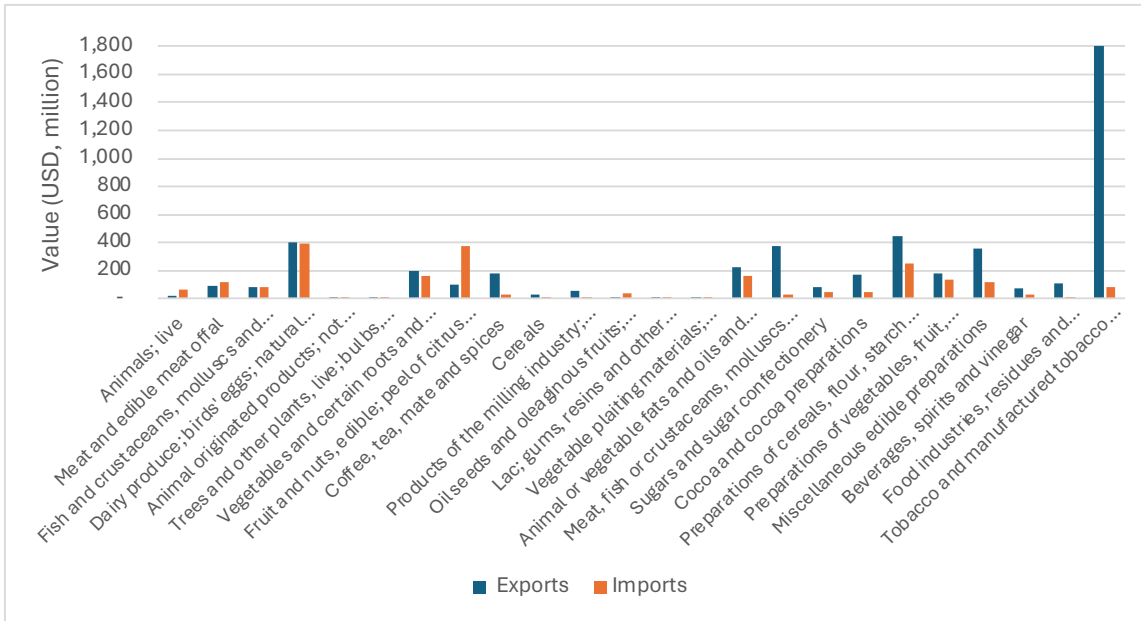
Source: Data obtained from the World Bank's World Integrated Trade Solution (WITS)

In terms of food imports, the UAE faces a trade deficit of approximately \$3.5 billion, underscoring its reliance on other nations to fulfil domestic food requirements. Europe and Central Asia emerge as the primary sources of food imports for the UAE, totalling \$4.7 billion in 2021, constituting 25% of the total food imports. In contrast, food imports from SSA amounted to \$894 million, which constitutes 4.8% of the total UAE food imports. Considering the vast land resources of Africa, the limited share of total food imports from the continent is an indicator that Africa's food production is below its full potential. Establishing stronger trade relations between the UAE and Africa is crucial for fostering an extensive food trading network between the two regions.

## Product-level Analysis of UAE Food Trade with SSA and MENA

To provide a detailed product analysis of agri-food items traded between the UAE and its trading partners in the MENA and SSA regions, Figures 3 and 4 provide data on the value of exports and imports classified at the HS-2 level. Figure 3 reveals that UAE's agri-food exports are primarily dominated by processed agri-food products such as tobacco and tobacco substitutes (HS24), miscellaneous edible preparations (HS21), and preparations of cereals, flour, starch, and pastrycooks' products (HS19). Additionally, one primary agri-food product category -- dairy produce, birds' eggs, natural honey, and edible products of animal origin (HS04) -- is exported from the UAE to the MENA region.

**Figure 3: Agri-food products (HS2 level) traded between the UAE and MENA**

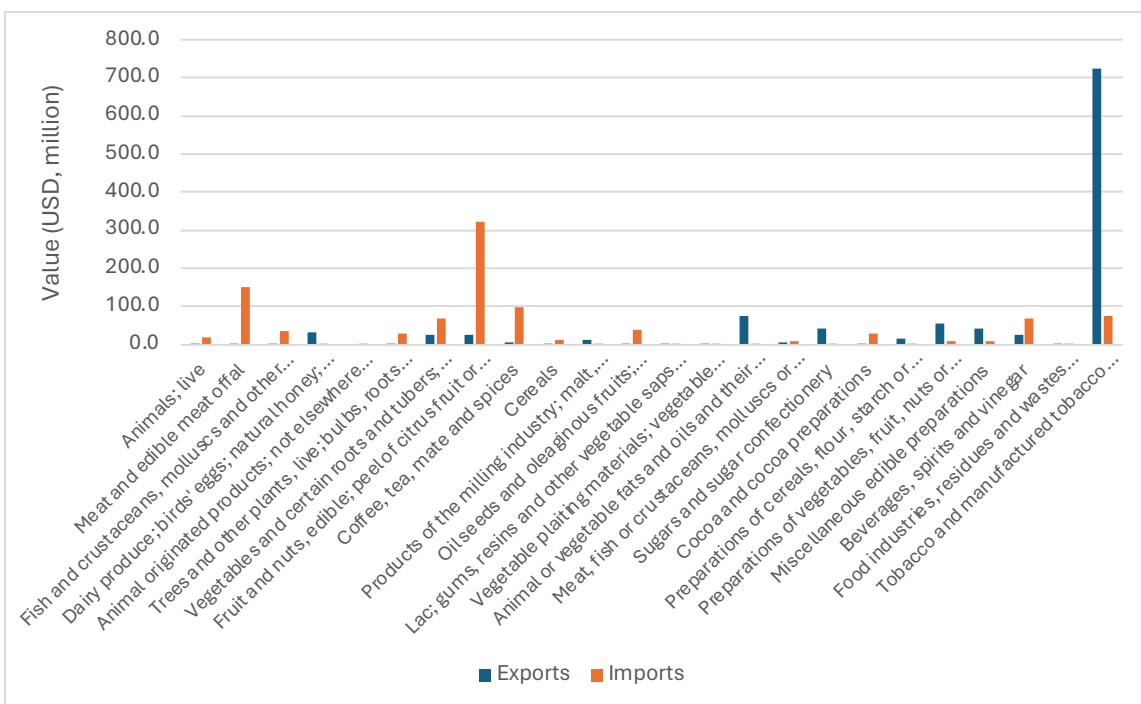


Source: Based WITS trade data

In comparison, the UAE's imports from the MENA region mainly comprise preparations of cereals, flour, starch, and pastrycooks' products (HS19); dairy produce, birds' eggs, natural honey, and edible products of animal origin (HS04); and edible fruits and nuts, peel of citrus fruit or melons (HS08). This is intuitive as imported agri-food products require large agricultural land for their cultivation.

For a product-level analysis between the UAE and SSA, the UAE's exports are predominantly composed of tobacco and tobacco substitutes. In contrast, the UAE's imports from SSA are mainly concentrated in three key product categories: meat and edible meat offal (HS02); edible fruits and nuts, peel of citrus fruit or melons (HS08); and coffee, tea, mate, and spices (HS09).

**Figure 4: Agri-food products (HS2 level) traded between the UAE and SSA**



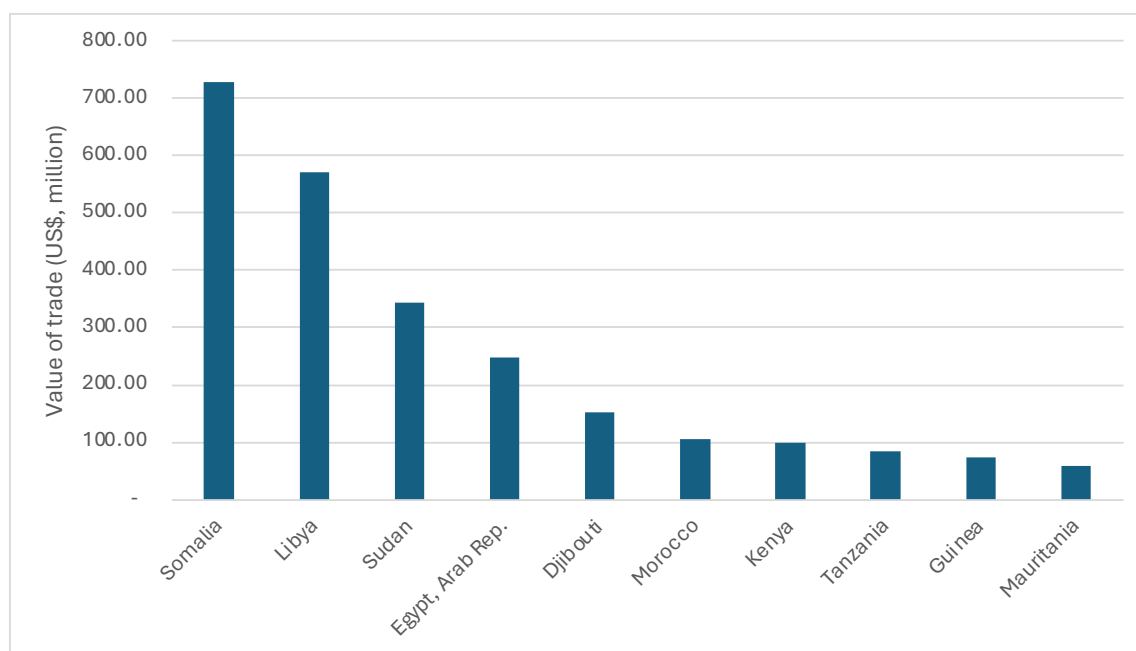
Source: Based WITS trade data

## Country-Level Analysis of UAE Food Trade with SSA and MENA

The trade relationship between the UAE and Africa differs for specific countries. For food exports, the top destination African countries are depicted in Figure 5. The UAE's food exports are mainly targeted to African countries that have majority Muslim populations. The top five destinations include Somalia, Libya, Sudan, Egypt, and Djibouti. This perhaps underscores the continued influence of religion in advancing international trade, particularly in the export of food from the UAE.

The top 10 African destinations for the UAE's food exports account for over 80% of the total export to the region, which means low penetration or lack of market diversification of the UAE's food exports on the continent. Economic diversification, in terms of products and destinations, is a crucial economic policy for the UAE. Diversifying its food trade towards other non-Muslim African countries will deepen the UAE's market access on the continent.

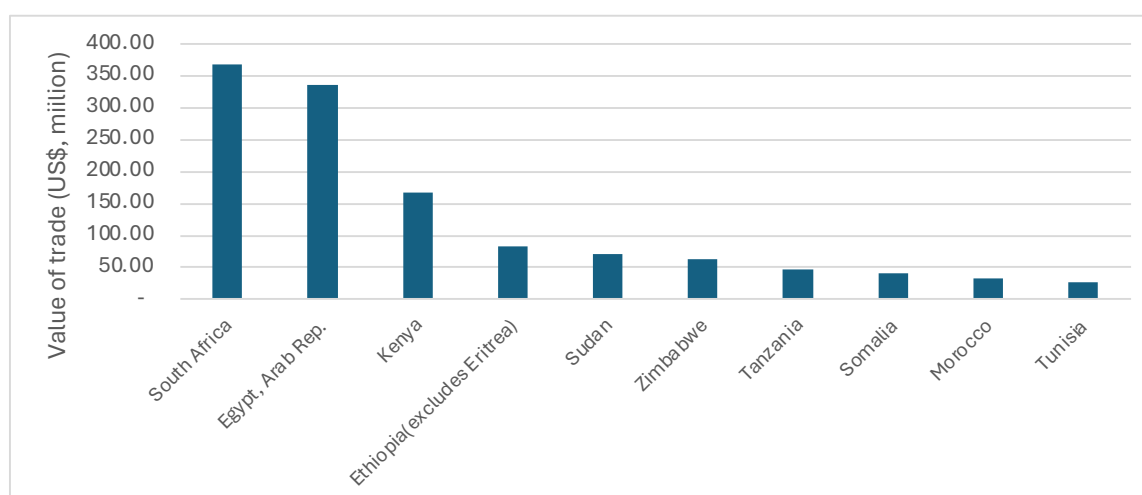
**Figure 5: UAE's Food Exports to Various African Countries**



Source: Based on WITS trade data

In terms of food imports, Figure 6 displays the top 10 African countries from which the UAE imports food, collectively constituting over 90% of the UAE's total food imports from the continent. Among these, South Africa, Egypt and Kenya stand out as the three primary sources. Notably, South Africa and Egypt rank among the largest economies on the continent in terms of GDP.

**Figure 6: Food Imports from Various African Countries**



Source: Based on WITS data



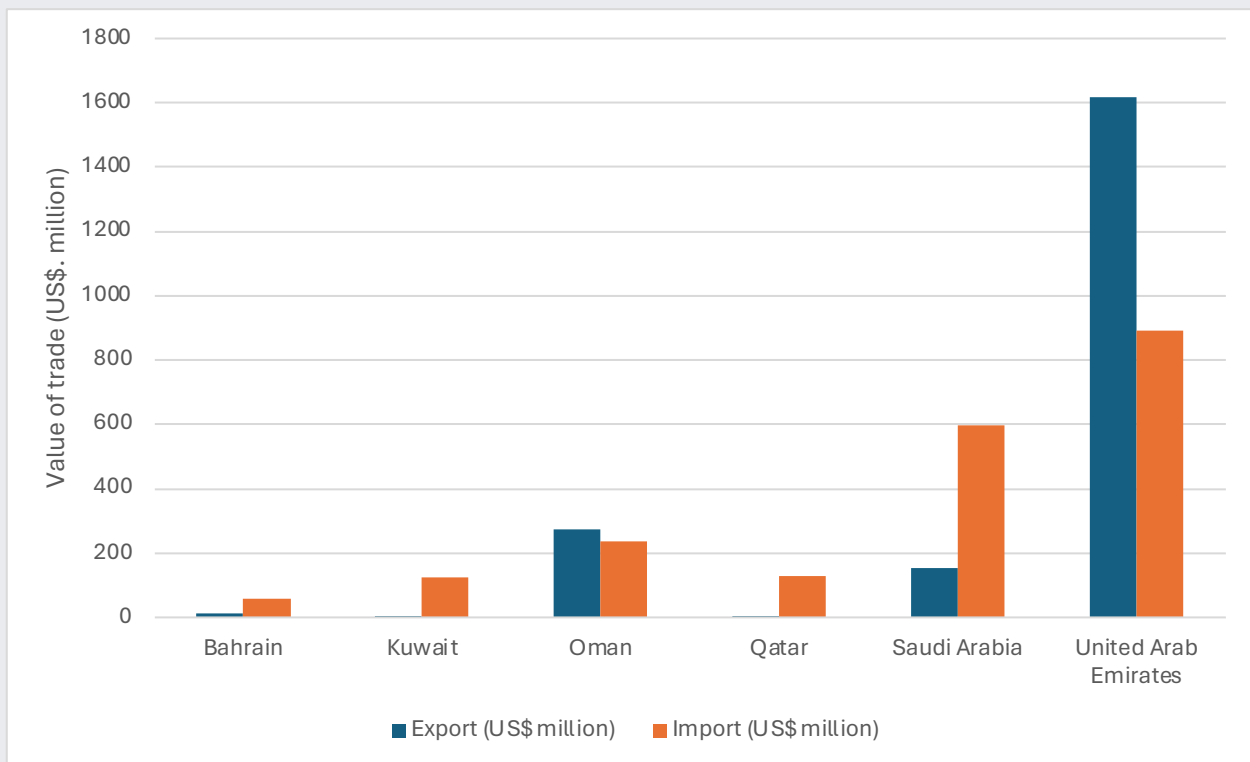
It is also evident that African nations that are signatories to free trade agreements (FTAs) with the UAE represent a substantial portion of food trade among other African countries. For example, in 2021, Morocco, Tunisia, Libya, Egypt, and Sudan — all signatories to the Pan-Arab FTA with the UAE — accounted for 42% of total African food exports to the UAE and 34% of total African food imports from the UAE. This aligns with the trade literature emphasizing the trade-promoting impact of FTAs on agri-food trade.<sup>20</sup> FTAs play a crucial role in trade policy, particularly considering that trade barriers, including both tariff and non-tariff measures, tend to be higher within the agri-food sector. Protectionist policies are frequently imposed on agri-food products, underscoring the significance of FTAs in facilitating smoother trade within this sector.

The recent negotiations of Comprehensive Economic Partnership Agreements (CEPAs) between the UAE and several African countries represent a positive step toward enhancing trade relations. Through CEPAs, the UAE has finalised trade agreements with Kenya, Mauritius, and the Republic of Congo.<sup>21</sup> A key component of these CEPA negotiations is food production, which is expected to boost food trade between the UAE and Africa.

### The Bigger Picture: Food Trade between GCC States and Africa

The Gulf Cooperation Council (GCC) -- comprising Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE -- is an economic and political union. These member states rank among the world's top food importers. Recognising this dependence on food imports, there's an opportunity for countries in tropical regions like Africa to emerge as the primary food source for the GCC region.<sup>22</sup>

**Figure 7: Food trade between GCC member states and SSA**



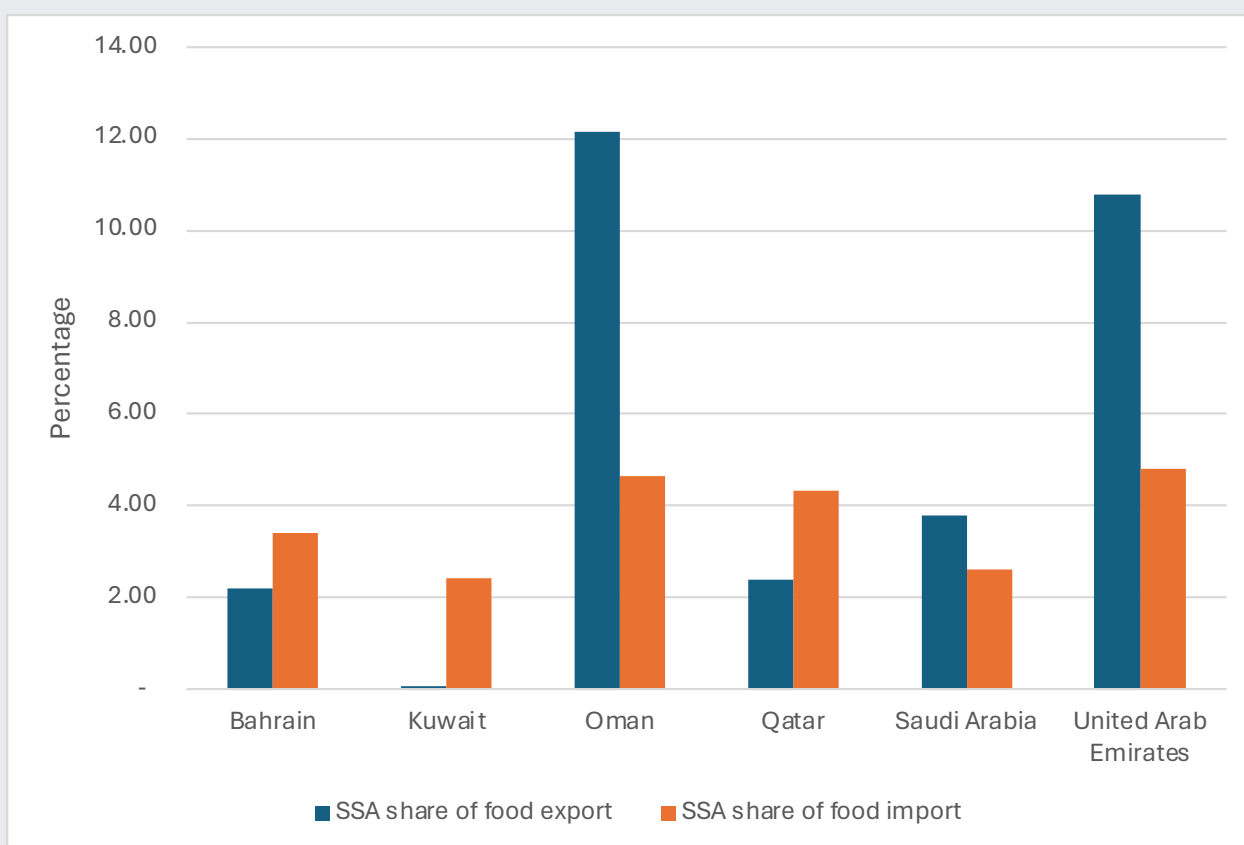
Source: WITS data

Figure 7 illustrates the food trade value between the GCC states and SSA in 2021. Among these GCC nations, the UAE records the most extensive market access to SSA in terms of food exports and imports. Notably, Oman and the UAE are the only GCC countries with a surplus in food trade with SSA, while the others face deficits.

The distribution of the GCC states' participation in global food exports to and imports from SSA is displayed in Figure 8. Again, Oman and the UAE demonstrate the most significant involvement in food trade with SSA. Specifically, SSA constitutes 12% of Oman's total food imports, compared to 11% for the UAE. However, the proportion of food imports from SSA is notably lower than that of food exports, with SSA accounting for only 4.7% and 4.8% of Oman and the UAE's food imports, respectively. Conversely, the remaining GCC states have minimal food trade ties with SSA.

Strengthening diplomatic relations between states is crucial for enhancing trade, particularly in the agricultural sector. This is especially challenging in agriculture, where political interference in international trade is more common compared to other sectors.<sup>23</sup> Establishing robust political ties is essential because international companies encounter numerous risks in foreign markets.<sup>24</sup> Political risks often emerge in the absence of strong political bonds between countries, potentially hindering international trade.

**Figure 8: Share of SSA in total food trade with the GCC member states (2021)**



Source: WITS data

## Conclusion and Recommendations

Trade significantly influences food security by impacting incomes and expenditures. A nation's openness to international trade and foreign direct investment plays a crucial role in optimising resource allocation for food production, maximising real incomes, and minimising fluctuations in domestic food prices and trade quantities. This trade openness has distinct implications for the key dimensions of food security.

The direct impact of trade on food availability is evident as imports contribute to the overall domestic food supplies. Embracing open trade can enhance nutrition by providing better access to a diverse range of food options, thereby improving the overall quality of food baskets. The primary objective of this Insight is to examine the impact of bilateral flows in terms of food trade between the UAE and Africa, and how this affects food security in the UAE. The Insight utilises descriptive and graphical analyses of the bilateral international flows between the UAE and Africa and their implications for food security in the UAE.

Ensuring food security in the UAE necessitates a focus on several key strategies. First, the UAE should pursue agricultural economic diplomacy by fostering collaboration with African nations to cultivate food for domestic consumption and potential export. This entails expanding agricultural investments across African regions abundant in arable land and water resources. These investments will prioritise the production of agricultural commodities like rice, wheat, maize, and other cereals that may not be sustainably viable domestically but are essential for export to the UAE.

Historical examples include initiatives like the Rahad Scheme in Sudan, where the UAE had acquired extensive farmland and invested in irrigation infrastructure.<sup>25</sup> More recently, it was reported that the UAE has concluded 56 land acquisition deals, with major land concentrations in Africa.<sup>26</sup> Such agricultural ventures will not only enhance agricultural productivity in African countries but also yield mutual benefits of ensuring food security for both the UAE and Africa.

Second, the UAE needs to adopt a strategic approach to its production and international trade policies. It should leverage its comparative advantages in agricultural commodity production in exchange for food products in sectors where it faces comparative disadvantages.

Third, signing free trade agreements with African nations could prove crucial in reducing tariffs and non-tariff barriers that are more endemic in the agricultural sector. Developing strong diplomatic relations between the governments of the UAE and African countries will also facilitate the optimal utilisation of market access opportunities that will be offered by trade agreements.

Fourth, urban food production stands out as a transformative innovation capable of bolstering food security and mitigating climate change. Traditional agricultural farming that uses more inputs will not be economically feasible and ecologically sustainable in the case of the UAE. By maximising output, productivity and efficiency, urban farming not only enhances food production but also addresses climate change concerns.<sup>27</sup>

Furthermore, urban farming plays a vital role in climate change adaptation by promoting environmental sustainability. Through the efficient reuse of urban organic waste, it contributes to reducing the carbon footprint of cities, making them more ecologically sound. An example of modern agricultural technology in the UAE is indoor farming by firms like Aranya Farms and Pure Harvest Smart Farms, although currently on a limited scale.<sup>28</sup>

Finally, the UAE government must prioritise the development of agricultural methods resilient to the adverse impacts of climate change. This entails leveraging technology to enhance productivity while conserving scarce resources like land and water.

## Endnotes

1. <https://www.mofa.gov.ae/en/mediahub/news/-2022-10-24/24/10/2022uae>, accessed on April 2024 ,3.
2. Guéraiche, W. (2022, May). Between Foreign Policy and Development Assistance: The UAE International Cooperation in Africa. In Forum for Development Studies (Vol. 49, No. 2, pp. 232-211). Routledge.
3. Wiggins, S. (2014). African agricultural development: Lessons and challenges. *Journal of Agricultural Economics*, 556-529 ,(3)65.
4. UAE Ministry of Climate Change and Environment (2023). A guide to food security in the UAE.
5. Dur-Gundersen and Al Suwaidi, K. (2024). Potential for the UAE as a model for coordinating GCC-wide economic diversification. Anwar Gargash Diplomatic Academy, UAE.
6. Walsh, B. (2018) Middle Eastern investment in Africa: A means to improve food security.
7. UAE Ministry of Climate Change and Environment (2023). A guide to food security in the UAE.
8. Walsh, B. (2018). Middle Eastern investment in Africa: A means to improve food security.
9. Fischbach, T. (2018). Strengthening resilience: Advancing food security in the UAE.
10. UAE Ministry of Climate Change and Environment (2023). A guide to food security in the UAE.
11. Fischbach, T. (2018). Strengthening resilience: Advancing food security in the UAE.
12. [https://impact.economist.com/sustainability/project/food-security-index/resources/Economist\\_Impact\\_GFSI\\_2021\\_Global\\_Report\\_Oct\\_2021.pdf](https://impact.economist.com/sustainability/project/food-security-index/resources/Economist_Impact_GFSI_2021_Global_Report_Oct_2021.pdf)
13. Janssens, C., Havlík, P., Krisztin, T., Baker, J., Frank, S., Hasegawa, T., ... & Maertens, M. (2020). Global hunger and climate change adaptation through international trade. *Nature Climate Change*, 835-829 ,(9)10.
14. Himics, M., Fellmann, T., Barreiro-Hurlé, J., Witzke, H. P., Domínguez, I. P., Jansson, T., & Weiss, F. (2018). Does the current trade liberalization agenda contribute to greenhouse gas emission mitigation in agriculture? *Food policy*, 17. 129-120 ,76.
15. Al-Maamary, H. M., Kazem, H. A., & Chaichan, M. T. (2017). Climate change: the game changer in the Gulf Cooperation Council Region. *Renewable and Sustainable Energy Reviews*, 576-555 ,76.
16. The Global Economy (2020). Business and economic data for 200 countries. Access from <https://www.theglobaleconomy.com/rankings/precipitation/Sub-Sahara-Africa/>
17. <https://www.aljazeera.com/news/25/4/2024/scientists-say-oman-uae-deluge-most-likely-linked-to-climate-change>, accessed April 2024 ,2.
18. <https://www.weforum.org/agenda/04/2024/africa-gcc-gulf-economy-partnership-emerging/>, accessed on April 2024 ,29.
19. <https://impact.economist.com/sustainability/project/food-security-index/explore-countries/united-arab-emirates>
20. Afesorgbor, S. K., Fiankor, D. D. D., & Demena, B. A. (2024). Do regional trade agreements affect agri-food trade? Evidence from a meta-analysis. *Applied Economic Perspectives and Policy*, 759-737 ,(2)46.
21. <https://www.bilaterals.org/?uae-aims-to-conclude-more-cepas>
22. Woertz, E., & Keulertz, M. (2015). Food trade relations of the Middle East and North Africa with tropical countries. *Food Security*, 1111-1101 ,7.
23. Afesorgbor, S.K. and Beaulieu, E. (2021). Role of international politics on agri-food trade: Evidence from US-Canada relations, *Canadian Journal of Agricultural Economics*, 35-27 ,(1)69.

24. Afesorgbor, S.K. (2019). Regional integration, bilateral diplomacy and African trade: Evidence from the Gravity Model, *African Development Review*, 505-492 ,(4)31
25. Woertz, E. S. Pradhan, N. Biberovic and Jingzhong, C, Potential for GCC agro-investments in Africa and Central Asia. Gulf Research Center (GRC) Report. 2008a.
26. [https://www.fitchsolutions.com/bmi/agribusiness/gcc-food-security-uae-looks-land-acquisitions-trade-deals-and-domestic-agtech-mitigate-food-supply-risks2023-11-03-?fSWebArticleValidation=true&mkt\\_tok=NzMyLUNLSC03NjcAAAGTFG0v62XYT62TY0jdY8cYNVjG7h8gDUdNtN-TE1-9wUrEnsw0EqKszUiMYUfwsFO8PtMHvW9F6CBHTVtFGpJ7VYEsErVtsu9H9DNAu4Y6qFphywiu\\_Q?fSWebArticleValidation=true&mkt\\_tok=NzMyLUNLSC03NjcAAAGTRVmXy1JmZK8e48Tg-HRMseeHQxLXHxbzTZxmrr6tefvYMr0dqPE7ry8ejK5W3L9nsawEouG7J4HniLDDZc1Uz0Q3Ip\\_wX-P0AIMxf7JM6kroSi0z0w](https://www.fitchsolutions.com/bmi/agribusiness/gcc-food-security-uae-looks-land-acquisitions-trade-deals-and-domestic-agtech-mitigate-food-supply-risks2023-11-03-?fSWebArticleValidation=true&mkt_tok=NzMyLUNLSC03NjcAAAGTFG0v62XYT62TY0jdY8cYNVjG7h8gDUdNtN-TE1-9wUrEnsw0EqKszUiMYUfwsFO8PtMHvW9F6CBHTVtFGpJ7VYEsErVtsu9H9DNAu4Y6qFphywiu_Q?fSWebArticleValidation=true&mkt_tok=NzMyLUNLSC03NjcAAAGTRVmXy1JmZK8e48Tg-HRMseeHQxLXHxbzTZxmrr6tefvYMr0dqPE7ry8ejK5W3L9nsawEouG7J4HniLDDZc1Uz0Q3Ip_wX-P0AIMxf7JM6kroSi0z0w)
27. Sharma, R., Wahbeh, S., Sundarakani, B., Manikas, I., & Pachayappan, M. (2024). Enhancing domestic food supply in the UAE: A framework for technology-driven urban farming systems. *Journal of Cleaner Production*, 139823 ,434.
28. [https://www.fitchsolutions.com/bmi/agribusiness/gcc-food-security-uae-looks-land-acquisitions-trade-deals-and-domestic-agtech-mitigate-food-supply-risks2023-11-03-?fSWebArticleValidation=true&mkt\\_tok=NzMyLUNLSC03NjcAAAGTFG0v62XYT62TY0jdY8cYNVjG7h8gDUdNtN-TE1-9wUrEnsw0EqKszUiMYUfwsFO8PtMHvW9F6CBHTVtFGpJ7VYEsErVtsu9H9DNAu4Y6qFphywiu\\_Q?fSWebArticleValidation=true&mkt\\_tok=NzMyLUNLSC03NjcAAAGTRVmXy6YUKBoG51uwvg6R94gkFAh4P3s78gaY2nro7imwV5c-v0rsxSWdsGGAXTDdrs-KZGAZoKYVKNWejcpqPGMhMQxDZ5f8nK1cBofOBbXnvyuiog](https://www.fitchsolutions.com/bmi/agribusiness/gcc-food-security-uae-looks-land-acquisitions-trade-deals-and-domestic-agtech-mitigate-food-supply-risks2023-11-03-?fSWebArticleValidation=true&mkt_tok=NzMyLUNLSC03NjcAAAGTFG0v62XYT62TY0jdY8cYNVjG7h8gDUdNtN-TE1-9wUrEnsw0EqKszUiMYUfwsFO8PtMHvW9F6CBHTVtFGpJ7VYEsErVtsu9H9DNAu4Y6qFphywiu_Q?fSWebArticleValidation=true&mkt_tok=NzMyLUNLSC03NjcAAAGTRVmXy6YUKBoG51uwvg6R94gkFAh4P3s78gaY2nro7imwV5c-v0rsxSWdsGGAXTDdrs-KZGAZoKYVKNWejcpqPGMhMQxDZ5f8nK1cBofOBbXnvyuiog)