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In This Edition

Editor's Corner

Editor's Note

We are hereby publishing Volume 6, Number 1 of *EPPAD Bulletin*. Since the inception of the publication, we have put out a total of 11 issues regularly and on time. We hope to continue this tradition into the future. The Editorial Team would like to encourage pharmacy and allied professionals to submit manuscripts to the biannual (twice yearly) *EPPAD Bulletin* which comes out in March and September of every year.

In the current issue, various write-ups are presented. A special coverage appears in this issue on the announcement of the official publication of the Ethiopian Herbal Pharmacopoeia by the Ministry of Health, Ethiopia. EPPAD Traditional Medicine Working Group took an active role in the initiation and development of this important document. Innumerable scholars and institutions within Ethiopia and our team at EPPAD collaborated in realizing the trail blazing project.

Dr. Ermias summarizes the highlights of the 6th Annual EPPAD Conference that was held successfully on November 8, 2025, in Silver Spring, MD. At the Conference, several timely lectures were presented followed by lively discussions.

In the *Pioneers of Pharmacy Section*, the illustrious career of Professor Eyasu Makonnen appears. He is at the forefront of pharmacology research and well deserves coverage of his portfolio in this issue. In the *Meet Our EPPAD Board Members Section*, a brief introduction is given about our EPPAD Vice President, Dr. Raniya Al-Matari.

Three articles are published in this issue. In an article titled The *Future of Food, Beverages and Nutrition as Medicine*, Dr. Moa et al present a compelling argument on the role AI in transforming these natural substances into useful health commodities. Gabriel Daniel puts together a comprehensive manuscript on the versatile plant ***Enset.*** In this issue, a historical article prepared by five senior scholars is included. The authors were active in the field of herbal medicine during the early days. A significant progress has been achieved on Ethiopian medicinal plants since the appearance of this 1979 paper.

We hope you will find this issue to be interesting and informative.

Fekadu Fullas, Ph.D.

Editor-in-Chief, ***EPPAD Bulletin***

Dr. Tesfaye Biftu Scholarship

Dr. Tesfaye Biftu scholarship is now available for eligible Ethiopian - American students who are currently attending Pharmacy schools in North America.

For scholarship eligiebility & application vist https://www.eppad.org/scholarship

Application Deadline

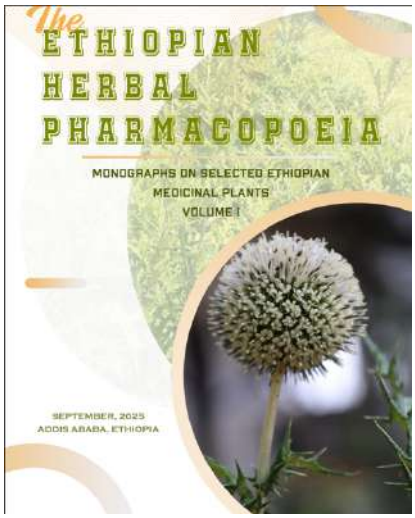
April 1, 2026 11:59pm EST

Visit: www.eppad.org

Email: info@eppad.org

Special Announcement

ETHIOPIA PUBLISHES ITS FIRST HERBAL PHARMACOPEIA



The first-ever Ethiopian Herbal Pharmacopoeia represents a significant milestone in the documentation and standardization of Ethiopia's rich heritage of medicinal plants. Ethiopia, with its diverse ecosystems and long-standing tradition of using herbal medicine, has a wealth of indigenous knowledge on the therapeutic use of plants. This first volume of the pharmacopoeia aims to preserve, promote, and validate this traditional wisdom by providing scientifically backed standards for the safe and effective use of selected medicinal plants. This pharmacopoeia serves as a comprehensive reference for healthcare professionals (both conventional and traditional), researchers, policymakers, and regulators in Ethiopia and beyond.

By systematically cataloging information on botanical descriptions, vernacular names, ethnomedicinal uses, chemical constituents, pharmacological studies, dosage forms, quality control measures, and adverse effects, the pharmacopeia aims to facilitate the safe and effective utilization of herbal medicines.

Furthermore, the document seeks to establish standards and guidelines for the production, regulation, and marketing of herbal products, thereby promoting quality assurance and consumer safety. As a pioneering effort, this pharmacopeia serves as a foundational reference for future editions, with the vision of fostering continued growth and development in Ethiopia's herbal medicine field.

The 387-page Pharmacopoeia offers detailed monographs on 36 medicinal plants that were carefully selected based on their historical significance, widespread use, availability, and scientific validation.

"…The publication of the first volume of the Ethiopian Herbal Pharmacopoeia represents a major milestone. This volume is the result of sustained efforts by the Ministry and a broad community of experts whose work reflects the depth of national expertise in traditional and herbal medicine research. I extend my sincere appreciation to the members of the Pharmacopoeia Development Expert Committee, EPPAD, and AHRI, as well as to the traditional healers, researchers, and professionals who contributed to this work in various capacities. Their dedication, commitment, and professional service were central to the successful completion of this important document. I am confident that the Ethiopian Herbal Pharmacopoeia will advance rational traditional medicine practices and support the effective integration of traditional medicine within the national health system. I commend this publication as an essential reference for researchers, practitioners, regulators, and policy makers, and as a valuable contribution to the continued strengthening of health care in Ethiopia"

Mekdes Daba (MD, MPH)

Minister

Ministry of Health

"This document is the result of a collaborative effort led by the MoH's Traditional medicine desk and Ethiopian Pharmacists and Pharmaceutical scientists in diaspora (EPPAD), with contributions from a dedicated multidisciplinary team of experts both from Ethiopia and abroad. ... would like to extend .. special acknowledgment to EPPAD for initiating and cascading this essential project… The Ethiopian Herbal Pharmacopoeia will serve as a critical resource for regulatory authorities, healthcare professionals, and practitioners of TM. It will also play a pivotal role in supporting TM researchers, helping to identify gaps in knowledge that require innovative research solutions. Ultimately, this document contributes to the Ministry of Health's overarching goal of creating an integrated health system, where traditional and conventional healthcare practices work together to improve the overall healthcare outcomes in Ethiopia. This first volume marks an important step toward strengthening the safety, efficacy, and quality of TM, and…. it will become an invaluable reference for all stakeholders involved in this field"

[*Pharmaceutical and Medical Devices Lead Executive Office*

Ministry of Health]

To Access Full Document:

Website: https://www.moh.gov.et/

(Under: Resources-Publications & Literature)

EPPAD News and Highlights

The 5th EPPAD Annual Conference Session Recap: Vaccines, Global Health Access, and Clinical Trials Capacity in Ethiopia

Prepared by Ermias Tilahun, PhD

The President of EPPAD, Dr. Ermias Tilahun, thanked participants who joined the fifth annual gathering and those who contributed to a vibrant, mission-driven discussion. Despite a few brief audio and connection challenges at the start, the program quickly moved into rich scientific and strategic content that centered on vaccine development and safety, global access to essential medicines, and our shared responsibility to strengthen clinical trials capacity and pharmaceutical innovation in Ethiopia.

1) Vaccine Development, Safety Testing, and the Role of Pathology

A key portion of the program focused on the scientific foundations of vaccine development, with emphasis on how modern tools are transforming both efficacy and safety evaluation. We discussed the importance of antigen design, novel adjuvants, and genomics to improve immune responses, particularly for older adults and other populations with weaker vaccine responses. The broader message was clear: successful vaccines require coordinated efforts across scientists, pharmacists, clinicians, pathologists, regulators, and public health agencies, with strong evidence generation and transparent communication to build trust.

A highlight of the session was the in-depth look at preclinical safety assessment and how pathologists help ensure both safety and scientific credibility before products reach human studies. Case-based examples reinforced how pathology supports decisions related to dosing, target-organ toxicities, and the interpretation of findings that can affect the direction of development programs. This conversation was especially valuable as it connected "behind-the-scenes" technical work to real-world outcomes: safer products, better studies, and stronger public confidence.

2) Ethiopian Pharmacists Association (EPA): Building for the Future

We also received updates on the Ethiopian Pharmacists Association (EPA) from Ethiopia and their efforts to build a multi-purpose facility that will support pharmaceutical education, training, and research. This initiative reflects a long-term vision for strengthening the profession and creating infrastructure that benefits future generations of pharmacists and scientists in Ethiopia.

The EPA team shared an ambitious fundraising plan and called on the broader community, including the diaspora and international partners, to support this transformative investment. We encourage EPPAD members to follow these developments closely and look for opportunities to contribute through advocacy, partnership, and resource mobilization.

3) HACT: Horn of Africa Clinical Trials—A Strategic Step for Ethiopia

One of the most anticipated updates was the presentation on the Horn of Africa Clinical Trials (HACT) initiative. The session highlighted the current gap in Ethiopia: the limited availability of functional private Contract Research Organizations (CROs), which constrains local and regional clinical trial activity, delays evidence generation, and reduces opportunities for workforce development.

HACT is being built as a Good Clinical Practice (GCP) aligned, digital-first clinical trials

organization, supported by diaspora expertise, with services planned across:

- Clinical trial monitoring
- Data management and database development
- Biostatistical analysis
- Regulatory affairs support
- Pharmacovigilance and safety operations
- Biomarker/laboratory analysis

The team shared progress in Phase 2, including deployment of SOPs and database management systems, alongside ongoing legal and operational steps to complete CRO setup in Addis Ababa. Importantly, the discussion emphasized HACT's goal to be an AI-native and modern organization, capable of partnering locally and globally while building sustainable local capacity.

The session concluded with an engaging panel discussion that addressed timely questions: vaccine hesitancy, mRNA vaccine development, ethical considerations in trials, dosing standards, and regulatory complexities. These conversations underscored that Ethiopia's clinical research future will depend not only on talent, but also on strong systems, ethics, and trusted partnerships.

4) Global Health Access: From Challenges to Solutions

A strong theme throughout the program was **access to medicines** and the structural barriers that limit health outcomes in low- and middle-income countries. The discussion emphasized the importance of:

- Good governance and effective regulatory systems
- Streamlined and harmonized drug approval processes
- Strong public-private partnerships
- Local clinical trials to generate context-relevant evidence
- Investment in workforce development and local manufacturing

We also discussed the need for transparent procurement systems and how digital tools can help countries "leapfrog" outdated processes. The message resonated: improving access to medicines requires both technical capacity and a commitment to equity-centered innovation.

5) Botanical Anti-Infective Agents: Innovation Rooted in Science

We also explored the promise and the limits of botanical anti-infective agents. The presentation reviewed examples of plant-derived compounds with encouraging **in-vitro activity** against resistant pathogens, alongside the real challenges of translating early findings into safe, effective clinical interventions. We discussed both globally recognized examples (including FDA-approved botanicals and widely used agents such as artemisinin) and the importance of rigorously studying traditional remedies from Ethiopia and beyond.

This topic sparked strong interest because it sits at the intersection of science, culture, and innovation. The main takeaway was balance: botanical agents hold promise, but meaningful progress requires well-designed studies, standardized products, and careful evaluation.

Member Engagement & Next Steps

To keep momentum and convert ideas into action, here are key follow-ups:

For EPPAD / Members

- Join EPPAD as a member and participate in working groups (research, policy, education, traditional medicine, clinical trials, and innovation).
- Submit articles for the biannual EPPAD Bulletin (success stories, research, policy commentary, career highlights, and thought leadership).

- Continue building partnerships with the Federal Ministry of Health, universities, and sister associations.

Continuing Education (CE)

- Attendees presented with access to CE certificates by scanning the QR code and using access codes: **"medicine"** and **"herb."**
- EPPAD promised to share the PDF of presentation after the conference.

EPA Facility Project

- EPA will continue fundraising toward the facility project and broader mobilization goals, with a call for diaspora and international engagement.

HACT

- Complete Phase 2 deployment of SOPs and database management systems.
- Work with legal teams in Ethiopia to finalize CRO establishment in Addis Ababa.
- Interested partners are invited to explore collaboration with HACT for clinical trial services.

Innovation & Knowledge Sharing

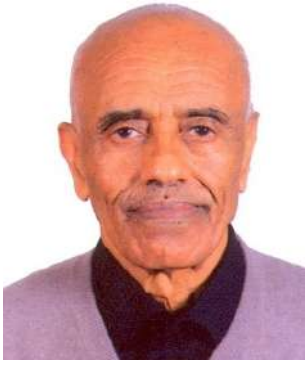
- Support the authors in our community, purchase books from the book signing (proceeds support EPPAD).
- We encourage members to write, publish, and share knowledge so we can expand future book signings and amplify our collective impact.

Closing

EPPAD's strength is our people, our expertise, our shared identity, and our willingness to collaborate. This session demonstrated how much we can accomplish when we connect science to action: improving vaccine confidence, strengthening safety

Pioneers of Ethiopian Pharmacy and Related Fields

EYASU MAKONNEN ESHETU



In this issue of EPPAD Bulletin we are featuring Prof. Eyasu Mekonnen who is a distinguished professor of pharmacology and is recognized for his extensive work in pharmacology and therapeutics. He is a Professor of Pharmacology at Addis Ababa University (AAU) within the College of Health Sciences and is considered one of Ethiopia's leading authorities on clinical trials and phytotherapy (the study of using plant-derived medications).

In addition to his routine activities in the department of Pharmacology and Clinical pharmacy, Professor Eyasu is currently serving as Deputy Head of the World Bank Supported Centre for Innovative Drug Development and Therapeutic Trials for Africa (CDT-Africa), CHS, AAU, Ethiopia.

Prof Eyasu graduated from Addis Ababa University in 1980 with Bachelor of Pharmacy (B.Pharm) degree as a Gold Medalist. He got his Master of Science (MSc) in Pharmacology from the University of Ljubljana, Slovenia, in 1985 and a Doctor of Philosophy (PhD) in Pharmacology in 1987 from the same University. He became a full professor of Pharmacology in February 2003.

He has served as the Head of Department of Pharmacology and as Coordinator of Biomedical Research and Training Program at the former Faculty of Medicine, AAU for several years and advised over 114 MSc and 34 PhD students.

Prof Eyasu has **taught courses** like Pharmacology, Regulatory Affairs, Clinical Trails, Clinical Toxicology, Good Clinical Practice, Health Research Ethics, Translational Medicine and Clinical drug Development **to undergraduate medical students as well as graduate and post graduate students** both nationally and internationally in. He has also trained many health professionals both locally and regionally (Other African professionals) in GCP, Bioethics, Clinical trials, etc for their professional development through short term training. He has served as an external examiner for both undergraduate and post graduate students in local and overseas universities.

His research and clinical trial interests and experience include phytotherapy, pharmacokinetics, pharmacodynamics, pharmacogenetics, and observational studies on infectious diseases (HIV, leishmaniasis, schistosomiasis, soil-transmitted helminthiases, and tuberculosis) and cancer (breast and cervical).

Prof Eyasu has widely **collaborated in research and academic work** with scientific institutions in the USA, UK, Sweden, Netherlands, Germany, Switzerland, Italy, Norway, Japan, South Korea,

Kenya, Tanzania, Rwanda, Uganda, Senegal, Ghana, South Africa, Nigeria, DRC, Sudan and locally with AHRI and EFDA, and Ethiopian Regional Universities.

Prof Eyasu served on different **national and international committees** such as Committee for Preparation of Pharmaceutical Sector Policy of Ethiopia, National Health Science and Technology Council Chairman, National Ethical Review Committee Founding Member, Ethiopian Bioethics Initiative (ETBIN)

Founding Member, Leishmaniasis East African Platform (LEAP), DNDi Founding member, National Medical Curriculum Review Panel , Ethiopian Pharmaceutical Association as vice president, Society for Clinical and Experimental Pharmacology in the PTA Countries, National Drug Advisory Committee member, Moringa Task Force Member, CDT Africa Scientific and Ethics Review Committee Chair, Advisory Committee on Clinical Trials (Chair), National Advisory Committee on Traditional Medicine of Ethiopia Member, Advisory Committee of Ethio-Korean Center for Research, Korea-Ethiopia Alumni Association Chair, Ethiopian Academy of Science Fellow, etc.

Prof Eyasu is a recipient of several **awards and recognitions** including Gold Medal award for being an outstanding student of the year 1980, School of Pharmacy, AAU; Gold Medals for Research & Development and Meritorious Service for Pharmacy Profession from the Ethiopian Pharmaceutical Association (EPA); Gold Medal High Honor Laureate (Abyssinia Award); Award in recognition of 20 years dedicated service for Drug for Neglected Diseases initiative (DNDi) and as founding member of Leishmaniasis in East Africa Platform (LEAP); Life Time Service Award (Medal and Certificate) from College of Health Sciences, AAU; Certificate of Recognition from Ethiopian Public Health Institute for investigation of *Moringa stenopetala;* Utility Model Group Award for Tea Granule Blend from Moringa *stenopetala* and for Herbal Adjuvant for the management of Diabetes and Hypertension from the Ethiopian Intellectual Property Office etc.

Prof Eyasu has **published** over 268 peer reviewed scientific papers and books/book chapters as well as over 180 monographs/training modules. His publications have appeared in various renowned local and international journals.

He served in different capacities in **editorial work** as Editorial Board Member of the Ethiopian Pharmaceutical Journal, Editorial Panel of East and Central African Journal of Pharmaceutical Sciences, Editorial Consultant of the Ethiopian Journal of Health Development, Editorial Board of the Ethiopian Medical Journal, etc.

About CDT-Africa

The Center for Innovative Drug Development and Therapeutic Trials for Africa (CDT-Africa) is a World Bank-supported Africa Centre of Excellence focused

- ✓ Researching and developing novel medicines, vaccines, and diagnostics using medicinal plants.
- ✓ Training and upgrading infrastructure in/for clinical trials
- ✓ Fostering partnerships across Africa and internationally.

It aims to build local capacity for health innovation in Africa, offering Master's and PhD programs, and training clinical trial professionals. The center leverages Africa's biodiversity, promotes regional collaboration, and works to reduce reliance on external medical supplies.

CDT-Africa is part of the Addis Ababa University College of Health Sciences and Tikur Anbessa Hospital, a public hospital with 700 beds and a clinical staff of nearly 600, that treats patients from Ethiopia and surrounding countries in the Eastern and Southern Africa regions. CDT-Africa has access to thousands of patients treated each year and all the equipment and resources housed at Tikur Anbessa Hospital and other hospitals within Addis Ababa and outside. It works across the large regions of the country, including the Amhara, Oromia and the Southern Regions. It has a large field study site in south Ethiopia with access to over a million residents.

CDT-Africa has previously hosted clinical trials, including trials of infectious diseases such as tuberculosis and leishmaniasis and non-communicable diseases such as schizophrenia.

More on Prof Eyasu in the link below.
https://orcid.org/0000-0002-9259-5288

Meet Our EPPAD Board Members

Raniya Ali Al-Matari, PhD, is a founding member and Vice-President of EPPAD. She is a regulatory and public health professional with a strong background in pharmacoepidemiology and clinical research. She brings more than five years of regulatory experience in drug review and regulatory science across academic and government settings. She currently serves as a Regulatory Health Project Manager at the U.S. Food and Drug Administration (FDA), where she supports high-quality regulatory decisions through project coordination, drug application review, and collaboration with multidisciplinary teams.

Dr. Al-Matari earned her PhD in Clinical and Administrative Pharmacy Sciences with a focus on Pharmacoepidemiology and Health Services Research, along with a Bachelor of Pharmacy degree. She has served as Adjunct Faculty at Howard University, teaching biostatistics and contributing to graduate and professional pharmacy education. Her expertise combines advanced data analysis, survey research, and medication adherence studies with hands-on experience in regulatory affairs, drug development, and public health research.

The Future of Food, Beverages, and Nutrition as Medicine

Moa Biftu, Beniam Biftu and Tesfaye Biftu

In the future, the integration of AI, biotechnology, and data-driven personalization will redefine food as a preventative healthcare tool rather than a passive calorie source.

Certain sections of this manuscript discuss nutrients, food components, beverages, and bioactive compounds that have been investigated for associations with health outcomes. Unless explicitly stated otherwise, claims regarding health benefits, therapeutic action, disease prevention, or treatment effects are not established by rigorous clinical evidence and should not be interpreted as medical advice. The information presented in this manuscript is intended solely for educational and scientific contextualization only. Health outcomes associated with foods and bioactive compounds often derive from centuries of observational epidemiology or preliminary mechanistic studies, which may not reflect causal effects. However, demonstration of safety and efficacy in controlled clinical trials is necessary before any food, supplement, or ingredient can be claimed to prevent, treat, or cure a disease under regulatory standards (e.g., FDA, EMA).

Abstract

The global food, beverage, and nutrition ecosystem is undergoing a fundamental transformation driven by technological innovation, climate pressure, population growth, and rising health challenges. This brief manuscript explores near-term (1–5 years) and long-term (5–20 years) changes in food production, beverage formulation, and personalized nutrition. It examines emerging technologies such as precision fermentation, cultivated meat, AI-driven agriculture, functional beverages, and data-driven nutritional personalization. The report also outlines execution frameworks and societal impacts, positioning food as a programmable, preventive, and health-optimizing system.

Introduction

Food systems have historically evolved slowly; however, the convergence of biotechnology, artificial intelligence, and health sciences is accelerating change at an unprecedented pace. Traditional agriculture faces mounting constraints including land scarcity, climate volatility, water shortages, and inefficiencies in nutrition delivery. Simultaneously, consumers are demanding healthier, more sustainable, and personalized food options. This manuscript identifies the core drivers of transformation and details how food, beverages, and nutrition will evolve from mass-produced commodities into intelligent, health-oriented systems.

1. Near-Term Evolution (1–5 Years)

In the near future, food systems will focus on transition rather than disruption. Precision fermentation will enable the production of animal-free proteins such as dairy and egg components, while hybrid foods blending plant, animal, and microbial inputs will gain consumer acceptance. AI-guided farming and robotics will improve yields and reduce resource consumption.

Beverages will increasingly serve functional roles, targeting cognition, gut health, hydration, and stress management. Alcohol alternatives and non-intoxicating mood beverages will expand rapidly. Nutrition will begin shifting toward personalization through DNA testing, microbiome analysis, and AI-generated dietary guidance.

For example, fermented beverages such as kombucha and alcoholic beverages including red wine and mead contain bioactive phenolics (e.g., resveratrol in red wine) implicated *in vitro* and in small human studies with markers of cardiometabolic health. Claims tying moderate consumption to disease prevention are controversial and not universally supported by randomized controlled trials (RCTs). Any potential benefit must be weighed against established risks of cancer, liver disease, and addiction. Evidence supporting benefit from mead specifically (honey wine) is currently limited and not substantiated by high-quality RCTs. Mead is high in antioxidant content which play a crucial role in combating oxidative stress in our bodies, which can lead to various diseases and

premature aging. Moreover, mead is rich in essential nutrients, including vitamins, minerals, and amino acids. These nutritional components are vital for our body's optimal functioning and overall health. Furthermore, mead has been historically valued for its potential medicinal properties. Traditional healers often used mead to alleviate various ailments, such as sore throats, digestive issues, and even insomnia. While scientific studies on the specific health benefits of mead are still limited, the abundance of natural ingredients in this ancient drink undoubtedly contributes to its potential therapeutic effects.

Adaptogenic herbs (e.g., *Rhodiola*, *Ashwagandha*) have been studied for stress modulation and fatigue in small clinical or pilot studies. Evidence is often limited by small sample sizes, heterogeneous endpoints, and potential bias. Claims of broad "stress resilience" in the absence of controlled trials should be described as preliminary and hypothesis generating.

Nootropic compounds (e.g., racetams, certain plant extracts) are marketed for cognition enhancement, but robust evidence from large, well-controlled RCTs demonstrating clinically meaningful cognitive improvement in general populations is lacking. Human studies often use surrogate markers or small cohorts, limiting external validity.

2. Mid- to Long-Term Transformation (5–20 Years)

Over the longer term, cultivated meat and cellular agriculture will move from niche markets to mainstream adoption. Vertical farming and urban food systems will reduce dependency on rural agriculture and long-distance transport. Programmable foods capable of adapting nutrient profiles will emerge. Beverages will become software-driven delivery systems, dynamically formulated through smart dispensers and apps. Nutrition will evolve into a continuous feedback loop powered by wearables and biomarkers, enabling real-time dietary optimization and longevity-focused diets.

3. Regulatory Constraints

Distinguishing *food* from *drug* is foundational. In many jurisdictions (e.g., FDA, EMA), therapeutic claims elevate a product to *drug* status, triggering stringent approval processes. Structure-function claims must be supported by substantial evidence; unapproved disease claims expose manufacturers and publishers to regulatory action. Many functional compounds (adaptogens, certain nootropics) may require pre-market approval or novel food status.

Regulatory frameworks for labeling and health claims for alcoholic products are particularly restrictive due to public health concerns.

List of what is coming in years ahead:

Precision Fermentation – Animal-free protein production

Hybrid Foods – Transitional plant-animal blends

AI Agriculture – Robotics and predictive farming

Functional Beverages – Health-targeted drinks

Alcohol Alternatives – Non-intoxicating social beverages

Personalized Nutrition – DNA and microbiome-based diets

Cultivated Meat – Cellular agriculture protein systems

Vertical Farming – Urban, controlled-environment agriculture

Programmable Food – Adaptive nutrient delivery

Longevity Nutrition – Diets targeting aging and cognition

Discussion Summary

The transformation of food, beverages, and nutrition represents a paradigm shift from consumption-based models to health-optimization systems. Technological readiness already exists for many innovations; however, scalability, regulatory alignment, and consumer trust will determine adoption speed. The integration of AI, biotechnology, and data-driven personalization will redefine food as a preventative healthcare tool rather than a passive calorie source.

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ENSET (Enset ventricosum)

History, Nutrition, Medicine, and Industrial Potentials

Gabriel Daniel (Aklile G Giorgis)

Highlighted Topics:

- Introduction
- *Enset* and its Historical Journey from the Forests in the North
- Oral Stories and Myths Around *Enset*
- The Importance of Enset for Environment
- *Enset* Products as Food (Kocho, Bulla and Amicho)
- *Enset* Products as Medicine
- Pharmaceutical Applications
- *Enset* Fiber & Biomass: Novel Industrial Applications
    - *Enset* fiber - an alternative to synthetic fibers
    - *Enset* Fiber as a source of Nanocellulose
    - *Enset* Biomass as a source of Biofuel and Caproate
- *Enset* Diseases
- *Enset* & Women
- Institutional efforts to modernize the *Enset* Value Chain
- Regulatory and Intellectual Property Rights

Introduction

This writeup is premised on the fact that there is limited awareness about *enset* except its food products and to provide a bird's eye view of *Enset*, its diverse benefits and its potential.

Ethiopia, the "Cradle of Humanity," is the sole center of domestication for *enset* (*Ensete ventricosum*), where farmers have developed hundreds of landraces over millennia that has sustained its people for over 10,000 years. While it resembles the banana plant and commonly known as the "false banana," this multipurpose indigenous crop is a cornerstone of Ethiopian culture, nutrition, medicine and ecology. The plant is typically propagated via the *Amicho* (corm), although rarely seeds from the fruit of mature *enset* are used also [1].

Today, it serves as a "superfood" staple for 26 million people—20% of the 130 million population and has evolved from a neglected "orphan crop" into a central pillar of Ethiopia's National *enset* Development Flagship Program (NEtDFP) food security and industrial strategy. The staple food (**Kocho**, Bulla, Amicho) is high in carbohydrates, fiber, minerals and phytochemicals. Leaves and stem residue which contain 13% protein, 10% sugar are critical livestock feed.

Although more landraces exist, current data shows some 270 landraces identified and used by the majority of *enset* growing communities in Ethiopia. These landraces are distinguished by a complex "folk classification" system for their Kocho and Bulla (60.5%), for their Amicho (corm) and delicious, crispy texture (23.7%), and Medicinal Landraces (~16.7%). Diversity is highest in the Southern and Southwestern Highlands, notably Gurage & Amaro Zones notable for having the highest diversity of medicinal landraces, Gedeo Zone for an ancient, UNESCO-recognized *enset*-based agroforestry system and Keffa Zone for wild relatives and high genetic diversity, particularly in forest areas like Sheka [2].

The shift from subsistence use to advanced industrial valorization transforms *enset* from a "rescue crop" into a pillar of Ethiopian industrialization. By converting agricultural residues into platform chemicals and nanomaterials, Ethiopia can increase producer income, mitigate environmental impact, and establish a competitive presence in the global green materials market.

Farmers often classify landraces as "Male" - generally late-maturing, disease-resistant, and vigorous, but with lower food quality or "Female"- early-maturing and prized for having tastier **kocho** (fermented bread) and *Amicho* (boiled corm), though they are more susceptible to disease.

***Enset* Historical Journey: From Ancient Forests in the North to the South**

The history of *enset* is deeply intertwined with the migration of Ethiopia's earliest inhabitants. Historians suggest *Enset* farming began tens of thousands of years ago with the descendants of the Omotic and Eastern Kushitic peoples (Sidamo origin), while others place the origin in Gurage and Kaffa. Others say the Agew people expanded its cultivation in the northern parts of the country.

Enset plant under Tis Esat (Tana) Falls (Photo by GD)

Historical records confirm European travelers between 1600 and 1800 (including Manuel de Almeida, Father Jeronimo Lobo, Walter Plowden, and James Bruce) documented *Enset* cultivation in northern regions for food and other purposes. At Deresge not far from Bahirdar, two types of Enset were reported and one was called Gunaguna. Gunaguna is a place in northern

Tigray and might have likely named after the plant. It was in the 1850s that *Enset* started expanding to the south of the country. It is believed that drought, disease, conflict or neglect taking good care of the plantation eventually pushed the primary cultivation southward. Although not used as food, *Enset* can still be seen around Lake Tana waterfalls and some communities in Tigray but not used for food [3.4].
Local folklore from old Enarya (around present-day Jimma) tells of ancient ancestors who, driven by extreme hunger, discovered the plant in the forest. Upon roasting the root (corm), they found it so sustaining and healthy that it was adopted as a staple food for the community [4].

Oral Stories and Myths Around *Enset*
It is said that a monk named Abba Zenamarkos came from Tigray with the army of King Amde Tsion to Gurage land and lived there for forty years. One day, Abba Zenamarkos was travelling from his home in Mukher Gurage to another place for a short time and entrusted his cow to a neighbor. On the Abba's return to his village, the caretaker told him that the cow died and he buried it in the backyard. The Abba went to the burial place and found a rare, broad-leafed plant grew from the grave. Upon eating it, he found it to be tasty and healthy for the body and called it an "Esset (እሴት) meaning Asset" provided by God to the people and the plant was named *Esset* or *Enset*. It is also linked to the coming of the army of Amde Tsion who introduced it to the area.

Oral story of *Enset* is also tied to the plant having emanated from heaven and that the Gurage people call it the "Tree of Life" and a day in a month is dedicated as spiritual observance. To this day, *Enset* is spiritually revered and used to mark life's milestones—births, sorrows, and joys. In some communities, *Enset* is planted around homes to ward off evil spirits. A further myth of the origin of Enset says that Adam had a cow in the garden of heaven. From the cow's dung a small plant grew which was consumed by a porcupine and wherever the porcupine eased itself seedlings of *Enset* started to multipy.
Another tale speaks of a man who was forced to leave the area by the order of an ancient king. The man travelled with his family sustaining their with the milk of a cow with her calves. Because of the lifesaving service the cow provided, the man named her the golden cow - "my gold (የኔ ወርቅ/ወርቁ)". Upon the cow's death, a broad-leafed plant grew from her burial site which became a source of lifesaving and tasty food to the family and calling the plant "my gold (ወርቁ)" just like the cow. In Sidamo and some places in South West Ethiopia the Enset is called Wesse or Workey [5].

The Importance of *Enset* for the Environment [6]
Enset is a botanical powerhouse with a unique growth cycle of up to 12 years. It provides climate resilience, deep-root soil protection, and a versatile raw material for the modern circular bioeconomy. Known as a "Rescue Plant," it is highly drought-tolerant and requires minimal off-farm inputs like chemical fertilizers. Its deep root systems prevent soil erosion and facilitate groundwater recharge. Modern applications have even developed erosion-control mats from *Enset* fibers that can retain up to 98% of soil on steep slopes.

Enset has significant potential as carbon sequestration agent by capturing and storing atmospheric carbon dioxide to reduce greenhouse gases that drive global warming and mitigate climate change thereby generating carbon credits.
Enset Products as Food [1,2]
Enset (*Ensete ventricosum*) is often called a "superfood" because it provides a reliable, starchy energy source alongside therapeutic minerals and phytochemicals.
Enset provides the three primary food staples: **Kocho** & Bulla - the processed food products that retain significant carbohydrate and antioxidant properties, and Amicho - the underground corm, the most nutrient-dense part of the plant. While *Enset* is a mineral and energy powerhouse, it is low in protein. Traditional diets balance this by serving *Enset* with milk, yogurt, or legumes

Kocho (ቆሬጭ): The Fermented Pseudo stem
Kocho is the primary energy source for millions and is prized for its long shelf life and portability.
It is produced by scraping (decortication) the bundle of overlapping leaf sheaths and mixing with grated underground corm. This pulp is then buried in leaf-lined earthen pits to undergo natural lactic acid fermentation for weeks, months, or even years.

It is exceptionally high in soluble carbohydrates and starch.
Once fermented, the dough-like mass is squeezed to remove liquid and baked into flatbread or prepared as powdered and baked in a sort of cereal mix with butter, cabbage etc.
In Sidama, it is prepared as ***Kekelo*** (bread roll), *Furfurame* (crumbs), or *Omolcho* (flat bread).

Bulla (ቡላ): The high-grade starch and medicinal part
Bulla is considered the highest-quality product of the *Enset* plant, often referred to as "refined gold" due to its purity and digestibility.
While processing **Kocho**, the liquid squeezed from the pulp is collected. The high-grade starch settles at the bottom, and the water is poured off. The resulting paste is then dehydrated to form a white powder. The powdered **Bulla** is baked like flat bread or made into porridge.
It is nearly 99% pure starch with a high amylose content (29%). It is gluten-free and highly digestible, making it ideal for children, the elderly, and those recovering from illness. Its unique gelling properties make it a superior natural binder and thickener for both the food and pharmaceutical industries.

Amicho (አሚኾ): The underground Corm
Amicho is the underground, potato-like part of the *Enset* plant that provides immediate nutrition without the need for fermentation. The corm is harvested, cut into chunks, and boiled similarly to potato or cassava. It is typically harvested from immature plants or specific "female" landraces. **Amicho** is rich

in minerals and contains 17 of the 20 essential amino acids, with a particularly high concentration of Arginine, which is vital for bone healing and tissue repair. The Amicho is used as critical part of the plant for propagation. A single corm can be divided to produce up to 200 new seedlings.

***Enset* Products as Medicine** [2,5,7]

In Ethiopian traditional medicine, *Enset* (*Ensete ventricosum*) is a "biological pharmacy." It is utilized to treat or manage more than 100 different health conditions.

The medicinal value of *Enset* is concentrated in the underground corm (**Amicho**) and the starchy **Bulla**, which together account for approximately 89% of its clinical applications. The products are served with milk, yogurt, or butter to enhance medicinal effect.

Research into *Enset's* "medicinal landraces" (such as *Astara*, *Kibinar*, and *Guarye*) has validated indigenous knowledge, revealing a complex profile of minerals, amino acids, and bioactive phytochemicals that support bone healing, tissue regeneration and disease prevention.

There is a consensus among indigenous healers that landraces with red pigments (often called the "red carpet" varieties) possess the strongest medicinal benefits.

To transition these indigenous knowledge and products into the modern global market, further research is required to standardize dosage and formulation, extract and determine concentration of bioactive substances and minerals in the different landraces etc. By standardizing Enset-based medicines, Ethiopia can modernize its traditional pharmacopeia, reduce reliance on imported synthetics, and supply high-value bioactive compounds to global markets.

Medicinal *Enset* Landraces and Their Traditional Therapeutic Uses (partial) [1,2,5,7]

The nonedible parts of *Enset* are also used in traditional medicine as shown in the table below.

- Pseudo stem: Sap is used for wound healing, treating abdominal pain, cough, and as a source of medicinal sap. Rich in carbohydrates and minerals.
- Leaf (Koba): Infusions and ashes are used to treat hepatitis and liver complaints (detoxify the liver)
- Seed: Used to treat debility, diabetes, and kidney stones. It contains alkaloids, steroids, and phenols.
- Root: Infusion is used as a detoxifier to treat hepatitis and liver complaints.

Landrace (Variety)	Key Nutraceutical Advantage	Traditional Medicinal Value	Other
Astara (አስታራ) – Gurage	• High Calcium, Zinc and Phosphorus. • Arginine (most abundant free amino acid in Enset, a precursor to nitric oxide and proline). Critical for bone mineralization, osteoblast regeneration and collagen synthesis	Bone fractures, inflammation, pus extraction, tissue regeneration, wound healing, and cardiovascular health.	Known as the "Mother of All Ensets"
Guarye (ጓርየ)- Gurage	• Rich in Protein and Phosphorus.	Dislocated tendons, bone strength, and erectile dysfunction.	
Agade (አጋዴ)- Gurage	• High Arginine Collagen synthesis and tissue repair	Back pain, bone fractures, and joint displacement; Energy & Vitality, enhance stamina and libido in both humans and livestock.	Known as the "The Power of Love."
Kibinar (ቅብናር)- Gurage **Yedem Arett (የደም አርጥ) - Gurage**	• High Protein & Tannins. • Arginine, Lysine, and Leucine • Phenylphenalenones - potent phytoalexins Antitumor/Antimicrobial/Antiprotozoal/ Anti-inflammatory properties Vital for collagen synthesis, tissue repair, and bone healing	Damaged internal organs, sprains, and swelling. Respiratory issues (cough), Liver disease/hepatitis and urinary tract infections, Eye redness. Significant activity against human parasites, including *Leishmania donovani and Trypanosoma cruzi.*	Kibnar often used as a follow-up treatment to Astara.
Quashquasheye (ቋሸቋሸየ)- Gurage	• High Arginine Levels. Essential for rapid collagen synthesis.	Tissue repair and deep wound healing	
Kake, Mundo and Kerse (Gedeo) ***Ado (sidama)*** **Argama (Wolaita)** **Loffe & Sweete (Gamo & Areka)** **Tayo (Bonga)**	• High Zinc and Phosphorus	Orthopedic issues, skin ailments, and internal wounds	
Sapara (ሣፓራ)- Gurage **Ado, Genticho, Midashsho, Askala (Sidama)**	• Anti-inflammatory phytochemicals (Tannin) Astringent & Stimulatory.	Placenta removal, post-partum hemorrhage, and birth-related swelling	Known as the "Midwife's Plant." Pounded leaf decoctions are also used to stimulate labor

Pharmaceutical Applications [8]
The most significant leap in *Enset* has been in the production of starch for pharmaceutical and textile use. Arba Minch University and the Sidama Agricultural Research Institute have successfully piloted Enset starch. This is a critical import substitution move to reduce reliance on corn-type starches. The Yirgalem Integrated Agro-Industrial Park (IAIP) hosts the first large-scale extraction units.
With starch ~ 99.24% on a dry basis, high amylose content ~ 29%, low fat, protein, and ash content *Enset* starch is becoming an alternative to potato or corn starch. Because it has high water-binding capacity and strong gelling properties, starch extracted from *Enset* is increasingly recognized in tablet manufacturing as a superior binder, disintegrant and gelling agent.
Starch extracted primarily from the ***Amicho*** (corm) is utilized as a high-purity pharmaceutical excipient. *Enset* starch can act as a natural gelling agent to replace agar in laboratory microbial cultures. *Enset* starch is also being utilized as a high-performance thickener and stabilizer in food sauces and dairy products due to its high firmness and gel stability.
Phytochemicals extracted from the pseudo stem sap are being researched for use in fragrances, lubricants, and pharmaceuticals. *Enset* is rich in polyphenols, Flavonoids and tannins which are primarily responsible for its antioxidant, antimicrobial and anti-inflammatory effects. Fermentation (to produce *kocho*) actually enhances the antioxidant activity of these phenols, making the nutrients more bioavailable while neutralizing harmful free radicals in the body [2,9].

Standardized bacterial/yeast cultures (lactic acid bacteria and yeast) from *Enset* are being developed as liquid microbial starter cultures to speed up industrial-scale fermentation.
Bioactive compounds from *Enset* such as Phenylphenalenones (PPs), polycyclic aromatic ketones, acting as phytoalexins that defend the plant may inhibit tumor growth hence used as antifungal and anticancer medicines and are reported as highly toxic to protozoan parasites and nematodes. They are also used for liver problems [9].

Enset is scientifically distinguished from other staples by its high concentration of Arginine, an essential amino acid. The primary reason why specific *Enset* landraces are used in Ethiopian traditional medicine for bone healing and tissue repair is mainly due to Arginine and selected minerals like calcium, phosphorus and zinc.

Arginine is a precursor for proline, which is a fundamental building block of collagen. It serves as the sole substrate for the synthesis of nitric oxide, a powerful vasodilator. This increases blood flow to the site of an injury, delivering necessary nutrients and immune cells to accelerate healing. By stimulating nitric oxide, Arginine can help lower blood pressure and improve overall cardiovascular function. Arginine is a precursor to polyamines, which are critical for cell growth and division during the wound repair process. Arginine plays a role in regulating nutrient metabolism and has been studied for its potential to ameliorate metabolic syndromes like obesity and diabetes.

Recent studies show *Enset* pseudo stem to be a massive source of Glucomannan - a high-value hydrocolloid which was often a "by-product" or rather than an isolated supplement. Glucomannan from other plant sources has established its use as Prebiotic & Metabolic Health product in weight management and supporting healthy gut bacteria. Glucomannan is a potential area of further research and development of *Enset* in Ethiopia [10].

Enset is particularly advantageous for caproate production compared to other crops. Caproate has several pharmaceutical and cosmetic benefits. It acts as an intermediate in the synthesis of various drug compounds. Due to its antimicrobial properties, caproate is used in feed additives and antibiotics to promote animal growth and as a natural plant growth promoter. In cosmetics, it serves as a base for high-end fragrances and emollients.

Enset Fiber & Biomass: Novel Industrial Applications [11].
Enset fiber is increasingly recognized as a superior, eco-friendly alternative to synthetic fibers and other natural inputs like sisal or cotton.
Ethiopia generates over 150,000 tons of *Enset* fiber residue annually as a byproduct of traditional food processing (specifically from ***Bulla*** and ***Kocho***). This lignocellulosic biomass historically was treated as waste or used for low-value cordage, and now at the forefront of a circular bioeconomy. Characterized by high tensile strength, exceptional length (up to 6m), high cellulose (60–70%) and low lignin (under 6.8%) content, and biodegradability, Enset fiber shows competitive advantages of replacing synthetic polymers to reduce carbon footprint with a potential of being re-engineered for high-tech applications ranging from biofuels to nanotechnology [10].

Enset fiber - an alternative to synthetic fibers
Enset fiber, is being investigated for numerous novel industrial applications beyond traditional ropes and mats, primarily due to its high cellulose content, low lignin content, good mechanical properties, and biodegradability.

Enset fiber emerges as a high-performance, sustainable alternative to synthetic fibers like polyester, nylon, and glass fiber. While synthetic fibers are prized for their consistency and weather resistance, *Enset* offers

superior specific strength, lower weight, and a significantly smaller environmental footprint.

The natural hollow structure of *Enset* fibers provides inherent soundproofing and thermal insulation properties that solid synthetic fibers lack.

Enset fiber is high-quality high cellulose fiber and starch for producing specialty papers (like currency, filter paper, tea bags); packaging industry (like sacks, ropes, mats); advanced bio composites (reinforcing agent in bioplastics, fiber-reinforced cement, floor tiles, ceiling boards, wall partitioning, and general construction components); bio-resin composites in automotive and aerospace interior parts; and Erosion-Control Mats for soil preservation and slope stabilization. Fiber ash can also replace up to 25% of conventional fillers with bituminous mixtures [6].

***Enset* Fiber as a source of Nanocellulose** [11,12,13].

Cellulose is the most abundant, natural, renewable and biodegradable polymer that occurs as a nanostructure in plants. It is made up of bundles of long chain polymers of sugar bound together through hydrogen bonds. Nanocellulose is a family of cellulosic material that has at least one of their dimensions in the nanoscale.

Although no significant study has been done on the production of cellulose nanocrystal from *Enset* fiber, the high cellulose content and low lignin levels, Enset fibers is becoming a prime candidate for research and production of cellulosic nanocrystals (CNC).

Innovators have started looking at nanocellulose for a variety of applications and penetrating many market sectors such as batteries, supercapacitors paints/coatings, liquid crystal displays (LCD), optical films, drug delivery systems, tissue engineering, and other biomedical products, coatings & adhesives, printing, bioplastics, cosmetics and food industry as thickeners and stabilizers.

Enset Biomass as a source of Biofuel and Caproate [14]

Enset is increasingly recognized as a versatile biorefinery feedstock due to its unique chemical composition, specifically its high cellulose and exceptionally low lignin content. This allows for easier microbial breakdown compared to traditional wood or straw.

Researchers are now converting massive amounts of *Enset* fibrous waste into Biofuels such as Biobutanol (used as direct gasoline replacement), Biogas – Methane (used for cooking, heating, power plants), Hydrogen (used for fuel cells, clean electricity) and Caproate, a medium-chain fatty acid (MCFA) with high energy density and low water solubility, making it a versatile chemical platform in many applications being used as specialty chemicals base to synthesize esters high-end fragrances and emollients and also chemically upgraded into long-chain alkanes, making it direct Bio-Jet Fuel Precursor that can power jet engines as sustainable aviation fuel – (SAF).

***Enset* Diseases** [6]

Enset diseases are significant factors that challenge production and productivity. The main diseases that affect Ensets are caused by bacteria, fungi, viruses (bacteria, fungus, viruses), and those that affect the roots are worms, hedgehogs, mites, etc.

The most common disease in Ethiopia is Enset Bacterial Wilt (EXW), which is caused by the bacterium *Xanthomonas campestris pv. musacearum* (Xcm). This is the single most destructive disease which can destroy the entire farm. Other bacterial diseases affect the underground corm and the protective leaf sheaths. Parasitic nematodes damage the roots and corm, often predisposes the plant to secondary infections like bacterial wilt. Various fungi and viruses have been reported to cause leaf spots and stunted growth.

Bacterial Wilt disease is highly contagious and spreads through contaminated farm tools, infected planting materials (suckers), and sometimes by insects or animals. Currently, no drug has been found that can cure the disease or kill the bacteria. Excavations and agricultural facilities that touch contaminated Enset plants and soil transmit the disease.

To prevent the spread of the disease, it is important not to reuse contaminated agricultural equipment, to keep Enset plants out of the vicinity of infected plants, to remove or carefully bury infected plants by burning, sourcing planting material only from certified, non-infected areas or to educate the local population. Mass-production using tissue culture and distribution of disease-free seedlings to replace infected farm stock is a strategic approach that is being pursued.

***Enset* & Women**

Enset production for food is traditionally a labor-intensive task performed primarily by women. Women play the lion's share of fertilizing, weeding, peeling and scraping the pseudo stem (trunk) with a bamboo or wooden tool to separate the starchy pulp from the fiber, preparing the Bulla, chopping and pulverizing the **Amicho** into a mash, preparing and storing the **Kocho** in a pit lined with *Enset* leaves for weeks to several years, and cooking it in various ways and presenting it for food. The role of men is to prepare suckers from the corm and monitor the growth of the suckers and fell the mature *Enset* for the women to undertake the above tedious and demanding task.

Institutional Efforts to Modernize the *Enset* Value Chain

The Ethiopian government officially launched the National *Enset* Development Flagship Program (NEtDFP 2024–2030) in July 2025, a primary vehicle for Enset transformation, elevating *Enset* otherwise long considered "orphan crop", to a strategic commodity and industrial powerhouse. *Enset* Seed Bank and an *Enset* Center of Excellence are established to serve as centralized hubs for research, training, and germplasm conservation [8].

To address the traditional labor burden of women and address the challenges and exploit opportunities/potentials, national research institutes like the Bio and Emerging Technology Institute (BETin) of the Ministry of Innovation and Technology, Soddo, Arba Minch, and Hawassa Universities; Ethiopian Biodiversity Institute, Kew Royal Botanical Gardens, and NGOs like Alabaster International etc. are collaborating with NEtDFP in comprehensive modernization process.
Over one hundred thirty woredas have been targeted for *Enset* scaling-up and transitioning from labor-intensive manual processing by establishing centralized hubs for integrated hygienic mechanized processing for grating, pressing, decortication, pulverization, drying, storage etc. New industrial hubs and processing clusters like Arba Minch University (AMU) Hub (dedicated *Enset* Processing Facility and a tissue culture laboratory to mass-produce disease-free seedlings); Chencha District (community-based processing site replacing manual labor with automated scrapers and squeezers); Dorze "Lucy *Enset*" (a model for value-added products, specializing in high-hygiene packaging, cookies, waffles etc. and waste management using *Enset* waste for biogas) are planned or operational under this strategy.

The government is integrating *Enset* into existing agro-industrial parks to facilitate large-scale export and pharmaceutical-grade processing like Yirgalem IAIP (Sidama Region) (primary hub for Industrial Starch extraction, targeting the pharmaceutical and textile industries); Bulbula IAIP (Oromia) (target for *Enset*-based Bioplastics research); etc. New pilot projects in the Wolayta and Gurage zones are utilizing *Enset* biomass waste for biobutanol and biogas production, moving toward a "zero-waste" industrial model.
NEtDFP is in the process of pilot introduction of *Enset* from Oromia and Sidama to drought-prone Northern regions (Lalibela, Gondar, Aksum) to build climate resilience to ensure permanent food security.

Digital agriculture using AI-driven apps are being launched to provide farmers with real-time data on soil health, disease diagnosis, landrace selection, weather pattern forecasting and carbon sequestration tracking.

NEtDFP is looking at improving the use of Mandillo *(Crassocephalum macropappum)* a phytochemical rich indigenous local plant used as natural starter culture by the Sheka people of South Western Ethiopia to speed up breakdown of the plants' fibrous pulp and using bioreactors to reduce fermentation time, enhance nutrient profiles, and eliminate the strong odors traditionally associated with the process (a characteristic cheese/goat smell due to Caproic acid in *Enset* products) [1].

Regulatory and Intellectual Property Rights [15]
Ethiopia is home to over 6,000 plant species and is the primary center of origin for several globally significant crops, including Coffee *(Coffea arabica)*, Teff *(Eragrostis tef)*, Noug *(Guizotia abyssinica)*, and Enset *(Ensete ventricosum)*.
Because *Enset's* primary genetic diversity exists almost exclusively within Ethiopia, the government maintains strict sovereignty over these resources to prevent unauthorized biopiracy and ensure the nation benefits from their commercialization.

Historically, Ethiopia has struggled to capture the full economic value of its indigenous species (such as **Vernonia** *(Vernonia galamensis)* for environmental pollutants, *Endod (Phytolacca decandra)* for health, and **Teff** *(Eragrostis tef)* for gluten-free markets). Regulated, scrutinized and monitored collaborations have become the gold standard in times when biopiracy has become a global challenge.
As *Enset* moves into high-tech sectors, and as a "strategic genetic asset" with a potential role in solving global nutrition, health challenges and industrial feedstock, the regulatory landscape needs to ensure equitable outcomes with any commercial or academic engagement with *Enset* to enforce Access and Benefit Sharing (ABS) principles and other national and international protocols.

Note from the Editor: A shorter version of an article on *Enset* (in Amharic) written by the same author was published on www.semenaworq.org in February 2026. This is a more expanded English version to reach English readership.

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THE POTENTIALITIES OF TRADITIONAL HEALERS AND INDIGENOUS DRUGS IN HEALTHCARE IN AFRICA*

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THE POTENTIALITIES OF TRADITIONAL HEALERS AND INDIGENOUS DRUGS IN HEALTH CARE IN AFRICA

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1. The Position of Traditional Medicine in Ethiopia

Ethiopia is essentially rural. In 1974 it was estimated that only 10.9% of its people live in towns of populations exceeding 2000 (Statistical Abstracts. 1975). The rural nature of Ethiopia implies that its social services institutions are essentially traditional. This applies to medical services as well. Ten years ago, i.e. in 1959, there was a total of 83 hospitals in Ethiopia. Of these, 43% were in Addis Ababa and Asmara, yet only 3% of the population of the country lived in these cities (Richir, 1969). The picture has now only slightly been changed, in 1972 there were 85 hospitals, excluding those of the armed forces, out of which 30 (1.e. 35.3%) were in Addis Ababa and Urban Eritrea, and ** population of Addis Ababa and Urban Eritrea was 1.425,580% or 6.2% the whole population of the country (calculations based on data from statistical abstracts 11975).

The Minister of Health in his opening speech to this meeting has stated only 20% of the total population of Ethiopia has access to any modern health facility. The 80%, therefore, still depend on traditional medicine and the traditional healer for all of its health care. A large proportion of the health care needs of even the 20% with access to modern health care is in fact catered for by the traditional sector. Kloos et. al. (1978) thus found that the biggest market for traditional medicines in central Ethiopia is Addis Ababa.

This, apparently, is not the experience of Ethiopia alone. A panel of experts on traditional medicine convened by then WHO Regional Office for Africa (1976) in Brazzavile, stated, "Traditional Medicine was currently being applied to a large proportion of the population in many countries...".

There can thus be no doubt that whether constructively or destructively, traditional medicine should be the most important focus for the attention of the coordinating and regulating activities in health care of the Ethiopian State if, as it must be assumed, the number of people served by it is the main criterion. There has, however, not been even an official acknowledgement in the Ethiopian laws except for a brief statement stipulating that a traditional healer can practice, if he is not sued for damage. This is a consequence of the lamentable attitude of our now defunct feudal order which, accepting a traditional system under the carpet placed only imitations of European systems on the carpet. Or, to adopt another hackneyed saying our Ostrich defunct feudal order decided to busy its head in the sand under the stare of Europe.

Now that we are having a revolution, has it changed? Not yet. The start seems, however, to have been made for a complete involvement of the Ministry of Health. A committee has for some time now been established to chart the hows and whys of this involvement, and an office has, for the first time, been established in the Ministry of Health to spearhead the involvement. Even now, however,

there is the feeling that events are not progressing at a satisfying pace.

Assuming that traditional medicine in Ethiopia will be integrated with modern medicine and become more useful both through the curbing of its harmful aspects & the open accessibility of its useful aspects, let us evaluate its attributes, look at the problems involved, the fruits that can be reaped and the harmful aspects that have to be corrected. The fact that Ethiopian Traditional Medicine is hidden from official existence, and the fact that we, as scientists, are part of the banishing officialdom limits our horizons, and information gathered when traditional medicine officially exists in the future may prove some of the following observations naive, or even wrong. However, we expect this to be lessened by the fact that one of our members is a traditional healer.

2. The Attributes of Ethiopian Traditional Medicine.

The attributes of Ethiopian traditional medicine are essentially the same as those encountered in the rest of Africa, as very briefly outlined by the panel of experts on traditional medicine at Brazzaville (WHO Regional Office for Africa, 1976). We shall, nonetheless, outline them here.

3. Negative Attributes.

As pointed out above, traditional medicine in Ethiopia functions more or less underground. It thus suffers from all the problems of clandestine existence. A clandestine organization can often have the necessary coordination for the expression of a distinct personality; but traditional medicine is a system and not an organization. Hiding has not only made it inscrutable, but it has also, in the absence of openly expressed and organizationally enforced norms, eroded its personality through fringe components, e.g. the deterioration in length of time and in quality of apprenticeship, the proliferation of quacks and the recourse to sorcery.

Even if traditional medicine were not clandestine, there would still have been many aspects of it which would compare unfavorably with modern medicine.

When diagnosis is made by an experienced traditional healer, the identification of diseases that have obvious superficial manifestations would, no doubt. be precise. Skin diseases are thus well known and unusually successfully treated by traditional healers. The diagnosis of internal diseases is, however, very unsatisfactory.

Even when a disease has been precisely diagnosed and its medicine is known, dosage is imprecise. This is so in spite of the traditionally standardized small weights used in Ethiopia (Strelcyn, 1955). Even if weighing were precise, there is an inherent imprecision in dosage arising from the variability of the concentration of the active ingredients in the concoctions used. Since medicines are rarely given from a single source but are concocted from several to many ingredients, the majority of the ingredients being claimed to be aimed at diluting the impact of the active ingredients (Gelahun Abate, personally compiled pharmacopoeia), the importance of this imprecision cannot be estimated until these claims are examined.

Traditional medicine is an art and a lore transmitted from individual to individual, usually from father to son. The lore is kept more or less a secret. There has, however, been a flow of information from healer to healer usually on an exchange basis. The pace of self-improvement in this barter system is obviously slow.

The traditional healer improving himself through this system is of continually changing expertise. When he comes in contact with modern medicine, he retains this attitude, and there are reports, which are difficult to check, that much of the "traditional concoction" nowadays in the urban areas consists of antibiotics and sulpha drugs. Even if these allegations are not true, the fact still remains that the traditional healer whose ways are being studied by scientists is changing very fast under the contact with them, and the distinction between the traditional and the modern parts of his conceptions become

irrecoverably lost. Antibiotics in a "traditional" concoction would easily be identified, but modern concepts of diseases and diagnoses that creep into traditional medicine are not easy to identify. For this reason and others, some of which are exemplified by the problems involved in identifying medicinal plants discussed below, the correspondence between traditionally recognized diseases and scientifically recognized ones is ill known, and this is proving a serious setback to our studies. Recently, a medical doctor has agreed to work with us.

This complication is not the only difficulty encountered in understanding and unveiling Ethiopian traditional medicine. Some of the problems involved in identifying medicinal plants as examples of the problems involved in the identification of diseases, systems, drugs, etc., are given below.

a. The same name is often used for different organisms in different areas which even use the same language. The Oromo name "**lafto**", for example, means *Acacia pilispina* in **Ambo**, *Acacia lahai* at **Fincha**, *Acacia dolicocephala* in **Shashemene** and *Acacia negrii* and **Addis Ababa**. This shows that it can be imperative that information on ethnobiology should be complemented with either specimens collected from the area, or on the spot identification of the organisms by qualified scientists.

b. Many people who have written on Ethiopian ethnobotany have incorporated errors of identification, which have been perpetuated by successive writers who often have had no adequate familiarity with the biology of the country. As an example may be quoted the confusions that have arisen from the reporting of *Buddleja polystechya* as "**metere**" from the **Tigrigna** name with an explosive "t" and as a result calling *Glinus lotoides* "**metere**" from the **Amharic** and **Oromogna** with a soft "t" *Buddleja polystachya*, or similarly the reporting of *Albizi anthelminthica* (**bissina**" - **Tigrigna**) and *Croton macrostachys* (**Bissana** - **Amharic**), and the thorough mixing up of the identification of these two plants, which are used for different purposes. There also are errors of no apparently explicable origin, e.g. the reporting by Kloos (personal communication) which he traces to Strelcyn, of identifying *Securidaca longipedunculata* as *Adhathoda schimperiana*. Perhaps one way of minimizing this would be to edit all ethnobiological articles so that only names of definitely identified plants will be included.

c. Many Ethiopian medicinal writings use ***Geez*** names which are known only to the healers of many years of church education (**debteras**). For example, *Verbascum sinaiticum* which is **'Gura Harre**" in **Oromo**, "**Ketetnna**" in **Amharic**, "**Traakha** in **Tigrigna**, etc., is referred to as "**Itse debtera**" in many medical writings. The identity of such plant names should be established while it is still possible to find practicing medical men to show the plants.

4. Positive Attributes.

Ethiopian traditional medicine views human diseases wholistically in their social context. It does not make the distinction between psychosomatic disorders and other problems, let alone between psychological and somatic ailments. Since specialization enables the acquisition of more precise information, this lack of specialization may very well contribute to the unprecision of traditional medicine described above. It cannot be denied, however, that the wholistic approach to human problems is desirable, and psychoanalysis has developed in response to this. The psychoanalytic aspect of traditional medicine has adequately been covered in this meeting by Dr. Fikre Workneh. Traditional healers, suffice it to say, have always been on the scene, and their "Freudian" approach certainly pre-dates Freud.

Traditional medicine is a part of traditional society. As such, it is socially and economically in harmony. The traumatic experience of modern medicine in a traditional society in which there are machines that no one can repair, drugs which are too expensive for most, doctors who are a rarity, etc. are chronic phenomena that are unknown in traditional medicine. As an integral part of traditional society, it could also respond to changes to social needs and norms much more easily than the foreign corpus, modern medicine.

Perhaps the incontestable positive attribute of traditional medicine is its role as the repository of millions of years of man's experience in treating himself. The following well known remedies of traditional medicine in origin will illustrate this: *Digitalis purpurea* (foxglove) for heart diseases, *Rauvolfia* spp and "*Vinca major* (periwinkle) for hypertension etc.

5. Unassessed Attributes

It is a short step to recruiting a plant as a source of drug for modern medicine from the traditional sector. It is likely, however, that modern medicine, once devested off its prejudices against traditional medicine, could learn other lessons too. A topical example, is perhaps, acupuncture from Chinese medicine (A Barefoot Doctor's Manual, 1977). There could be more.

The African traditional medical practice of mixing many herbs together claimed to produce the desired properties acting against a specific ailment need further investigation. The Ethiopian healers' claim is that the variety of herbs reduces the harmful side effects of the desired active component. That there is some circumstantial evidence for this claim is perhaps not well recognized. The treatment "**Abisho**" may be used to illustrate this. "**Abisho**" is a concoction taken by most "*Debteras*" (learned healers) when they are students to facilitate memory. The active ingredient is apparently *Datura stramonium*, the well-known poisonous plant producing the alkaloid stramonin, mixed with various other herbs and treated in various ways not yet known well to the authors. The very fact that these "*Debteras*" are alive is enough to induce closer scrutiny of the mechanisms involved in the "attenuation" of the active principles.

The use of parasitic plants in the family Loranthaceae as a choice when possible, rather than using the host plant may well have the same function. Incidentally, the authors know of no other traditional medicine which uses this.

The systems of classifying diseases and other disorders are also worth studying. It is obviously different from that of modern medicine. Before Freud, "Psychological and psychosomatic" ailments would not have been recognized by modern medicine: yet the phenomena have always been recognized and treated by traditional medicine. There would be other phenomena that await "discovery".

6. Potential of Traditional Medicine.

The potential of traditional medicine as a source of empirical knowledge to act as a starting point for modern R & D systems leading to improvements in modern medicine is well recognized. We shall look at three fields of likely impact of Ethiopian traditional medicine on modern medicine in this context. We shall also look at the possible role that traditional medicine could play, by joining hands with modern medicine, in bridging the gap between the modern technological socio-political set of systems (urban) and the empirical traditional set of systems (rural).

6.1 Useful contributions to Health care likely to come from the Traditional Sector. A full discussion of this would involve the whole compendium of Ethiopian folk medicine. This would be too long. Only three types of health problems will be viewed in the context of possible solutions that could be obtained from the traditional sector.

6.1.1 Anthelminthic Traditional Drugs

Anthelminthic drugs are not seriously studied by modern medicine because they are mostly needed in the third world countries including Ethiopia. Ethiopia

being a rural (traditional) country, its resources that could cope with the problem must be drawn from the traditional sector if they are to be adequate since the modern sector is very small. Berhanu Abegaz and Ermias Dagne (1979) have evaluated twenty-five traditionally used anthelminthic plants and some marketed drugs. They have found that many of the traditionally used herbs are as efficient as the marketed drugs. It sounds more feasible for a poor country that is Ethiopia to start with this rich and well-tried traditional medical lore to build upon than to start a western type of pharmaceutical industry which would certainly be very expensive. That this approach can work has been shown in the People's Republic of China (A Barefoot Doctor's Manual 1977 Lewis & Elvin-Lewis, 1977 p.3). Some of the Ethiopian traditional herbal drugs are listed in TABLE 1 **[Table 1 will be published in the next issue of EPPAD Bulletin]**

6.1.2 Anticancer Traditional Drugs.

Cancer is a family of diseases which modern medicine seems incapable of tackling fully. In the United States of America alone, 3 billion dollars are spent on cancer medical expenses each year (Lewis & Elvin- Lewis, 1977, p.105). There are many plants claimed to have anticancer activities by Ethiopian traditional medicines. Some of them are given which în TABLE 2 **[Table 2 will be published in the next issue of EPPAD Bulletin**]. It should be noted, however, that cancer as a disease seems to have a not absolutely co-incident definition between Ethiopian traditional medicine and modern medicine. It is, nonetheless, worth noting that some of the plants used in Ethiopian traditional medicine for cancer have been reported in the literature as having antitumoral properties. *Brucea antidycenterica* (Waginos) and *Haytenus* spp. (**Atat**, **Qoqoba**) can be cited as examples. The alcoholic extract of *B. antidysenterica* has been found to be active on cells derived from cancer of the oesophagus (Kupchan et al., 1973, 1975). *Maytenus* spp. have recently become famous for providing a principle active against the mouse tumour.

6.1.3 Skin Disorders

Many skin disorders have effective traditional drugs. In the household of one of the authors, there was an outbreak of ringworm. Antifungal drugs bought from pharmacies in Addis Ababa were used, but the response was slow. Fresh or dried and soaked leaves of *Croton machrostachys* were tried and the effect was much faster. Now, *C. machrostachys* is destined to be in the garden, even at the expense of roses. Another one of the authors, together with a graduating student working for his B.Sc. project, has proved that *Rhamnus prinoides* (**Gesho**) which has been claimed to be active against "*Chirt*" does indeed act against the pathogenic fungus in culture. Several skin diseases are recognized by Ethiopian traditional medicine. **TABLE 3** shows some of the plants used for those diseases [**Tale 3 will be published in the next EPPAD Bulletin**]. Note that the *Amharic* names of diseases are used because their "modern" equivalents are not certainly known to the authors.

7. Possible Cooperation Between the Traditional and the Modern Health Care Sector:

Given that traditional medicine could be officially recognized, there is no doubt that it could carry a large portion of the burden that the modern sector presumes as its responsibility. The modern sector could then help in enabling the traditional sector to overcome its shortcomings, and as scientifically rather than empirically based, it would be in a strong position to do so. The meagre resources of the modern sector would then concentrate on the diseases which the traditional sector cannot handle.

8. A case for Recognizing Ethiopian Traditional Medicine.

The change in attitude towards traditional medicine, which has occurred in our Ministry of Health has been described by the Minister in his opening speech. This is good, but it has still not gone far enough. Traditional medicine exists, and an official recognition of this would have several advantages.

a. It would be easy to regulate it and thus help it protect itself from quacks,

b. It would be possible, through scientific investigations, to require it to modify the undesirable aspects of its pharmacopaea,

c. It would become easy for the modern sector to obtain information from the traditional sector. Incidentally, it may not be realized that the traditional sector had been vaccinating against smallpox long before Jenner "discovered" vaccination.

d. The modern sector could be given more leeway in these economically difficult times by allowing the traditional sector to officially take over those aspects of health care that it can. Ethiopia would not be the first country to do this; the People's Republic of China has done it (A Barefoot Doctor's Manual, 1977, Lewis & Elwin-Lesis, 1977, p.3).

Our views can be summarized in a few sentences. Both the scientifically based modern and empirically based traditional health care systems exist in Ethiopia side by side. The modern sector prefers to think that the traditional sector does not exist. If the two sectors officially recognize each other and the state regulated their relationship, both sectors could benefit greatly.

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*Editor's Note: The above manuscript was mimeographed and never appeared in a journal. It has been reproduced here with minimal editing to preserve the originality. Tables 1,2 and 3 will be published in the next issue of EPPAD Bulletin.