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Preferred Mode of Presentation: Exhibition

Priority Area: Agriculture, Climate Resilience, Innovation, Commercialization

Title:
AgriXpert: A Machine Learning-Based Agriculture App for Farmers – Adapting to Climate Change

Abstract
This project presents AgriXpert, a machine learning-powered mobile application designed to support farmers of all scales by providing intelligent, real-time agricultural guidance and decision-making tools. In response to increasing challenges posed by climate change, resource constraints, and the digital divide in rural areas, AgriXpert serves as a holistic and user-friendly solution that empowers farmers to manage both crops and livestock without requiring prior agricultural experience or technical training.

AgriXpert delivers a powerful suite of features through a single, accessible platform. The app integrates essential services such as weather forecasting, crop yield prediction, disease and pest detection, and a fully functional online marketplace for the buying and selling of farm produce, agricultural inputs, and equipment. These services are powered by machine learning algorithms that generate personalized, location-specific insights, enabling farmers to make data-driven decisions that improve productivity, reduce operational losses, and enhance climate resilience.

One of the most innovative features of AgriXpert is its livestock management module. This feature allows users to track animal health, productivity, behavior, and environmental conditions in real time. Whether a farmer is raising cattle, goats, poultry, or other livestock, the app sends smart alerts and provides expert-backed recommendations to support animal welfare and increase efficiency. The crop management module is equally robust, offering tools for crop identification, seasonal planning, AI-powered yield estimation, and early warnings for disease or pest outbreaks.

In addition to these core features, AgriXpert also focuses on community engagement and continuous support. The platform includes a community discussion forum for peer-to-peer interaction, an AI-assisted chatbot for instant guidance, and access to professional agricultural consultations. These tools help build knowledge, foster collaboration, and support users in real-time, all while reducing reliance on manual labor and traditional extension services.

AgriXpert aligns with major developmental frameworks such as the University of Zimbabwe Strategic Plan (2019–2025), National Development Strategy 1 (NDS1), and the United Nations

Sustainable Development Goals (SDGs). By promoting sustainable farming, enhancing digital inclusion, and accelerating rural transformation, AgriXpert addresses national and global priorities for food security and economic empowerment. This innovation holds immense potential for commercialization and national adoption, making it a key driver for advancing Zimbabwe's agricultural sector in a modern, climate-adaptive, and tech-driven direction.