

Indian Context for Block Chain in the Fisheries Value Chain

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SUMMARY

Blockchain technology has emerged as a transformative force across various industries globally, yet its potential in the fisheries sector remains largely untapped. This article explores the application of blockchain in the fisheries value chain within the Indian context. It delves into the types of blockchains, the intricacies of fisheries value chains, and the national blockchain strategy of India. The article also highlights the need for blockchain in fisheries, discussing how it addresses issues such as traceability, illegal fishing, efficient value chain management, and quality assurance. The potential benefits, challenges, and the ongoing initiatives in implementing blockchain in fisheries are analysed. The objective is to create a transparent, efficient, and sustainable fisheries value chain in India.

INTRODUCTION

Block chain is the new technology which was gaining popularity and was used in various sectors across the world. But it was not used extensively in Fisheries sector due to many challenges which were prevailing in the sector. So, here we can see the types of block chain and how it can be implemented in fisheries value chain and what are the challenges existing which prevents the implementation of the block chain technology in Indian context

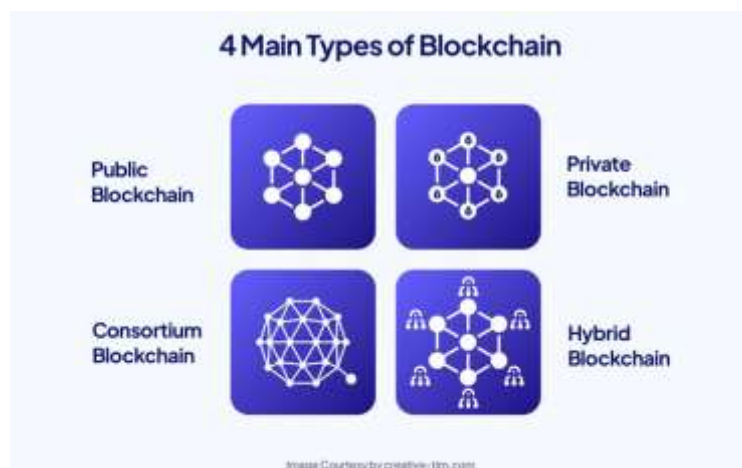
What do you mean by Block chain?

Blockchain is a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network (*IBM*) Blockchain is an innovative distributed ledger technology which was first introduced in the designing and development of cryptocurrency (Bitcoin) in 2009 by “**Satoshi Nakamoto**”.

Why do we need Block chain?

Blockchain is ideal for delivering **immediate, shared and completely transparent** information which was stored on an immutable ledger that can be accessed only by permissioned network members. A blockchain network can track orders, payments, accounts, production and much more

Types of block chain



(source-creative-tim.com)

Public -These blockchains are completely open to follow the **idea of decentralization**. They don't have any restrictions, anyone who have a computer and internet with good hardware can participate in this public blockchain.

Private – They are not as open as a public blockchain as they are open to some authorized users only and they are usually are **operated in a closed network** within a company or an organization.

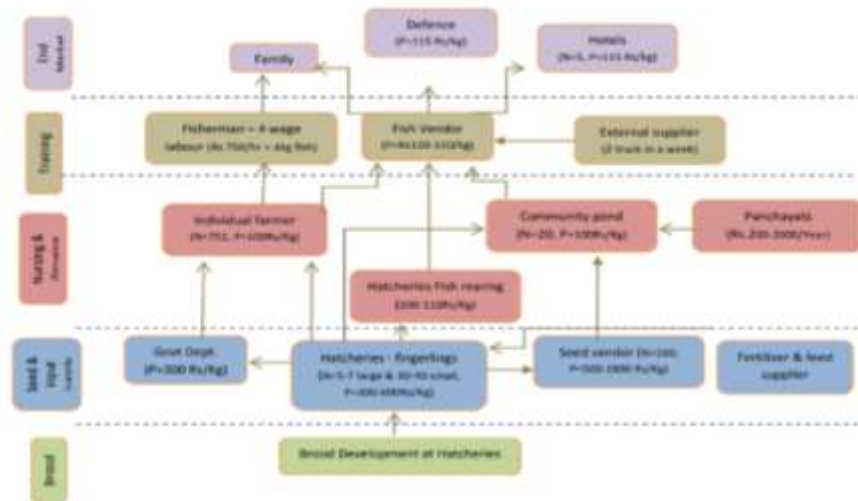
Hybrid blockchain- This type of blockchain technology combines elements of **both private and public blockchain**. It lets organizations to set up a private permission-based system alongside a public permissionless system, allowing them to control who can access specific **data stored in the blockchain**, and what data will be opened up publicly.

Consortium blockchain-Consortium blockchain is a private blockchain with **limited access** to a particular group, eliminating the risks that come with just one entity controlling the network on a private blockchain. also known as a **federated blockchain**, is similar to a hybrid blockchain in that it has private and public blockchain features

What do you mean by value chain?

The term value chain was first introduced by **Michael porter** in his book “**Comparative Advantage**” during **1985**. A **value chain** is the full range of activities that are required to bring a product or service from **its conception, increasing its value to the final consumers**. This includes activities such as design, production, marketing, distribution and support services. Value chains include local, regional and global markets (FAO)

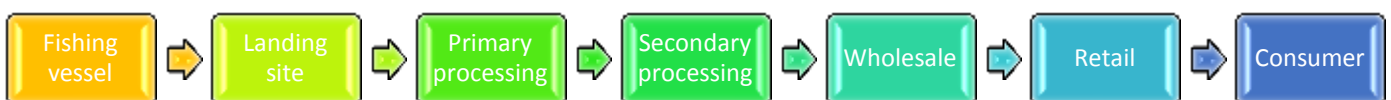
Value chain in terms of fisheries?



(source-Value chain management in fisheries)

(Inland value chain)

The value chain of inland fisheries (aquaculture) showed a varied chain. Generally, in aquaculture, the chain starts at hatchery i.e., brooding stage and followed seeding, nursery and growth, trading and finally reaches the final consumer



(source-Value chain management in fisheries)

(Marine value chain)

The fish value chain usually starts at harvesting stage at sea, and then the catch is brought to landing sites (centres). After processing, the fish is marketed by wholesalers to retailers and finally it reaches to the end users (consumers).

National block chain strategy of India

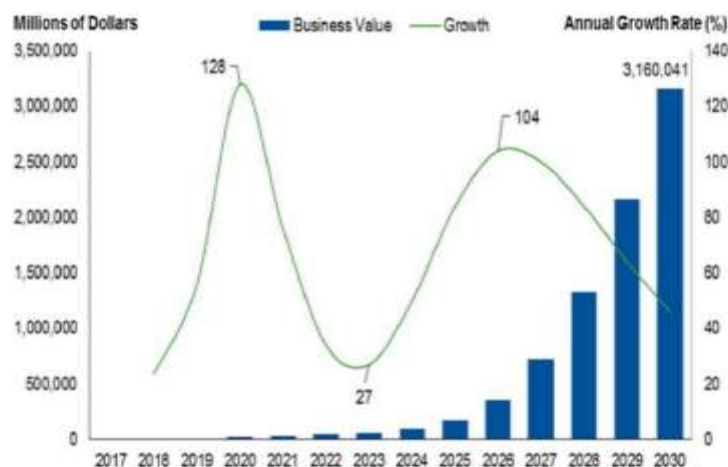
Ministry of Electronics & Information Technology have launched a national block chain strategy for India in 2021 with an aim towards “**Enabling Trusted Digital Platforms**” and to develop a proper block chain plan and technology in various sectors across India

Vision: To create trusted digital platforms through shared Blockchain infrastructure; promoting research and development, innovation, technology and application development; and facilitating **state of the art, transparent, secure and trusted** digital service delivery to citizens and businesses, thus making India a global leader in Blockchain Technology

Mission: Endeavour to evolve a vigilant and trusted collaborative digital ecosystem to provide a consensus based, **tamper-evident, transparent and open framework** for offering e Governance services to citizens and businesses involving multiple organizations in a participating environment assuring trust, security, track and trace, integrity and regulatory compliance

Block chain business value (2017 to 2030)

- Technology provides a platform for future economic development and possible growth which is worthy of valuation. Based on analysis, it shows that many new innovative companies will start to develop by using Blockchain technology and if any new business was created by using Blockchain technology it will gain a net worth of \$10 billion.
- By 2030, Blockchain will be used as a foundational technology to about 30% of the global customer base that will be made up of things, and these things will be used for conducting commercial activities. Based on the analysis, by 2025, Blockchain would add a business value that will grow to over \$176 billion. This would increase further to \$3.1 trillion by 2030



Forecast: Blockchain business value, worldwide 2017 -2030 (source: Gartner 2017)

Block chain in other fields in India

- Ministry of Electronics & information Technology has supported a multi-institutional project titled “**Distributed Centre of Excellence in Blockchain Technology**” with C-DAC, Institute for Development & Research in Banking Technology (IDRBT), Hyderabad and Veermata Jijabai Technological Institute (VJTI), Mumbai as executing agencies to develop block chain technologies across these cities.
- NeGD has released an **approach paper** on National Strategy for Blockchain which provides details about the Blockchain application domains, challenges in adoption of the technology, societal impact, role of the government and principles to guide national strategy and is currently working on **e-Attestation** using Blockchain for the State of Karnataka.
- **IIT Kanpur** is working on Blockchain technology focused on developing e-governance solutions. The project spans across three phases which comprises of **feasibility report** on the technology, **development of protocols**

and **research on validating** the property of tamper resistance which is prominently used in Blockchain and application development

- NITI Aayog is working on various Blockchain use cases. **NITI Aayog in collaboration with Gujarat Narmada Valley Fertilizers & Chemicals Limited (GNFC)** has developed a Blockchain based system for fertilizer subsidy. The application demonstrates the utilization of Blockchain features such as **tamper-proof and transparency** for efficient movement of fertilizer across the value chain and reduction of time to activate subsidy
- **Telangana and Tamil Nadu** have released the policy documents towards adopting the Blockchain technology. Telangana Government is also actively promoting the Blockchain technology
- IDRBT has released a **whitepaper** describing the roadmap for the adoption of BCT to banking and finance in India via 3 steps:
 - (a) **Intrabank**: A private Blockchain for the banks internal purpose
 - (b) **Interbank**: Implementation of Pocks and testing them;
 - (c) **Central bank**: For initiating suitable efforts towards digitizing the Indian Rupee through BCT

Why do we need block chain in fisheries value chain?

Fish and fish products are one of the main sources of protein in the human diet.

Traceability and transparency- Blockchain facilitates the tracking of fisheries products from their origin to the end consumer. By recording every step in the value chain on an immutable ledger, consumers can verify the product's authenticity and ensure its sustainability about its processing methods.

Illegal Fishing- Recording IUU fishing activities on a **transparent and immutable ledger** makes it easier to trace and identify any illegal, unregulated fishing methods and helps to easily monitor and enforce fishing quotas and regulations effectively

Efficient Value chain Management-Ability to automate and streamline processes can lead to an efficient value chain which helps us to **decrease delays, errors, and operational costs** by reducing paperwork, manual record-keeping, and intermediaries

Quality Assurance- Blockchain technology can be used to record relevant information such as **origin, handling practices, processing methods, value addition process, storage and transport** conditions at every stage across the value chain

Data Sharing and Collaboration - Blockchain enables secure and efficient data sharing among different stakeholders across the value chain which thus helps to improve **collaboration, coordination, and decision making** among fishermen, processors, distributors, regulators, and other participants across the value chain

Reduced Fraud and Counterfeiting -Blockchain's secure and transparent nature can reduce the risk of fraud and counterfeiting within the value chain. With **verifiable and tamper-proof records**, it becomes more difficult for any unauthorized parties to introduce fraudulent products into the market.

Consumer Empowerment - By providing information to the consumers about the seafood they purchase across the value chain, blockchain technology empowers them to make **informed choices** based on their preferences, ethical considerations, and health concerns.

Overall, the objectives of implementing blockchain technology in the Indian fisheries industry are interconnected and revolve around creating a more **accountable, efficient, and sustainable fisheries** value chain that benefits all stakeholders involved in it.

How to implement block chain technology in fisheries sector?

Identify the use case - A use case in this scenario is a **specific situation or problem that blockchain is able to solve in a more efficient manner** than other technologies. In terms of fisheries the main focus is to avoid the problem of **middleman** in the case of both marine and inland sector and to increase the transparency and traceability across the value chain in both sectors

Create a proof of concept- Include outlining the scope, designing the technical architecture, developing the prototype, and showcasing and analysing the finished prototype. Along these stages, there should be proper discussion and documentation of any issues or complications that arise in accordance to fisheries value chain we must develop a prototype linking different fishers, stakeholders, processors, and consumers across value chain and analyse their relation and position across the value chain

Choose a blockchain platform and consensus protocol, and design the architecture - Choose the correct type of block chain. Consensus protocol is nothing but a method that is utilized to gain trust, security, and agreement when dealing with a decentralized network. In accordance to fisheries value chain, we must gain confidence, trust and security among the different fishers, stakeholders, processors, retailers and consumers who were linked across the value chain by providing them a transparent information equal rights with a decentralized network.

Develop smart contracts - Smart contracts also allow for the creation of **decentralized apps (d Apps) and automated market makers (AMM)**, also known as decentralized exchanges. Smart contracts in fisheries value chain can be developed by creating an app or a network which enable fishers, stakeholders, processors, retailers and consumers who were linked across the value chain in both marine and inland sectors to **interact with apps or network and exchange tokens** and do so much more without any necessary role of middleman

Maintain and update the network - It is crucial to keep the network **up to date** in order to increase security, confidence among the different fishers, stakeholders, wholesalers, retailers and consumers who were linked across the value chain

Challenges in implementing block chain in fisheries sector

Lack of Trust Among Users - Since the network is decentralized, there is **no central authority** to confirm and verify the transactions. This is due to regulatory uncertainty and concerns about the capacity to interconnect business network

Lack of Financial Resources – Blockchain cannot be implemented cheaply and thus requires huge amount of capital investment

High Energy Consumption - Another issue with blockchain adoption is its **high energy consumption** as the majority of blockchains now on the market use huge power to store data across the value chain.

Poor Scalability - One of the most significant technological challenges is the **network's technical scalability**, which might impede adoption, particularly for public blockchains.

Lack of Security and Privacy - While blockchains are more secure than traditional computer systems, **hackers** can still compromise blockchain-based apps, systems, and enterprises.

Lack of Adoption - To function correctly, blockchains rely on widespread adoption. To implement track-and-trace capabilities in value chains, an organization would have to adopt a blockchain network across all the actors in the value chain

Skill Gap - Blockchain is still a relatively new technology, and the skills required to develop and use it are not known to many members.

CONCLUSION

In conclusion, blockchain technology presents a promising avenue for revolutionizing the fisheries sector in India. By ensuring traceability, transparency, and efficiency in the value chain, blockchain can address key challenges like illegal fishing, fraud, and inefficiencies. The national blockchain strategy of India underscores the commitment to leverage this technology for the greater good. However, challenges such as lack of trust, financial resources, energy consumption, scalability, and security need careful consideration. As various stakeholders in the fisheries industry collaborate and implement blockchain solutions, the potential for a more accountable, sustainable, and consumer-empowered fisheries ecosystem becomes increasingly achievable.

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