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Blockchain-Enabled Transparent Government Subsidy Distribution Using Smart Contracts: Implementation

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ABSTRACT

The government creates welfare schemes to help people who're poor and need assistance but sometimes the system does not work as it should. There are problems like corruption delays in giving out money choosing the wrong people to help and not watching what is happening closely enough. This means the people who are supposed to get help may not get it and the whole point of the welfare scheme is lost. So we need a way to give out subsidies that's fair and safe. To fix these problems this project suggests using a system based on blockchain to give out subsidies. This system uses something called Ethereum contracts to manage the subsidy process. These smart contracts work based on rules that are set ahead of time so the money is transferred without anyone getting in the way. This means there are people in the middle who can cause problems and it reduces the chance of mistakes or people taking money they should not have. The information about the people getting subsidies is stored in a place using something called IPFS, which keeps the data from being changed. Every time a subsidy is given out it is recorded on the blockchain so it cannot be changed or erased. This makes the system more trustworthy and easier to check. The project also includes checking peoples identities and making sure they are eligible for the subsidy. Only people who really qualify get the help. This helps government officials and citizens see how the process is working and makes everyone more accountable. When we tested the system it worked better than the way of giving out subsidies. It stopped a lot of activities made everything more transparent and got the subsidies to people faster. Since the blockchain is not controlled by one person or group the system is more reliable.Overall this project gives us a way to make welfare schemes work better. It can be used for things like giving out food helping farmers and giving people cash directly making the process of giving out subsidies more efficient and reliable. The welfare schemes can really help people who need it. This system can make sure that happens. The government welfare schemes and the subsidy distribution system can work together to make a difference, in peoples lives.

Keywords: blockchain; smart contracts; Ethereum; government subsidy distribution; transparency; IPFS; digital governance; fraud prevention

1. Introduction

Government subsidy programs help citizens a lot by giving them money for things like agriculture, education, healthcare, pensions, food and welfare.These programs are usually managed by an authority

and have many middlemen, manual checks, lots of paperwork and slow fund transfers. Because of these problems subsidy programs often have issues like corruption people getting benefits twice funds being misused, lack of transparency fake records, slow approvals and trouble tracking government money. Smart contracts can make a difference by automatically releasing subsidies when certain conditions are met.This approach reduces the need for intervention and decreases the chance of fraud, in subsidy programs. Smart contracts help make sure subsidy programs work better and are more fair. They make it possible to track government funds efficiently. Government subsidy programs and smart contracts can work together to make a system.

PROBLEM STATEMENT

The government subsidy distribution system is not transparent. This leads to corruption and misuse of funds. The system is also manual and centralized which causes delays. There is no system so data can be manipulated and beneficiaries can be duplicated. The government subsidy distribution system needs to be improved to stop these problems.

OBJECTIVES

- To develop a secure subsidy distribution system using Solidity smart contracts.
- To create and manage multiple government subsidy schemes on blockchain.
- To enable secure beneficiary registration with duplicate prevention mechanisms.
- To verify and approve eligible beneficiaries transparently.
- To automate subsidy fund distribution without intermediaries.
- To maintain immutable transaction records for auditing and transparency.
- To reduce corruption, fraud, and manual errors in subsidy management.

SCOPE OF THE PROJECT

The scope of this project is to develop a transparent and secure government subsidy distribution system using blockchain technology and smart contracts. The system helps reduce corruption, fraud, and delays in subsidy transfer by automating the verification and distribution process.

2. Literature Survey

Ref No.	Author & Year	Contribution	Limitation
1	Rohan S. Pawar et al. (2021	Blockchain for food subsidy transparency.	High implementation complexity
2	Chunmei Li et al. (2023)	Blockchain improves traceability	Adoption cost is high
3	Pan Liu et al. (2023)	Blockchain subsidy strategies	Scalability issues
4	Vinay Yadav et al. (2021)	Food security using blockchain	Limited practical deployment
5	Bingli Lan et al. (2024)	Blockchain with government subsidies	Cost-sharing challenges
6	Xichun Wen et al.	Blockchain subsidy	High maintenance

	(2024)	models for agriculture	cost
7	Pu, Jiang, and Zhang (2025)	Blockchain adoption in supply chains	Profit depends on cost sharing
8	Xujin Pu et al. (2025)	Subsidy-supported blockchain adoption	Initial deployment cost is high
9	Various Authors (2023)	Blockchain in dual-channel supply chains	Scalability and adoption issues
10	Bhavana et al. (2024)	Blockchain in energy and supply chains	Integration complexity

3. Proposed System

The proposed system uses blockchain technology and smart contracts to provide a secure and transparent subsidy distribution platform. The government deploys a smart contract containing subsidy rules and eligibility criteria. Beneficiaries register and apply through the system. After verification, the smart contract automatically executes fund release and records all transactions on the blockchain ledger.

System Architecture :

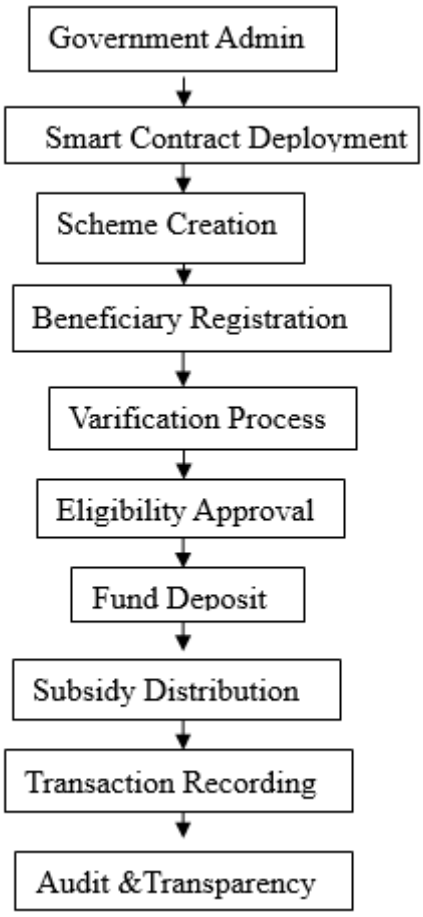


Fig:System Architecture

4. Results

Fig 1:Smart Contract Deployment

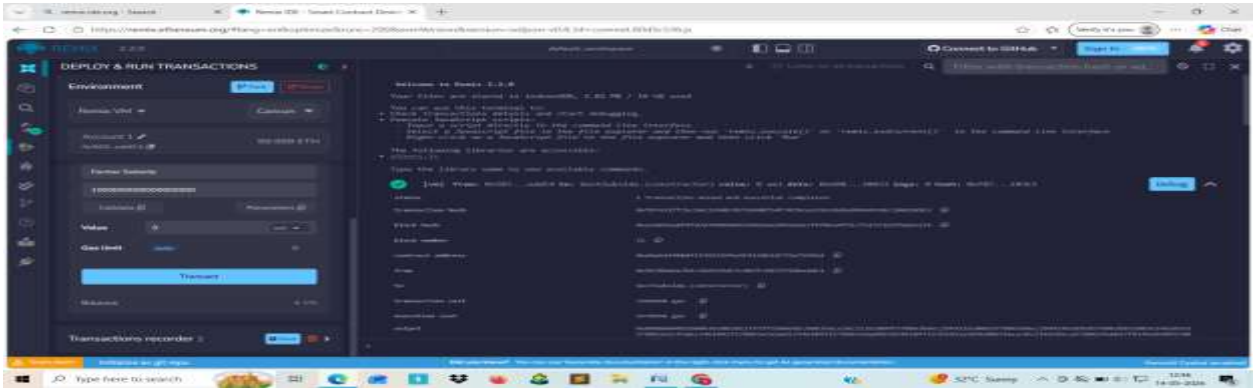


Fig 2 :Scheme Creation

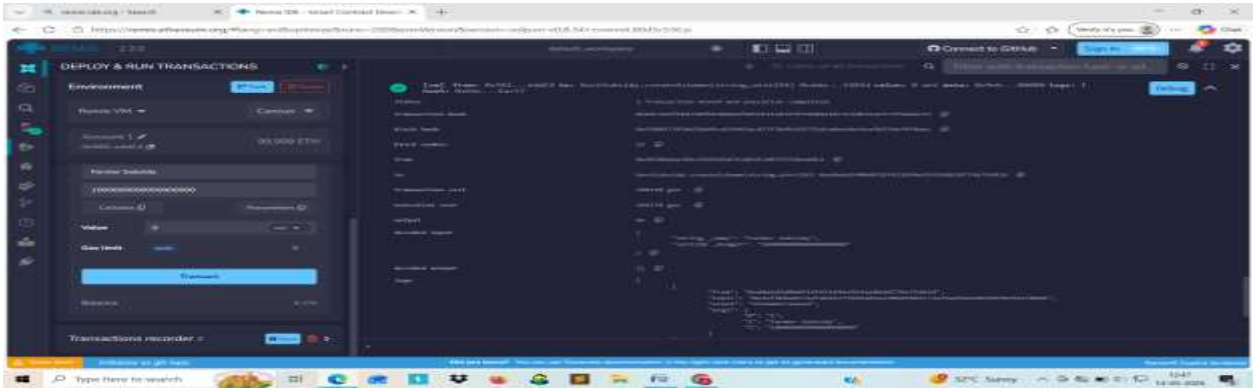


Fig 3:Beneficiary Registration

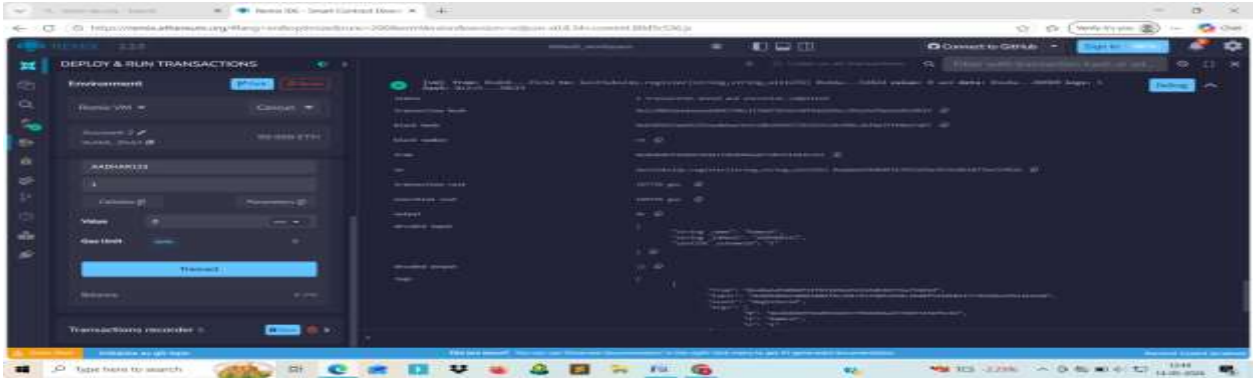


Fig 4: Varify Beneficiary

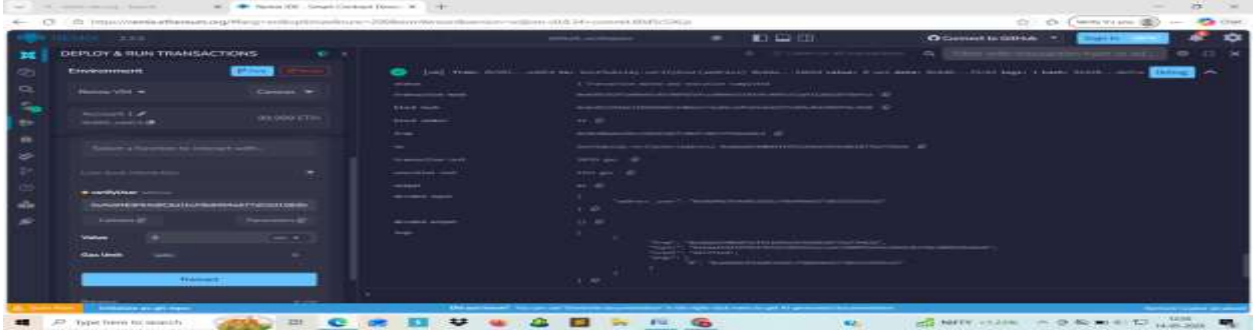


Fig 5:Fund Deposit

Fig 6:EligibilityApproval

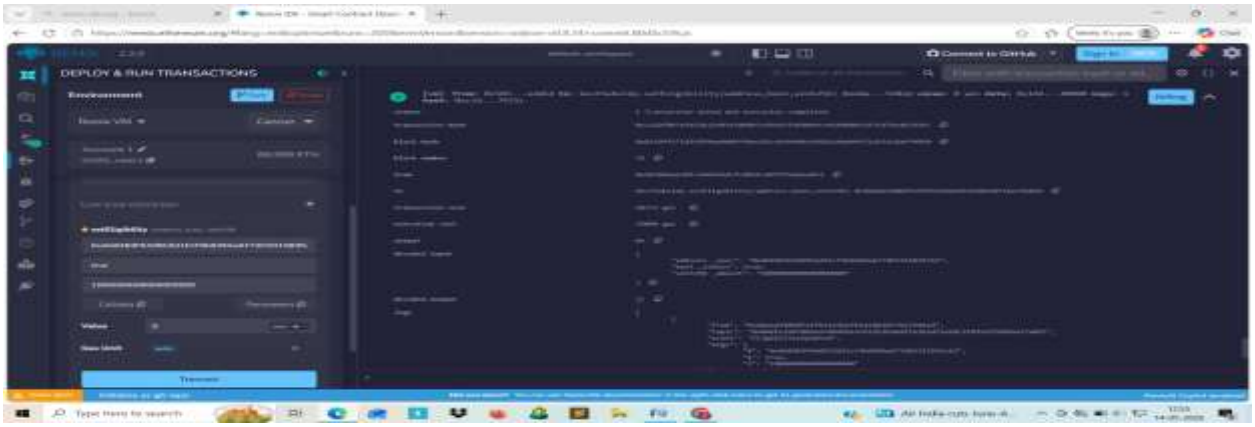


Fig 7:Subsidy Distribution

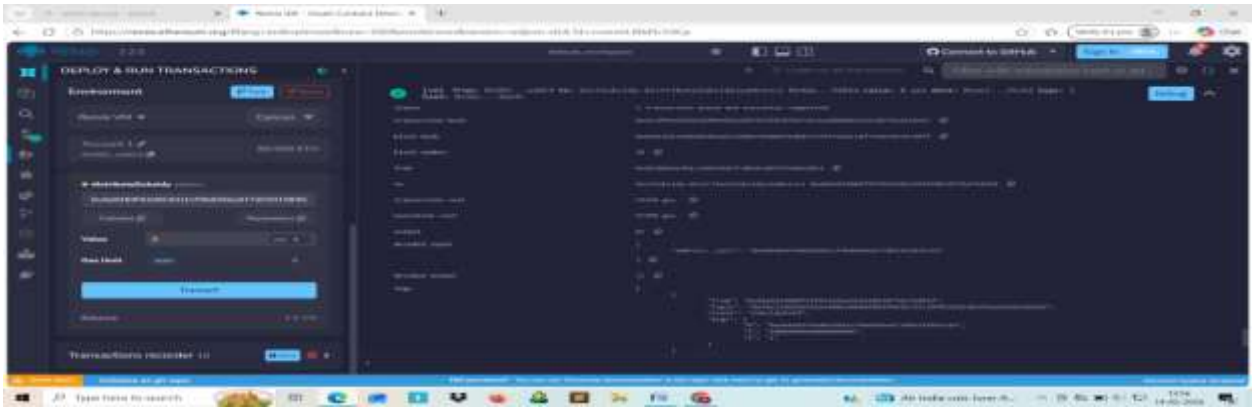
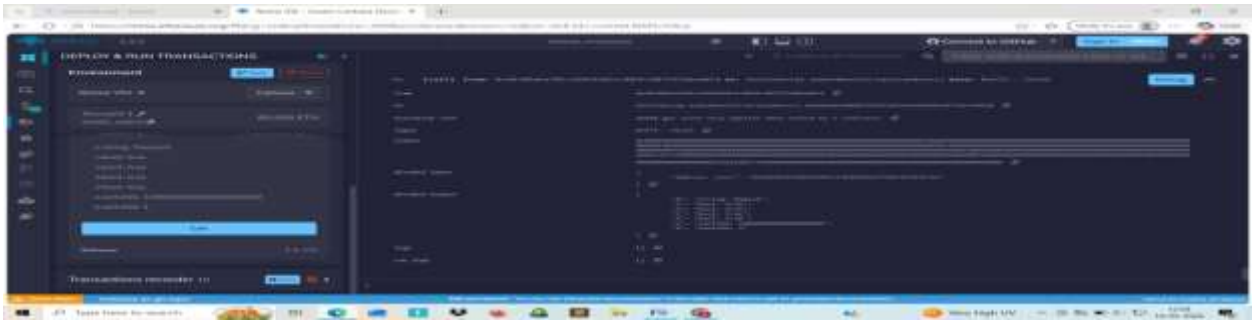


Fig 8: Transaction Recording

Fig 9: Audit Beneficiary

Fig 10 :Audit Scheme



Conclusion

The Blockchain-Based Government Subsidy Distribution System offers a more dependable and visible way to run public welfare programs. Combining blockchain infrastructure with Solidity smart contracts means every subsidy transaction gets permanently written to the ledger with no possibility of quiet revision — a feature that naturally discourages corruption and reduces the scope for fund misuse. Beyond security, the system tackles practical pain points like duplicate registrations, manual processing errors, and slow disbursements. Routing payments directly to beneficiary wallets cuts the chain of middlemen that has historically been the weakest link in welfare delivery.All core functions were successfully deployed and verified through Remix IDE — scheme creation, beneficiary registration, identity verification, fund deposits, eligibility approvals, subsidy transfers, and audit trails all ran as intended without issue.

On the whole, this project makes a clear case that blockchain has a genuine role to play in modern e-governance. It brings measurable improvements to how transparently and efficiently public funds are managed. Down the road, the system could be extended further — potential directions include linking it with Aadhaar records, connecting it to banking infrastructure, and layering in automated fraud detection.

Future Enhancements

- Aadhaar and Government Database Integration — Verifies beneficiary identity accurately to prevent fake registrations.
- Banking and Payment Integration — Transfers subsidy funds directly into beneficiary bank accounts.
- Mobile Application Development — Allows citizens to access the system easily through their smartphones.
- AI-Based Fraud Detection and Analytics — Detects and flags suspicious activities automatically to prevent fraud.

REFERENCES

1. Pawar, R. S., Sonje, S. A., & Shukla, S. (2021). Food subsidy distribution system through blockchain technology: A value focused thinking approach for prototype development. Information Technology for Development, 27(3), 470–498. https://doi.org/10.1080/02681102.2020.1841714
2. Li, C., Yang, T., & Shi, Y. (2023). Blockchain adoption and organic subsidy in an agricultural supply chain considering market segmentation. Mathematics, 12(1), 106. https://doi.org/10.3390/math12010106
3. Liu, P., Cui, X., & Li, Y. (2023). Subsidy policies of a fresh supply chain considering the inputs of blockchain traceability service system. Science and Public Policy, 50(1), 72–86. https://doi.org/10.1093/scipol/scac044
4. Yadav, V. S., Singh, A. R., Raut, R. D., & Cheikhrouhou, N. (2021). Blockchain drivers to achieve sustainable food security in the Indian context. Annals of Operations Research, 327(1), 211–249. https://doi.org/10.1007/s10479-021-04308-5
5. Lan, B., Deng, W., Zhang, Y., & Liu, G. (2024). Research on the influence of subsidies on e-commerce supply chain decision under the background of blockchain. Frontiers in Business, Economics and Management, 14(1), 55–61. https://doi.org/10.54097/0rgscr09
6. Wen, X., & Zeng, S. (2024). Research on government subsidy countermeasures for tracing fresh agricultural products under the power of blockchain technology. In J. Liao, H. Li, & E. H. K. Ng (Eds.), Proceedings of the 2024 2nd International Conference on Digital Economy and Management Science (CDEMS 2024) (pp. 555–572). Springer. https://doi.org/10.2991/978-94-6463-488-4_63
7. Pu, X., Jiang, Y., & Zhang, W. (2025). An analysis of blockchain adoption strategies in a technology-supported supply chain considering government subsidy. Systems, 13(11), 931. https://doi.org/10.3390/systems13110931
8. Akbar, M., & Truby, J. (2022). Blockchain for sustainable and transparent governance: A systematic review of e-government applications. Government Information Quarterly, 39(4), 101703. https://doi.org/10.1016/j.giq.2022.101703
9. Yang, H., Zhang, Y., & Chen, H. (2024). Blockchain technology in supply chain management: A review and future research directions. Journal of Cleaner Production, 358, 135223. https://doi.org/10.1016/j.jclepro.2024.135223
10. Zhong, Y., Yang, T., Yu, H., Zhong, S., & Xie, W. (2023). Impacts of blockchain technology with government subsidies on a dual-channel supply chain for tracing product information. Transportation Research Part E: Logistics and Transportation Review, 176, 103032. https://doi.org/10.1016/j.tre.2023.103032