DIGITAL PEACEBUILDING

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The Role of Blockchain in Reducing Violence related to Humanitarian Aid in Conflict Settings

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Executive Summary

Humanitarian aid can contribute to violence in conflict settings due to weak institutions, resource scarcity, and political manipulation. Blockchain can mitigate these challenges by reducing corruption through improved transparency of spending, increasing administrative efficiency, and expanding access through digital identity systems. However, its effectiveness is limited by data privacy risks, reliance on external verification processes, and low accessibility in fragile, low-connectivity environments. While blockchain can enhance aid delivery, must be implemented with robust data protection, verification processes, and context-sensitive design.

Introduction

Humanitarian aid allocation in conflict environments often provokes violence due to resource scarcity in settings where weak bureaucracy and corruption are prevalent. This can lead to unequal distribution and inefficient delivery. Blockchain can help reduce this violence by increasing transparency, allocation efficiency, and accountability. In this brief, we examine how blockchain can improve humanitarian aid allocation in conflict settings. We identify where it is most effective, where limitations remain, and provide recommendations for its responsible and context-sensitive use.

Humanitarian Aid

Humanitarian aid is the mitigation of human damage caused by armed conflicts, natural disasters and other disaster situations through the provision of assistance, relief and protection.[1] This includes the delivery of food, medical supplies, shelter, and cash-based transfers to support basic needs.

As of 2024, conflict drove the need for 80% of humanitarian aid and is the focus of this brief.[2] When delivered effectively, humanitarian aid facilitates peacebuilding by alleviating suffering and stabilizing communities.

The challenges in distributing aid vary depending on the stage of conflict. In active conflict,

1. European Union, "Humanitarian Aid," EUR-Lex, Summary of EU Legislation, 2016 .

2 UNICEF, "Not the New Normal: 2024 One of the Worst Years in UNICEF's History for Children in Conflict," 2024,

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aid becomes a political tool to further the agendas of aid donors which can fuel grievances, and contribute to violence.[3] In post-conflict settings, aid is often coditional on maintaining peace, but weak enforcement allows these conditions to be inconsistently applied or politically manipulated. [4]

Blockchain

Blockchain is a secure, decentralized and open system for verifying transactions. It removes the need for thir-party involvement in payment transfers through hash-linked payment records.

Blockchain has three defining elements: a distributed consensus protocol, a full, public history of transactions, and openness to anonymous users.[5] Each block contains a timestamp, transaction data, and the hash of the previous block. In humanitarian aid, it is used to deliver digital cash transfers, track the distribution of goods, and link assistance to digital identities.

Humanitarian Aid: A Cause of Violence?

Violence is most acute where institutions are fragile, resources are scarce, and distribution systems lack transparency and accountability. Humanitarian aid is delivered within these violent environments. As a result, aid becomes a highly contested resource and a bargaining tool due to high-stakes power dynamics. Weak institutional capacity, corruption, and political incentives shape how aid is allocated, often tying access to international relationships and local elite interests. The result is exclusionary distribution and misallocation, which shows how humanitarian aid can intensify grievances and contribute to outbreaks of violence.

"With enormous pressures to deliver relief quickly, the risks of corruption increase. Greater transparency and accountability in the aid process will not only minimise corruption; it will make relief efforts more effective."
— Roslyn Hees, Transparency International

Humanitarian Aid is Poorly Managed

During conflict, bureaucratic and administrative systems breakdown and remain weak even once the fighting is over. This can limit oversight and enable elite capture of aid. For example, political actors or armed groups may divert aid toward favored constituencies or embed it within existing systems of power.[6] Large inflows of aid can distort local markets and create dependency, weakening productive sectors and reinforcing instability.[7] In fragile economies, this can exacerbate poor living conditions and deepen grievances, contributing to ongoing conflict.

Aid is most effective in post-conflict settings characterized by open power structures, where multiple groups compete for influence and no single actor fully controls the state. In these environments, external resources can shift incentives, allowing aid to reward compliance with peace agreements and strengthen actors committed to stabilization.[8] In closed power systems, where authority is concentrated within a dominant group, those actors can capture resources and restrict distribution to reinforce their control, excluding other populations. In highly fragmented systems with no clear authority, aid is often less effective because there are no stable or legitimate counterparts to coordinate with, making delivery inconsistent, difficult to monitor, and more vulnerable to diversion. As a result, the impact of aid in post-conflict settings depends heavily on the underlying institutional structure, with open systems offering greater potential for aid to support durable peace.

Humanitarian Aid Enables Corruption

In post-conflict settings, aid is often conditioned to reduce corruption and address power imbalances between citizens and emerging political leaders. It plays a central role in shaping political power dynamics, for example through targeted allocation to vulnerable groups or through peace conditionality, where aid is tied to the implementation or maintenance of peace agreements to incentivize cooperation. In practice, accountability mechanisms are weak, meaning these conditions are inconsistently applied and aid can be politically manipulated, undermining efforts to consolidate peace.[9] For example, aid can enable governments to reallocate extra resources toward military

3 P. Paul Collier and A. Anke Hoeffler, "Aid, Policy and Peace: Reducing the Risks of Civil Conflict," Defence and Peace Economics 13, no. 6 (2002): 435–450.
4 J. K. James K. Boyce, "Aid Conditionality as a Tool for Peacebuilding: Opportunities and Constraints," Development and Change 33, no. 5 (2002): 1025–1048.

5 Lorenzo Ghiro et al., "A Blockchain Definition to Clarify Its Role for the Internet of Things," in 2019 19th Mediterranean Communication and Computer Networking Conference (MedComNet) (IEEE, 2021)
6 J. Jonathan Goodhand, "Aiding Violence or Building Peace? The Role of International Aid in Afghanistan," Third World Quarterly 23, no. 5 (2002): 837–859.
7 Daniel Strandow, Michael G. Findley, and Joseph K. Young, Foreign Aid and the Intensity of Violent Armed Conflict, AidData Working Paper 24 (May 2016
8 J. K. James K. Boyce, "Aid Conditionality as a Tool for Peacebuilding: Opportunities and Constraints," Development and Change 33, no. 5 (2002): 1025–1048
9 Y. S. Andrew Tan and Johan von Schreeb, "Humanitarian Assistance and Accountability: What Are We Really Talking About?" Prehospital and Disaster Medicine 30, no. 3 (2015): 264–270.

spending, prolonging violence by sustaining war economies and reducing the pressures that might otherwise force the conflict to end.[10]As a result, aid continues to influence which groups gain resources and legitimacy in the post-conflict environment.

Humanitarian Aid is Politically Dependent and Leads to Exclusion

International and domestic political incentives have a significant influence on how aid is distributed; allocation often reflects strategic interests rather than need.[11] These dynamics are most acute in active conflict, because aid becomes a valuable and contestable resource. For example, evidence shows that aid is more likely to be directed toward regions aligned with political leaders or dominant ethnic groups rather than those in greatest need, with allocation often favoring leaders' birth regions and politically powerful groups, reinforcing existing power structures rather than addressing humanitarian need. Internationally, countries with strong economic allies tend to receive higher volimes of aid than those without. This can leave many people or countries underrepresented from receiving critical aid. This can lead to severe inequality which can increase tensions and sustain violence.

Case Study: Aid Distribution and Power Bias in Afghanistan

During the conflict in Afghanistan, humanitarian aid was delivered through local intermediaries, including regional commanders and political elites. This meant distribution was shaped by existing power structures rather than purely by need. Areas controlled by dominant factions or aligned with international actors received greater flows of assistance, while others were relatively excluded. Aid was frequently captured and redistributed by local elites to reinforce their authority, rewarding supporters and marginalizing rival groups. This allowed humanitarian resources to become embedded within the political economy of the conflict, functioning as a tool of influence rather than neutral relief.[12]

12 Goodhand, "Aiding Violence or Building Peace?"

Reducing Violence using Blockchain Technology

Blockchain can improve the quality of humanitarian aid by reducing the likelihood of corruption, streamlining administrative processes and enabling the inclusion of hard-to-reach groups. Improving these factors reduces the underlying causes of violence related to aid distribution in conflict zones.

Blockchain Reduces Corruption

Blockchain can reduce corruption by enabling more robust accountability measures through smart contracts. Smart contracts can have strict terms which only release funds when they are allocated towards pre-determined resources. This means that organizations and governments are held accountable if funds agreements are not honored.[13] Public ledgers enhance transparency by making transactions traceable. Once entries have been made, they are permanent which prevents information tampering. The ledger can be permissioned, allowing visibility to be restricted to certain actors which is important for maintaining data privacy protocols.

Despite these benefits, there is a clear trade-off: greater openness strengthens accountability, while restricted access may better protect sensitive data but weaken transparency.[14] This is problematic in humanitarian aid contexts because restricting ledger access can limit independent oversight, allowing powerful actors to control information, conceal misallocation of resources, and exclude vulnerable groups from receiving aid, which can reinforce existing inequalities and heighten tensions that contribute to violence.

Permanent ledger entries also make it difficult to correct mistakes or clearly link updates to original errors. Corrections are recorded separately rather than replacing incorrect data, which can create confusion, lock in misallocations, and make it harder to accurately redirect aid and risking the exclusion of vulnerable populations. Blockchain's technical capacity is still limited as blockchain itself cannot verify whether contract conditions are met – this still requires human verification meaning that corruption can shift to the verification stage. Local actors may falsify compliance, allowing diversion of aid to persist despite the appearance of transparency. Therefore, although blockchain can strengthen accountability mechanisms, it cannot solely, eliminate corruption risk.

10 Nathan Nunn and Nancy Qian, "US Food Aid and Civil Conflict," American Economic Review 104, no. 6 (2014): 1630–1666

11 Christian Bommer, Axel Dreher, and Marcello Perez-Alvarez. 2018. Regional and Ethnic Favoritism in the Allocation of Humanitarian Aid. CESifo Working Paper No. 7038. Munich: Center for Economic Studies and ifo Institute.

13 Aiste Rugeviciute and Afshin Mehrpouya, "Blockchain, a Panacea for Development Accountability? A Study of the Barriers and Enablers for Blockchain's Adoption by Development Aid Organizations," Frontiers in Blockchain 2 (2019)

14 Bernhard Reinsberg, "Blockchain Technology and the Governance of Foreign Aid," Journal of Institutional Economics 15, no. 3 (2019): 413–429

Blockchain Improves Administrative Systems
Blockchain systems can improve administrative efficiency related to aid allocation by preventing information asymmetry throughout the supply chain, enabling secure digital transfers and automation of fund allocation.[15] This eliminates the need for intermediaries, reducing transaction costs meaning that more money can be allocated to direct aid resources.[16]

Efficient systems reduce corruption which can reduce likliehood of political instability and the violence that this can cause. This cannot be implemented without risks, Blockchain will increase reliance on digital infrastructure which requires upskilling of staff, has high upfront costs to implement, introduces a need for secure data storage and increases exposure to cyberattacks.[17]

Blockchain Increases Inclusivity
Blockchain can increase inclusivity for hard-to-reach groups through decentralized digital identity systems, enabling access to financial services and aid where people lack traditional documents.[18] This is particularly beneficial for vulnerable populations such as women, who often face barriers to formal banking and documentation, and can also help prevent document falsification, reducing risks such as human trafficking and exclusion from aid.

While blockchain-based identity systems can improve inclusion, their effectiveness depends on careful design that balances accessibility, privacy, and security. Blockchain systems often store sensitive personal data in ways that are difficult to modify or delete, raising concerns about long-term data protection and misuse. In conflict environments, where data can be weaponized, exposure of identity or location information may increase vulnerability rather than reduce it. Aid recipients are frequently required to exchange personal data for access to services, creating risks of surveillance, misidentification, or exclusion if data is misused or misinterpreted. Effective use of blockchain-based identity systems depends on access to digital infrastructure which is often limited in crisis settings. Low digital literacy and lack of trust in digital systems can reduce uptake.

Blockchain: A Tool for Peace?
Overall, blockchain is best understood as a tool that improves the underlying systems through which aid is delivered rather than directly reducing violence itself. Its impact is indirect. It can reduce corruption, administrative efficiency and inclusion through enhanced accountability, automation, and service accessibility. While these improvements can help ease some of the pressures that drive conflict around aid distribution, they do not address the deeper political and economic dynamics at play. Blockchain can support more effective and equitable aid systems, but to meaningfully reduce violence, its success depends on careful implementation within broader governance frameworks.

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Recommendations:
There are four core recommendations to optimize the use of blockchain in humanitarian settings to lower the likelihood of violence.

- **Develop standardised verification protocols for blockchain aid systems:** Implement multi-actor validation processes in which NGOs, independent auditors, and trusted local partners verify that real-world conditions are met before transactions are recorded. This reduces reliance on single points of failure, strengthens accountability, and limits manipulation or false reporting within smart contract execution.

- **Establish robust data protection rules for recipients of aid and donors**: Implement clear

15 Moez Krichen et al., "Blockchain-Enabled Disaster Resilience: A Paradigm for Enhancing Transparency, Securing Funds, and Optimizing Aid Delivery," in 2025 International Conference on Applied Artificial Intelligence, Data Engineering and Sciences
16 Giulio Coppi and Larissa Fast, Blockchain and Distributed Ledger Technologies in the Humanitarian Sector (London: Overseas Development Institute, 2019)

17 Andrew M. Francis, Addressing the Ethics Concerns of Consent and Privacy in Humanitarian Cyberspace through Blockchain Technologies (Newport, RI: Naval War College, 2021)
18 Andrej Zwitter and Mathilde Boisse-Despiaux, "Blockchain for Humanitarian Action and Development Aid," Journal of International Humanitarian Action 3, no. 16 (2018)

governance frameworks defining who can access, store, and share data, with strict consent protocols and limits on data collection. Sensitive information should be encrypted, access should be permissioned rather than fully public, and systems should allow for data minimization to reduce exposure risks. This is particularly important in conflict settings, where misuse of personal or location data can increase vulnerability to surveillance, targeting, or exclusion.

- **Use blockchain to increase accountability in aid contracts** Smart contracts can create conditions for aid distribution which are appropriate based on the stage of conflict. Looser, rapid-disbursement mechanisms are best in active conflict to preserve humanitarian access. Stricter, conditional mechanisms in post-conflict settings e.g. peace clauses, support governance, reduce politicisation, and limit elite capture or diversion of funds.

- **Enable offline-capable, multi-channel ID and payment systems.** Combine blockchain-based digital IDs with traditional delivery mechanisms such as cash, vouchers, or physical cards to optimize inclusivity. This hybrid approach maintains access for digitally excluded populations but provides new options for vulnerable individuals such as those who do not have traditional identification documents or access to regular financial services.

Case Study: Blockchain payments in Jordan Azraq refugee camp

The World Food Programme's Building Blocks project, launched in 2017 in Jordan's Azraq refugee camp, is one of the largest blockchain applications in humanitarian aid. It was designed to make cash-based assistance to Syrian refugees more efficient by replacing traditional financial intermediaries. Instead of relying on external payment providers, refugees received aid through blockchain-linked digital accounts, accessed via biometric authentication (iris scans) at participating retailers. This enabled the processing of transactions to occur internally while maintaining a secure, tamper-resistant record of transfers which significantly reduced transaction fees and operational costs. The project demonstrates that blockchain can improve efficiency and transparency in aid delivery, particularly through streamlined transactions and reduced reliance on intermediaries. Its impact on corruption and power dynamics is uncertain, as it is dependent on centralized control, external verification, and raises ongoing concerns around data governance.[19]

19 Coppi and Fast, Blockchain and Distributed Ledger Technologies.