

## Can technologically enabled ranching reverse the anti-development impacts of climate change-triggered farmers and pastoralists conflicts in Nigeria?

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### *An overview of the farmers—pastoralists conflicts*

The conflict between farmers and pastoralists in Nigeria is undoubtedly historical and protracted. The effects of climate change have only reinforced and added a new dimension to them. The farmers-pastoralists crisis is situated within the precinct of climate change-prompted competition for water and land resources orchestrated by the migration of pastoralists from the arid northern parts of Nigeria to the southern parts. Nomadic herders from the northern fringe and farmers' communities southward have had an age-long mutual relationship. Herders frequently settle in farming settlements and forge beneficial relationships with farmers to enhance their transhumance activities. They mutually ensure each other's livelihood protection, food security, and trade. The farm supplies pasture and crop feed for the herder's flock, while the flock produces manure to fertilize the farmer's crops. However, in recent years, this economic interdependence has largely been disrupted and replaced by the destruction of each other's means of subsistence through incessant violent conflicts over natural resources such as grazing land and water.

Furthermore, the destructive and horrible dimension of these disputes has caused economic adversity due to the interruption of farming and pastoral activities, which inevitably threaten food security and livelihoods, as well as negating poverty and hunger reduction, which are core sustainable development indicators. Farmers and herdsmen are critical to Nigeria's agricultural economy and food value chain. And their critical role in the agricultural economy, food value chain, and mutual coexistence is determined by their access to water and land resources. Therefore, it is imperative to offer modern technology-based suggestions for policy interventions to address the underlying causes of the conflicts while fostering stable livelihoods for both farmers and herders.

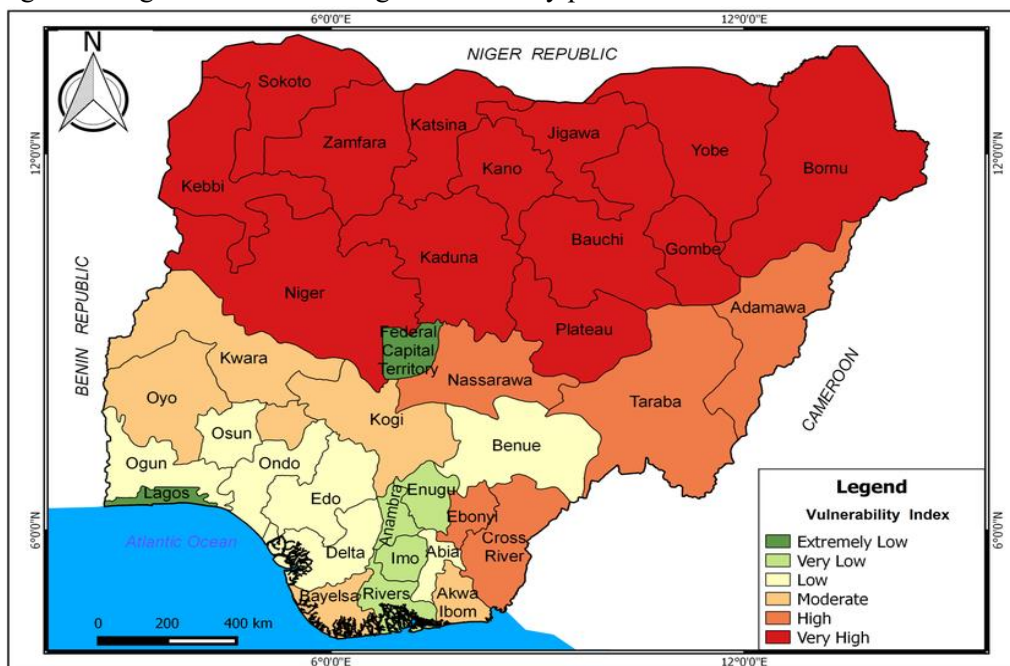
### **Climate change as a trigger**

As depicted in Figure 1 below, extreme droughts, shrinking resources, and desertification in Nigeria's arid northern areas threaten livestock herders' livelihoods, thereby making them adopt a severe strategy for livelihood protection and making dangerous transhuman migration southward inevitable. Roughly 35% of Nigeria's northern fringe states are becoming arid, posing an alarming threat to the livelihoods of about 15 million pastoralists. The scourge of desertification is devouring deeply into Nigeria's northern states of Bauchi, Niger, Gombe, Yobe, Kebbi, Zamfara, Sokoto, Katsina, Plateau, Kano, Jigawa, and Borno, afflicting them to the extent that the bodies of water and foraging fields are drying up. Farms, thus, become less fruitful than they previously were, and heatwaves continue to injure both humans and livestock with increasing levels of induced hunger and poverty.

This reality often triggers the migration southward of herders and their livestock, and the competition over scarce resources brings these herders and landowning farmers into intense conflict. The collision point for the farmers borders on the complaint that the herders' livestock destroy farmlands and cultivated crops therein, and that the biological and physical properties of the soil are significantly undermined by constant cattle overgrazing. Furthermore, invasive access to and pollution of communities' water sources also constitute another important trigger of such conflicts. Efforts to stop these by preventing cattle grazing often result in conflicts. For the herders, the triggers are cattle rustling by farmers' host communities, harassment of herders, commercializing crop residues, and blocking water sources and stock routes. The ensuing conflicts are often of a violent nature and often involve the rape and sexual assault of women, violations of cultural norms and values, and the destruction of livelihoods, properties, and food systems, amongst others. These are the primary consequences of herdsmen migrating southward due to climate change.

The impacts of conflicts are far-reaching in terms of sustainable development and Nigeria's internal security. In 2018, an estimated 300,000 people were displaced, while about 2500 lives were lost in 2016 and about 1300 in the first quarter of 2018 due to this conflict. To put things in perspective, this represents more deaths when compared to those connected to the Boko Haram insurgency. The Nigerian Security Tracker believes that herders carried out 478 attacks between 2012 and 2021 and killed about 3652 people during this timeframe. Though the presented statistics may not be very accurate, they allow us to imagine the gloomy nature of this conflict.

Figure 1: Nigeria's climate change vulnerability patterns



**Source:** Ignatius, A. M. (2016). Rurality and climate change vulnerability in Nigeria: Assessment towards evidence based even rural development policy.

*Sustainable development issues*

Nigeria is one of the African nations with the highest rates of food insecurity. Additionally, Nigeria's food security situation has worsened over the past fifteen years, partly due to the devastating conflicts between farmers and herders that intensely ravaged the nation between 2015 and 2018. Based on the disruption in the agricultural sector, labor scarcity, livelihood threat, malnutrition, displacement, and loss of income, there is a 13.4% increase in food insecurity. Farming and pastoralism are the most important livelihood and food security sources. Yet, both vocations have been impeded, and poverty and hunger are perpetuated in Nigeria by these adverse consequences of climate change, as pastoralists, crop farmers, and the ecosystems that determine their livelihoods are severely vulnerable and impacted by climate change, which is further exacerbated by socio-economic and political stresses in the country.

Development concepts—livelihood and food security—are both interrelated and significant in the poverty, conflict, and poverty reduction debate. While livelihood security means having the resources and capabilities to consistently meet basic needs sustainably and live above the poverty line, food security, according to the FAO, is sustainable access to quality food that meets nutritional requirements and food choices for healthy living. Access to quality food, land, water, housing, health, education, and community engagement are crucial indicators of livelihood security. Food security indicators are food availability, accessibility, usability, and stability. The worsening conflicts between farmers and pastoralists have continuously affected food security and livelihood indicators, thereby entrenching poverty, hunger, social injustice, and the disempowerment of vulnerable categories in the Nigerian landscape.

#### **How can technological innovation help?**

While transhumance activities pose a risk to pastoralists' and farmers' livelihoods and heighten conflict propensity due to the adverse effects of climate change, a sedentary lifestyle within the context of a technologically driven ranching system is pivotal to ending this conflict cycle and bringing transhumance ventures to their full potential in Nigeria, as it has been accomplished in Brazil, the United States of America (USA), Australia, New Zealand, Argentina, and Uruguay, just to mention a few. It also has enormous potential to eradicate poverty and ensure zero hunger in Nigeria by 2030 by increasing productivity and improving agri-businesses and livelihood protection in this regard. Nigeria's pastoral sector is not as profitable as one might expect. It contributes extremely little to Nigeria's GDP when compared to nations such as Israel, the USA, and the Philippines. This very low remission is attributable to the transhumance practice and ensuing conflicts with farmers. Cattle are made to travel great distances, and this profoundly affects both their milk production and beef quality.

Introduction of proper technology into pastoralists' livelihood endeavors to facilitate innovative ranching, adequate irrigation, soil fertility enhancement, livestock breeding, animal development, and genetic modification will prevent nomadism and conflicts. The potential to minimize pastoralists' risks and losses within this framework is incredible, up to lessening strain on the ecosystem by reducing overgrazing, allowing degraded pastures to recover, and decreasing the likelihood of conflicts between pastoralists and farmers.

To mitigate water scarcity and drought—adverse effects of climate change—technology-based solutions should include, but not be limited to, water storage technologies, canal irrigation, micro-irrigation technologies, drip irrigation, bubbler irrigation, micro sprinkler irrigation, fungal seed and plant treatment for water-related stress, stabilized silicic acid for drought tolerance, irrigation scheduling systems, and decision-support systems, planting technology for

increased water efficiency, water pads (water buffering technology), rainwater harvesting mechanisms, water desalination technologies, wastewater reuse, and portable sensors for groundwater detection.

In general, technical innovation is a critical factor in attaining the SDGs, particularly in areas of sustainable peace, livelihood protection, food security, poverty and hunger reduction, and the agricultural economy. The need for technology to lessen transhumance and its effects is becoming more and more prominent. Therefore, cutting-edge technology applied to all aspects of pastoral systems, including alternate water supplies, transportation, animal healthcare, digital animal identification, and satellite-based information systems on natural resources, markets, and livestock insurance, is essential in the context of these farmers and pastoralists conflicts in Nigeria.

Mfon, U. Y. (2023). Climate Change and Farmers-Pastoralists Conflict in Nigeria: A Development-Centered Analysis. In *Global Climate Change and Environmental Refugees: Nature, Framework and Legality* (pp. 121-136). Cham: Springer International Publishing; [https://trebuchet.public.springernature.app/get\\_content/38ebaf68-34e4-4665-bb16-16b47d9f71b7?sap-outbound-id=93BA973037661FF7E34E5ACFE63DA634FA31F8DD#page122](https://trebuchet.public.springernature.app/get_content/38ebaf68-34e4-4665-bb16-16b47d9f71b7?sap-outbound-id=93BA973037661FF7E34E5ACFE63DA634FA31F8DD#page122)