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24 MAY 2023

Powering the Future: Punjab's
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SPECIAL ISSUE
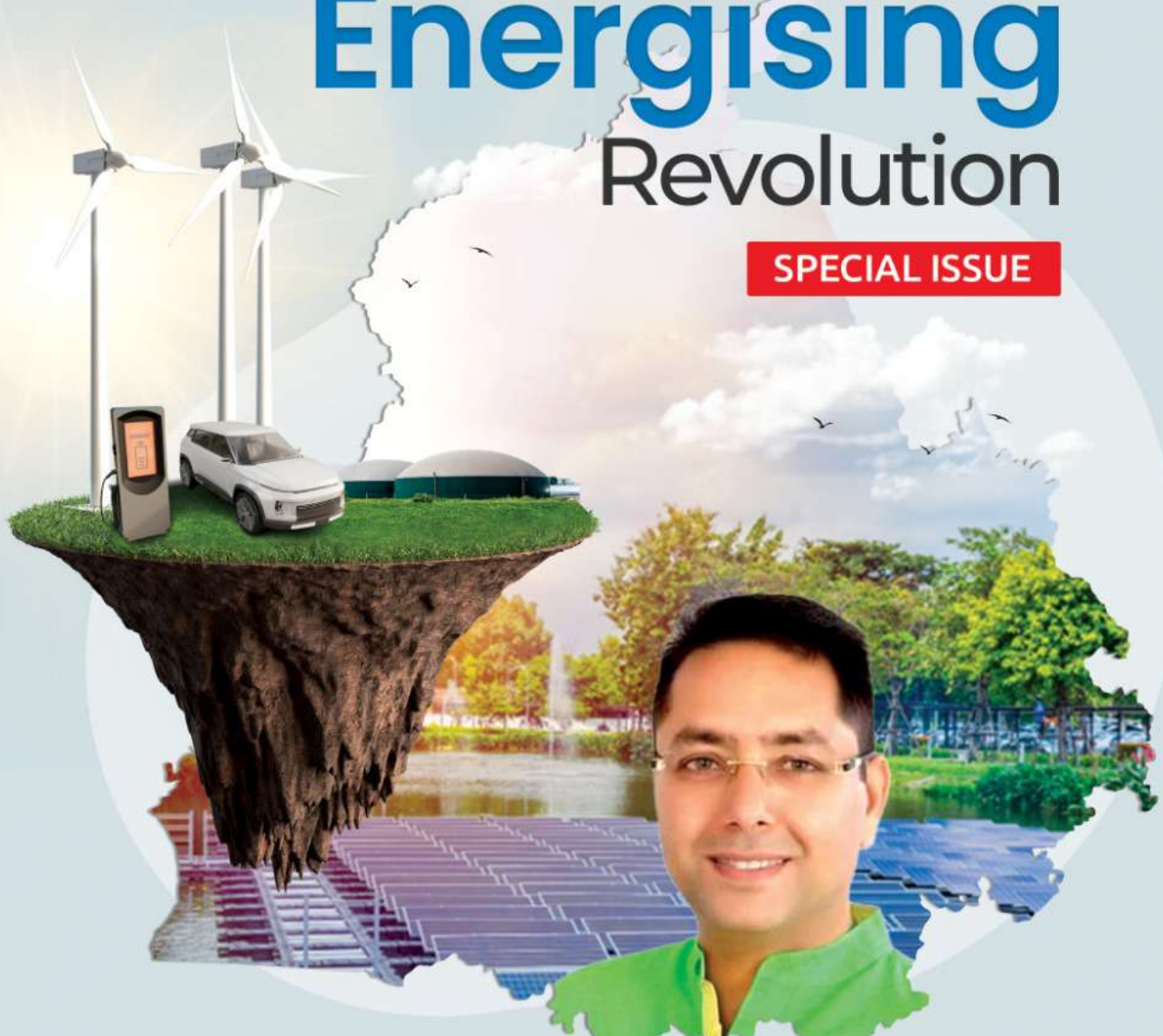
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Resonance of Seed Chain & formation of a National Seed Grid

National e-Governance Award- 2015-16

With the growing demand for food, the use of technology has become more prevalent in improving crop yields, reducing waste, and enhancing supply chain management. One such technology is the SATHI system, developed by NIC Bhubaneswar, which provides farmers with a powerful tool to track the origin and authenticity of their seeds, and to manage their inventory in a more efficient and sustainable manner, write **Ashok Kumar Hota**, Deputy Director General and **Niladri Mohanty**, Jt Director (IT), NIC Bhubaneswar

Agriculture is the spine of our Indian economy which provides the fundamental resources required for survival. Much like the human spine has three energy nerves, agriculture relies on three key components: seeds, fertiliser, and insecticide. This particular project focuses on one of these crucial components, namely seeds. As the saying goes, the finer the cause, the grosser the effect. In the case of global food security, the tiny seed is the root cause.

In 2014, the Government of Odisha collaborated with the National Informatics Centre to create a comprehensive seed chain system known as the Six Verticals of Seed. The system comprises various components such as seed production, seed quality certification, seed dealership licensing, seed inventory management, and seed Direct Benefit Transfer (DBT). This groundbreaking application integrates all seed verticals in a well-planned manner,

ensuring that only certified seeds are distributed to licensed dealers, who, in turn, can sell them to verified farmers registered in a central database. The DBT module is integrated with the Public Financial Management System (PFMS), allowing farmers to receive seed subsidies directly to their bank accounts. The project has received the National e-Governance Award 2015-16 from the Department of Administrative Reforms & Public

Grievance, Government of India, in recognition of its pioneering efforts. In 2019, the state of Uttarakhand implemented an automated system for seed quality certification, which completely transformed the process into a paperless and digitally-end-to-end one. This success prompted the Indian government to envision a comprehensive national seed grid that would include all state seed certification agencies, seed testing labs, seed producers, processing plants, ICAR research labs, breeder seed production centers, seed distributors, and retailers nationwide. The aim is to bring all these entities together onto a single national grid for more efficient and streamlined operations.

With its extensive experience in the seed industry spanning over a decade, the National Informatics Centre (NIC) has joined hands with the Ministry of Agriculture and Farmers Welfare to create SATHI (Seed Authenticity Traceability and Holistic Inventory) - a comprehensive system that covers all stages of seed production, from nucleus to breeder, foundation, and certified seed. SATHI was developed by NIC and officially launched by the Honourable Minister of Agriculture, Shri. Narendra Singh Tomar, on April 19, 2023. Within a few days of its launch, several states such as Odisha, Uttarakhand, Punjab, Chhattisgarh, Maharashtra, Jammu, Kashmir, West Bengal, Assam, and Himachal Pradesh have already adopted the platform, while others are in the process of doing so.

During his speech at the launch, the hon'ble minister urged leaders in agritech to not only focus on the needs of Indian farmers, but also to consider the global demand. The Principal Secretary of Agriculture for the Government of Odisha, Mr. Aravinda Padhi (IAS), stated that the new portal would shorten the timeline between the development of new crop varieties by research labs and their availability in the

market. He also informed the nation about the online pre-booking system for popular seed varieties implemented by the Odisha government, ensuring timely availability for farmers.

Salient Features of the SATHI:
- Device agnostic & offline friendly PWA based App
- GIS based reports to represent geo tagged inspection reports
- Auto validation for interstate transactions
- Based on open source technology
- Microservice architecture on top of highly scalable cluster of servers
- Single click payment gateway integration for all stakeholders
- Multi tenancy application with state specific configuration for different modules
- Integration with Land record data
- Integration with centralise farmer registration database

To achieve 17 SDG of the UN in which food security is one of the major components, the availability of quality seed at the right place at the right time is very critical.

A more effective approach than haphazardly importing breeder seeds due to insufficient nucleus seeds is to import a smaller quantity of nucleus seeds and locally produce a larger quantity of breeder seeds. However,

overproduction of seeds should be avoided to prevent losses. To achieve this, it is crucial to accurately predict seed demand well in advance. This is part of the SATHI blueprint, which utilizes AI/ML to forecast future seed requirements and production, allowing India to prepare seed production plans based on projected demand. To ensure India is truly future-ready, international scenarios should also be considered for more accurate predictions.

The system will enable achieving seed traceability, which is a crucial aspect. It can serve as both a deterrent and an empowering tool for farmers. By simply scanning the QR code on the seed bag, farmers can access comprehensive information such as the seed's origin, the processing plant responsible for it, laboratory test reports, field inspection reports, distributor details, storage location, the source seed used, the provider of the source seed, as well as their attributes, among other relevant details.

The widespread adoption of the SATHI-Seed grid by the entire nation will inevitably lead to numerous futuristic developments that will revolutionize the field of seeds.

Suppose a seed bag is available for purchase from a dealer in one state, and it has an illegitimate counterpart
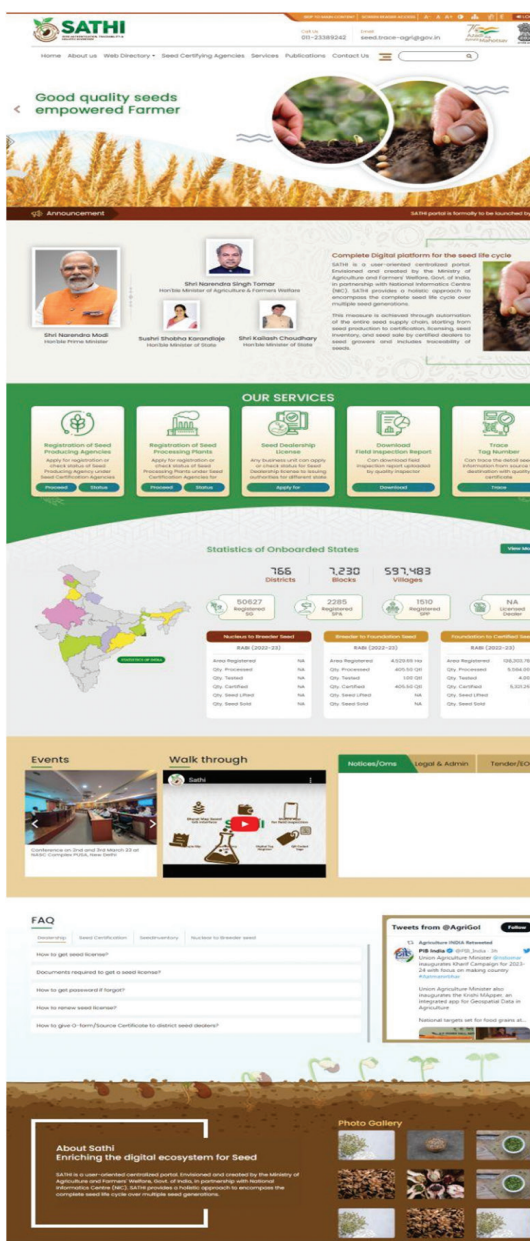
in another state. If a farmer intends to purchase the counterfeit seed bag, they can scan the QR code on the seed tag. If the code reveals that the seed bag is located in another state and not with the dealer, the farmer can deduce that the tag is fraudulent. Additionally, a mobile application can identify the geographical location of the counterfeit seed bag and alert the relevant authorities in that area as well as the original seed producing agency to take necessary measures.

The State Government's Enforcement Division conducts random seed sample tests to ensure purity. In case of a substandard seed lot, farmers can report to SATHI, which can help the administration block the sale of that particular seed lot throughout India with just one click. This information will be shared with all states using the same seed lot, empowering them to make informed decisions. This measure will safeguard farmers from using substandard seeds and protect their crops.

The plan also includes a provision for farmers to provide their feedback on the quality of seeds after harvesting, which will enable us to collect ratings through

crowdsourcing. These ratings will be linked to specific attributes that contribute to either positive or negative outcomes, allowing for a focused approach towards improving the seed quality.

Once the second phase of the project is launched, all distribution channels throughout the country will be onboarded, allowing farmers to not only pinpoint dealer locations on a map, but also view available stock at each dealer point. This enhanced level of transparency is set to become available very soon.

The Indian government has allocated sufficient funds to facilitate the creation of software and server infrastructure, as well as offering support for the rollout process. Additionally, they are providing financial assistance to state seed certification agencies to acquire high-volume thermal tag printers. The implementation of these measures will ensure that standardised tags are used throughout the country, enabling QR code traceability and bar code-based inventory management at both production and sales levels.

Scopes are many, this is just a humble beginning like a seed.