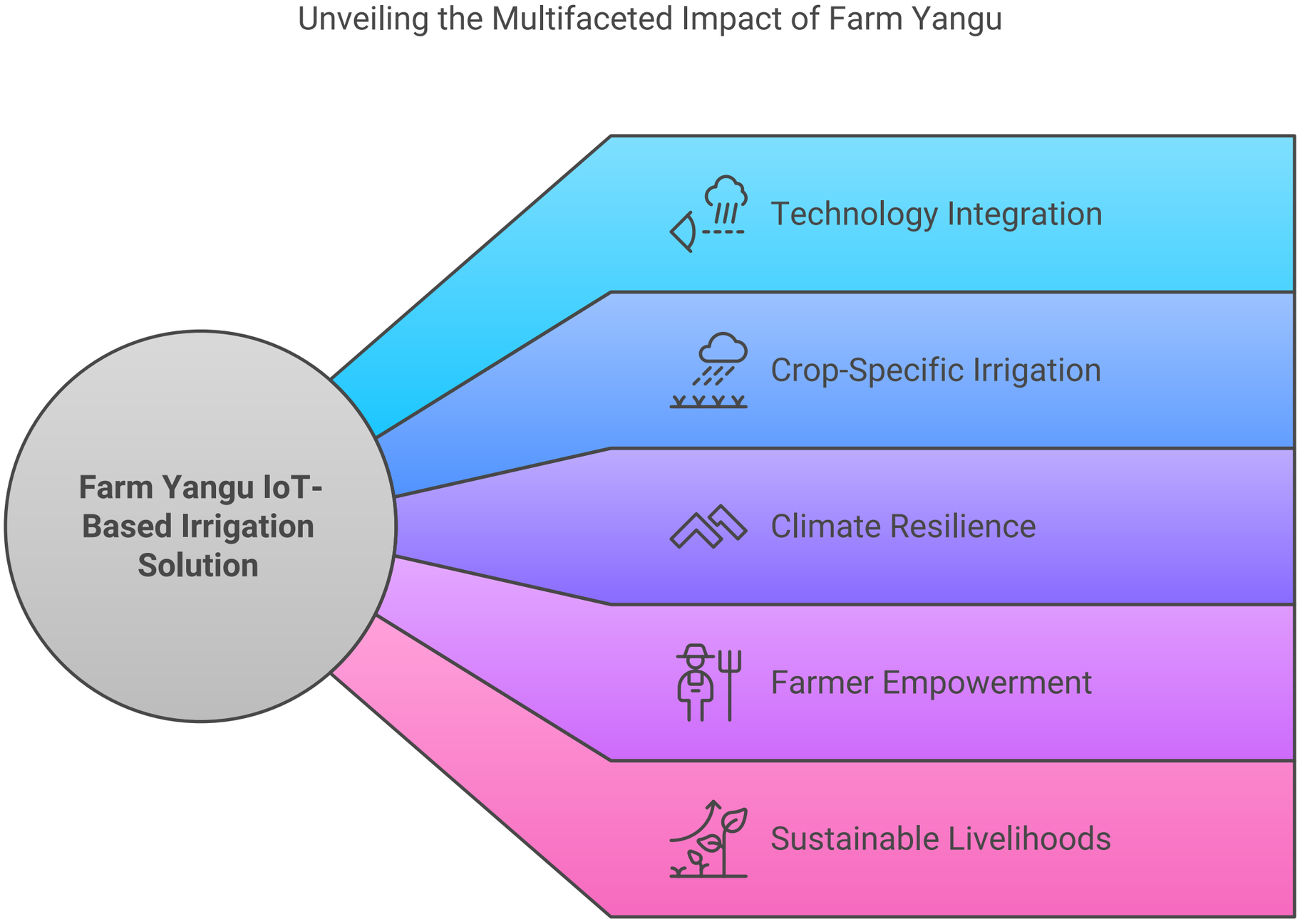
Problem statement

Farm Yangu is an IoT-based irrigation management solution currently deployed in Nyeri County, Kenya. It uses sensors, weather data, and crop-specific requirements to provide precise irrigation for coffee, maize, and kale, ensuring optimal water use and resilience against climate variability. By integrating local weather forecasts from OpenWeather, measuring humidity and temperature with a DHT sensor, and monitoring soil moisture levels, the system accurately calculates evapotranspiration rates. This ensures each crop receives the right amount of water at every growth stage. Farm Yangu empowers smallholder and large-scale farmers alike to become all-season producers, boosting yields and supporting sustainable livelihoods.

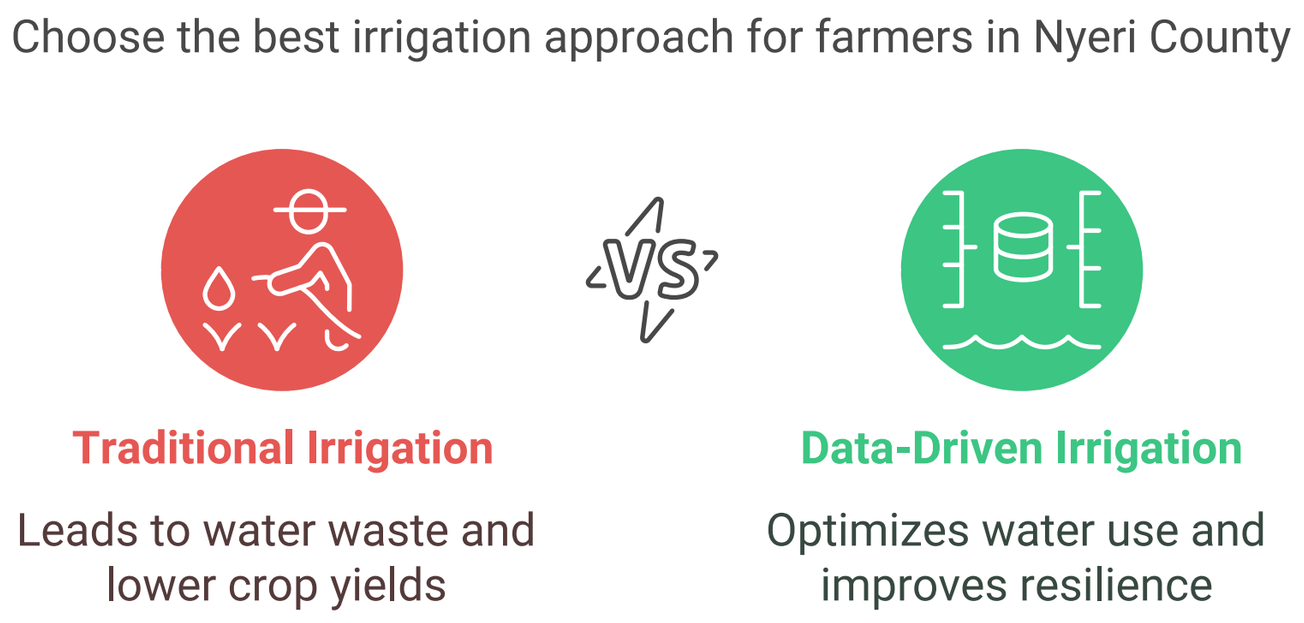


Problem Statement (250 words)

In Nyeri County, both smallholder and large-scale farmers grapple with unpredictable rainfall, prolonged droughts, and limited water resources. Traditional irrigation methods often depend on manual labor—such as hiring individuals to water crops—or guesswork, causing over- or under-watering. These inefficiencies lead to reduced yields and wasted resources. Compounding the issue, many farmers lack timely weather forecasts or modern technology, leaving them vulnerable to climate change impacts and inconsistent harvests.

Water scarcity further deepens social and economic inequalities, particularly among smallholders and marginalized groups. Existing solutions are frequently generic or unaffordable, failing to address the distinct needs of varied crops or local climate conditions. As a result, farmers face multiple hurdles, including inadequate technical know-how and minimal extension support for precision agriculture.

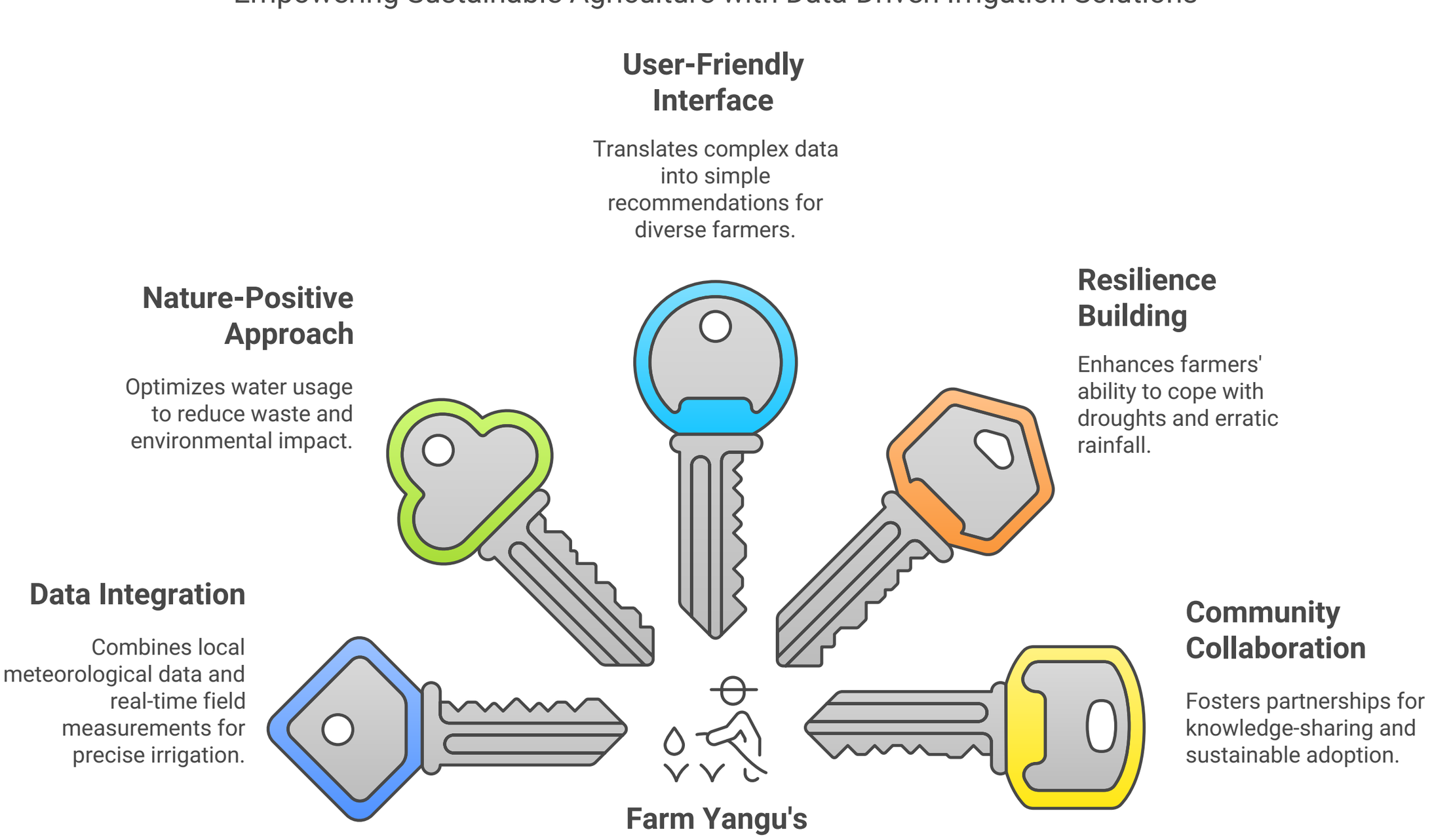
Recognizing these barriers, Farm Yangu introduces a mobile application that tracks crop age, irrigation history, and on-farm weather data. Over time, analytics will help farmers gauge monthly water usage, anticipate rainfall, and even suggest optimal crop choices based on emerging soil health metrics—like pH levels. By integrating crop requirements, real-time weather data, and soil conditions, farmers can boost resilience, conserve resources, and stabilize their earnings. Ultimately, Farm Yangu's data-driven platform empowers Nyeri's agricultural community to move away from manual, inefficient irrigation methods toward a sustainable, climate-resilient future.



Solution Statement (250 words)

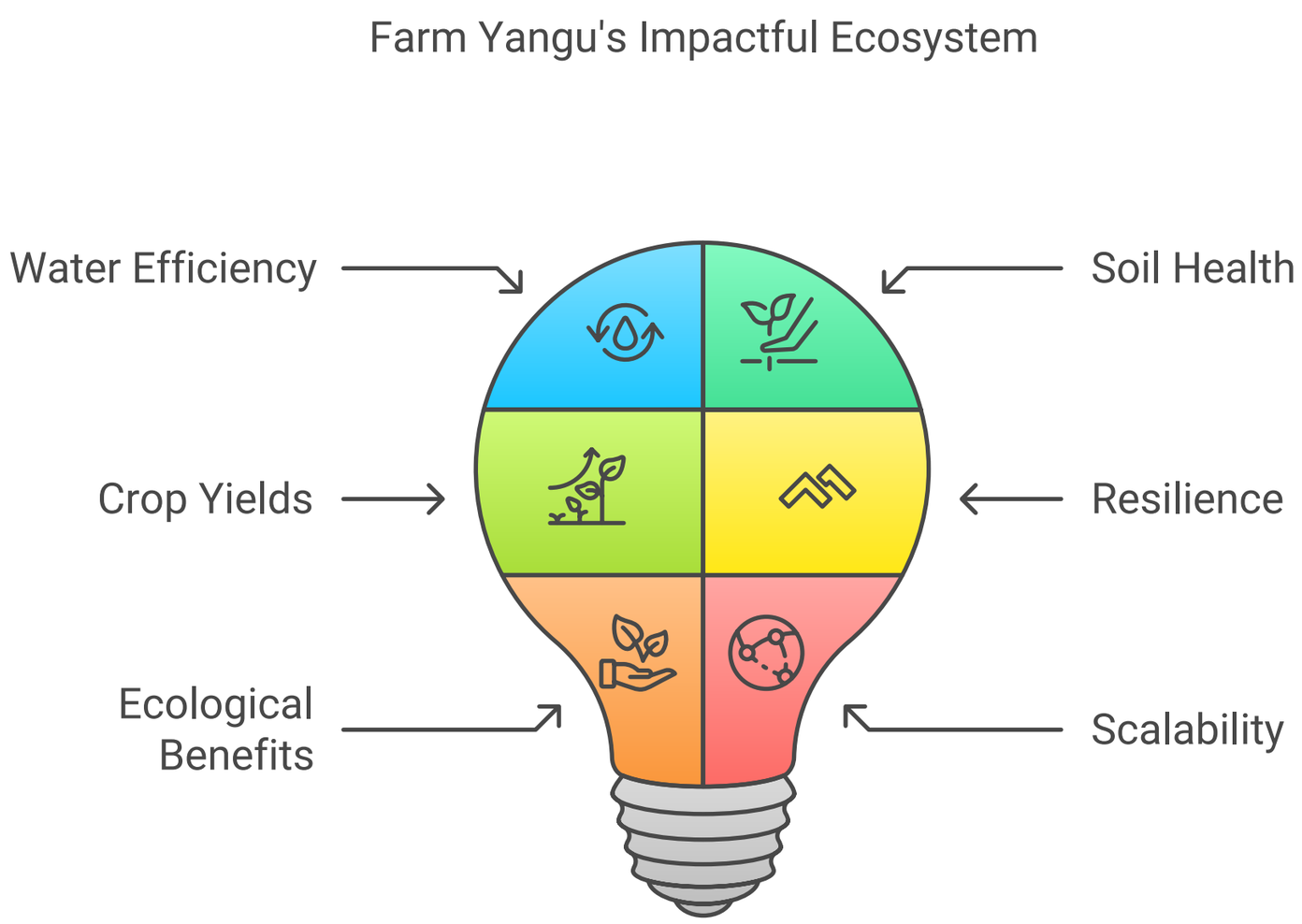
Farm Yangu delivers a data-driven irrigation management system refined through consultations with both small-scale and large-scale farmers in Nyeri County. It integrates local meteorological data (from OpenWeather) with real-time field measurements—humidity and temperature from DHT sensors, soil moisture readings, and soon-to-be-added soil health indicators—to calculate precise evapotranspiration rates for coffee, maize, and kale. This ensures crops receive exactly the right amount of water, based on growth stage and local weather conditions.

A key objective is to maintain healthy water tables and safeguard natural resources. By optimizing irrigation intervals and volumes, Farm Yangu minimizes waste and environmental strain. The intuitive mobile app enables farmers to monitor their fields remotely, track irrigation schedules, and observe weather patterns, all while maintaining affordability for different farm sizes. Over time, enhanced analytics will offer insights into monthly water usage and pH-based crop recommendations, further boosting efficiency.
Farm Yangu fosters resilience against droughts and climate uncertainties by automating critical decisions. Timely alerts help prevent crop stress, thereby increasing yields.
Partnerships with agricultural extension officers, community organizations, and cooperatives facilitate broad-based adoption and knowledge transfer. By embedding technology into the local agricultural ecosystem, Farm Yangu not only addresses immediate irrigation challenges but also lays the groundwork for sustainable, climate-smart agriculture in Nyeri County.



Potential for Impact (200 words)

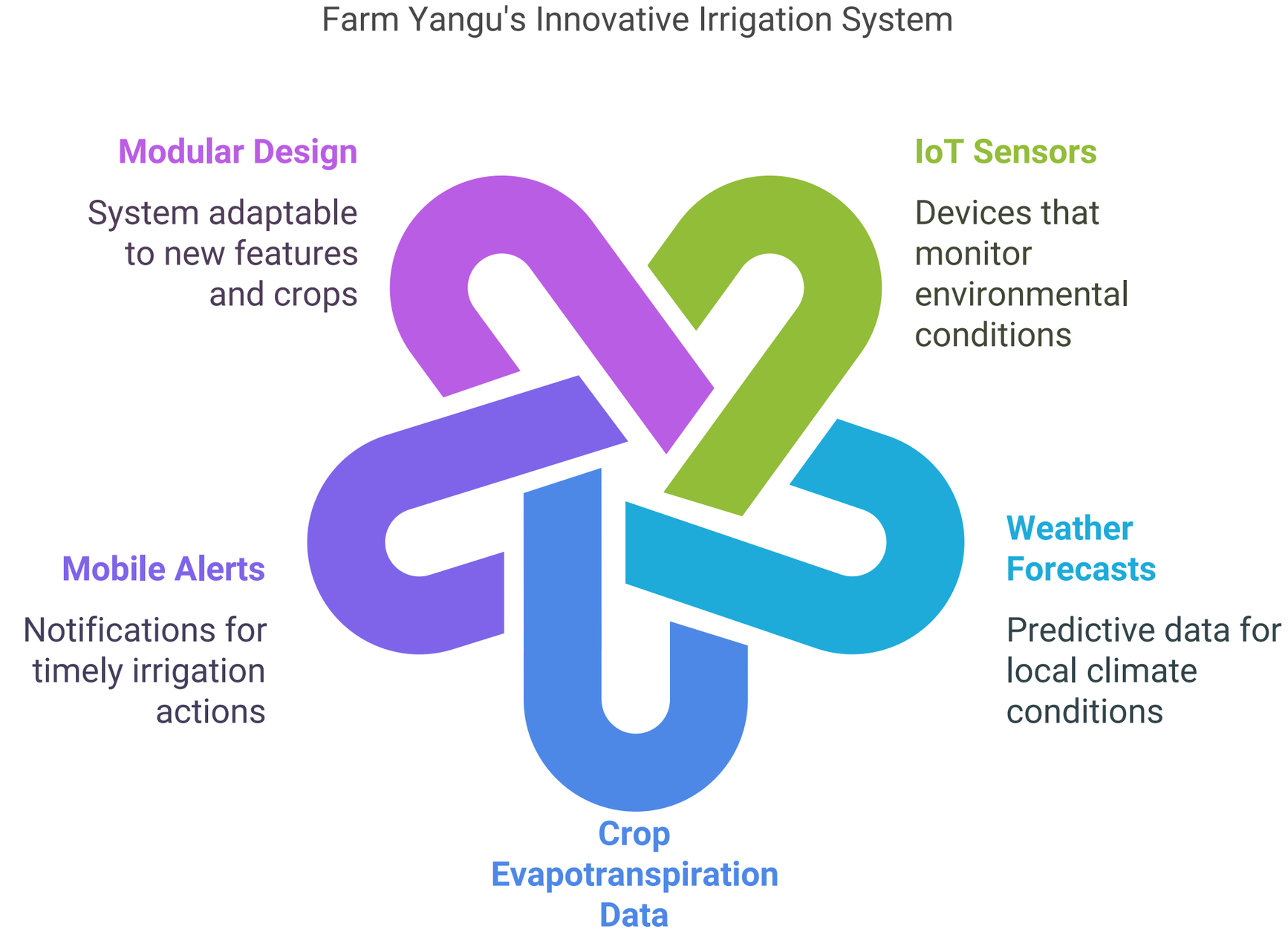
Farm Yangu has the potential to transform irrigation for thousands of farmers in Nyeri County and beyond. By delivering precise, crop-specific water management, it tackles water shortages and maintains soil fertility, ultimately bolstering yields and farmer incomes. The accompanying mobile app extends this impact by offering remote farm monitoring—investors can track farms' performance in real time, which can encourage funding, create local employment opportunities, and stimulate economic growth.
Enhancing resource efficiency through optimized irrigation conserves water, eases pressure on local water sources, and helps farmers adapt to erratic rainfall. This, in turn, strengthens the resilience of communities most at risk from climate shocks. Over time, Farm Yangu aims to establish mini power stations that provide a reliable energy source for data collection and sensor operation, further improving accuracy and reach.
As Farm Yangu expands, more farmers will benefit from reduced water waste and healthier ecosystems. The platform's adaptability allows it to serve additional crops and regions facing similar climate-related vulnerabilities. Collaboration with cooperatives, government bodies, and agricultural institutions paves the way for integrating climate-smart solutions into regional development strategies. By combining precision agriculture with innovative technology, Farm Yangu nurtures long-term environmental stewardship and broader economic vitality in Nyeri and beyond.



Innovativeness (200 words)

Farm Yangu represents a leap forward in smart irrigation by integrating real-time weather forecasts, IoT sensors, and advanced data analytics to deliver precise, crop-specific watering. Tailored for Nyeri County, its features include automated rain detection—pausing irrigation if rainfall is imminent—and a mobile app that lets farmers remotely switch pumps on or off, monitor tank water levels, and track irrigation frequency.

This modular platform is designed to evolve. Future enhancements will incorporate soil health metrics (like pH levels) for crop selection, predictive harvest analytics, and on-site solar power generation. By tapping into solar energy, Farm Yangu not only powers critical components—like sensors and pumps—but can also generate surplus electricity for nearby households. This clean energy approach addresses rural electrification gaps, lowering operational costs while improving community livelihoods.
Farm Yangu's user-friendly alerts and data insights accommodate farmers with diverse technical abilities. Low-power hardware, locally sourced materials, and open-source meteorological data keep expenses manageable and extend the platform's reach into underserved areas. Further, its capability to function offline or in low-bandwidth scenarios provides resilience against infrastructure challenges. Altogether, Farm Yangu exemplifies how a hyper-local, data-driven system—enhanced by renewable energy—can deliver impactful water management, strengthen climate resilience, and foster sustainable, tech-enabled agriculture in rural communities.

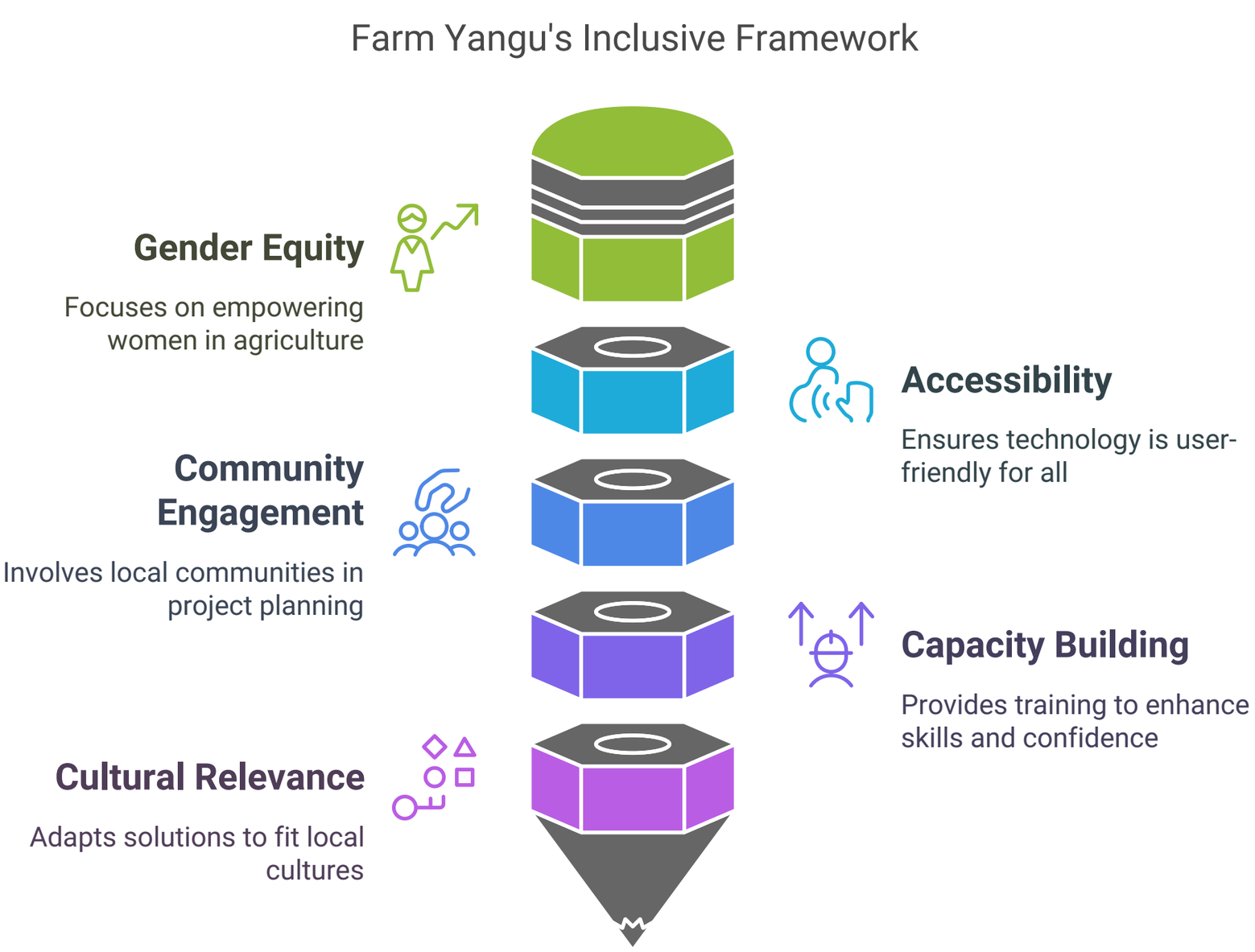


Equity (200 words)

While Farm Yangu is woman-led, our broader goal is to uplift entire farming communities in Nyeri County, thereby enhancing social equity across various groups. Increased yields and more reliable incomes from coffee, maize, and kale can directly improve household livelihoods and enable families to invest in critical needs, including their children's education. Since coffee is a key economic driver in Nyeri, stabilizing and increasing production can offer a pathway for families to keep children in school and pursue better educational opportunities.

Farm Yangu's design ensures that farmers of all literacy levels and physical abilities can use the platform. Simple mobile interfaces, local language support, and visual guides make the technology broadly accessible. Moreover, community-driven engagement—through farmer groups, cooperatives, and local gatherings—facilitates knowledge sharing and inclusivity, especially for those who have historically lacked access to advanced agricultural tools.

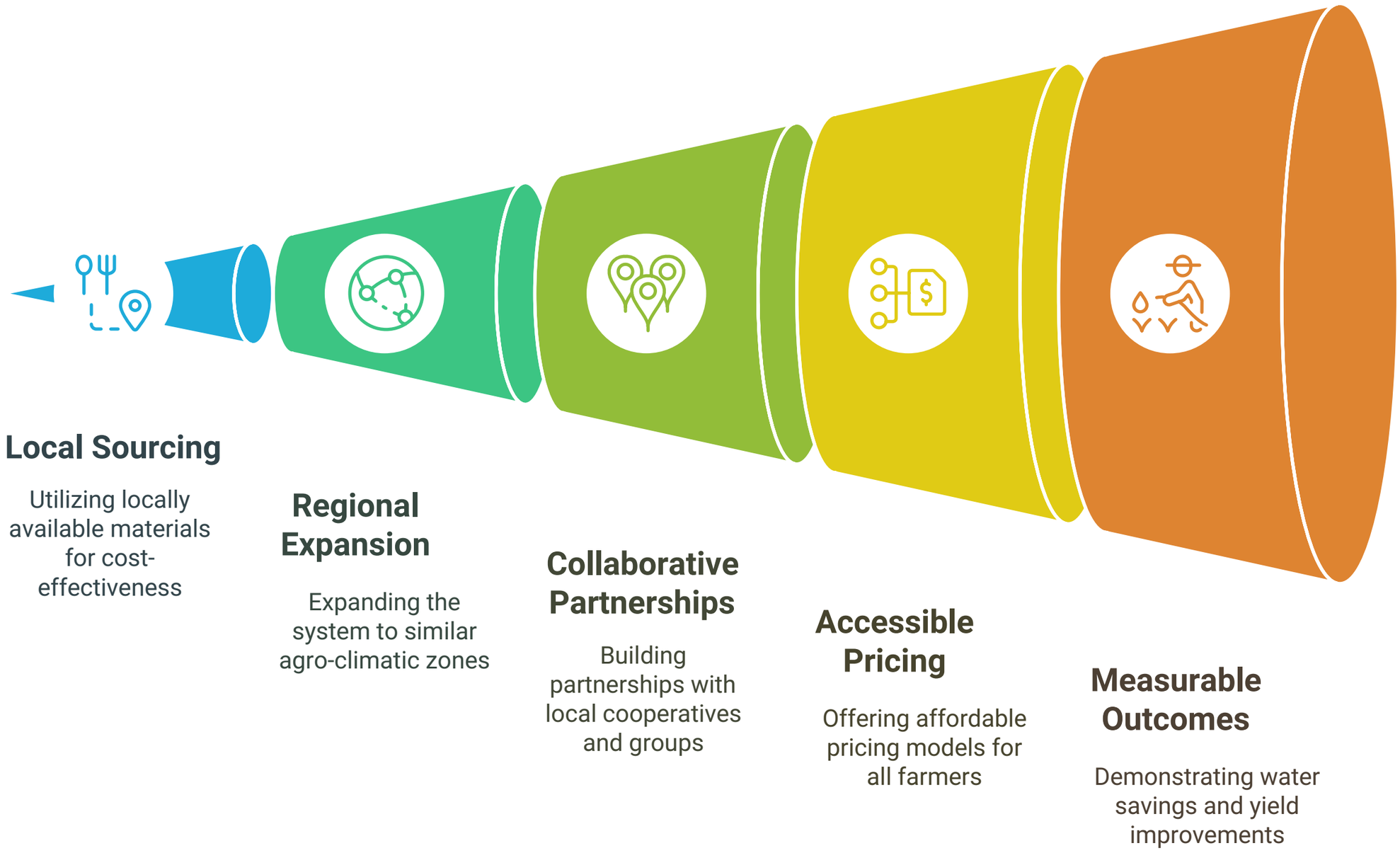
By improving farm productivity and incomes, Farm Yangu helps alleviate economic pressures that often force children and youths out of school. This ripple effect strengthens entire communities, supporting long-term well-being and fostering a generation more resilient to climate impacts. In this way, equitable growth is built into the very foundations of Farm Yangu's approach.



Scalability (200 words)

As a nonprofit initiative, Farm Yangu emphasizes cost-effective solutions and community-driven deployment. The platform uses readily available hardware, open-source software, and free meteorological data to keep operational costs low. This approach allows for gradual, phased expansion into neighboring counties with similar agro-climatic conditions.

Scaling hinges on collaborative partnerships with local cooperatives, extension services, and government agencies. By demonstrating tangible benefits—like improved yields and water conservation—Farm Yangu will garner wider acceptance among farmers and policymakers. Community workshops, demonstration plots, and peer mentorship programs will further accelerate adoption without the need for costly subscription models.
Financial sustainability can be achieved through a mix of philanthropic grants, government support, and in-kind contributions from stakeholders who see the value of precision irrigation in addressing food security and climate resilience. Ongoing dialogues with regional and national authorities also open avenues for integrating Farm Yangu into broader agricultural development strategies. This collective framework ensures that as Farm Yangu scales geographically, it remains aligned with local needs and resource constraints, thereby maximizing long-term impact and viability.



Viability and Sustainability (200 words)

Farm Yangu’s viability is founded on an adaptable business model and robust local partnerships. We offer both subscription and pay-per-use plans, lowering financial barriers for smallholders while ensuring a sustainable revenue stream. Over time, as more farmers adopt the technology and sensor production scales up, costs will decrease, increasing profitability and affordability.

We collaborate closely with local extension officers, who act as trusted intermediaries. Their involvement not only improves farmers' technical knowledge but also builds confidence in technology adoption. Engaging banks and microfinance institutions to offer tailored credit packages will help farmers invest in sensors and related infrastructure, further strengthening the project's financial base.

To ensure long-term sustainability, we focus on capacity building and community ownership. Farmer cooperatives and women's groups receive training in system maintenance and data interpretation, enabling them to provide first-line support. On the policy side, we engage county-level authorities, showcasing how precision irrigation can enhance food security and conserve water. These relationships pave the way for supportive regulations, subsidies, or partnerships that bolster the solution's longevity.

Eventually, Farm Yangu can transition to local leadership, with cooperatives or agribusinesses taking over distribution and support. This exit strategy cements the platform's continued impact in advancing sustainable agriculture.