MKULIMA AI FIELD IMPACT REPORT

From Mount Uluguru to Mount Meru:Scaling Agricultural Liberation Across Tanzania

The four rural villages in the Arusha Region are Usa River Village, Nkoaranga Village, Maji Ya Chai Village, and Seela Sing'isi Village.

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A Movement Takes Root Across Tanzania

> **"** *Technology must bend toward the farmer, not force the farmer to bend toward Silicon Valley."*

Over the past three months, we have witnessed an inspiring agricultural transformation across Tanzania. What began quietly in Kisosa and Maekani villages in the Morogoro Region has now taken root in four rural villages in the Arusha Region, Usa River Village, Nkoaranga Village, Maji Ya Chai Village, and Seela Sing'isi Village. A movement that once involved only 20 farmers has now reached hundreds, demonstrating that technology built by Africans, for Africans, and in African languages can scale across regions, crops, and generations. Farmers are embracing this innovation not because it is modern, but because it delivers real, measurable change: a 90–95% reduction in pest-control costs, a complete elimination of chemical fertilizer expenses, full functionality with zero internet, and support for diverse crops such as tomatoes, beans, cabbage, and yams.

Knowledge spreads organically, shared phone-to-phone via Bluetooth, creating digital inclusion through community networks. Many ask why Mkulima AI is not available on the Google Play Store. The answer is simple, because the people we serve cannot reach it. Rural farmers face unreliable connectivity, English-based digital barriers, and high data costs that make downloads inaccessible. That is why Mkulima AI is designed to meet people where they are: pre-installed onto devices, fully offline, Bluetooth-shareable, and powered by a Swahili voice interface that removes the need to read. This is not a limitation; it is liberation, a model of technology that bends toward the farmer and brings opportunity directly into their hands.

VILLAGE CASE STUDY 1: USA RIVER VILLAGE

Four Youth Farmers vs. Tuta absoluta (Kantangaze)

> " *We depended on shop chemicals that cost more than our profits. Now we are self-reliant, and our soil is recovering."*

In Usa River Village, four young farmers, three women and one man, joined forces to save their tomato crop from Tuta absoluta, a destructive pest locally known as Kantangaze. Working as a unified team with only two smartphones between them, their chairman and co-champion coordinated a simple but powerful strategy: using Mkulima AI as their shared guide. The crisis they faced was severe; leaves were scarred with irregular mines, transparent patches, frass deposits, and fruit-boring damage that signaled imminent crop failure. Their previous approach spending TZS 50,000 on chemical pesticides, had pushed them deeper into debt, costing more than their profits.

With Mkulima AI, the group shifted to early detection and an agroecological emergency protocol that included intensive neem applications, garlic–chili repellent, pheromone traps, beneficial insects, and improved plant spacing, all at a cost of less than TZS 3,800 per treatment. The results were dramatic: chemical dependency became agroecological independence, debt transformed into profit-sharing, and a failing crop recovered fully. As one farmer shared, "Tulikuwa tunategemea dawa za dukani ambazo zinagharimu zaidi ya faida yetu. Sasa tunajitegemea na afya ya ardhi yetu inarudi ." ("We depended on shop chemicals that cost more than our profits. Now we are self-reliant, and our soil is recovering.") This youth-led transformation advances multiple SDGs, from No Poverty and Zero Hunger to Innovation, Climate Action, and Gender Equality, showing what happens when local knowledge and African-built technology come together.

VILLAGE CASE STUDY 2: NKOARANGA VILLAGE

Mother & Daughter vs. Red Spider Mites

In Nkoaranga Village, a mother–daughter farming team faced a devastating outbreak of red spider mites (Tetranychus spp.) that threatened to wipe out their bean crop. The plants were covered in fine webbing, stippled feeding marks, and yellowing leaves, classic signs of escalating damage in the region's hot, dry conditions. With guidance from Mkulima AI, the daughter quickly mastered early pest detection and adopted a holistic agroecological protocol tailored to their environment. Together, they implemented daily high-pressure water treatments to dislodge mites, applied a homemade hot pepper–soap spray every four days for under TZS 2,200, planted flowers to attract predatory insects, and restored soil fertility through green manure and proper bean spacing. Over three months, the daughter became the lead user of the tool, helping her mother apply every step with precision.

The transformation that followed was remarkable. Pest-control expenses fell dramatically to just TZS 2,200 per treatment, the once-yellowing bean plants regained their vibrant green color, and the family fully replaced chemical dependence with sustainable, soil-building practices. The daughter emerged as a recognized digital champion in her community, training other women on early detection, agroecology, and soil restoration techniques she mastered through Mkulima AI. Reflecting on the journey, she shared, "Mama alikuwa hajui kwamba teknolojia inaweza kumsaidia. Sasa yeye ni mwalimu kwa wanawake wengine. Mkulima AI imeturudishia imani." ("My mother didn't know technology could help her. Now she teaches other women. Mkulima AI has restored our confidence.") This success story advances key SDGs, from No Poverty and Zero Hunger to Gender Equality, Innovation, and Climate Action, showing how local knowledge paired with African-built technology can transform livelihoods and landscapes.

VILLAGE CASE STUDY 3: SEELA SING'ISI VILLAGE

One Couple vs. Aphids & Fertilizer Dependency

In Seela Sing'isi Village, a married couple cultivating two hectares of cabbage faced a double crisis: aphid infestations were reducing harvest quality and quantity, while chemical fertilizer costs exceeded their profits, trapping them in a cycle of debt with agro-dealers. As animal keepers, they had a unique opportunity, and with Mkulima AI's guidance, they implemented a two-pronged agroecological strategy. For aphid control, they used daily soap-oil sprays, neem oil rotations, strong water sprays, and companion planting with marigolds, nasturtiums, and garlic to attract beneficial insects, all at a cost under TZS 600 per treatment.

For fertilizer management, Mkulima AI provided a calculator, step-by-step instructions to make organic manure, application guidance, and storage methods. Leveraging their livestock, the couple transformed cattle waste into nutrient-rich fertilizer, reducing input costs to zero. The results were remarkable: aphids were fully controlled, cabbage quality improved, and profits were retained entirely. As they shared, "Tulikuwa tunauza ng'ombe wetu ili kununua mbolea. Sasa tunachukua kinyesi cha ng'ombe na kuifanya mbolea. Mkulima AI imetuonyesha utajiri uliokuwa chini ya miguu yetu." ("We were selling our cattle to buy fertilizer. Now we take cattle manure and turn it into fertilizer. Mkulima AI showed us the wealth under our feet.") This transformation contributes to multiple SDGs, from No Poverty and Zero Hunger to Innovation, Climate Action, and Responsible Production, demonstrating the power of local knowledge, technology, and resourcefulness.

VILLAGE CASE STUDY 4: MAJI YA CHAI VILLAGE

One Young Woman vs. Dead Soil

> " *I spent years watching my soil die. There was no help. Now I have a good advisor inside my phone. My land is coming back to life.*"

In Maji Ya Chai Village, a young woman pursuing horticulture faced an almost impossible challenge: completely infertile soil. Years of failed crops, seeds dying before germination, no access to extension services, and no knowledge of soil restoration left her ready to give up farming entirely. With guidance from Mkulima AI, she implemented a soil fertility restoration protocol that included soil diagnosis to identify nutrient deficiencies, the addition of compost and green manure, strategic crop selection yams to improve soil structure and precise planting protocols with correct spacing, depth, timing, and mulching to retain moisture.

The results were transformative: dead soil became fertile, seeds germinated successfully, and she achieved her first harvest. Beyond the technical success, she became a Mkulima AI champion, training other youth and demonstrating that even dead soil can be revived with the right guidance. As she shared, "Nilikuwa nimekaa miaka nikiangalia udongo wangu ukifa. Hakuna msaada. Sasa nina mshauri mzuri ndani ya simu yangu. Ardhi yangu imerudi kuwa hai." ("I spent years watching my soil die. There was no help. Now I have a good advisor inside my phone. My land is coming back to life.") This story advances multiple SDGs, from No Poverty and Zero Hunger to Quality Education, Gender Equality, Innovation, Climate Action, and Life on Land, highlighting the profound impact of technology meeting farmers where they are.

IMPACT SUMMARY & COMPARISON

The Arusha impact is clear across economic, environmental, social, and technological dimensions. Economically, pest-control costs dropped dramatically: tomatoes from TZS 50,000 to TZS 3,800 (92% reduction), beans to TZS 2,200 (90% reduction), cabbage to TZS 600 (95% reduction), while chemical fertilizer for cabbage was completely eliminated, generating 100% savings. Soil restoration in Maji Ya Chai turned total loss into a successful harvest, yielding an infinite return on investment. Environmentally, all four villages stopped using chemical pesticides, two villages adopted 100% organic fertilizer, degraded land began regenerating, and biodiversity was restored through companion planting. Socially, seven women were directly empowered, youth led agricultural innovation, mother-daughter teams enabled intergenerational knowledge transfer, and household partnerships strengthened. Technology adoption flourished, with 100% offline functionality, a Swahili voice interface, Bluetooth sharing for farmer-to-farmer spread, and icon-based navigation accessible even to elders.

From Morogoro to Arusha, the movement continues to grow. In October 2025, Morogoro had just two villages, 20 farmers, and three crops, strawberries, tomatoes, and cabbage. By December 2025, Arusha included four villages, Usa River, Nkoaranga, Maji Ya Chai, and Seela Sing'isi, with dozens of farmers cultivating four crops: tomatoes, beans, cabbage, and yams. Mkulima AI is more than a tool, it is a movement. Every farmer becomes a champion, training others and expanding the network. This is how real development happens: from the soil up, from the people out.

WHY THE MKULIMA AI MODEL WORKS

The Mkulima AI model works because it is designed for the people it serves, built around five key pillars. First, Language Justice ensures the technology speaks Swahili, meeting farmers in their mother tongue rather than forcing them to learn English. Second, Offline-First Design allows knowledge to reach rural Tanzania where internet access is limited, working 100% offline with no connectivity barriers. Third, Agroecological Foundation places soil health and biodiversity first, using chemicals only as a last resort. Fourth, Community Distribution leverages Bluetooth to spread farmer-to-farmer, ensuring technology flows freely and peer-to-peer without gatekeepers. Fifth, Gender-Inclusive Design ensures women can lead, youth can innovate, and elders can participate through voice interfaces, icon-based navigation, and collaborative features.

The global message is clear: real innovation is happening in rural Tanzania, not just Silicon Valley. Mkulima AI proves that AI doesn't need the cloud, it can live offline on a phone; technology doesn't need English, it can speak local languages; distribution doesn't need app stores, it can spread via Bluetooth; and innovation doesn't need venture capital, it can be built with simple tools. If the world is serious about climate action, food security, and poverty elimination, we must build technology that serves billions, not millions, technology that works offline, speaks local languages, and costs nothing to share, and Mkulima AI is proof that this is possible.

MWALIMU NYERERE'S VISION & THE SOIL'S TESTIMONY

01 The Spirit of the Work: Mwalimu Nyerere's Vision Alive

"If real development is to take place, the people have to be involved." - Mwalimu Julius K. Nyerere. Mkulima AI embodies this principle. It is not technology imposed on farmers, it is technology with farmers, created by someone who understands their struggles and speaks their language. Across rural Tanzania, Mkulima AI puts farmers at the center, ensuring that innovation respects local knowledge, culture, and daily realities.

02 The Laptop That Changed Everything: Local Innovation in Action

This system was built on an old HP laptop by Erwin Nanyaro, a young Tanzanian who refused to accept that his people should be left behind. Without waiting for Silicon Valley, venture capital, or external permission, he created what farmers truly needed. Today, the technology is spreading, village by village, phone by phone, farmer by farmer, demonstrating that local innovation, born from understanding real challenges, can achieve scalable, impactful change.

03 The Soil Knows the Truth: Evidence in the Field

The soil itself testifies to Mkulima AI's effectiveness. In Usa River, pest costs dropped 92%; in Nkoaranga, a mother-daughter team restored their bean crop; in Seela Sing'isi, a couple transformed animal waste into fertilizer; and in Maji Ya Chai, dead soil returned to life. Because Mkulima AI works offline, in Swahili, and spreads via Bluetooth, it continues to deliver results across Tanzania and beyond. This is not just a field report, it is a declaration that African farmers do not need foreign "help," but technology that respects them, speaks their language, and works in their reality. And this is only the beginning.

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