Empowering Wheat Farmers in Uttar Pradesh with FASAL: A Digital Revolution

By - Anuvrat Sharma
Mentor - Dr. Sanjukta Ghosh
Lab- Habits and Behavior
Institute - Srishti Manipal Institute of Art, Design and Technology

Overview:

FASAL is a cutting-edge digital application that has been painstakingly created to completely transform the lives of wheat farmers in Uttar Pradesh who must deal with the numerous difficulties associated with agricultural cultivation. This cutting-edge instrument is committed to improving the lot of farmers, especially those who work in the hard agricultural terrain of Uttar Pradesh's Dhanora and Bijnor. FASAL's steadfast goal is to provide these committed farmers with actionable information by utilising the revolutionary power of cutting-edge technologies, such as artificial intelligence, big data analytics, and machine learning. FASAL is poised to transform farmers' habits and behaviours by introducing data-driven practices and offering the resources required for sustainable agriculture. This will ultimately strengthen crop output projections, improve crop health, and protect farmers' beloved livelihoods.

Challenges:

Uttar Pradesh is a major centre for wheat growing in India because of its variety of agroclimatic zones. However, there are many difficulties in the agricultural environment in places like Dhanora and Bijnor. Temperature increases, irregular rainfall patterns, protracted droughts, severe crop diseases, poor soil quality, and recurring pest outbreaks have all combined to create a dire threat to the wheat crops essential to the local farming communities. These environmental challenges represent a serious risk to crop output and, consequently, the livelihood of the diligent wheat growers.

Problem Statements:

Farmers' Adoption of Technology:

Problem: A lot of farmers don't have access to contemporary agricultural technologies like data analytics and artificial intelligence.
Data: The majority of farmers in the Dhanora and Bijnor regions do not profit from technology, with only 20% having access to digital agricultural instruments.

Variability in Crop Yield:

Problem: Farmers' revenue is unstable because of erratic weather patterns and inaccurate yield projections.
Data: Because production projections are only sometimes accurate, 60% of wheat farmers in the area report large variations in their revenue.

Crop Disease Incidence:

Problem: Due to their slow identification and inadequate preventative efforts, crop diseases are a continuous concern.
Data: Each year, illnesses harm 40% of the region's wheat crops, resulting in significant yield losses.

Deterioration of Soil Health:

Problem: Unsustainable farming methods are causing environmental problems and soil deterioration.
Data: During the past ten years, soil health has decreased by 15%, which affects the long-term sustainability of agriculture.

Income Levels of Farmers:

Problem: The unpredictability of crop yields puts farmers at risk financially.
Data: Statistics show that 70% of farmers in the area earn less than the federal poverty threshold each year, mostly as a result of production issues.

Inefficiencies in the supply chain:

Problem: The region's present warehousing and supply chain are beset by inefficiencies, which cause post-harvest losses and lower farmer revenue.
Data: Inadequate storage facilities, traffic jams, and subpar warehousing techniques cause the region to lose about 30% of its wheat production.

Price Variations and MSP Inconsistencies:

Problem: Wheat prices in the Dhanora and Bijnor regions are highly volatile, and farmers may not receive enough protection from the government's Minimum Support Price (MSP).
Data: According to data, wheat prices in the area have varied by an average of 30% over the last three years, making farmers susceptible to unstable revenue.

Regenerative Agriculture

Problem: Limited Awareness and Education
Data: Government organisations such as the National Institute of Agricultural Extension Management (MANAGE) and the National Bank for Agriculture and Rural Development (NABARD) have reported on the need for more farmer education and awareness regarding regenerative and sustainable farming methods. The advantages of regenerative farming methods are not well understood by many farmers. They must have access to instruction and training regarding these procedures. The significance of integrating regenerative agricultural principles into the FASAL solution is underscored by this issue.

Possible Solution:

The goal of FASAL is to provide wheat farmers with a comprehensive digital application that uses cutting-edge technologies to handle the various difficulties they encounter. Among its primary attributes and capabilities are:

- **Crop Health Analysis**: Using artificial intelligence to assess wheat crop health and spot early warning indicators of illnesses, dietary deficits, and other problems.
- **Crop yield prediction**: It is the process of forecasting crop yields by utilising big data and machine learning, taking into account historical data, current inputs, and environmental factors.
- **Digital crop scanning:** This technology enables farmers to use an application to precisely assess the health of their wheat plants by scanning them.
- **Practical Advice**: Providing farmers with practical advice based on crop health evaluations and yield forecasts, as well as customised direction to handle particular problems.
- **Monitoring Soil Health**: Includes tools to keep an eye on the condition of the soil and make recommendations for how to keep it fertile.
- **Decreased Chemical Use:** Assisting farmers in utilising fewer toxic fertilisers and pesticides than necessary.
- **Weather Forecast Integration:** Giving decision-makers access to current weather forecasts so they may make well-informed choices.
- **Real-time market pricing information**: for wheat in the Dhanora and Bijnor regions is available.

- **Supply Chain Integration**: To expedite the transit of wheat from farms to warehouses and markets, FASAL will establish a digital supply chain network that links farmers with logistics and transportation companies.
- **Responsive Drip Irrigation**: GrowStream is the world's first and only irrigation system to ever interact directly with plant roots and their chemical signals, allowing the plant to self-regulate its own water delivery.

Benefits:

For farmers, FASAL provides several advantages:

- Responsive drip systems for effective management of water resources.
- Regenerative agricultural techniques to maintain soil health over time.
- Profitability and crop productivity both increased.
- Enhanced decision-making based on insights from data.
- Availability of market prices and weather forecasts.
- Less dependence on inputs of chemicals.
- Improved yield forecasting for more effective scheduling.
- Supplying knowledge to farmers.
- Availability of Agriculture credit

Conclusion:

FASAL is a cutting-edge technology that meets the unique requirements and difficulties experienced by wheat farmers. It closes the gap between conventional and modern farming with AI, machine learning, and data-driven insights. FASAL has the potential to revolutionise agriculture in India by committing to continuous improvement, which would secure a successful and sustainable future for farmers in Uttar Pradesh. The FASAL journey represents a major step forward in the direction of sustainable agriculture, where local knowledge, technology, and data come together to guarantee the prosperity of farming communities and produce long-lasting effects.