Ethan Leem
Canyon Crest Academy
San Diego, CA, USA
Kenya, MaasaiGPT and Climate-Driven Food Insecurity
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Kenya: Community-Led AI Technology for Climate Adaptation and Cultural Preservation

The Maasai of Kenya and Tanzania represent one of the last pastoral communities to have sustained a traditional way of life for over five centuries. Even today, Maasai warriors spend their days herding cattle across rolling foothills and parched open fields, returning hours later with dust caked into their skin and livestock visibly depleted. This scene, repeated across generations, reflects not mere hardship but a civilization defined by a profound and reciprocal relationship with its landscape — one now under existential threat. Climate change poses that threat directly. In response, this paper proposes and introduces preliminary results from MaasaiGPT: a community-led AI solution designed to address climate vulnerability while preserving Maasai culture and language.

The Maasai community in the Amboseli region of Kenya numbers between 15,000 and 20,000 semi-nomadic pastoralists, and one hundred percent of that population lives in rural communities — there is no urban environment in Amboseli. The total population of the Maasai in Kenya and Tanzania is estimated at over 2 million: roughly 1.1 million in Kenya (according to the official 2019 Kenya Population and Housing Census) and around 1 million in Tanzania (an estimate, as Tanzania's official census generally does not track ethnicity or tribal affiliation). Governance follows a decentralized gerontocratic system in which leadership is age- and family-legacy-based. The climate is hot and dry, and the region has a diverse geography of wetland environments as well as dry plains; as terrain approaches Mount Kilimanjaro, forested foothills become common.

The average Maasai family consists of six people: two parents and four children. Most Maasai live in the village and observe traditional gender roles. Three core foods form the foundation of the traditional Maasai diet — milk, meat, and blood — all of them cattle-derived; the remainder of the diet consists of items like fat, honey, and tree bark, which are less commonly observed. Maasai families typically consume their own cattle, meaning the health of the herd is functionally equivalent to the health of the community. Maasai society is organized around seasonal relocation away from dry, infertile areas toward viable grazing land. Many Maasai have begun to enjoy increased access to education, though this is not affordable on a sufficiently large or consistent scale, and traditional medicine has sustained the community for centuries. Many Maasai villages do not have access to clean water, and traditional Maasai life does not hinge on modern plumbing and electricity.

Food insecurity is worsening over time, and climate change and other factors will only exacerbate the trend. Its roots are historical: when British colonialists arrived in Kenya, the Maasai were the dominant tribe, and they lost the more fertile environments, including the modern-day Nairobi area, to the British. They were relocated to harsher landscapes, mirroring the displacement of Native Americans. Nearly all Maasai in Amboseli are food insecure due to a layered system of driving factors, and over 2.1 million Maasai are affected in total. Climate stress sits on top of land dispossession, which undermines community mobility and breaks the pastoral food system. The

broken pastoral system demands adaptive solutions, but these cannot be delivered without sufficient Maasai representation in the policymaking branches of the Kenyan government.

As a semi-nomadic people whose health and subsistence are inseparable from cattle herding, the Maasai are disproportionately vulnerable to a crisis they did not create. As droughts grow longer and more severe, communities built around mobility face mounting pressure toward permanent sedentarization, and these compounding symptoms attack Maasai livelihoods from multiple directions simultaneously. The crisis does not affect all members of the community equally. Maasai women and children are disproportionately harmed by food insecurity. Men are fed the most nutritious meals due to their strenuous physical labor responsibilities in and out of the village. Decisions about slaughtering or selling livestock — the food of the Maasai — are reserved for men, so Maasai women and mothers are unable to make significant food-related decisions while men are away for days or weeks at a time during herding. In these periods, women, mothers, and children starve.

Any proposal must help the Maasai maintain their current way of life — their pastoral existence. Asking them to abandon that way of life and take up farming, for example, even if it might generate more food, would not be feasible: they do not know how, and they wish to preserve their traditions. This is therefore a multifaceted problem that must be approached in multiple ways: providing immediate solutions they do not currently have at hand, so that they can do daily work more effectively; helping them maintain their culture, knowledge, and language, which are eroding day by day; and ensuring that the solution is not imposed from outside but originates from within. History offers many examples of changes enforced from outside on the assumption that Western practices are inherently superior and indigenous ones outdated and primitive. Such approaches have failed: they were not welcomed by the communities they targeted, did not address what those communities actually needed, and produced friction and even outright conflict. It is ironic that, while the Western world itself struggles with so many problems, anyone would presume to export those problems to a tribe with a different way of life and thinking. Genuine progress requires a learning curve in both directions. I therefore propose a solution that is multifaceted and hierarchical — one that addresses immediate daily needs while also engaging long-term concerns, and that delivers what the Maasai want, not what outsiders presume they need.

To inform this work, we conducted interviews with the Maasai and consulted a non-profit organization that has worked with the community for more than sixteen years and earned its trust. Through those conversations, I identified three problems the Maasai face.

First, they need support for cattle herding under worsening climate conditions. They do not have access to modern weather forecasts and cannot anticipate when rain will come. There is also no government documentation of where the drinking water wells are, and these wells are not systematically maintained or updated. Finally, they do not know where good grazing grass can be found, so they must make long trips to distant locations with their cattle — trips that, without any information, come down to chance.

Second, Maasai culture and long-held knowledge are dying and urgently need to be preserved. The Maasai have long traditions and accumulated wisdom for surviving harsh conditions, such as knowing when to expect rain by observing the color of Mars seen with the naked eye at dawn, or sustaining communal practices that carry the community through long droughts. In Maasai culture,

no one eats alone: before eating, one must first find someone to share the meal with. This may sound strange to Westerners accustomed to an individualist way of life, but when everyone eats together, food is shared and someone who would otherwise be starving can be saved. All of this knowledge is dying, because it is transmitted only orally. The Maa language itself is disappearing, with no organized effort or investment to teach it in schools. If Maa is lost, the details and nuances of Maasai knowledge, wisdom, and culture will be lost with it.

Third, the crisis extends beyond the Maasai community to the entire Amboseli ecosystem. Most human communities, whether developed or not, maintain a human-environment relationship that runs in one direction: the community takes from the environment, and the environment receives nothing in return. The Maasai are part of the environment. Historic zebra migration patterns in Amboseli National Park, for example, coincide with Maasai movement in short succession; where the Maasai go, the zebra follow for food and water. According to Maasai pastoralists, the zebra "understand" the Maasai's nomadic search for fertile cattle-herding grounds. When the Maasai pastoral landscape-to-nutrition system breaks down under food insecurity, the landscape loses its environmental stewards. The effect is akin to removing a keystone species: animals in Amboseli lose the foundational presence that guides them to fertile lands, and when prey populations like zebras and wildebeest suffer, so do lion and hyena populations.

Finally, the Maasai need modern vocational training. Traditional Maasai labor revolves around three activities: men herd cattle, while women fetch water and braid. There is no formal vocational training that prepares the community to find new jobs or alternative sources of income. The Maasai have smartphones, but many have never seen or used a laptop — an irony given that most Western societies live amid a flood of electronic devices.

Synthesizing these observations, I propose a layered and sustainable community-led solution: Satellite Imagery and Weather Forecast (Layer 1), Maasai Knowledge, Wisdom, Culture, and Language Preservation (Layer 2), and Vocational Education (Layer 3). At the heart of this approach is MaasaiGPT (www.maasaigpt.org), a large language model integrated with three core applications: a grazing area and weather forecasting tool; a Maasai cultural knowledge chatbot; and a bidirectional Maa-English language translator. The platform is also cost-effective, because AI technology is becoming more ubiquitous and less expensive every day; leveraging AI to address the climate challenges facing the Maasai therefore seems a natural solution. A working version is available online at https://www.maasaigpt.org.

First, MaasaiGPT delivers grazing-area and drinking-water-well recommendations alongside weather forecasts (Layer 1), helping the Maasai perform better what they already do: cattle herding for the men, and water-gathering for the women. Drawing on publicly available Sentinel-2 satellite data from the European Space Agency at 10-meter resolution, MaasaiGPT classifies a 100 km × 100 km area of surrounding terrain into actionable categories: "excellent grazing," "moderate grazing," "poor grazing," "open water," "dense bush," and "bare rock." This classification is generated through a Grazing Suitability Score (GSS) computed per pixel from multiple spectral indices, which includes NDVI (Normalized Difference Vegetation Index), SAVI (Soil-Adjusted Vegetation Index), NDRE (Normalized Difference Red Edge Index) and NDWI (Normalized Difference Water Index). Results are rendered as plain-language labels on a color-coded map overlay, updated approximately every 30 days. With a working version of MaasaiGPT in place, its accuracy was validated by Maasai warriors over three months of on-foot field verification.

Previously, locating grass and water could require a four-hour one-way journey; the tool has significantly reduced that time by providing real-time grazing and water recommendations.

Second, MaasaiGPT offers a Maasai knowledge, wisdom, culture, and language preservation solution (Layer 2). The cultural knowledge chatbot documents Maasai heritage. Community members contribute knowledge through text documents, PDFs, and audio recordings — the latter automatically transcribed for those unfamiliar with digital tools. The system currently covers nine thematic areas including culture and tradition, oral history, pastoralism, land and environment, health and medicine, social structure, ceremonies and rituals, and Maasai education. Eighty-seven documents have been archived, and their significance lies in their provenance: every one was submitted by the Maasai themselves or by volunteers working directly with the community. The Maa-English translator addresses a parallel preservation challenge. While contemporary large language models support over 200 languages, low-resource languages such as Maa remain largely absent from their training corpora. Drawing on Peace Corps Maa language training materials and the Maa-language Bible, the project assembled over 20,000 Maa-English sentence pairs spanning both conversational and written registers, and achieved above 95% accuracy in short-sentence translation — a meaningful result for a language with limited digital presence.

Third, in 2025, a local vocational center for the Maasai was opened with thirty laptops donated by San Diego high-tech companies (Layer 3). The center is led by community members and open to all. It is Kenya's first community-run computer center, as well as the first ICT center accredited by the Kenyan government. In July 2026, the first 20 Maasai students graduated from this center.

The recommendation is to expand MaasaiGPT as a replicable framework for community-led climate adaptation. Expansion to additional communities throughout Amboseli, the rest of Kenya, and potentially neighboring areas of Tanzania is entirely feasible. Translation accuracy feedback from Maasai elders has yielded a 98% accuracy rate for MaasaiGPT's Maa translation feature.

MaasaiGPT's components are modular and transferable to any indigenous community facing climate vulnerability and cultural erosion. Replication requires no proprietary software, hardware, or data: the system draws only on freely available data sources and open-source frameworks, demonstrating that low-resource languages can be fine-tuned for LLMs at minimal cost. The knowledge platform supports document uploads, audio recording, and automatic transcription, enabling contributions from community members at any level of digital literacy.

Two major resources exist within Kenya. The first is the openness of the Kenyan government to invest in small, novel technologies; the government has sent members of parliament and other representatives to Amboseli to meet with My Chosen Vessels and to express their interest in supporting MaasaiGPT as a technology for indigenous resilience. The second, and arguably the greatest, is the openness of the Maasai population itself: MaasaiGPT's effectiveness depends on the Maasai community's involvement, since the Maasai choose which pieces of wisdom to train the model on and validate the accuracy of Maa translation.

Collectively, these tools can serve over one million Maasai across Kenya and Tanzania, demonstrating that community-led climate adaptation is achievable in under-resourced contexts. MaasaiGPT is also engaging the Kenyan National Museum and UNESCO for collaboration.

Regarding the development of a solution for food security, I believe that planning for long-term sustainability is just as important as developing the original solution. For the system to be sustainable, we need two things: people who can maintain it and sufficient funding to support its continued operation.

First, we need to develop local technical capacity. As we have seen with the vocational center connected to MaasaiGPT, maintaining the platform requires people who can implement new features, troubleshoot problems, and update the system. Fortunately, recent advances in AI-assisted development, particularly vibe coding tools such as Claude Code and OpenAI Codex, can significantly lower the technical barrier. By providing laptops and basic computer equipment, we can establish vocational centers similar to the one in Amboseli, Kenya. Local participants can receive practical computer and AI training while learning to maintain and improve MaasaiGPT using AI coding tools. This allows us to achieve two goals at once: provide valuable information technology skills and develop the local technical capacity needed to sustain MaasaiGPT.

Second, we need a sustainable funding model. We can develop a broader model by creating sister GPTs for Indigenous communities around the world, eventually forming a network of AI systems grounded in Indigenous knowledge and wisdom. A goal is that this broad network can expand opportunities for financial support in diverse, multifaceted ways.Unlike conventional large language models, which focus primarily on general knowledge and problem-solving, this network could provide perspectives based on cultural knowledge and generations of lived human experience. Its value would grow as more Indigenous communities participate and contribute their unique perspectives.

Many LLMs offer different models of their AI. For example, ChatGPT offers 5.6-Sol, 5.6-Terra, and 5.6-Luna. Claude offers Fable 5, Opus 5, and Sonnet 5. Users can toggle between different models depending on the intensity of their workflow. As MaasaiGPT expands to different indigenous communities and broadens its knowledge, the goal is that it can offer different models just like ChatGPT and Claude. MaasaiGPT can become a model of its own, alongside separate GPTs for other indigenous communities. Users could theoretically toggle between the Maasai, Kumeyaay, Kikuyu, or other indigenous communities.

This network could eventually support a membership or subscription model. Revenue could be used to maintain the technology, operate vocational centers, preserve additional Indigenous knowledge, and support participating communities. Ultimately, this creates a reinforcing cycle: vocational training develops local people who can maintain the technology; the network preserves and shares Indigenous wisdom; and revenue from the network helps sustain both the technology and the communities behind it.

MaasaiGPT represents a replicable model of community-owned technological empowerment. The framework developed here — community-validated satellite intelligence, fine-tuned low-resource language modeling, and consent-based indigenous knowledge archiving — is transferable to other indigenous communities facing analogous pressures. As climate change accelerates, MaasaiGPT offers evidence that the knowledge required to navigate a changing world may already reside within the communities most affected by it, and that the most durable technology is the kind built by those with the most at stake.

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