



ISSN: 0976-3376

Available Online at <http://www.journalajst.com>

ASIAN JOURNAL OF
SCIENCE AND TECHNOLOGY

Asian Journal of Science and Technology
Vol. 12, Issue, 09, pp. 11846-11848, September, 2021

RESEARCH ARTICLE

SUPPLY CHAIN MANAGEMENT IN ARGO MARKET BASED ON BLOCKCHAIN

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ARTICLE INFO

Article History:

Received 24th June, 2021

Received in revised form

24th July, 2021

Accepted 21st August, 2021

Published online 30th September, 2021

Key words:

Blockchain, Smart Contract, Supply chain, Cryptocurrency, Industry 4.0, Agro market.

ABSTRACT

The development of agrarian Economics started from the barter trade of village hut markets and taxation by their province rulers for the effective management of their estate finance for various financial and military obligations. Agriculture has been a core issue for the food security of every nation as the price discovery mechanism of the Agro market is especially connected with the primary market and indirectly to the manufacturing and service industry also. The Fiscal policy of subsidy and demand economics is the main issue for market availability in the global framework of WTO for every government and policymakers in the new economic order of the post covid19 Era. The IoT and Big Data with Blockchain can provide a practical solution to farmers Minimum support price by efficient utilization of resources and inputs. In this paper, we have discussed the Agro market in the context of blockchain and implemented Agro smart contracts in the era of modern Industry 4.0 technologies.

Citation: Manish Verma, 2021. "Supply chain management in Argo market based on Blockchain", *Asian Journal of Science and Technology*, 12, (09), 11846-11848.

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INTRODUCTION

With the starting of Human Civilization in irrigation and food were the two important events in the development of Agriculture independent of rainfall. Especially in Asia, Monsoon is a crucial factor for good Agriculture Harvest. The Agro market for the agricultural products and their fair valuation is the main issue for farmer profit and financial commodity markets price. Various Fiscal subsidy models and Agricultural institutes have from time to time review the profitable price to farmers in the globalization framework. But with the advent of industry 4.0 IoT-based technology and Big Data, the Agro market dynamics have changed for the post covid19 Era. The efficiency of the Agriculture and Agriculture Supply chain will be of paramount importance in this scenario. Thus, the Agriculture Ecosystem will be changed in the green renewable technologies. e., solar pumps, solar panels, wind etc in addition to IoT and Big Data consideration. The Supply chain management in the Argo market has been dynamically ever changing always from the industrial revolution era to date. [1-10]. Argo market: The consideration of adoption of central bank digital currency by major economies and pre-existing cryptocurrency ecosystem for the digital money compliance

for the global supply chain can be a grand game changer for the farmers of developing countries. This will lead to the formalization of the rural economy of African and Asian Agro markets for the good governance & behavioural Economic model. In surplus manpower employment in the agriculture sector with the emergence of Africa and Asia as emerging Agro-product suppliers to developed countries in the food security context of sustainable development goals of united nations. This can lead to the emergence of new Agro-based start-ups and the Agro-processing industry by the adoption of supply chain management based on blockchain with the creation of new jobs and providing customers with reliable suppliers of Agricultural produce and products. Thus win-win for both suppliers and customers of the blockchain market, be it multinationals Nestle or multi-retail stores or small businesses owners on the e-commerce platform of Amazon, Alibaba etc wholesale suppliers online. This will provide greater access to the markets to small businesses and farmers.

Supply chain management in Argo market based on Blockchain: Blockchain-based Supply chain management (SCM) in the Argo market has a smart contract in written solidity language. The Solidity Compiler 0.6.0 is used for "FW_Agro Supply" smart contract deployment in remix IDE as shown in Figure 1. The code for farm work agriculture supply is provided below section. It has two structs "primary source" and "farm Produce". It also many functions for getting quality and productivity as well as sending coins.

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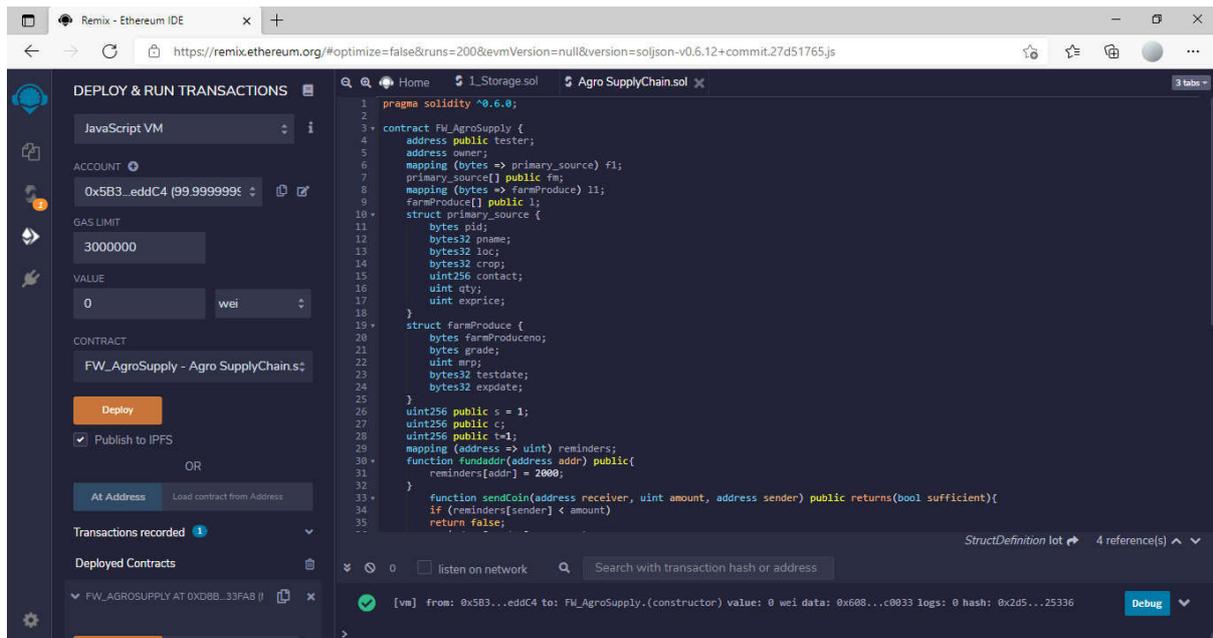


Figure 1. Snapshot of Smart Contract “FW_Agro Supply Chain” -Agro SupplyChain.sol

```

pragma solidity ^0.6.0;
contract FW_AgroSupply {
    address public tester;
    address owner;
    mapping (bytes => primary_source) f1;
    primary_source[] public fm;
    mapping (bytes => farm Produce) l1;
    farm Produce[] public l;
    struct primary_source {
        bytes pid;    bytes32 pname;    bytes32 loc;
        bytes32 crop;    uint256 contact;    uint qty;
        uint expdate;
    }
    struct farm Produce {
        bytes farm Produceno;    bytes grade;    uint mrp;
        bytes32 test date;    bytes32 exp date;
    }
    uint256 public s = 1;
    uint256 public c;
    uint256 public t=1;
    mapping (address => uint) reminders;
    function fundaddr(address addr) public {
        reminders[addr] = 2000;
    }
    function send Coin(address receiver, uint amount, address
sender) public returns (bool sufficient) {
        if (reminders[sender] < amount)    return false;
        reminders[sender] -= amount;
        reminders[receiver] += amount;
        return true;
    }
    function getReminder(address addr) view public
returns(uint) {
        return reminders[addr];
    }
    function produce(bytes memory id, bytes32 name, bytes32
loc, bytes32 cr, uint256 con, uint q, uint pr) public {
        f1[id] = fnew;        fm.push(fnew);
        s++;
    }
    function get produce (bytes memory j) public view
returns(bytes
memory,bytes32,bytes32,bytes32,uint256,uint,uint) {
        return
(f1[j].pid,f1[j].pname,f1[j].loc,f1[j].crop,f1[j].contact,f1[j].qty,
f1[j].expdate);
    }
    function farm Quality (bytes memory ll, bytes memory g,
uint256 p, bytes32 tt, bytes32 e) public {
        FW_Agro Supply. Farm Produce memory lnew=farm
Produce (ll,g,p,tt,e);
        l1[ll]=lnew;        l.push(lnew);
        t++;
    }
    function getfarm Quality(bytes memory k) public view
returns(bytes memory, bytes memory,uint,bytes32,bytes32) {
        return(l1[k].farmProduceno,l1[k].grade,l1[k].mrp,l1[k].testdate
,l1[k].expdate);
    }
}
FW_Agro Supply Chainat
0xd8b934580fcE35a11B58C6D73aDeE468a2833fa8

```

The Published FW_Agro Supply's Metadata details are given below

Published FW_Agro Supply's Metadata
Metadata of "fw_agrosupply" was published successfully.
Agro SupplyChain.sol :
dweb:/ipfs/Qmaj1UcF3JEnsKMgTgABwn3G9gnexnxNhHpwhu32HL3TKF
metadata.json :
dweb:/ipfs/QmU7r4Cezrvxe88WQLNuRdmvE5ACqNqMHT83AynhYghGeK

Transactions recorded 1 and All transactions in this environment can be saved and replayed in another environment. e.g., Transactions created in JavaScript VM can be replayed in the Injected Web3.

Advantage of Blockchain-based SCM in Agro market:

There are various advantages for Blockchain-based SCM in the Agro market. Some of these advantages are discussed in this section. The Blockchain-based SCM in the Agro market is less prone to risk in long term in the commodity market. The blockchain-based SCM being based on the consensus-based algorithm are tamper proof and unchangeable with a timestamp that is most suitable for hundreds of transactions per second. Blockchain-based SCM in the Agro market can be maintained P2P networks in real-time and are in distributed ledger with the possibility of Agriculture product insurance via immutable records.

Conclusion

The Agro Smart contract's successful implementation has been discussed. Blockchain-based Supply chain management in the Argo market is the immutable, tamperproof extremely reliable consensus-based solution to small farmers of post covid Era as it leads to fair price discovery for all stakeholders i.e., farmers and consumers in the context of IoT based Agro Ecosystem and Big Data-based Agro commodity markets. Hence, Blockchain-based Supply chain management in the Argo market will lead to more access to global markets by small farmers and corporate farming too.

Acknowledgment

The author is thankful to Dr. Namburi E. Prasad, Director DMSRDE, Kanpur for permitting this work.

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