

# Reflection on Regional Integration and Food Security in Developing Sub-Saharan Africa Countries

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**Abstract:** Regional integration has significant potential for Africa, a vast continent with more than 1.2 billion people. However regional integration is posed to reassuring strong and equitable economic growth through markets, reducing violence, and improving trade liberalisation. These might combat challenges a continent faces with numerous tiny national markets and landlocked countries. Regional integration plays huge a role across different sectors. As a result, African governments have signed a relatively large number of agreements for regional integration, many of which have considerable overlap in their membership. Among the agreements is the Economic Commission for Africa that backs the Economic Community of West African States (ECOWAS), the Common Market for Eastern and Southern Africa (COMESA), the Economic Community for the Central African States (ECCAS), Southern Africa Community for Development (SADC) and eventually the Arab Maghreb Union as three regional integration initiatives (AMU). The rationale behind regional integration is an assumption to have an impact on economic growth by improving the economy's competitiveness, increasing industrialization, and offering better employment possibilities that reduce poverty in the region. Finally, for regional integration to be a success among African countries divisions need to be overcome to reduce restrictions of movement by people, investment, goods, services, and ideas through the regional integration area. These divisions have hampered economic progress, particularly in developing nations.

**Keywords:** Agreements, Community, Division, Economics, Poverty, Reduction, Security

## 1. INTRODUCTION

According to United Nations Food and Agriculture Organization (FAO) research, across sub-Saharan Africa[1,2], extreme food insecurity and nutritional insecurity affected around 153 million people in 2014-2015, or roughly 26% of the population aged 15 and older. What it means is that almost one in four people in sub-Saharan Africa over the age of 15 were undernourished, which means they were unable to eat or were unable to eat for a full day due to a lack of funds or other resources for food[3]. Lack of funds to purchase food or inputs for agriculture is most common in rural areas. Rural areas comprise 60% to 70% of farming households or smallholder farmers in most African countries.

Boliko (2019) therefore, alluded that these farming households or smallholder farmers play a major role in agricultural production (i.e. crop and animal). Despite providing the majority of the country's food, they are the group most at risk from hunger and poverty[2,4,5,49]. Smallholder farmers are therefore an essential starting point for agriculturally oriented interventions to enhance food and nutrition security[5]. In the last three years, a number of observational studies have evaluated the connections between agriculture and nutrition[2,7-10]. Nutritional security and food security depend on the type of crops that can be grown[10]. The amount harvested depends on inputs and on the amount of rainfall which has an impact on the year-round

availability of food. The incidence of livestock systems is also influenced by the agroecological circumstances, with agro-pastoral systems in dry regions and mixed crop-livestock systems in higher rainfall zones[11].

When linking farm and nutrition data, there are challenges because the temporal scales are consistently out of sync. Usually, assessments of food and nutrition security are made over very short time frames.

Environmental and economic factors, [4]such as climate shocks, conflicts, unemployment, low wages, and food price inflation, as well as a lack of access to and adoption of better technologies, as well as a lack of institutions, structures, and markets for farmers and consumers[12], have all had an impact on the state of food security and nutrition in developing countries[13].

The majority of African nations' current food systems have gotten worse. Conflict, climate change, and Covid-19-related circumstances have all been associated with declines. Therefore, cases of micronutrient deficiencies will decline as a result of availability to sufficient food[14]. Hunger has decreased in recent years. Iodine and vitamin A deficiency in pregnant women decreased along with malnutrition in children under five. Adults who are obese or underweight are less common[13]. People will thus be free from hunger and have improved conditions along with increased wealth[15]. The majority of constituencies are doing well to have extra

food for their citizens to accomplish SDGs 1 and 2, which are "zero hunger" and "no poverty [49]."

The state of cross-border trade in sub-Saharan Africa; informal cross-border trade is business done by small, unlicensed, vulnerable traders between neighboring nations[16]. Produce is typically moved between marketplaces close to the border as part of proximity trade. African trade is largely informal, small-scale, cross-border[17], and unregistered. Cross-border trade is crucial for the economic and social recovery of fragile and conflict-affected states (FCS),[18] since it enables vulnerable populations to reintegrate into society and access essential goods and services[19]. The economies of Sub-Saharan Africa have been indissociably connected for centuries. Trading has taken place across what are now borders on a regular basis between traders, frequently from the same ethnic group or family[20]. This has resulted in intense movements that make up a sizeable portion of trade on the continent. Cross border trade through regional integration is a solution to food security, nutrition security and adequate food[20-22- 23].

**Definition: Regional Integration**

The process through which two or more nation-states decide to cooperate and work closely together to create peace, stability, and wealth is known as regional integration[23]. Although it has typically taken the form of a political economy initiative where commercial interests are the focus for achieving more general socio-political and security objectives,[24] as defined by national governments, the agreement's objectives could range from economic to political to environmental. Either intergovernmental decision-making, supranational institutional structures, or a combination of both have been used to organize regional integration[25].

**Definition: Food Security**

"Food security occurs when all people, at all times, have physical and economic access to sufficient amounts of safe[26], nourishing food that satisfies their nutritional needs and food preferences for an active and healthy life,"[27]. That all people, at all times, have physical, social, and financial access to enough, safe, and nourishing food that satisfies their dietary needs and food preferences for an active life.

**Definition: Nutritional Security**

"A condition exists when all individuals, at all times, have physical, [11]social, and economic access to sufficient, safe, and nutritious food that fits their dietary needs and food preferences for an active and healthy life," according to the dictionary definition of nutritional security. In addition to food security, nutrition security also takes into account the systemic elements that affect a person's nutritional health. Access to important nutrients, not simply calories,[28] is the issue. In many developing nations malnutrition and increasingly overnutrition are still serious problems. Numerous potential exist to promote economic and pro-poor development through the promotion of nutrition security in an economical manner[29].

**Definition: Adequate Food**

The availability of food in an amount and quality sufficient to meet people's nutritional needs while being free of harmful ingredients is referred to as adequate food[29]. Pinstrip-Andersen [10] pointed out that adequate food is a condition to meet the need and good enough in their requirements; of a good or respectable quality. Adequate quality, but not better than acceptable Her initial performance was only passable[1,2,31].

## **2. Scope of Regional Integration**

Regional integration is basically concession in which a number of countries arrange for common objectives or goals such as trade, monetary policies among others. Regional integration, in its simplest form, is the union of separate states within an area into a bigger whole[23]. The readiness and commitment of independent sovereign states to share their sovereignty determines the level of integration[6]. Fleischer[54] and, Debroy and chakraborty[55] explains on how there are various challenges facing the deep integration that focuses on controlling the business environment more broadly.

Regional integration in developing countries can spearhead improved income through facilitating cross border trade of developing countries and food security[23]. It aid's economic growth by working towards achieving intended objectives and goals on trade markets[31]. Expectations of member countries have been: (a) Countries adhere to and implement agreed policies (b) rapid economic growth and improved welfare (food security)[33,34]. Previous attempts at regional integration have frequently concentrated on lowering trade barriers within the region, enhancing cross-border freedom of movement for people, capital, goods, and labor, lowering the likelihood of armed conflict within the region (for example, through Confidence and Security-Building Measures), [32]and adopting unified regional positions on policy issues like the environment, climate change, and migration.

The current global economic system includes agreements for regional integration, and this development is widely recognized as the international scene's direction for the future[35,36]. It now has a fresh perspective and new importance[26]. The need for nation-states to integrate their economies to promote rapid economic growth, reduce conflict, and foster mutual trust among the integrated units has mostly led to regional integration agreements.

Therefore, conferring to Ng'asike[17] African countries are frequently viewing closer economic integration among neighbors as the first step toward opening up a larger regional market for trade and investment. This is said to promote improved efficiency, productivity growth,[36] and competitiveness by cutting additional trade and investment costs and risks in addition to border barriers. Governments have promoted bilateral and sub-regional trade agreements as instruments for economic growth since they are meant to encourage economic deregulation[37,52]. These agreements also sought to lock in existing changes and promote additional

structural adjustment in order to lessen the possibility of a return to protectionism.

As a result, Regional Integration Agreements have become very significant. A large number of developing countries are also parties to at least one, and in some cases, many, of these accords, in addition to practically all of the industrialized countries[34]. The percentage of commerce that occurs under the purview of such agreements is over 35%, or more than one-third of all trade worldwide. Although the reduction of economic obstacles between the concerned countries is the primary goal of these agreements, their structures might differ. In many situations, the lifting of trade restrictions or the liberalization of many economies has increased the Gross Domestic Product (GDP),[24] but it has also increased global inequality, wealth concentration, and the frequency and severity of economic crises.

Previous studies by Bischoff[33] and evaluations have alluded that a developing country belonging to a regional integration of a particular region benefits from policies that are implemented such as removal or minimal tariffs on trade; by removal of unnecessary tariff hikes and cross border customs kept uniform[37]. The latter facilitates most of developing countries who cannot reach international markets and yet they are able to produce enough for instance Chad, Lesotho, Namibia, Malawi, and Niger to mention a few. Most of developing countries are unable to reach trade markets due to a dependence on one on one trade negotiations with superior states to them and this affect the impact on poverty[29,39].

What does the above paragraph entail? Regional integration can lead to food security and nutritional security in developing countries[39]. As regionalism reduces pressure on export tariffs and quotas among member states. As agreements push each member state to reach a certain level of trading on agricultural commodities accompanied by creating a favorable(niche) market for agriculture produce and other natural resources. For instance, if there is an outbreak of crop diseases or animal diseases efforts will be put together by member states curb the outbreak[41,42]; different interventions through improved technology and agricultural systems. Most of developing countries in Africa produce different agricultural products in excess and in that country they are abundant[43,44]. Abundance results in poor pricing (e.g. maize in Zambia, bananas in Uganda, beef in Botswana). Poor pricing of agriculture produce are not satisfactory to producers[29]. However, excess agriculture produce can fetch good pricing in neighboring countries provided cross border trade is favored.

### **3. Benefits of Regional Integration**

Regional integration aids nations in overcoming divisions that restrict the movement of people, capital, goods, services, and ideas. Economic progress is hampered by these divisions, particularly in developing nations. Economic growth is hampered by geographic divisions between nations, subpar infrastructure, and ineffective policies[44]. By connecting the markets for goods, services,[15] and factors, regional integration enables nations to get around these expensive

divisions, easing the movement of people, ideas, capital, energy, and goods. The geographic divisions between nations, inadequate infrastructure, trade, investment, and domestic regulations; infrastructure for energy, ICT, and transportation; financial and macroeconomic policy; the supply of additional common public goods (e.g. shared natural resources, security, education)[23,35, 36,46].

Africa will need to prioritize meaningful regional integration far more than it has in the past if it is to flourish, and it must decide that economic development takes precedence over political cohesion. Some nations Botswana, Rwanda, and others have made these decisions,[3] but in many cases, efforts to advance decent governance, sound economic policies, and the rule of law lag far behind.

According to World Bank (2016), the basis of regional integrational permits agricultural and industrial production across national boundaries. This would allow for economies of scale for investors, as well as the creation of much larger markets and new business opportunities for both small and large companies[33]. Additionally, it would aid in dismantling monopolies and improving cross-border spillovers between countries that are landlocked and coastal[22,46].

However Fleischer[54] integration can also boost regional security because growing international trade frequently results in less conflict. For Africa's tiny and fragmented economies, deeper market integration for commodities, infrastructure services, and essential production components (people and capital) is particularly crucial - both economically and strategically[36,45,47]. The African Continental Free Trade Area gained new momentum in 2018 after being ratified by African leaders. Regional integration has the potential to benefit both Africa and the rest of the globe greatly with the appropriate mix of ambition and practicality.

Ceasefire: In communities and/or countries with conflicts such as CAR, Ethiopia, Sudan, Mali and DR-Congo efforts have been made by heads of states to cease fire and dialogue with rebels. Heads of state in the aforementioned countries have made strides although others have been futile[47]. For instance in DR-Congo the national troops have sought aid from Ugandan government to fight the rebels to restore peace in some portions of the country[47].

### **4. Non-Benefits of Regional Integration**

Security: As countries join RTAs, they may see an increase in intra-regional commerce and investment as well as a network of beneficial connections and interdependence connecting them. This will probably increase trust, make war more expensive as an option, and lower the likelihood of international wars. RTAs may potentially exacerbate the tendency of industrial concentration in one or a small number of countries, which could lead to tensions between member nations if the consequence is more divergence than convergence. On the other hand,[6] RIAs may actually enhance intra-regional security by creating a culture of collaboration and systems to deal with problems of shared

interest. Cooperation may also include "shared defense" or reciprocal military aid, thereby boosting international security[3,22,35,49,50].

**Settle on domestic reforms:** In the absence of regional trade agreements (RTAs), a government may be able to pursue policies that improve welfare but are time-inconsistent by entering into RTAs (e.g. adjustment of tariffs in the face of terms of trade shocks, confiscation of foreign investment). An RTA must fulfil two requirements in order to function as a commitment mechanism. One is that the advantage of remaining a member outweighs the benefits of leaving and the worth of switching back to other policies[50]. The second is that the threat of punishment is legitimate. The best regional integration agreements provide as a mechanism for committing to trade policy. However, if I those policies or norms are defined in the agreement (deeper integration arrangements) and (ii) the underlying incentives have altered since the RTA's implementation, RTAs can also help to lock the country into micro and macroeconomic reforms or democratisation[51].

The cheap cost of leaving and the challenges of enforcing rules and punishing offenders may limit the efficacy of RIAs as a tool for shared commitment to a reform agenda[52]. One could argue that the degree of transparency of RIAs may help maintain macroeconomic policy rigour in relation to other macroeconomic changes (especially if the zone shares or target a common exchange rate).

**Signaling:** Although it is expensive to enter RTAs (political capital investment and transaction expenses), [48]a country may desire to do so to advertise its policy direction or approach or to convey certain economic underpinnings (industry competitiveness, exchange rate sustainability) in order to draw investment. This may be crucial for nations that struggle with consistency and legitimacy[38].

**Insurance:** RTAs can also be thought of as offering members insurance against potential risks (macroeconomic instability, terms of trade shocks, trade war, resurgence of protectionism in developed countries, etc.). The insurance argument may not be a crucial justification for regional agreements between developing countries because all nations are in the[26] "same boat." However, "insurance" may become a crucial justification for integration in the event of asymmetric terms-of-trade shocks (like the price of oil in Nigeria and the rest of ECOWAS).

**Coordination and negotiating strength:** Since countries are accustomed to a give-and-take strategy during negotiations under RTA norms, it may be simpler to coordinate policies inside these agreements than through multilateral ones[53]. RTAs may make it possible for nations to coordinate their stances, giving them at the very least more visibility and maybe more negotiating influence in multilateral negotiations (like those with the World Trade Organization, or WTO). The notion of collective bargaining power is particularly pertinent for the underdeveloped and fragmented countries within a sub-region. Instead of negotiating on a country-by-country basis,[54] it may assist countries build common stances and negotiate as a group, which would raise visibility,

credibility,[55] and potentially improve negotiation outcomes.

The study by Illegbe[47] expounds how heads of state have taken steps to halt hostilities and engage in discussion with rebels in communities and/or nations that are experiencing conflict, such as the CAR, Ethiopia, Sudan, Mali, and DR-Congo. Although some of their efforts have been ineffective, the aforementioned countries' heads of state have made progress. For instance, [38,54]in the Democratic Republic of the Congo, the government has asked Uganda for assistance in fighting the rebels so that peace can be restored in some areas of the country.

## CONCLUSION

In conclusion regional integration has an impact towards economic growth and food security of developing countries although its success depends on the relationship of countries and political stability. Change of government is problematic towards such interventions that would lead much into trade diversion and pulling out of some member countries from it as it the current situation with European Union BREXIT issue. In other ways regionalism could be a huge challenge to those countries who have less to offer on the market and decision on policies will favor the elite members. Even though, it can work out in regions with different policies as it has been proven or seen. It's quite tricky on food security promotion among member countries in that region; it's an issue on geographical locations, policy agreements, price harmonization is a problem and staple food for most developing countries differ and this doesn't guarantee poverty alleviation. "Food security and nutrition depend heavily on fostering resilience through peacebuilding initiatives. Protecting, preserving, and restoring agricultural livelihoods in times of armed conflict and protracted crises is essential to maintaining peace and stability and laying the foundation for long-term resilience. It is important to recognize the agriculture sector's crucial role in times of crises and to make the necessary investments.

## REFERENCES

- [1] M. C. Boliko, "FAO and the situation of food security and nutrition in the world," *J. Nutr. Sci. Vitaminol. (Tokyo)*, vol. 65, no. Supplement, pp. S4–S8, 2019.
- [2] S. J. Smyth, P. W. B. Phillips, and W. A. Kerr, "EU failing FAO challenge to improve global food security," *Trends Biotechnol.*, vol. 34, no. 7, pp. 521–523, 2016.
- [3] W. H. Y. R. Integration, "From the literature 3 and experience, some traditional and non-traditional gains from regional integration arrangements could be identified, including: 2.1 Traditional Gains from Regional Integration Arrangements," pp. 1–12, 2003, [Online]. Available: [https://sarprn.org/documents/d0001249/P1416-RI-concepts\\_May2005.pdf](https://sarprn.org/documents/d0001249/P1416-RI-concepts_May2005.pdf)
- [4] E. B. Barbier, A. Markandya, and D. W. PEARCE,

- "Sustainable agricultural development and project appraisal," *Eur. Rev. Agric. Econ.*, vol. 17, no. 2, pp. 181–196, 1990.
- [5] B. Turyasingura and P. Chavula, "Climate-Smart Agricultural Extension Service Innovation Approaches in Uganda," 2022.
- [6] A. A. Tinta, D. B. Sarpong, I. M. Ouedraogo, R. Al Hassan, A. Mensah-Bonsu, and E. Ebo Onumah, "The effect of integration, global value chains and international trade on economic growth and food security in ECOWAS," *Cogent Food Agric.*, vol. 4, no. 1, 2018, doi: 10.1080/23311932.2018.1465327.
- [7] K. E. Giller *et al.*, "The future of farming: Who will produce our food?," *Food Secur.*, vol. 13, no. 5, pp. 1073–1099, 2021.
- [8] P. P. Reddy, *Climate resilient agriculture for ensuring food security*, vol. 373. Springer, 2015.
- [9] M. F. Desire *et al.*, "Exploring food fortification potential of neglected legume and oil seed crops for improving food and nutrition security among smallholder farming communities: A systematic review," *J. Agric. Food Res.*, vol. 3, p. 100117, 2021.
- [10] P. Pinstrip-Andersen, "Food and agricultural policy for a globalizing world: Preparing for the future," *Am. J. Agric. Econ.*, vol. 84, no. 5, pp. 1201–1214, 2002, doi: 10.1111/1467-8276.00381.
- [11] C. F. S. HLPE, "Social protection for food security," *A Report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security*. HLPE Rome, Italy, 2012.
- [12] M. Abraham and P. Pingali, "Transforming smallholder agriculture to achieve the SDGs," in *The role of smallholder farms in food and nutrition security*, Springer, Cham, 2020, pp. 173–209.
- [13] E. B. Nchanji, C. K. Lutomia, R. Chirwa, N. Templer, J. C. Rubyogo, and P. Onyango, "Immediate impacts of COVID-19 pandemic on bean value chain in selected countries in sub-Saharan Africa," *Agric. Syst.*, vol. 188, p. 103034, 2021.
- [14] P. Caron *et al.*, "Food systems for sustainable development: proposals for a profound four-part transformation," *Agron. Sustain. Dev.*, vol. 38, no. 4, pp. 1–12, 2018.
- [15] S. J. Scherr, S. Shames, and R. Friedman, "From climate-smart agriculture to climate-smart landscapes," *Agric. Food Secur.*, vol. 1, no. 1, pp. 1–15, 2012.
- [16] M. D. Hanouz and C. Ko, "Enabling African Trade: Findings from the Enabling Trade Index," *Africa Compet. Rep. 2013*, p. 41, 2013.
- [17] O. P. Ng'asike, T. Hagmann, and O. V. Wasonga, "Brokerage in the borderlands: the political economy of livestock intermediaries in northern Kenya," *J. East. African Stud.*, vol. 15, no. 1, pp. 168–188, 2021.
- [18] N. O. Ama, K. T. Mangadi, and H. A. Ama, "Characterization of informal crossborder traders across selected Botswana borders," *Int. J. Manag. Mark. Res.*, vol. 7, no. 1, pp. 85–102, 2014.
- [19] D. G. Muga, "Effects of Informal Cross Border Trade On Growth of Women Entrepreneurial Businesses at the Busia Border." United States International University-Africa, 2018.
- [20] S. O. Oloruntoba, "Pan-Africanism, regional integration and development in Africa," in *Pan Africanism, Regional Integration and Development in Africa*, Springer, 2020, pp. 1–14.
- [21] B. Paul and Soprano, "Supporting Small Scale Cross-Border Traders across Africa," *Int. Cent. Trade Sustainable Dev.*, vol. 7, no. 4, pp. 4–5, 2018, [Online]. Available: [bralac.org/images/docs/13116/bridges-africa-june-2018-ictsd.pdf](http://bralac.org/images/docs/13116/bridges-africa-june-2018-ictsd.pdf)
- [22] P. D. Aluoch, "Complexities of informal cross border trade: Vulnerabilities and coping strategies among traders in Namanga, Kenya," *Unpubl. Master Diss. Int. Inst. Soc. Stud. Hague Netherlands*, 2014.
- [23] M. Leshoele, "Regional integration prospects, challenges and opportunities in Africa: A case of the tripartite free trade area," *Innov. Reg. Integr. Dev. Africa*, pp. 107–120, 2019.
- [24] D. Alusa, "Regional Integration and Food security in Eastern Africa," *J. Lang. Technol. Entrep. Africa*, vol. 1, no. 1, 2008, doi: 10.4314/jolte.v1i1.41767.
- [25] E. T. Aniche, "Post-neo-functionalism, pan-Africanism and regional integration in Africa: Prospects and challenges of the proposed Tripartite Free Trade Area (T-FTA)," *State Dev. post-independent Africa*, pp. 155–174, 2018.
- [26] P. Mkandawire and H. Nyantakyi-frimpong, *Regionalism, food security and economic development*, no. 23. 2014. [Online]. Available: <https://www.africaportal.org/publications/regionalism-food-security-and-economic-development/>
- [27] A. Y. Prosekov and S. A. Ivanova, "Providing food security in the existing tendencies of population growth and political and economic instability in the world," *Foods raw Mater.*, vol. 4, no. 2, pp. 201–211, 2016.
- [28] A. Gassner *et al.*, "Poverty eradication and food security through agriculture in Africa: Rethinking objectives and entry points," *Outlook Agric.*, vol. 48, no. 4, pp. 309–315, 2019.
- [29] M. van Dijk, "African Regional Integration: Implications for Food Security," pp. 1–29, 2011.
- [30] R. Pérez-Escamilla, "Food security and the 2015–2030 sustainable development goals: From human to planetary health: Perspectives and opinions," *Curr. Dev. Nutr.*, vol. 1, no. 7, p. e000513, 2017.
- [31] J. Okafor and E. Aniche, "Deconstructing neo-functionalism in the quest for a paradigm shift in African integration: Post-neo-functionalism and the prognostication of the proposed continental free trade area in Africa," *IOSR J. Humanit. Soc. Sci. Vol.*, vol. 22, pp. 60–72, 2017.

- [32] M. Leshoele, "AfCFTA and Regional Integration in Africa: Is African Union Government a Dream Deferred or Denied?," *J. Contemp. African Stud.*, pp. 1–15, 2020.
- [33] A. Ullah, C. Pinglu, S. H. Hashmi, and S. Ullah, "Nexus of regional integration, socioeconomic determinants and sustainable development in belt and road initiative countries," *PLoS One*, vol. 16, no. 7 July, pp. 1–29, 2021, doi: 10.1371/journal.pone.0254298.
- [34] P.-H. Bischoff, "The Politics of Regional Integration in Africa," in *Oxford Research Encyclopedia of International Studies*, 2021.
- [35] J. Ravenhill, "Regional integration and development in Africa: lessons from the East African Community," *J. Commonw. Comp. Polit.*, vol. 17, no. 3, pp. 227–246, 1979.
- [36] "15-06-2022\_08-11-57\_8598."
- [37] I. Moyo, "Migration and regional integration in Africa: Some critical disjunctures," in *Regionalism, Security and Development in Africa*, Routledge, 2021, pp. 60–73.
- [38] J. Brooks, "Development , Poverty Reduction Agricultural Policy Choices in Developing Countries : A Synthesis," no. November, pp. 15–17, 2010.
- [39] UNDESA, "Advancing an Inclusive Green Economy: Rationale and Context," p. 8, 2012.
- [40] P. Chavula, "A Review between Climate Smart Agriculture Technology Objectives' Synergies and Tradeoffs," *Int. J. Food Sci. Agric.*, vol. 5, no. 4, pp. 748–753, 2021, doi: 10.26855/ijfsa.2021.12.023.
- [41] N. Istudor, R. A. Ion, I. E. Petrescu, and A. Hrebenciuc, "Agriculture and the twofold relationship between food security and climate change. Evidence from Romania," *Amfiteatru Econ.*, vol. 21, no. 51, pp. 285–293, 2019.
- [42] M. S. Hossain, M. N. Islam, M. M. Rahman, M. G. Mostofa, and M. A. R. Khan, "Sorghum: A prospective crop for climatic vulnerability, food and nutritional security," *J. Agric. Food Res.*, vol. 8, no. March, p. 100300, 2022, doi: 10.1016/j.jafr.2022.100300.
- [43] V. Gitz, A. Meybeck, L. Lipper, C. De Young, and S. Braatz, "Climate change and food security: risks and responses," *Food Agric. Organ. United Nations Rep.*, vol. 110, pp. 2–4, 2016.
- [44] S. E. Barnekow and K. G. Kulkarni, "Why regionalism? A look at the costs and benefits of regional trade agreements in Africa," *Glob. Bus. Rev.*, vol. 18, no. 1, pp. 99–117, 2017.
- [45] A. Geda and H. Kibret, "Regional Economic Integration in Africa : A Review of Problems and Prospects with a Case Study of COMESA \* Regional Economic Integration in Africa: A Review of Problems and Prospects with a Case Study of COMESA Alemayehu Geda and Haile Kibret Introduction Regional integration initiatives in Africa have a long history , dating back to the establishment of the," 2002.
- [46] S. Kayizzi-Mugerwa, J. C. Anyanwu, and P. Conceição, "Regional integration in Africa: an introduction," *African Dev. Rev.*, vol. 26, no. S1, pp. 1–6, 2014.
- [47] A. Ikelegbe, "Civil society, oil and conflict in the Niger Delta region of Nigeria: Ramifications of civil society for a regional resource struggle," *J. Mod. Afr. Stud.*, vol. 39, no. 3, pp. 437–469, 2001.
- [48] L. Georgeson, M. Maslin, and M. Poessinouw, "The global green economy: a review of concepts, definitions, measurement methodologies and their interactions," *Geo Geogr. Environ.*, vol. 4, no. 1, 2017, doi: 10.1002/geo2.36.
- [49] J. Alcamo *et al.*, "Analysing interactions among the sustainable development goals: findings and emerging issues from local and global studies," *Sustain. Sci.*, vol. 15, no. 6, pp. 1561–1572, 2020.
- [50] C. Hall, T. P. Dawson, J. I. Macdiarmid, R. B. Matthews, and P. Smith, "The impact of population growth and climate change on food security in Africa: looking ahead to 2050," *Int. J. Agric. Sustain.*, vol. 15, no. 2, pp. 124–135, 2017.
- [51] F. Bushehri, "Green Economy In The Arab Region," 2012, [Online]. Available: [http://link.springer.com/10.1007/978-3-642-37018-2\\_1](http://link.springer.com/10.1007/978-3-642-37018-2_1)
- [52] W. Bank and C. International, "Regional integration dynamics in Africa," vol. 5, no. 4, 2016.
- [53] Ü. Sığırı, A. Kadir Varoğlu, U. Başar, and D. Varoğlu, "Information sharing in multinational peacekeeping operations," in *Information sharing in military operations*, Springer, 2017, pp. 183–200.
- [54] C. L. Fleischer, *Benefits and barriers: Outcomes of an emergent volunteer industry in Tanzania*. University of Colorado at Denver, 2014.
- [55] B. Debroy and D. Chakraborty, *The Trade Game: Negotiation Trends at WTO and Concerns of Developing Countries*. Academic Foundation, 2006.