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**Decentralized smart contracts-based platform
for agricultural supply chain**

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Abstract

Even though over 300 million people suffer from food insecurity, approximately 1.3 billion tons of agri-food will go to waste or be lost each year due to food supply chain inefficiency in the world. The total value of the global agri-food industry is \$5.98 trillion. Considering such a massive industry, small primary stakeholders are often missing out on the benefits of global value chains. Therefore, the necessity of solutions that can gain the efficiency of the food supply chain has been revealed.

Even though plenty of solutions can be found in the industry, most of the solutions are not sufficient enough to solve the problem. In addition, blockchain technology has been utilized widely considering the highlighting benefits such as transparency, reliability, immutability, and security. Nevertheless, many aspects of a blockchain-based system should be considered, including the cost and scalability issues that arise as the number of nodes in the agriculture sector rises.

The proposed solution targets this massive industry to enable stakeholders in the agri-food supply chain to create smart contracts through a decentralized platform. With the capabilities of blockchain, the solution will support all parties to make more secure and transparent contracts to make local and international trades efficiently and reliably. In addition, the solution will introduce a novel architecture for reducing the gas cost of blockchain-based solutions.

With the aim of establishing the accuracy of the proposed solution, an overall cost comparison testing has been performed to compare gas consumption of the platform with and without the optimized architecture. The total reduction of the cost has been presented below considering the cost of several assorted functionalities (actions) of the proposed solution.

	With optimized architecture	Without optimized architecture
Total gas cost spent for main actions for 10 repetitive queries	24,948,310	42,631,630