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GENDER, CLIMATE AND AI

Addressing the Triple Threats with AI: Economic Crises, Climate Change, and Civil Conflict

Introduction

Macroeconomic policies, climate change, and violent conflicts are interlinked. Poorly designed macroeconomic policies can exacerbate existing vulnerabilities and create new ones. When food prices rise due to reduced subsidies and poor agricultural productivity due to climate impacts, social unrest often ensues, particularly in regions where food insecurity is already prevalent. In this paper, we argue that Artificial intelligence (AI) offers novel possibilities for mitigating these issues and fostering economic stability and security.

Macroeconomic policies, including tax regimes, structural adjustments, and trade liberalization, aim to stabilize economies and foster growth but often overlook the informal economy. **In many countries in Sub-Saharan Africa, South Asia and Latin America, the informal economy is the actual economy, not the shadow economy**. The challenge often lies in capturing data from informal sectors characterized by cash-based transactions and unregistered businesses. For instance, in many African nations, a significant workforce operates in informal markets like street vending, which aren't reflected in official statistics, leading to ineffective tax reforms. Structural adjustment programs often disproportionately impact informal workers reliant on public services, as seen in Latin America where such adjustments increased informality. Similarly, trade liberalization can undermine local informal producers, as evident in Southeast Asia following 1990s trade agreements. AI can enhance policy frameworks by analyzing large datasets to understand informal economic activities. Machine learning can detect patterns from non-traditional sources like mobile transactions, offering richer insights for inclusive economic policies.

A critical aspect of macroeconomic policies is their effect on food prices. The reduction or removal of subsidies on essential goods can lead to higher food prices, worsening food insecurity in regions already suffering from climate change impacts. By leveraging AI-driven simulations and models, policymakers can predict the impact of policy changes on food prices and household purchasing power, enabling proactive measures to mitigate adverse effects. For example, AI can forecast price fluctuations and inform subsidy adjustments to stabilize food markets and protect vulnerable populations.

Climate change acts as a threat multiplier for negative externalities of macroeconomic policies, intensifying resource scarcity and civil unrest.

In regions heavily dependent on natural resources, such as water and arable land, climate-induced scarcity can lead to violent conflicts. The Sahel region of Africa exemplifies this, where competition over diminishing resources has fueled violent conflicts. Advanced AI algorithms enhance climate resilience by improving forecasting and early warning systems. AI can analyze climate data to predict extreme weather events and identify areas at risk, enabling timely interventions that minimize damage and resource scarcity.

Impacts of climate change, such as unpredictable weather patterns, prolonged droughts, and severe flooding, devastate agricultural productivity. In Sub-Saharan Africa, Latin America, and South Asia, agriculture is a primary livelihood for many. Disruptions in productivity due to climate change lead to reduced yields, pushing food prices higher. Small-scale farmers in the informal economy often lack financial resources for necessary inputs like improved seeds, fertilizers, and irrigation systems. Consequently, their productivity declines, exacerbating food insecurity and poverty. Precision agriculture, powered by AI, optimizes resource use and improves crop yields. Real-time data and insights from AI tools help farmers make informed decisions about planting, irrigation, and pest management, thereby increasing resilience to climate impacts.

The informal economy, operating outside regulatory frameworks are not often included in social protection programs and economic safety nets. **When negative externalities of macroeconomic policies and climate impacts converge, the informal sector is hardest hit, pushing people further into poverty and desperation**. **This creates fertile ground for recruitment into violent groups, perpetuating a cycle of conflict and instability**. AI improves social protection systems by identifying and targeting vulnerable populations more accurately. Predictive analytics can support the design of interventions that provide timely support to those in need, reducing the risk of social unrest and violence.

In many developing countries, the informal economy is the primary source of employment and income. For instance, in Sub-Saharan Africa, it constitutes approximately 85% of employment. Despite its significance, the informal economy is often marginalized in policy discussions and lacks protections afforded to the formal sector. **This lack of protection becomes problematic in the face of climate-induced shocks and poorly designed macroeconomic policies**. AI bridges this gap by providing policy-makers detailed insights into the informal economy, enabling more comprehensive and inclusive policy development.

The link between macroeconomic policies, climate change, and violent conflicts is evident in increasing social unrest and conflict in regions experiencing these pressures in Nigeria, Kenya and Bangladesh. When food prices rise due to reduced subsidies and climate-induced agricultural failures, resultant food insecurity can lead to protests and social unrest. In regions with existing vulnerabilities, such as high poverty rates and weak governance structures, these protests can quickly escalate into violent conflicts[1]. AI-driven conflict prediction models

identify early warning signs of social unrest and violence, allowing for timely interventions and conflict prevention strategies.

Climate change exacerbates these tensions by increasing competition over scarce resources. In the Sahel, for example, diminishing water and arable land resources have intensified conflicts between pastoralists and farmers. Competition for these resources, driven by climate change, creates a volatile environment where violent conflicts are more likely8. AI tools can support resource management by helping decision-makers optimize allocation and use of scarce resources, thereby reducing competition and conflict. For instances, predictive analytics of water usage per neighborhood can enhance water management systems, ensuring equitable distribution and efficient use, thereby mitigating tensions.

Conclusion

The informal sector's poor access to social protection programs in many countries means limited capacity to absorb and adapt to these shocks. When macroeconomic policies and climate impacts reduce livelihoods and increase poverty, individuals may be more likely to join violent groups as a means of survival. This perpetuates a cycle of conflict and instability, challenging sustainable development and peace12. The use of AI tools can facilitate individuals and groups adaptive capacity by providing tailored solutions for livelihood diversification and resilience building. By offering data-driven insights, AI would support communities to withstand economic and environmental shocks, promoting stability and development13.

Understanding and addressing linkages between macroeconomic policies, climate change, and violent conflicts is crucial for fostering resilient and equitable societies. By effectively mitigating these interconnected challenges, we can reduce the risk of instability and promote sustainable development. By leveraging AI technologies we can enhance policy design, predict and mitigate risks, and support vulnerable populations. These advancements can significantly contribute to a more stable, equitable, and sustainable future, ensuring that societies are better equipped to handle the complex challenges of our time.

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