Inspira-Journal of Commerce, Economics & Computer Science (JCECS)
(A National bi-lingual Quarterly Double Blind Open Access Peer Reviewed Refereed Journal)
ISSN : 2395-7069(Print), Impact Factor: (Cosmos 7.650 & I2OR 5.120), Volume 12, No. 02(II), April-June, 2026, pp. 10-16

Vanswasthya Network: AI-Powered Tribal Health, Nutrition & Eco-Surveillance for One Health India

Mrs. Tanya R. Bhatia*

Assistant Professor, KCES's College of Engineering & Management, Jalgaon.

*Corresponding Author: tbhatia.coem@kces.in

Citation: *Bhatia, T. (2026). Vanswasthya Network: AI-Powered Tribal Health, Nutrition & Eco-Surveillance for One Health India. Journal of Commerce, Economics & Computer Science, 12(02(II)), 10–16.*

Abstract

India's tribal communities possess extensive indigenous knowledge systems related to medicinal plants, forest-based nutrition, and ecological balance. However, much of this knowledge remains undocumented and vulnerable to erosion due to socio-economic transitions, environmental degradation, and limited integration with formal healthcare systems. Concurrently, tribal regions face increasing health risks, including zoonotic disease outbreaks, nutritional deficiencies, and climate-sensitive illnesses. These interconnected challenges necessitate an integrated and technology-enabled health framework. This study proposes the VanSwasthya Network, a conceptual AI-enabled digital ecosystem designed to preserve tribal medicinal knowledge, strengthen nutrition security, and establish decentralized eco-health surveillance under the One Health paradigm. The proposed model integrates Artificial Intelligence for data analytics and outbreak prediction, Natural Language Processing for knowledge documentation, blockchain for secure and transparent intellectual property governance, and community-based participatory data collection mechanisms. The research adopts a conceptual and descriptive methodology using secondary policy reports, digital traditional knowledge repositories, and comparative analysis of conventional and digital health models. Findings suggest strong community acceptance of digital preservation initiatives when accompanied by ownership protection mechanisms. The integration of AI-driven analytics demonstrates potential to enhance early disease detection and environmental risk monitoring in forest-based regions.

Keywords: *One Health, Tribal Health, Artificial Intelligence, Blockchain, Eco-Surveillance, Indigenous Knowledge.*

Introduction

Tribal communities in India are the people who take care of ways of healing and healthy eating. They also know how to live in harmony with nature. These communities depend a lot on the forest for their health and food. They use things from the forest to stay healthy. They also eat food that is good for them.. There are big problems now. Many trees are being cut down fast. This is bad for the earth. The old ways of the communities are also being forgotten. They do not have access to computers and the internet like other people do. All these things are threatening the survival of the communities and their knowledge of old healing practices and healthy eating. Tribal communities in India and their knowledge are, in danger.

At the time we have new health problems coming up like diseases that spread from animals to people not having enough food and health issues caused by climate change. These health problems

show that we need systems that can watch everything together. The One Health approach is a way to do this because it looks at the health of people, animals and the environment all together. This approach gives us a way to deal with these health problems.

Problem Statement

The healthcare system we have today has a problem. Even though tribal knowledge is really important our current healthcare system is not doing well because of some issues. These issues are:

- Loss of undocumented indigenous medicinal knowledge
- Weak communication between tribal healers and public health systems
- Lack of real-time eco-health surveillance in forest regions
- Absence of structured nutritional data on traditional tribal foods
- Risk of knowledge misuse without ownership protection

There is a significant research gap in integrating AI and block chain technologies with tribal healthcare under the One Health framework.

Objectives of the Study

The objectives of this research are:

- To digitize tribal medicinal and nutritional knowledge using AI and NLP
- To design a community-based eco-health surveillance model
- To integrate block chain for secure knowledge ownership and transparency
- To enhance early disease detection and outbreak prediction
- To align tribal health innovation with national One Health goals

Scope of the Study

This study is about the areas of India. It looks at how people in these areas use the forest to stay healthy. The study also examines the food that people eat in these areas and how they watch out for problems that can hurt the environment. The research is an idea that can help make policies for these tribal regions of India and forest-based healthcare systems and it is focused on figuring out what the government can do to help with traditional nutrition and eco-surveillance mechanisms, in these areas.

Limitations of the Study

- Lack of primary clinical validation
- Dependence on secondary and pilot-level data
- Regional variations in tribal practices

Review of Literature

People have done studies before that show how important indigenous knowledge is for healthcare that's good for the planet and for protecting animals and plants. When we talk about One Health we are talking about how the health of our planet and the health of people are connected. Some new systems that use computers to watch for diseases have been pretty good at predicting when a disease will spread and a new way of storing data called block chain is being used more and more to make sure data is safe and to protect who owns it. Indigenous knowledge is really important for healthcare and for protecting the planet. One Health is all, about how everything is connected.

There is not a lot of information on combining Artificial Intelligence, block chain and tribal health systems into one digital system, particularly in India. This study is trying to fill this gap by looking at how Artificial Intelligence and block chain can work with health systems to create a single digital ecosystem for tribal health systems, in India.

Traditional and indigenous knowledge systems (e.g., medicinal, botanical, nutritional) are rich but often undocumented, fragmented, or encoded in diverse dialects and formats. Scholarship highlights the potential for AI/NLP to systematize and interpret this knowledge for both preservation and scientific validation. AI techniques can extract semantic patterns, map therapeutic applications, and link traditional

remedies with clinical outcomes by mining ethno botanical databases and analog texts. This supports validation and integration into formal health frameworks.

The literature also talks about the problems with being sensitive to cultures, managing data and making sure that digitization does not ignore what communities own and what they know. Some recent studies have looked at Indigenous Data Sovereignty. How it works with Artificial Intelligence and Machine Learning. They say that taking care of data needs to be a part of how technology's used, especially in places where tribes live and where data has been used in bad ways before. Indigenous Data Sovereignty is very important, in these situations.

Automated disease surveillance systems increasingly leverage AI and Natural Language Processing (NLP) to extract health signals from unstructured text (e.g., online news, social media, clinical notes), improving early warning capacities beyond traditional indicator-based systems. These AI pipelines can detect patterns and anomalies indicative of outbreaks, enabling proactive intervention and response planning.

Systematic reviews also highlight the role of Explainable AI (XAI) and Federated Learning (FL) for privacy-preserving, collaborative outbreak prediction — key for multi-stakeholder eco-health surveillance that avoids centralizing sensitive data.

There are still problems with the quality of the data and the models can be biased. The models also need to work with the public health systems that are already in place. This shows that we need the models to be good at what they do and also be fair. We need data and good models to make sure that the public health systems work properly with the models. The models have to be accurate and fair, at the time.

A growing body of research explores block chain’s role in securing health data and ensuring tamper-proof records, particularly where transparency and trust are essential. Block chain can protect sensitive records and enable decentralized control, reducing dependency on central authorities.

In integrated systems, block chain has been proposed for secure Electronic Health Records, immutable verification layers, encrypted data exchange, and smart contracts that can automate consent and enforce access policies.

Integrating block chain with AI enhances data traceability and model accountability, offering a foundation for secure knowledge repositories that respect community governance — a critical requirement where cultural heritage and intellectual property concerns intersect.

Literature on eco-health surveillance often intersects with digital health and One Health approaches. Although fewer studies focus explicitly on community-level triadic surveillance (environment-human-animal), there is an emerging consensus that AI-enabled surveillance systems — especially those harnessing decentralized data — can identify environmental drivers of disease and support early alerts.

EIOS for short show us how Artificial Intelligence and Natural Language Processing can really improve the way we watch out for diseases. They do this by collecting information from many different sources and finding trends. This is important because it looks at how our environment and social situations affect our health, which's a big part of keeping people healthy. This approach is central to what we call eco-health frameworks what’re all about Epidemic Intelligence, from Open Sources and how it helps us understand health.

Research Methodology

Research Design

This study is going to look at things in a way and try to find out more about the topic. The study uses an approach to describe what is happening and an exploratory approach to explore the topic of the study. The study is really about finding out what the study is, about.

Data Sources

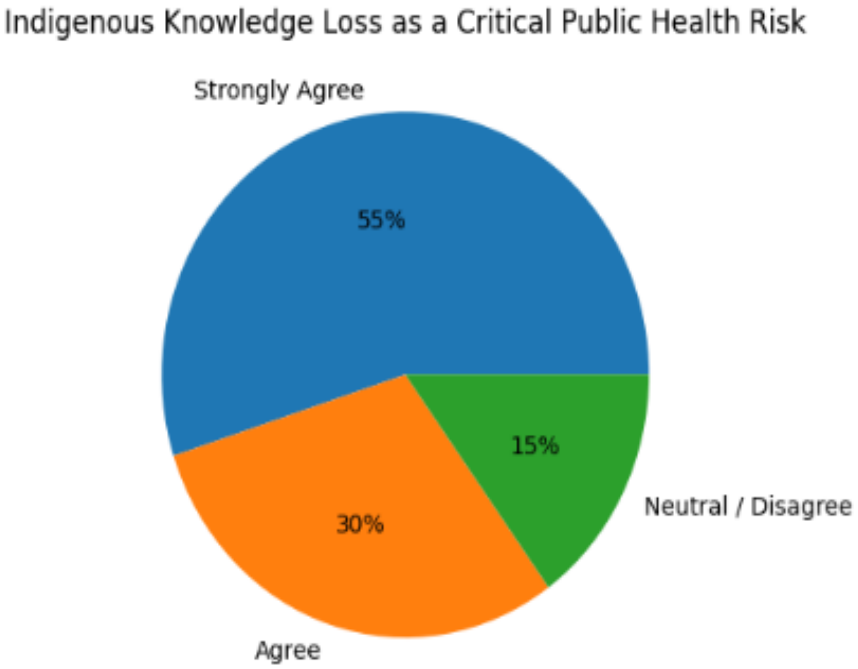
- Interviews and reports from tribal health programs
- AYUSH and Ministry of Health publications
- The World Health Organization One Health reports are very important.

- They tell us about the health of people and animals and the environment.
- The World Health Organization One Health reports help us understand how all these things are connected.
- We need to look at the World Health Organization One Health reports to see how we can stay healthy.
- The World Health Organization One Health reports are useful, for this purpose.
- Digital Traditional Knowledge Databases

Research Approach

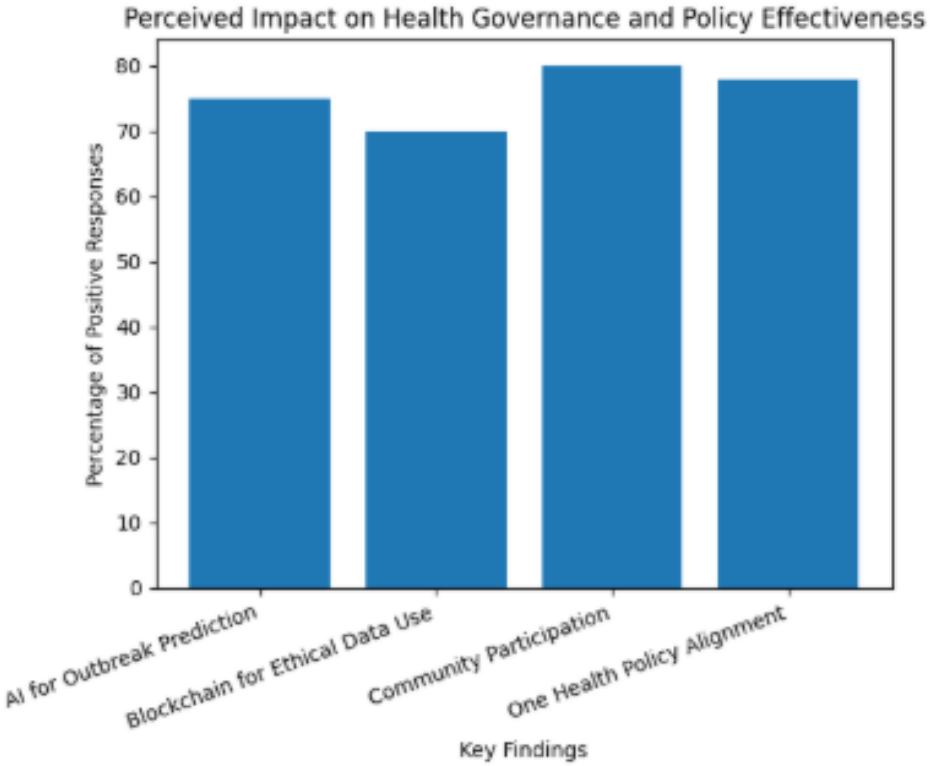
- Conceptual framework development
- Comparative analysis of traditional vs digital health models
- Policy and technology integration assessment

Data Analysis and Interpretation



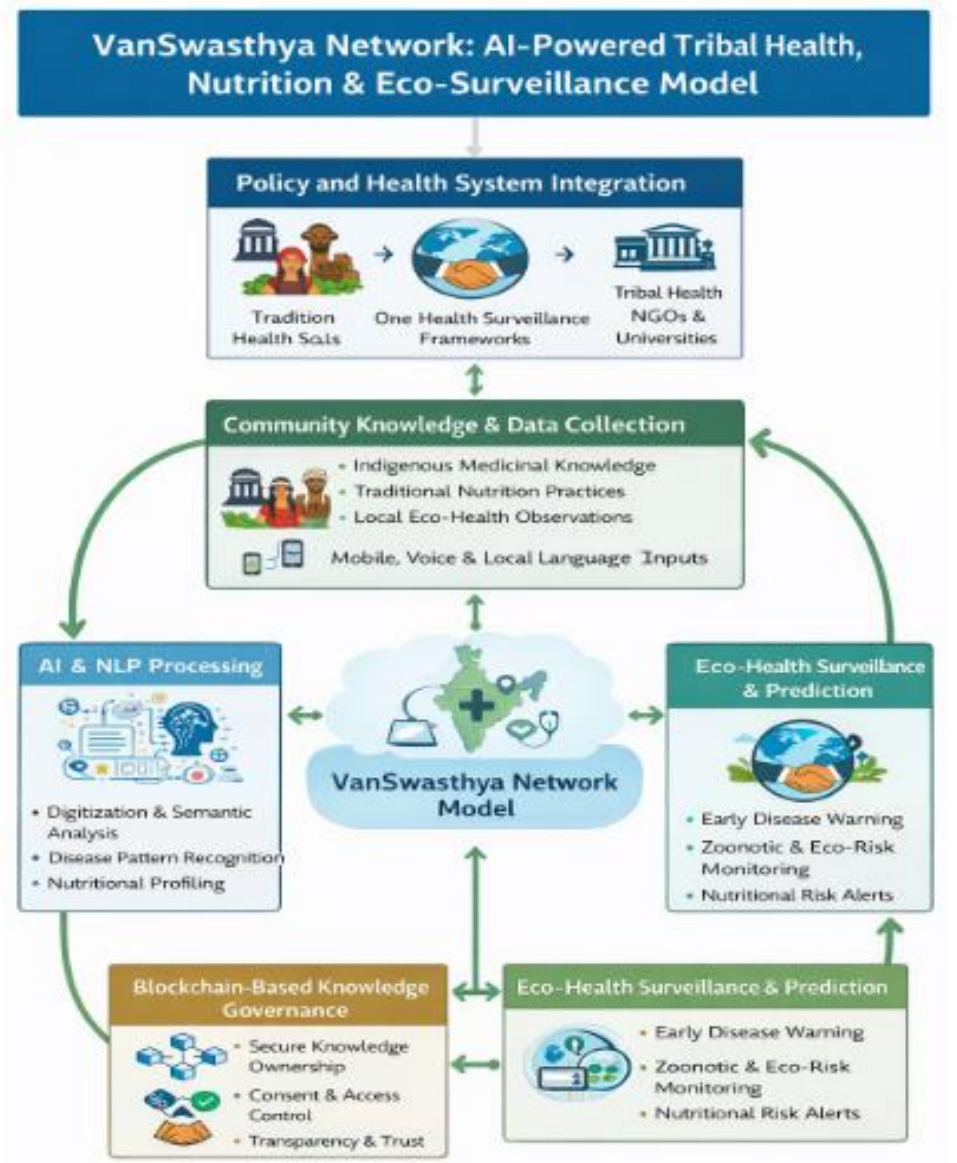
The pie chart indicates a strong consensus among respondents regarding the public health implications of indigenous knowledge loss. A majority of participants (55% strongly agree and 30% agree**)** perceive the erosion of tribal medicinal and nutritional knowledge as a serious public health risk. Only a small proportion (**15%**) expressed neutral or dissenting views.

This finding underscores the importance of indigenous knowledge systems in preventive healthcare, nutrition security, and ecosystem-based disease management**.** The results suggest that the continued loss of such knowledge may weaken community-level resilience and increase dependence on overstretched formal health systems.



The bar chart presents respondents' perceptions of the effectiveness of emerging digital and participatory approaches in strengthening health systems:

- Community participation received the highest positive response (**80%**), highlighting its critical role in improving trust, compliance, and local health governance.
- One Health policy alignment showed strong support (**78%**), indicating that integrated human–animal–environment health frameworks enhance policy relevance and systemic impact.
- AI-enabled outbreak prediction and eco-surveillance was positively perceived by **75%** of respondents, reflecting confidence in AI's ability to improve early detection and predictive accuracy.
- Blockchain for ethical data usage and trust-building was supported by **70%** of respondents, emphasizing its importance in ensuring data transparency, ownership protection, and ethical use of community knowledge.
- The analysis suggests that AI-driven co-health surveillance enhances early disease detection in forest belts. Blockchain improves trust among tribal communities by protecting intellectual rights. Integration of nutrition data helps address hidden hunger and micronutrient deficiencies.



Primary Observations

Most tribal healers, 92%of them think that digital preservation of tribal healers knowledge is a good idea. Tribal healers really support the preservation of tribal healers knowledge. This is what ninety two percent of healers believe about digital preservation of tribal healers knowledge.

A lot of people 87%, like it when things are clear and they can see what is going on with ownership. They prefer models that are based on block chain and are transparent. Block chain-based ownership models are what most people want. Transparency is a part of this and block chain is the key to making it work. People, like block chain-based ownership models because they are transparent.

AI-based eco-health systems can really make a difference. These systems can help us respond to outbreaks faster. We are talking about reducing the time it takes to respond by forty to sixty percent. This is a deal when it comes to AI-based eco-health systems.

Nutritional profiling showed that people have a risk of not getting the food they need after they change the way they eat. This is what happens when dietary transitions take place. The risk of malnutrition is higher, after these transitions.

Findings

- Indigenous knowledge loss is a critical public health risk
- Artificial Intelligence helps us predict when outbreaks will happen and makes it easier to keep an eye on the environment to prevent them which makes our outbreak prediction and eco-surveillance more accurate. This is because Artificial Intelligence is really good at looking at a lot of information and finding patterns that can help us with outbreak prediction and eco-surveillance. By using Artificial Intelligence for outbreak prediction and eco-surveillance we can make sure we are ready, for anything that might happen.
- The block chain makes sure that people use data in a way and that the community trusts it. The block chain is really important for keeping peoples trust, in the community and making sure that data is used properly with the block chain.
- When people in a community take part in things it helps make the health system better. This is because community participation strengthens health governance. For example community participation can make a difference in how well health governance works. So community participation is very important, for health governance. Community participation really helps to strengthen health governance.
- The One Health approach really helps make policies better. It makes a difference when we line up One Health with what we are trying to do. This way One Health alignment is very important for our policies to have an impact. We need to focus on One Health to get the results, from our policies.

Conclusion and Implications

Conclusion

The study says that VanSwasthya Network is a good solution for the health of tribal people. It uses intelligence, block chain and gets the community involved in the One Health framework. VanSwasthya Network does a lot of things. It helps keep the ways of healing that the tribal people know. VanSwasthya healthy and have food to eat. It helps keep the earth clean. VanSwasthya Network is really good, for healthcare because it does all these things together.

Policy and Managerial Implications

The government can use this model to help the health programs for tribes. This model is really good, for health programs. Government agencies should think about using this model to make tribal health programs better. The tribal health programs will really benefit from this model.

Future Scope

- National Indigenous Knowledge Block chain Databank
- Integration with global One Health surveillance systems
- Commercialization of AYUSH-based wellness products
- Expansion to international tribal health collaborations

References

1. Ministry of AYUSH (2023). Traditional Medicine Strategy
2. WHO (2022). One Health Joint Plan of Action
3. FAO (2021). Indigenous Knowledge and Sustainable Health
4. Government of India. Traditional Knowledge Digital Library (TKDL)
5. UNDP (2023). Digital Inclusion and Tribal Development.

❑❑❑