EnatCare

Ethiopian Family Wellness
Maternal & Child Health Digital Platform

Proposal for a national digital nutrition and immunization platform

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Acronyms

AI - Artificial Intelligence
AMIYCN - Adolescent, Maternal, Infant, and Young Child Nutrition
ANC - Antenatal Care
BMGF - Bill & Melinda Gates Foundation
cMYP - Comprehensive Multi-Year Plan for Immunization
CSR - Corporate Social Responsibility
DE2030 - Digital Ethiopia 2030 Strategy
DHIS2 - District Health Information Software 2
DPIA - Data Protection Impact Assessment
DTP - Diphtheria, Tetanus, and Pertussis Vaccine
EDHS- Ethiopia Demographic and Health Survey statistics
EPHI - Ethiopian Public Health Institute
EPI - Expanded Program on Immunization
ETB - Ethiopian Birr
FBDG - Food-Based Dietary Guidelines
FMOH / MOH - Federal Ministry of Health
GAVI - Gavi, the Vaccine Alliance
HEW - Health Extension Worker
HSTP II - Health Sector Transformation Plan II
IYCF - Infant and Young Child Feeding
MEL - Monitoring, Evaluation, and Learning
NGO - Non-Governmental Organization
PNC - Postnatal Care
RMNCH-N - Reproductive, Maternal, Newborn, Child Health and Nutrition
SDG - Sustainable Development Goal
SMS - Short Message Service
UHC - Universal Health Coverage
UNICEF - United Nations Children's Fund
USAID - United States Agency for International Development
USD - United States Dollar
VPD - Vaccine-Preventable Disease
WHO - World Health Organization

Executive Summary

Malnutrition and vaccine-preventable disease remain two of the most persistent and interlinked threats to maternal and child health in Ethiopia. Despite sustained national efforts, 40% of children under five are stunted, maternal undernutrition, particularly anemia, remains widespread, and nearly one million children are estimated to be “zero-dose”. These challenges are driven not only by service availability but by gaps in household-level knowledge, follow-up, and decision-making across the maternal and early childhood life course.

EnatCare is a multilingual, culturally grounded digital health platform designed to close this “last-mile” gap between national guidelines and household action. The platform translates Ethiopia’s nutrition and Expanded Program on Immunization (EPI) policies into practical, life-stage-specific guidance for women and caregivers, spanning pre-pregnancy, pregnancy, postpartum, and early childhood (0-5 years). By integrating locally adapted meal planning, nutrition counseling, routine immunization tracking, and service reminders into a single user experience, EnatCare addresses nutrition and immunization together, reflecting how families make health decisions.

The platform combines personalized nutrition guidance, child feeding support, digital vaccination records, and automated reminders, delivered through low-literacy icon-based interfaces in local languages. EnatCare is designed to work with existing health systems rather than replace them, functioning as both a caregiver-facing tool and a digital job aid for health workers.

An MVP of EnatCare has been developed and tested, and this proposal seeks support for pilot implementation, refinement, and scale-up. In its first 12 months, the project aims to reach at least 10,000 mothers and caregivers, improve nutrition knowledge and dietary practices, increase adherence to antenatal care schedules, and support higher on-time completion of routine childhood immunizations. By addressing demand-side barriers such as forgetfulness, misinformation, and weak follow-up, EnatCare complements ongoing investments in service delivery.

Aligned with Ethiopia’s Health Sector Transformation Plan II, the Seqota Declaration, Digital Ethiopia 2030 Strategy, and national nutrition and immunization frameworks, EnatCare offers a scalable, systems-oriented solution to strengthen maternal and child health outcomes. The platform is designed for sustainability through government alignment, open digital standards, and a diversified financing strategy, with potential for replication in other low-resource settings facing similar challenges.

1. Background

1.1 Maternal & Child Nutrition and Immunization Challenges in Ethiopia

The nutritional and epidemiological landscape of Ethiopia is currently defined by a vicious cycle of chronic undernutrition and a significant burden of vaccine-preventable diseases. This dual challenge represents a critical bottleneck to human capital development and national economic productivity.

Malnutrition remains a major public health challenge globally and in Ethiopia. Despite progress in some health indicators (e.g., modern contraceptive use among married women has reached 35%, and maternal mortality has fallen to around 141 per 100,000), 2024-25 EDHS, Ethiopia continues to face high burdens of undernutrition among women of reproductive age and children under five, with profound implications for morbidity, mortality, and economic productivity (1,2). Ethiopia's 2024-25 EDHS indicates alarmingly high malnutrition rates: 40% of children under 5 are stunted and 5% are wasted, 18% of children are underweight, and roughly one-quarter of women of reproductive age are anemic (3).

Dietary diversity remains critically low, with only 8% of children under 2 consuming adequately diverse diets, only 11% of children 6-23 months receive a minimum acceptable diet and 7% of women meet minimum dietary diversity requirements (4). Only about 16% of children 6-23 months are consuming foods from at least five food groups, around one in ten children receive a minimally acceptable diet, and under 10% of women meeting minimum dietary diversity requirements (3). Complementary feeding practices for children 6-24 months old often fail to meet recommended levels of nutrient diversity and adequacy (5,6). Exclusive breastfeeding for the first 6 months has stagnated at about 57% of infants, showing little improvement in recent years (3). Maternal nutrition deficits such as iron, folate, and vitamin A deficiencies, frequently co-occur, undermining maternal health and fetal development (7). Dietary diversity among pregnant women and lactating mothers remains suboptimal due to limited access to diverse foods, inadequate nutrition knowledge, and socio-economic constraints (8,9). The adherence to low iron/folate supplements is poor, while 69% of pregnant women took iron supplements at some point, only a small fraction completed the recommended 90-day course (3).

Additionally, the economic impacts are devastating, with malnutrition costs to the global economy and society estimated at $3 trillion per year, as lost productivity (10). In Ethiopia specifically, malnutrition contributes to an estimated 16.5% loss of Ethiopia's Gross Domestic Product annually. This crisis disproportionately affects rural populations (76.1% of the country) and reflects persistent gaps in nutrition knowledge, access to diverse foods, and appropriate feeding practices (11). Despite Ethiopia's progress in health service access, barriers such as limited nutrition counseling, low literacy levels, and inequitable distribution of health education persist, contributing to suboptimal maternal and child nutrition practices (12,13). These evidence gaps highlight the need for scalable, timely, practical, localized solutions that deliver guidance tailored to cultural contexts and real-world conditions.

Malnutrition, particularly in states of protein-energy deficiency or specific micronutrient deficits (Vitamin A, Zinc), leads to secondary immunodeficiency, which increases both the frequency and severity of infections. Conversely, infection induces metabolic stress, anorexia, and malabsorption, rapidly deteriorating the child's nutritional status, resulting in reciprocal causation of malnutrition and infection (14).

While Ethiopia's commitment to the Expanded Program on Immunization (EPI) dates back to 1980, and despite decades of intervention, the nation remains the third or fourth largest contributor globally to the burden of "zero-dose" children, those who have not received the first dose of the diphtheria, tetanus, and pertussis (DTP)-containing vaccine (15). As of late 2024, approximately 20% of Ethiopian children had not received their initial DTP dose, accounting for 6% of the total global burden of zero-dose infants (15). This gap in coverage is not merely a statistical failure but a primary driver of child mortality; VPDs such as pneumonia, diarrhea, measles, and meningitis are estimated to account for approximately 11% of total childhood deaths in Ethiopia (16).

The burden of disease is further intensified by large-scale outbreaks, most notably of measles, which is considered a sensitive indicator of wider immunity deficiencies in the population due to its high transmissibility (17). Between August 2021 and December 2024, Ethiopia reported 78,106 measles cases and 633 deaths across 458 woredas, yielding a case fatality rate of 0.81% (17). These outbreaks disproportionately affect children who have been "missed" by routine services, emphasizing that the accumulation of susceptible children inevitably leads to epidemic resurgence. These evidence gaps highlight the need for a scalable, localized solution.

1.2 Policy Alignment and Government Commitment

Ethiopia has established robust policy frameworks, including the National Nutrition Program II (2016-2020), the national Food and Nutrition Policy (FNP), the 2022 Food-Based Dietary Guidelines, and the National Food and Nutrition Strategy. The government's Seqota Declaration commits to ending child undernutrition by 2030. The 2022 Ethiopian Food-Based Dietary Guidelines provide 11 key messages for healthy eating, emphasizing dietary diversity, local foods, and lifecycle nutrition needs (18). Any food recommendations must align with Ethiopia's policies and scientific evidence.

The National Adolescent, Maternal, Infant, and Young Child Nutrition (AMIYCN) guideline (2022) updates the 2016 policy and "focuses on promotion of optimal nutrition in the first 1000 days plus" targeting adolescents, pregnant/lactating mothers, infants, and young children (1). Likewise, Ethiopia's 2018 Food & Nutrition Policy explicitly aims to improve the nutritional status of pregnant/lactating women and children, recommending balanced diets, micronutrient supplementation, dietary diversity, and infant & young child feeding best practices (19). The AMIYCN guidelines note that Ethiopian pregnant women "need to consume a diverse diet to meet their increased energy and micronutrient needs and ensure optimal pregnancy and positive birth outcomes" while instructing health workers to provide nutrition counseling, emphasizing locally available foods and family support (1).

The HSTP II (2020/21-2024/25) sets ambitious targets for Universal Health Coverage (UHC) and identifies the integration of Reproductive, Maternal, Newborn, Child Health, and Nutrition (RMNCH-N) interventions as a cornerstone of health system resilience (20). Key indicators for the HSTP II include reaching an 80% coverage rate for the third dose of the pentavalent vaccine (Penta3) and ensuring that at least 90% of districts achieve 80% coverage for essential antigens (21). Notably, the 2024-25 EDHS found that only about 40% of children receive all three pentavalent doses, underscoring the gap to these targets (3). The Comprehensive Multi-Year Plan (cMYP) for the EPI (2021-2025) further emphasizes reaching "missed communities" and zero-dose children through innovative service delivery.

Ethiopia's digital landscape presents significant opportunities despite challenges. Mobile connections reach 77.39 million (60.4% penetration), with internet users at 28.6 million (21.3% penetration). Mobile money has experienced explosive growth, with telebirr reaching 60 million users and 415,084 agents nationwide (22).

The Digital Ethiopia Strategy 2030 (DE2030) aims for 70% digital literacy nationally, highlighting digital health as a priority area, with a focus on health information systems improvement and telemedicine, connectivity, data governance, and cybersecurity as enablers to support effective implementation of digital health and nutrition interventions (23). This strategy aligns with broader regional frameworks, including the African Union Digital Transformation Strategy (2020-2030), the AU Continental AI Strategy (2024), African Continental Free Trade Agreement (AfCFTA) Digital Trade Protocol, United Nations Sustainable Development Goals and Global Digital Compact, and BRICS Digital Partnerships.

The expansion of telemedicine and remote consultation services constitutes one of the four strategic health initiatives of DE2030, with prioritization of platforms for remote consultations and health guidance for urban and, especially, rural populations. Further, government initiatives like the National Data Management Center and Unified Nutrition Information System demonstrate a commitment to evidence-based nutrition programming (1). Through the expansion of digital health solutions, improved digital literacy, and strengthened data-driven decision-making, the Digital Ethiopia Strategy and existing national digital infrastructure provide a supportive policy environment for digital interventions.

The proposed platform leverages technology for improved human development outcomes to promote preventive and primary healthcare through a data-driven approach. The platform’s alignment with national strategies enhances opportunities for government adoption and integration into routine maternal and child health services. At the same time, global frameworks such as the UNICEF Nutrition Strategy (2020-2030) and the WHO Antenatal Care Recommendations reinforce the importance of evidence-based nutrition guidance that this platform will deliver.

1.3 Digital Health Opportunity

The Ethiopian digital health landscape is currently defined by a "bottom-up" systemic strengthening approach. The primary vehicle for this is the District Health Information Software 2

(DHIS2), a web-based platform that has been implemented nationwide since 2017 to manage health data across more than 20,000 facilities (24). DHIS2 has significantly improved the government's ability to monitor health markers, leading to a marked increase in facility-based births and immunization reporting (24). However, the Ethiopian system faces a critical "data-to-action" gap. While health managers have better visibility into regional coverage, the individual mother at the household level often remains digitally isolated. Furthermore, a significant gender digital divide persists; only 57% of Ethiopian women own a mobile phone compared to 79% of men (25). This suggests that any successful digital health intervention must be inclusive of household decision-makers, such as husbands and mothers-in-law, to be effective.

A wealth of mobile and web tools now target maternal and child health, but few focus on locally relevant nutrition guidance for Ethiopian women. Studies in Ethiopia show mHealth solutions (SMS reminders and app interfaces) can increase focused antenatal care attendance and skilled birth attendance, while improving health education and follow-up adherence in resource-limited settings (5). Globally, websites like Marma (US-based) provide personalized week-by-week pregnancy nutrition information (with expert-reviewed content and linked recipes) (26).

Maternal health mobile apps are one way the tech sector is hoping to reduce the number of maternal deaths in sub-Saharan Africa, where the maternal mortality ratios are the highest.
Here are five mobile apps examples that are saving mothers' lives in Africa:

1. Mom Connect (South Africa) - Since its launch in 2014 nearly 500,000 South African women have received pregnancy and delivery information from Mom Connect, a mobile app that provides tips and education for expectant mothers. Mom Connect also allows health workers to follow up with expectant mothers if they miss an antenatal appointment or if they need additional care during pregnancy.
2. Notify Health - (Nigeria) supporting healthcare systems to implement automated message and voice-based vaccination reminders for parents of newborn children.
3. Gifted Mom (Cameroon) - Seven thousand women still die annually in Cameroon from preventable complications during childbirth. Through simple, free SMS messages, Gifted Mom reminds Cameroonian women when to go for antenatal care and why it is important for them to do so.
4. Zero Mothers Die (Ghana, Gabon, Mali, Nigeria and Zambia) - Zero Mothers Die provide small pink phones to expectant mothers that gives pregnancy and childbirth educational messages via voice in local languages as well as pregnancy push notifications. The women also have access to emergency numbers to health facilities and health workers.

Furthermore, the integration of sophisticated AI in nutrition-focused apps like ZOE and MyFitnessPal has revolutionized the way users track dietary intake, utilizing image recognition and voice logging to reduce the friction of data entry (27). However, a significant limitation of these global platforms is their reliance on Western food databases and calorie-counting frameworks that are often culturally and economically irrelevant in resource-constrained settings like Sub-Saharan Africa. The global opportunity lies in adapting these high-tech features, such as AI chatbots and multimodal tracking, to local dietary practices and healthcare infrastructures (26).

While Ethiopia has made important progress in digital maternal and child health, existing platforms leave critical gaps that EnatCare is intentionally designed to address.
Platforms such as:
The “Safe Delivery App” is a valuable clinical tool for health workers, concentrating on emergency obstetric care and complication management during delivery. However, it does not target women or families directly, nor does it address nutrition behaviors, household food practices, or decision-making across the reproductive and early childhood life course.

Similarly, the “LUCY app” was a maternal and newborn health app adapted for Ethiopia (Amharic & Affan Oromoo), integrated with pregnancy calendars, weekly information (on development, risks, nutrition, visits) - focusing primarily on general pregnancy information and reminders, rather than personalized nutritional guidance. However, the app closed all operations on 30 June 2025, highlighting the prior fragility of sustained digital nutrition interventions for Ethiopian women.

Additionally, the “L10K 2020 mHealth Tools” used by health extension workers allows for case registration, client tracking, and reminders for maternal and child health services - primarily designed for health workers and not for end-user nutritional education or personalized guidance.
There are also broader health technology platforms, including:

1. Tenenete (Government-backed): A new comprehensive health service platform (My Health) enabling users to search medicines, locate hospitals, and access health advice. It’s being rolled out with government support. Not specifically tailored to maternal/child nutrition guidance.
2. WeCare Telemedicine: A telehealth platform with consultations across specialties, including prenatal care. Expands access to clinicians. Fee-based and not focused on preventive nutrition education.
3. TenaFirst Plus: Telemedicine for direct clinical consultations. General health, not specifically maternal nutrition.
4. YeneHealth: Multilingual women’s health app including menstrual/pregnancy tracking and e-pharmacy. Broader women’s health limited structured nutrition content.
5. Tena’Adam (Tele-Health + Traditional Healers): Integrates modern and traditional practitioner access; users can book specialists, including nutritionists. Nutrition support is ancillary; focus is on consultation and traditional integration rather than structured dietary guidance.

More broadly, while existing apps are supportive in nature, they share several critical limitations. First, there is a general lack of nutritional focus and depth, as none of the existing apps provide comprehensive context-specific dietary guidance that blends personalized foods with life-stage and culturally tailored meals. Second, personalization is critically lacking across existing platforms, as most recommend generic pregnancy information or clinical tools, and those that do offer personalization do not offer budgetary support, choices for user preference, or combined nutrition and immunization support.

Further, no existing platform to date currently links recommended nutritious foods to availability, seasonality, or local markets for intentional agrifood systems and healthcare linkage - a central feature of EnatCare. Additionally, while existing platforms emphasize reminders or clinical content, only few incorporate behavioral change techniques, user decision support, or food-based actionable steps. Finally, there is no widespread use of AI or forum chat interactions for nutrition Q&A and personalized coaching in the current Ethiopian health tech.

1.4 Gaps in Existing Nutrition and Immunization Platform

Maternal & Child Nutrition Platforms

Specific to maternal and child nutrition platforms, the central gap in digital health work lies in actionable, localized personalization integrating cost barriers, cultural food norms, stigmas, or time constraints. As such, EnatCare intends to address this gap through multiple strategies. The EnatCare platform is meticulously mapped to HSTP II, with a primary pillar of HSTP II is the "Information Revolution," a strategy aimed at maximizing the use of data for evidence-based decision-making at the point of care. National guidelines will be translated into daily household decisions, converting the 2022 Ethiopian Food-Based Dietary Guidelines into meal plans using locally available and culturally informed Ethiopian foods.

This platform will also provide stage-specific personalized guidance across pre-pregnancy, pregnancy (by trimester), postpartum, and early childhood (0-5 years), something not currently available in existing applications. Furthermore, most platforms target women and children in isolation, failing to recognize that nutrition and food decisions are shared at the household level, culturally. As such, we provide features that offer extended support through husbands and mothers-in-law, recognizing that mothers may not have sole agency over changes in dietary habits.

Additionally, behavioral nudges are prioritized over static information, using AI-powered nudges (automated encouragement messages) to encourage specific habits, such as supplement intake or increasing meal frequency in the third trimester. Existing apps also do not account for food price volatility. Therefore, EnatCare integrates local market mapping, seasonality of food items, and updated price estimation based on user feedback to suggest nutritious, affordable meals for low-income families.

Along with creating space for actionable, localized personalization of nutrition recommendations in line with national guidance and agrifood systems, EnatCare also provides a space for two-way communication with qualified nutritionists and health professionals, contributing to users' ability to clarify, adapt, or contextualize guidance. Emotional and mental well-being support, alongside nutritional guidance, will be available through life stages as well, which incorporates icon-based mood tracking and normalized mental health support modules.

Child Vaccination Platforms

Despite ongoing investments in vaccine supply and service delivery, significant gaps persist at the caregiver level, contributing to missed and delayed childhood vaccinations. Many existing immunization platforms focus primarily on health facility reporting and supply-chain monitoring, leaving caregivers without reliable, accessible tools to track, understand, and act on their child's vaccination schedule.

EnatCare addresses this gap by strengthening caregiver-level accountability through a persistent, user-friendly digital vaccination record that remains with the family over time. The platform complements facility-based systems by providing caregivers with a clear, personalized view of their child's immunization history and upcoming doses, independent of changes in location, providers, or paper documentation.

Key features include:

- A digital child health passport that mirrors national EPI schedules and complements physical vaccination cards
- Automated, age-appropriate reminders for upcoming and missed vaccine doses
- Plain-language text and audio explanations of each vaccine, its purpose, and expected side effects
- Secure access for caregivers across devices, as a backup for the paper records that are often lost or damaged

Importantly, EnatCare is designed to operate only in settings with stable vaccine supply and does not replace or duplicate vaccine delivery systems. Instead, the platform focuses on demand completion, supporting caregivers to attend scheduled services and complete the full immunization series once vaccines are available.

Why EnatCare Targets Demand-Side Immunization Barriers

Evidence shows that a substantial proportion of missed or delayed vaccinations are driven not only by supply constraints but by demand-side barriers at the household level. EnatCare directly addresses these barriers by focusing on:

- Forgetfulness, through timely, repeated digital reminders
- Misunderstanding of vaccination schedules, through simplified, personalized guidance
- Fear of side effects, through trusted, evidence-based explanations and reassurance
- Weak caregiver-health worker communication, through clearer information and continuity of records

By addressing these factors, EnatCare strengthens caregiver engagement, supports informed decision-making, and reinforces trust in routine immunization services, particularly among populations at risk of missed follow-up. Finally, the HelpMum Vaxbot in Nigeria has shown that AI can reduce vaccine hesitancy by answering questions about side effects in real-time. EnatCare will integrate a similar AI chatbot trained on Ethiopian national guidelines to address maternal concerns instantly.

2. Project Description: EnatCare Platform

EnatCare is an innovative digital intervention designed to bridge the "data-to-action" gap. The platform addresses a critical and well-documented gap in the health system: while national guidelines, policies, and services exist, families often lack the practical tools needed to translate this guidance into timely household action.

EnatCare operationalizes Ethiopia’s nutrition and Expanded Programme on Immunization (EPI) policies at the household level. It delivers life-stage-specific, culturally appropriate guidance for women and caregivers, from pre-pregnancy through early childhood, integrating nutrition counseling, immunization tracking, and service reminders into a single, coherent user experience.

The platform is intentionally designed to address demand-side barriers that contribute to undernutrition and missed vaccinations, including low health literacy, fragmented information, forgetfulness, and weak follow-up. By providing clear guidance, timely reminders, and simplified decision support in local languages, EnatCare strengthens informed health-seeking behavior and continuity of care.

A defining feature of EnatCare is its integration with Ethiopia’s existing health system. The platform functions both as a caregiver-facing tool and as a digital job aid for Health Extension Workers, reinforcing standardized counseling, supporting follow-up, and complementing routine service delivery. EnatCare is designed to integrate with national digital health infrastructure, while avoiding duplication of clinical reporting systems.

EnatCare does not replace health services or commodity delivery. Instead, it enhances the effectiveness of existing public investments by strengthening demand completion, ensuring that available nutrition and immunization services are understood, accessed, and utilized on time.

An initial minimum viable product has been developed. This project seeks support for pilot implementation and early scale-up to demonstrate improved caregiver knowledge, strengthened health-seeking behavior, and increased timeliness of routine childhood immunization. Aligned with Ethiopia’s Health Sector Transformation Plan II, national nutrition strategies, and Digital Ethiopia 2030, EnatCare is designed as a scalable, system-aligned public-interest platform with long-term national relevance.

2.1 Project Goal & Objectives

Project goal

To strengthen maternal and child nutrition practices and improve timely completion of routine childhood vaccination in Ethiopia by translating national guidelines into practical, household-level action through a system-aligned digital platform.

Specific Objectives

1. Operationalize national nutrition and immunization guidance at the household level: Deliver life-stage-specific, evidence-based nutrition and immunization guidance for women and caregivers. covering pre-pregnancy, pregnancy, postpartum, and early childhood (0-5 years), aligned with Ethiopia's AMIYCN guidelines, Food-Based Dietary Guidelines, and national EPI schedule.
2. Improve demand-side completion and timeliness of routine childhood immunization: Strengthen caregiver understanding, follow-up, and adherence to vaccination schedules through simplified digital child health records and automated reminders for upcoming and missed doses.
3. Improve caregiver nutrition knowledge and feeding practices:
   Support improved dietary diversity, appropriate complementary feeding, and maternal nutrition practices using culturally appropriate, low-literacy guidance based on locally available foods.
4. Strengthen continuity of care through integration with the Health Extension Program: Support Health Extension Workers with a digital job aid that reinforces standardized counseling, improves household follow-up, and aligns with national digital health infrastructure.
5. Demonstrate the feasibility and effectiveness of a scalable digital demand-generation model: Pilot and refine the platform to reach at least 10,000 mothers and caregivers within 12 months, demonstrating improvements in caregiver knowledge, health-seeking behavior, and timeliness of routine childhood immunization.

2.2 EnatCare as a Digital Job Aid for Health Workers

A critical component for the long-term sustainability of the initiative is its framing as a "Digital Job Aid" for the nation's 42,000 Health Extension Workers (HEWs). The Health Extension Program is currently undergoing a revitalization as part of a 15-year roadmap (2020-2035) aimed at optimizing the primary health unit infrastructure (21). EnatCare is intentionally designed to strengthen, not bypass, Ethiopia's Health Extension Program. A core design principle of the platform is its function as a digital job aid for Health Extension Workers (HEWs), supporting standardized counseling, household follow-up, and continuity of care across maternal and child health, nutrition, and routine immunization services.

The Health Extension Program remains the primary interface between the health system and households, particularly in rural and underserved communities. EnatCare complements this role by reinforcing national protocols and counseling messages during routine home visits, antenatal care follow-up, postnatal care, growth monitoring, and immunization tracking.

As a digital job aid, EnatCare supports HEWs to:

- Deliver consistent, guideline-aligned nutrition and immunization counseling at household level

- Strengthen follow-up and defaulter tracing, particularly for missed vaccinations and nutrition services
- Reinforce life-stage-appropriate messaging across pregnancy, postpartum, and early childhood
- Improve continuity of care through shared understanding between caregivers and health workers

The platform is designed to be used during and between household interactions, serving as a practical counseling reference rather than a parallel reporting system. This approach reduces additional workload for HEWs while improving the quality and consistency of interactions with caregivers.

By aligning EnatCare with the workflows and counseling practices of the Health Extension Program, the intervention aligns with Ethiopia's health system strengthening priorities and supports ongoing efforts to modernize frontline service delivery. Positioning the platform as a digital job aid enhances government ownership, facilitates institutional adoption, and increases the likelihood of sustained use beyond the pilot phase.

Use of EnatCare as a digital job aid will be introduced in consultation with relevant health authorities and does not replace or modify existing reporting, supervision, or data governance arrangements.

Interoperability principles guiding the platform include:

The platform's logic is synchronized with Ethiopia's national Expanded Program on Immunization (EPI) schedule, including the full antigen sequence and catch-up vaccination rules, ensuring consistency with national immunization policy. This alignment enables accurate reminders, counseling support, and follow-up without altering or duplicating official immunization records.

Data governance and security are integral to the platform's design. EnatCare adheres to national data protection and cybersecurity frameworks and applies principles of data minimization, informed consent, and secure authentication. A Data Protection Impact Assessment (DPIA) will guide implementation to ensure responsible handling of personal health information, particularly for women and children.

3. Logical Framework

The project's goal, objectives, expected outputs, indicators, assumptions, and risks are operationalized through a results-based logical framework aligned with national nutrition and immunization priorities. The log frame forms the basis for monitoring, evaluation, and learning during the pilot and early scale-up phase.

A detailed Logical Framework Matrix is provided in Appendix 1.

4. Theory of Change

EnatCare's Theory of Change is grounded in the premise that improving maternal and child health outcomes in Ethiopia requires strengthening household-level decision-making and follow-up across the RMNCH-N continuum of care, rather than addressing nutrition, antenatal care, or immunization in isolation.

If women and caregivers receive timely, life-stage-specific nutrition guidance, preventive health tips, and service reminders, reinforced through trusted Health Workers, then they are more likely to attend recommended antenatal and postnatal care visits, adopt appropriate nutrition and feeding practices, and complete routine childhood immunization on time. This is because clear guidance, repeated reminders, and consistent counseling reduce forgetfulness, misinformation, and missed follow-up, which are key demand-side barriers in Ethiopia's maternal and child health system.

EnatCare delivers this support through a digital platform that integrates:

Preventive maternal health and nutrition guidance, including supplementation, danger signs, and daily health tips

- ANC and PNC follow-up reminders, linked to national service schedules
- Child nutrition and feeding guidance across infancy and early childhood
- Routine immunization tracking and reminders, aligned with the national EPI schedule

These inputs produce immediate outputs in the form of increased caregiver knowledge, confidence, and preparedness for health service utilization. As caregivers receive reminders and health tips before key milestones, such as ANC visits, vaccination dates, and growth monitoring sessions, they are better able to plan, attend services, and act on counseling received at health facilities and during home visits.

Health Extension Workers play a critical reinforcing role in this pathway. By using EnatCare as a digital job aid during household interactions, HEWs strengthen trust, reinforce consistent messaging, and support follow-up for missed or delayed services. This alignment between household-facing digital support and frontline health workers improves continuity of care and reduces drop-out across ANC, nutrition services, and immunization.

In the short to medium term, this leads to:

- Increased attendance at recommended ANC and PNC contacts
- Improved maternal nutrition practices and infant and young child feeding
- Increased timeliness and completion of routine childhood immunization

Over time, these changes contribute to improved maternal and child health outcomes by reducing preventable undernutrition, increasing protection against vaccine-preventable diseases, and strengthening the effectiveness of existing health system investments.

This Theory of Change assumes the continued availability of essential health services and commodities, functional Health Extension Worker engagement, and periodic access to mobile devices. Risks related to digital access, literacy, and service disruptions are mitigated through inclusive design, HEW-supported use, and alignment with national systems.

A visual Theory of Change diagram illustrating this pathway is provided in Appendix 2.

5. Target Population and User Analysis

EnatCare is implemented by a mission-driven social enterprise operating as a public-interest digital health platform. During the pilot phase, targeting and user engagement are guided primarily by public health priorities, equity considerations, and national RMNCH-N objectives, with commercial sustainability pathways explored separately in later phases.

5.1 Primary Target Population

The primary target population for EnatCare comprises women and caregivers whose health-seeking behaviors influence maternal and child health outcomes across the reproductive and early childhood life course, from preconception through pregnancy, postpartum, and early childhood (up to 5 years of age).
This includes:

- Women planning pregnancy (preconception), preconception nutrition, and early health-seeking behaviors that influence pregnancy outcomes
- Pregnant women, with a focus on timely antenatal care, maternal nutrition, supplementation, and preventive health practices
- Postpartum women, including support for postnatal care follow-up, maternal nutrition, and well-being
- Mothers and primary caregivers of children aged 0-5 years, particularly for infant and young child feeding, growth monitoring, and completion of routine childhood immunization
- Adolescent girls, with a focus on menstrual cycle tracking and nutrition support during menstruation.

During the pilot phase, implementation will prioritize women and caregivers in selected urban settings. Special attention is given to low-literacy users and households with limited connectivity through inclusive design and Health Extension Worker-supported onboarding.

5.2 Secondary Users

Recognizing that health and nutrition decisions in Ethiopia are often made at the household level, EnatCare also engages secondary users who influence maternal and child health practices.

These include:

- Husbands and male partners
- Mothers-in-law and elder female relatives
- Other caregivers involved in child feeding and care

Secondary users are not the primary recipients of services but are intentionally engaged through shared access, household-level messaging, and culturally appropriate content. Their inclusion supports improved adherence to nutrition guidance, antenatal care attendance, and immunization follow-up by reinforcing supportive decision-making environments within households.

5.3 System Users

A third category of users comprises system users, primarily:

- Health Extension Workers (HEWs)
- Selected frontline health facility staff involved in maternal and child health services

These users do not benefit directly as end-beneficiaries but play a critical role in reinforcing behavior change, continuity of care, and service utilization. EnatCare supports system users by functioning as a digital job aid, enabling consistent counseling, improved follow-up, and alignment with national RMNCH-N protocols.

5.4 Future Expansion Populations

As a social enterprise, EnatCare is designed with a long-term sustainability vision beyond the pilot phase. One potential future user group includes Ethiopian diaspora households, whose dietary practices and caregiving norms often remain strongly rooted in Ethiopian food culture, even while living abroad.

Many diaspora families continue to prepare traditional Ethiopian meals and seek culturally relevant guidance on maternal nutrition, child feeding, and healthy dietary practices in new food environments. EnatCare's culturally grounded content can support these households while maintaining consistency with national nutrition guidance.

Diaspora engagement also presents a potential cross-subsidization pathway, allowing voluntary paid use by families abroad to support free access for women and caregivers in Ethiopia.

Ethiopian diaspora worldwide (approximately 3 million people), United States (460,000), Saudi Arabia (2 million), UAE (200,000), Israel (155,300), and Germany (140,000) (28).
These populations are not a focus of pilot implementation and do not influence targeting, resource allocation, or equity considerations during the pilot phase. Any future expansion will be pursued without compromising access to core nutrition and immunization services for underserved populations.

6. Intervention Design and Technical Approach

The EnatCare platform is designed as a public-interest digital health intervention, implemented by a mission-driven social enterprise and aligned with Ethiopia's national RMNCH-N priorities. The intervention design prioritizes equity, system compatibility, and behavioral effectiveness, ensuring that digital innovation strengthens existing health services rather than operating as a parallel or standalone solution.

The design approach is guided by four core principles:

1. Alignment with national policies and service delivery pathways

All platform content and logic are grounded in Ethiopia's national nutrition, antenatal care, and immunization guidelines, ensuring consistency with Health Extension Program workflows and routine maternal and child health services.

2. Household-centered and behavior-focused design

The platform is built to support real-world decision-making at household level, using life-stage-specific guidance, preventive health tips, and timely reminders to reduce missed follow-up and strengthen continuity of care across nutrition, ANC/PNC, and routine immunization.

3. Inclusive access for low-literacy and low-connectivity users

Design choices prioritize accessibility for women in rural and underserved settings through icon-based navigation and offline-first functionality, complemented by Health Extension Worker-supported onboarding.

4. Scalable and interoperable technical architecture

The platform is designed to integrate with national digital health infrastructure using open standards and modular components, enabling phased adoption, data protection, and long-term sustainability.

Within this framework, the intervention combines evidence-based content, phased feature deployment, and participatory design processes to ensure relevance, usability, and readiness for scale. The sections below describe how content is aligned with national guidelines, how features are introduced in phases, and how inclusive and interoperable design principles are operationalized.

6.1 Content alignment with National Guidelines

All nutrition, maternal and child health, and immunization content delivered through EnatCare is grounded in Ethiopia's national policies and clinical guidance and aligned with relevant global standards. Content development follows a guideline-first approach, ensuring that all recommendations reflect current national priorities and approved service delivery pathways.

Primary content sources include:

- National Adolescent, Maternal, Infant, and Young Child Nutrition (AMIYCN) Guideline (2022)
- Ethiopian Food-Based Dietary Guidelines (FBDG, 2022)
- Infant and Young Child Feeding (IYCF) Guidelines
- National Antenatal Care (ANC) and Postnatal Care (PNC) Guidelines
- Ethiopian Food Composition Table
- National Expanded Program on Immunization (EPI) schedule, including catch-up vaccination guidance
- Relevant WHO and UNICEF recommendations, where consistent with national policy

Content is structured by life stage and service pathway, including preconception, pregnancy (by trimester), postpartum, early childhood (0-5 years). Nutrition, preventive health, antenatal care, and immunization guidance are intentionally integrated to reinforce continuity of RMNCH-N services and reduce fragmented messaging at the household level.

To ensure accuracy, relevance, and feasibility, all content undergoes a multistep review and validation process:

- Technical drafting by Ethiopian nutritionists, dietitians, and maternal and child health professionals
- Clinical review to ensure consistency with national protocols
- Cultural and contextual validation to reflect locally available foods, household constraints, and service access realities

Content delivery prioritizes clarity and usability, particularly for low-literacy users, through simplified language and visual aids. Guidance is tailored to rural and urban contexts and emphasizes actionable steps that households can realistically implement.

Content governance mechanisms are embedded to support periodic updates and quality assurance. As national guidelines evolve, content will be reviewed and updated in coordination with relevant technical experts and government counterparts to ensure ongoing alignment with Ethiopia's nutrition, maternal and child health, and immunization strategies.

6.2 Platform Features and Phased Rollout

EnatCare is implemented through a phased feature rollout designed to balance impact, usability, and feasibility. Features are introduced progressively to ensure that core RMNCH-N behaviors, particularly nutrition practices, antenatal care attendance, and routine childhood immunization, are supported before advanced functionality is activated.

Phase 1 - Core Information & Planning Tools (MVP phase)
This phase focuses on establishing foundational support and behavior change enablement:

- Evidence-based nutrition tips and guidance by life stage
- Personalized meal plans, recipe cards using locally available foods
- ANC follow-up support and reminders
- Child vaccine reminder
- Interactive nutrition and health calendar with growth monitoring
- Daily health tips
- Bump galleries to visualize pregnancy and child development milestones

Phase 2 - Interactive Support and Engagement
This phase introduces engagement and two-way communication:

- AI-powered health and nutrition chatbot trained on national guidelines
- Moderated community forum for peer learning and support
- Menstrual cycle tracking, supporting preconception and maternal nutrition awareness

Phase 3 - Service Integration & Access
This phase connects users to services, markets, and future enhancements contingent on success:

- Telemedicine consultations with qualified professionals
- Shopping center, Market Integration linking recommended foods and nutrition products
- Inclusive Design for Low-Literacy and Rural Users: Iconography, Culturally Resonant Visuals

Website Component

A web-based version of the platform will complement the mobile app, providing searchable resources, downloadable educational materials, and synchronized access to user content. This ensures accessibility for users, partners, and stakeholders.

6.3 Inclusive Design for Low-Literacy and Rural Users

Given that 76.1% of the Ethiopian population resides in rural areas and the adult literacy rate stands at approximately 52%, the success of EnatCare hinges on its accessibility to users with limited formal education and low digital literacy (21). Research indicates that nearly half of the Ethiopian health workforce also lacks basic digital health competence, highlighting the need for intuitive, user-friendly interfaces at both the consumer and health worker levels (30).

The application uses a standardized set of culturally relevant icons and high-contrast visuals, adhering to the "health literate app" guidelines that recommend keeping content centered and using familiar images to facilitate learning.

To reach users without smartphones or reliable internet access, EnatCare complements app-based delivery with SMS-based messaging for essential reminders and guidance. Health Extension Workers play a central role in inclusive use by supporting onboarding, facilitating shared-device access during routine visits, and reinforcing key messages through in-person counseling.

Inclusive design choices are informed by iterative user feedback during pilot implementation, ensuring that the platform remains usable and relevant for rural and low-literacy populations.

Offline Functionality

Recognizing that 75 % of households' power in rural areas depends on solar lanterns and individual solar home systems. Access in rural regions has consistently improved, rising from 37% in 2019 to 57% in 2024; however, significant disparities still exist, particularly in isolated and underprivileged communities (29). EnatCare is designed as an offline-first application. Data is synchronized periodically through the national visits to health facilities with internet access.

6.4 Technical Architecture & System Design

The technical architecture of EnatCare is designed to support its role as a public-interest, system-aligned digital health platform delivering nutrition, antenatal and postnatal care follow-up, preventive health guidance, and routine childhood immunization support. Architecture decisions prioritize reliability, interoperability, data protection, and scalability, while remaining appropriate for low-resource settings.

Platform Architecture Overview

EnatCare operates through a modular, mobile-first architecture comprising:

- A caregiver-facing mobile application
- A Health Extension Worker support interface, used as a digital counseling and follow-up aid
- A secure backend system that manages content logic, reminders, and anonymized analytics

The platform is designed as offline-first, with local data storage on devices and periodic synchronization when connectivity is available. This ensures continuity of use for caregivers and HEWs in rural and low-connectivity settings.

At this stage, cybersecurity is addressed through our technical architecture and data protection approach, covering authentication, encryption, and access control. As the platform moves beyond the pilot phase, we plan to develop a dedicated cybersecurity policy in alignment with MOH and national digital health security standards.

Alignment with National Digital Health Infrastructure

The system is aligned with Ethiopia's Digital Health Blueprint and designed to interoperate with national health information systems. EnatCare does not function as a parallel reporting system; instead, it complements existing infrastructure by strengthening demand-side engagement, counseling, and follow-up at the household level.

Key interoperability principles include:

- Clear separation of roles, with service delivery data retained within government systems and EnatCare supporting reminders, guidance, and continuity of care
- Phased interoperability, allowing technical integration to evolve in line with system readiness and institutional agreements

Service Logic and Health Content Synchronization

The platform is synchronized with Ethiopia's national RMNCH-N service pathways, including:

- National ANC and PNC schedules, enabling timely reminders and follow-up
- National Expanded Program on Immunization (EPI) schedules, including catch-up vaccination rules
- Life-stage nutrition guidance, aligned with AMIYCN and Food-Based Dietary Guidelines

Data Governance, Privacy, and Security

Data protection and ethical use are integral to EnatCare's system design. The platform adheres to national data protection and cybersecurity frameworks and applies the following principles:

- Data minimization, collecting only information necessary to deliver guidance and reminders
- Informed user consent, particularly for women and caregivers
- Secure authentication and encryption for stored and transmitted data

A Data Protection Impact Assessment (DPIA) will guide implementation and risk mitigation, ensuring responsible handling of personal and sensitive information. Data generated by the platform is used primarily for service improvement, monitoring, and learning, and is shared only in aggregated and anonymized form, in line with government and donor requirements.

Scalability and Sustainability Considerations

The system architecture supports incremental scale-up without fundamental redesign. Modular components allow:

- Expansion to additional regions and languages
- Integration with additional national systems as approved
- Adaptation to evolving RMNCH-N priorities

By combining open standards, modular design, and strong data governance, EnatCare is positioned as a digital public good that can be sustained, governed, and potentially institutionalized over time.

Data protection and privacy safeguards are guided by a Data Protection Impact Assessment and the Data Protection & Privacy Policy (Appendix 3).

7. Implementation Strategy and Operational Phases

The EnatCare intervention will be implemented through a phased, adaptive rollout strategy designed to ensure feasibility, user adoption, and alignment with Ethiopia's existing maternal and child health service delivery systems. Implementation emphasizes co-design, testing, learning, and gradual scale, rather than one-time deployment.

The phased approach allows the platform to be refined based on real-world use by caregivers and Health Workers, while maintaining fidelity to national RMNCH-N priorities and digital health standards.

7.1 Participatory Design and Continuous Evaluation

Implementation will follow a participatory and human-centered design approach throughout all phases. Caregivers and health workers will be engaged through co-design workshops, user testing, and feedback sessions to ensure cultural relevance, usability, and trust.

Continuous feedback mechanisms, including in-app analytics and structured user feedback, will inform iterative improvements to content delivery, reminder timing, and user experience. This adaptive approach ensures the platform remains responsive to user needs and service realities.

7.2 Phase 1: Planning & Content Development (Months 1-4)

The first phase focuses on establishing the technical, operational, and content foundations for pilot implementation.

Key activities include:

- Recruiting a responsible team with extensive work experience
- Content development of nutritional recipes, ANC/PNC, and immunization aligned with national guidelines
- Localization and translation of content into Amharic, Afaan Oromoo, and Tigrigna
- Finalization of platform logic, including reminder schedules and life-stage pathways
- Development of onboarding materials for caregivers and HEWs
- Establishment of data governance, consent protocols, and privacy safeguards

7.3 Phase 2: Prototype & Pilot (Months 5-8)

During Phase 2, the platform will be piloted in selected urban sites with existing maternal and child health services.

Key implementation actions include:

- Onboarding caregivers during routine ANC, PNC, immunization, and growth monitoring visits
- Training health workers to use EnatCare as a digital counseling and follow-up aid
- Activation of core platform functionality, including nutrition guidance, ANC/PNC reminders, and follow-up immunization
- Collection of early feedback to identify usability, comprehension, and engagement gaps

Pilot implementation is anchored within health facilities and health posts to reinforce trust and position the platform as a complement to routine care. Continuous feedback loops will be embedded through in-app analytics, structured user surveys, and direct input from HEWs and nutrition counsellors, enabling rapid content iteration to address comprehension gaps and usability challenges.

7.4 Phase 3: Public Launch and Engagement Expansion (Months 9-12)

Following pilot refinement, the platform will enter a broader launch phase focused on increasing reach and deepening engagement.
Key activities include:

- Expansion of caregiver onboarding through health facilities and community outreach
- Reinforcement of digital reminders and counseling during routine health service interactions
- Gradual introduction of interactive features, contingent on pilot performance and user readiness
- Strengthening coordination with regional health bureaus and implementing partners

By the end of this phase, the platform is expected to reach at least 10,000 caregivers, with a 50% demonstrated improvement in knowledge, follow-up, and service utilization.

7.5 Phase 4: Scale & Integration (Month 13-18)

The final phase focuses on institutionalization and scale.

Key actions include:

- Geographic expansion to additional regions based on readiness
- Strengthened alignment with Ministry of Health digital initiatives and RMNCH-N programs
- Integration of lessons learned into national and partner-supported interventions
- Transition of HEWs and facilities from pilot partners to long-term implementation anchors

This phase positions EnatCare as a sustainable, system-aligned digital health platform capable of supporting national maternal and child health priorities beyond the initial funding period.

Table 1: Work Plan & Implementation Timeline

Number	Activity	Month 1-4	Month 5-8	Month 9-12	Month 13-18
1.	Recruitment				
2.	Finalize study protocols/tools				
3.	Content development				
4.	Translation/localization				
5.	App prototype				
6.	Pilot testing				
7.	Full launch				
8.	Awareness campaign				
9.	Integration with MoH/NGOs				
10.	Scale-up rural deployment				
11.	Monitoring & evaluation				

8. Expected Outcomes and Impact

The EnatCare intervention is expected to generate measurable improvements in maternal and child health behaviors and service utilization during the pilot and early scale-up phase, while laying the foundation for longer-term health impact through system-aligned digital support.

8.1 Short-Term Outcomes (Pilot Phase)

During the first 12 months of implementation, EnatCare is expected to achieve the following outcomes among enrolled users:

- 50% improvement on caregiver knowledge and preparedness related to maternal nutrition, infant and young child feeding, antenatal care, and routine childhood immunization
- Increased attendance at recommended ANC and PNC contacts, supported by timely reminders and reinforced counseling
- Improved adherence to routine childhood immunization schedules, including reductions in missed or delayed vaccination appointments
- Strengthened continuity of care through improved communication and shared understanding between caregivers and Health Workers

8.2 Intermediate Outcomes

As adoption and engagement deepen, the intervention is expected to contribute to:

- Improved maternal nutrition practices, including better adherence to supplementation and dietary guidance during pregnancy and postpartum
- Improved infant and young child feeding practices, supporting dietary diversity and appropriate complementary feeding
- Increased completion of age-appropriate routine childhood immunization, contributing to reduced vulnerability to vaccine-preventable diseases
- Enhanced effectiveness of frontline service delivery, as Health Extension Workers are supported with consistent counseling tools and follow-up mechanisms

8.3 Long-Term Impact

Over time, and with sustained integration into health system workflows, EnatCare is expected to contribute to broader public health impact, including:

- Improved maternal and child nutritional status
- Reduced burden of vaccine-preventable diseases among children
- Strengthened health-seeking behaviors across the RMNCH-N continuum of care
- Improved efficiency and effectiveness of existing maternal and child health investments

9. Monitoring, Evaluation, and Learning Framework

Monitoring, Evaluation, and Learning (MEL) is embedded throughout the implementation of EnatCare to ensure accountability, adaptive learning, and evidence generation. The MEL approach is designed to assess whether the platform improves caregiver knowledge, strengthens RMNCH-N service utilization (including ANC/PNC and routine immunization), and supports continuity of care through Health Extension Workers.

9.1 MEL Objectives

The MEL framework aims to:

- Track implementation fidelity and platform performance
- Measure changes in caregiver knowledge, behavior, and service utilization
- Assess the feasibility and acceptability of a digital demand-generation model
- Generate actionable learning to refine content, reminders, and delivery strategies

9.2 Evaluation Approach

A mixed-method, phased evaluation design will be used, combining:

- Routine monitoring through platform analytics and implementation records
- Baseline and endline surveys among a representative sample of enrolled caregivers
- Qualitative feedback from caregivers and health workers
- Triangulation with aggregated service data, where feasible and appropriate

9.3 Key Outcome Domains

The MEL framework focuses on four core outcome domains:

1. Caregiver knowledge and preparedness (nutrition, ANC/PNC, immunization schedules)
2. Service utilization and follow-up (ANC attendance, PNC follow-up, immunization timeliness)
3. Behavioral practices (maternal nutrition, infant and young child feeding)
4. Health system reinforcement (health workers' counseling efficiency, follow-up support)

9.4 Data Collection and Use

Data will be collected through:

- In-app usage analytics (engagement, reminder completion)
- Structured caregiver surveys (baseline and endline)
- Health workers' feedback tools and supervisory reports

ANC and PNC utilization will be measured through caregiver self-report, in-app reminder completion, and aggregated feedback from health workers, with facility-level data used for triangulation where feasible.

Findings will be reviewed regularly to inform:

- Content refinement
- Reminder timing optimization
- User engagement strategies

9.5 Learning and Adaptation

Learning is a core objective of the pilot. MEL findings will be reviewed quarterly by the implementation team to:

- Identify what works and what does not
- Adjust platform features and messaging
- Inform scale-up decisions

Quarterly learning briefs will be shared with donors and governance partners.

9.6 Ethics, Data Protection, and Privacy

All MEL activities will adhere to national data protection standards and ethical principles. Data will be collected with informed consent and stored securely. Only aggregated and anonymized data will be used for reporting and learning. A Data Protection Impact Assessment (DPIA) guides data handling and risk mitigation.

A detailed MEL framework, including indicators, data sources, frequency, and responsibilities, is provided in Appendix 4.

All data collection and analysis adhere to the Data Protection & Privacy Policy (Appendix 3).

10. Feasibility, Risks, and Mitigation

The EnatCare intervention is designed with a clear understanding of the operational, behavioral, and system-level risks associated with implementing digital health platforms in low-resource settings. Drawing on lessons from prior digital nutrition and maternal health initiatives in Ethiopia, risk mitigation is integrated directly into platform design, implementation strategy, and governance arrangements.

10.1 Key Risks and Mitigation Strategies

1. Digital literacy and usability barriers
Women with limited literacy or prior exposure to digital tools may face challenges using mobile applications.

Mitigation: The platform is designed with icon-based navigation and simplified user flows. Health workers support onboarding and use during routine visits and facility interactions. For users unable to effectively engage with smartphone applications, core reminders and guidance will be delivered through SMS-based messaging, ensuring continued access to essential information.

2. Unequal phone ownership and access
Women may not own personal smartphones or may rely on shared devices.

Mitigation: EnatCare supports shared caregiver access with other household members (husband, partners). Content is designed for low data and battery consumption, and offline-first functionality reduces dependency on continuous connectivity. In addition, SMS delivery of key content (e.g., appointment reminders, nutrition prompts, immunization schedules) enables participation by users with non-smartphones or intermittent internet access.

3. User disengagement and fatigue
Excessive notifications or overly complex interfaces may reduce sustained use.

Mitigation: Reminder frequency and content are informed by behavioral insights and refined through ongoing monitoring. Engagement strategies are adjusted based on user feedback and usage data.

4. Trust, misinformation, and credibility risks
Caregivers may distrust digital health information or encounter conflicting messages.

Mitigation: All content is aligned with national guidelines and reinforced through health workers and health facilities. Messaging emphasizes consistency with government-endorsed services.

5. Supply-side constraints and service disruptions
Vaccine stock-outs or service interruptions could undermine caregiver trust.

Mitigation: The platform focuses on demand-side support and includes transparent messaging to guide caregivers on service availability. Coordination with facilities and health workers helps manage expectations during disruptions.

6. Sustainability and institutional ownership risks
Standalone digital platforms risk discontinuation once project funding ends.

Mitigation: From the outset, EnatCare is designed as a social enterprise where pertinent information will be equivalized by subsidization of user subscription. Engagement with government counterparts and the use of open standards support institutional adoption and reduce dependency on donor funding.

7. Data protection and cybersecurity risks
Handling personal and sensitive health information presents privacy and security concerns.

Mitigation: Data minimization, informed consent, encryption, and secure authentication are applied. A Data Protection Impact Assessment (DPIA) guides data governance and risk mitigation, with compliance to national data protection frameworks.

10.2 Adaptive Risk Management

Risk monitoring is continuous throughout implementation. Feedback from caregivers, Health Extension Workers, and partners informs adaptive mitigation measures. Emerging risks are documented and addressed through regular implementation reviews and governance oversight.

Safeguarding risks related to work with women and children are addressed through a dedicated Safeguarding and Child Protection Policy (Appendix 5)

11. Organizational Structure and Staffing

EnatCare is implemented by Alliance Health Tech, a mission-driven social enterprise established to deliver public-interest digital health solutions aligned with national priorities. The organizational structure combines strategic leadership, technical delivery, and health systems expertise to ensure effective implementation, accountability, and scalability.

11.1 Organizational Structure

The project operates under a hybrid delivery model, integrating centralized coordination with decentralized, field-level engagement through health facilities and the Health Extension Program. Clear role delineation ensures efficient decision-making, technical quality, and operational oversight.
Key functional units include:

- Strategic Leadership and Governance
- Platform Development and Technical Operations
- Health and Nutrition Content
- Monitoring, Evaluation, and Learning (MEL)
- Finance and Administration

Overall project oversight is provided by senior leadership within Alliance Health Tech, with internal governance mechanisms ensuring financial integrity, risk management, and compliance with donor and government requirements.

11.2 MVP Project Team

The implementation team includes the following roles:

- Project Director and Health Lead - Dr. Lord Tadesse Mekonnen
  Provides strategic direction, health systems leadership, and alignment with national RMNCH-N priorities.

- Grant and Operations Manager - Sara Ghebremicael
  Oversees day-to-day operations, partner coordination, reporting, and compliance with donor requirements.
- Technical Lead - Temaledegn Yisfa
  Leads platform architecture, development, and system integration.
- Software Development Team: Full-stack Developer: Yohaness Getu, Front-End / UI-UX Designer: Philemon Yacob, AI and Chatbot Engineer: Gebriel Gosaye
- Nutrition and Clinical Content Team: Nutrition Lead: Hawi Tesfaye
- Content Specialists: Betelhem Melese (Nutritionist), Betelhem Amha (Dietitian), Sara Seife (Nutritionist)
- Clinical Advisor: Dr. Rafiq Ramadan (OB-GYN)
- Monitoring, Evaluation, and Learning (MEL): MEL Lead: Dr. Weys Nesru, MEL Specialist: Hadassah Okandeji
- Translation and Localization: Hana Translation Center

Detailed governance and organizational structure are provided in Appendix 6.

11.3 Capacity, Roles, and Delivery Approach

Core positions are supported by part-time specialists and consultants, allowing the project to maintain technical depth while remaining cost-efficient. Highly specialized roles, such as AI development and clinical advisory, are structured as targeted engagements aligned with project phases.

Health Extension Workers and frontline health staff are not employed by the project but are engaged as system partners, reinforcing sustainability and government ownership.

11.4 Fiduciary Oversight and Risk Management

Alliance Health Tech maintains dedicated finance and administrative functions to ensure sound financial management, procurement integrity, and compliance with Ethiopian regulations and donor fiduciary standards. Internal controls and reporting systems support transparency, accountability, and timely risk mitigation.

A detailed organizational chart and governance arrangements are provided in Appendix 6.

12. Budget Overview and Value for Money

Budget Overview

The proposed budget for the EnatCare pilot and early scale-up phase is 9,500,000 ETB (approximately $61,300 USD), to be implemented over 18 months. Resources are tightly focused on essential deliverables and phased to maximize impact and learning. Phase I (Months 1-4) is already underway: an initial minimum viable product (MVP) of the mobile app has been developed, and the remaining Phase I work will finalize culturally tailored content, complete language localization (Amharic, Afaan Oromoo, Tigrigna), and refine the user experience. This proactive start underscores commitment and reduces risk, ensuring later phases can progress efficiently.

12.1 Budget Breakdown

The table below summarizes the amounts in Ethiopian Birr (ETB), approximate USD equivalents, and percentage of the total:

Table 2: Budget allocation by major cost category

Budget Category	**Amount (ETB)**	**Approx. USD**	**% of Total**
Personnel & Technical Expertise	4,750,000 ETB	~$30,650 USD	50%
Technology Development & Infrastructure	1,900,000 ETB	~$12,260 USD	20%
Program Implementation & Community Engagement	1,425,000 ETB	~$9,190 USD	15%
Monitoring, Evaluation & Learning (MEL)	712,500 ETB	~$4,595 USD	7.5%
Administrative, Legal & Compliance	712,500 ETB	~$4,595 USD	7.5%
Total	**9,500,000 ETB**	**~$61,300 USD**	**100%**

Exchange rate: 1 USD ≈ 155 ETB (January 2026)

Cost allocations prioritize local human resources, technical delivery, and community-level implementation, reflecting the labor-intensive nature of digital health, content development, and service integration. Administrative and overhead costs are intentionally kept lean, in line with donor expectations and good practice for public-interest digital health programs.

A detailed budget breakdown and cost assumptions are provided in Appendix 7.

12.2 Budget Allocation by Implementation Phase

The project is structured in four sequential phases over 18 months, corresponding to planning, pilot, expansion, and integration. Table 3 below outlines each phase with its timeline, key activities, and the indicative portion of the budget allocated. This phased approach ensures resources are released in steps, aligning spending with performance and learning before scaling up.

Table 3: Phased budget breakdown

Phase	Key Activities & Deliverables	Budget (ETB ~ USD)
Phase I - Planning & Content Development *Month 1-4 (ongoing)*	Foundational work is already in progress. Finalize and localize content in 3 languages; refine MVP app UX and offline features; recruit and onboard core project team; establish data protection and consent protocols.	1,900,000 ETB *~$12,260* (20%)
Phase II - Prototype & Pilot Deployment *Month 5-8*	Pilot rollout in selected sites. Train health workers to use EnatCare as a counseling aid; onboard caregivers during ANC/PNC visits and immunization sessions; activate core features, collect early user feedback, and usage data to troubleshoot issues.	2,375,000 ETB *~$15,325* (25%)
Phase III - Public Launch & Engagement Expansion *Month 9-12*	Broader launch to increase adoption. Implement a community outreach and awareness campaign (in collaboration with local health offices); expand user enrollment beyond initial pilot clinics; introduce interactive features like the AI chatbot and moderated forums once pilot content is validated; bolster engagement through periodic health tips and reminder optimization.	2,850,000 ETB *~$18,385* (30%)
Phase IV - Scale & Integration *Month 13-18*	Pursue integration of the app into routine workflows in the pilot region. Limited expansion to additional health centers or a new region may occur on a pilot basis to test replication. Emphasis is on sustainability: engaging government stakeholders for ownership and refining the model for future scale.	2,375,000 ETB *~$15,325* (25%)

Exchange rate: 1 USD ≈ 155 ETB (January 2026)

Each phase's activities have been right-sized to the 9.5 million ETB budget while maintaining the project's overall theory of change. Critical deliverables (localized content library, functional chatbot, trained HEWs, engaged users, and evaluation data) are retained, but the geographic and population reach is narrowed to fit the available resources. For instance, Phase II will focus on a handful of willing pilot health facilities rather than a wide district, and Phase III's public launch will be a targeted regional campaign rather than a national rollout. This phased, controlled implementation ensures the project remains feasible and impactful at a pilot scale, with lessons learned to inform any subsequent scaling when additional funding allows.

12.3 Donor Packages: Modular Support Opportunities

To facilitate contributions from multiple partners, the EnatCare budget is modular. Donors can **s**ponsor specific components or phases with contributions ranging from 465,000 to 2,325,000 ETB (~$3,000 to $15,000) each, tied to tangible outcomes. This allows a variety of funding partners to plug into the project at comfortable levels, accelerating progress collectively. Example donor packages include:

1. **Content & Localization Partner - 465,000 ETB (~$3,000):** Funds the completion of culturally tailored health content and translation into a local language. This package would cover expert reviews of maternal nutrition and immunization content, plus language localization (Amharic, Afaan Oromoo, and Tigrigna). Deliverable: a fully localized content set and UI, improving accessibility for thousands of mothers in that language group.
2. **Community Engagement Sponsor - 1,160,000 ETB (~$7,500):** Supports on-the-ground outreach and training efforts. This mid-level contribution finances HEW training workshops for a pilot area (e.g., training 50+ health workers), production of user-friendly print materials (flyers, counseling cards), and a community awareness campaign to boost caregiver enrollment.
   Deliverable: at least 1,000 new caregivers onboarded through trained health workers and community events, strengthening demand for services.
3. **Technology & Innovation Champion - 2,325,000 ETB (~$15,000):** Underwrites a major technical component of the pilot. A contribution at this level could fund the integration of the AI-powered chatbot and interactive features into the app, along with rigorous user testing and iteration. Alternatively, it could cover 6+ months of platform hosting and advanced data security enhancements.
   Deliverable: a robust, AI-enhanced platform component fully implemented and operational, elevating the user experience and evidence generation for the pilot.

Donors may combine packages or fund multiple units of a package. All contributions directly correspond to pilot outputs, ensuring clarity on how funds are utilized.

12.4 In-Kind Contribution Strategy

In addition to financial support, in-kind contributions are highly valuable to EnatCare, reducing cash expenditures and leveraging partner strengths. The project welcomes and has identified several in-kind support opportunities:

- **Technology Infrastructure:** Partnerships with technology companies to SMS delivery infrastructure or device access. Donated smartphones or tablets for Health Extension Workers would further enhance field implementation without additional budgetary costs.
- **Content and Creative Services:** Collaboration with content experts and creative partners. Nutritionists, pediatricians, and public health specialists may contribute time to

review and co-develop content, ensuring technical accuracy and cultural relevance. Graphic designers, illustrators, and local creative agencies can support user interface design, visual storytelling, and low-literacy-friendly illustrations.

- **Marketing and Media Partnerships:** Media houses, advertising agencies, and digital marketing firms may support EnatCare through pro bono or discounted services, including campaign concept development, public service announcements, audience targeting strategies, and dissemination of health messaging across radio, television, print, and digital platforms. Such partnerships can strengthen public awareness and trust while advancing partners' corporate social responsibility objectives.
- **Training and Event Support:** Government health bureaus, NGOs, and professional associations may contribute venues, facilitators, or logistical support for Health Extension Worker trainings, stakeholder workshops, and community outreach activities.
- **Operational and Logistical Support:** In-kind contributions may also include government support for health worker time allocation, technical assistance for system integration, transport for field activities, or academic partnerships for monitoring, evaluation, and learning.

All these in-kind contributions stretch the pilot budget further and build stakeholder ownership. By tapping into existing resources and goodwill, EnatCare can deliver more value than the modest monetary budget alone would allow.

Visibility and Recognition Principles

Visibility and recognition for donors and in-kind partners will be provided in a manner that is transparent, proportionate, and consistent with public health ethics and government guidelines. Recognition may include acknowledgment in project reports, public communications, partner listings, and selected outreach materials. All visibility arrangements will prioritize user trust, equity, and the integrity of maternal and child health messaging.

12.5 Ensuring Value for Money and Strategic Alignment

The EnatCare budget is structured to maximize value for money and align with strategic health priorities:

- Over 90% of the budget is directed to programmatic activities (technology, content, training, community engagement, and MEL) with only 7.5% on overheads. This ensures most resources go directly into service delivery and user impact**,** not administrative costs.
- Training and empowering government HEWs as digital health agents means the project builds on an established workforce, reducing the need for costly parallel staff and improving sustainability.
- The budget is phased to allow learning and course correction. Funds are committed in stages (Phase I/II for development and pilot, III for expansion, IV for integration) rather than all upfront. This adaptive approach means we "learn and adjust" before spending on expansion.

- All content development, technical work, and outreach utilize local expertise, avoiding expensive international consultants. Local professionals not only cost less but also bring contextual understanding, yielding more relevant solutions.
- By inviting co-funding and in-kind support, the project creates a coalition of stakeholders invested in its success. Each dollar invested catalyzes additional contributions (financial or in-kind), amplifying value.

12.6 Financial Management and Compliance

Alliance Health Tech will manage project finances in accordance with Ethiopian regulations and donor financial management requirements. The organization maintains internal controls, segregation of duties, procurement procedures, and reporting systems to ensure transparency, accountability, and audit readiness.

A detailed budget breakdown, cost assumptions, and notes are provided in Appendix 7.

13. Sustainability and Governance Plan, and Financing Strategy

EnatCare is designed as a public-interest digital health platform, with sustainability embedded through early alignment with national systems, disciplined governance arrangements, and a phased approach to financing. The strategy recognizes that long-term impact depends not on standalone continuation, but on institutional relevance, operational feasibility, and responsible financing.

13.1 Institutional Sustainability

From inception, EnatCare is aligned with Ethiopia's Health Sector Transformation Plan II, National Nutrition Program, and Expanded Program on Immunization. The platform is intentionally positioned to complement existing service delivery structures, particularly the Health Extension Program, rather than duplicate reporting or clinical systems.

Institutional sustainability is supported through:

- Technical alignment with national digital health architecture
- Use of open standards to reduce dependency on proprietary systems
- Design of EnatCare as a digital job aid and demand-side support tool, enabling adoption without structural disruption

This approach increases the feasibility of future government endorsement, adaptation, or integration.

13.2 Governance Arrangements

EnatCare is governed within the fiduciary and accountability framework of Alliance Health Tech, which provides executive oversight, financial management, and compliance with Ethiopian regulations and donor requirements.

At the current stage, governance is provided through:

- Executive Director oversight and decision-making authority
- Internal controls, compliance procedures, and risk management systems
- Defined roles across technical, programmatic, and financial functions

As implementation progresses, the project intends to establish a non-binding advisory mechanism to support strategic guidance and technical alignment with government and development partners. This advisory arrangement will not involve day-to-day operations.

Detailed governance and organizational structure are provided in Appendix 6.

13.3 Financial Sustainability and Financing Strategy

During the pilot and early scale-up phase, EnatCare will be financed primarily through donor and development partner support, consistent with its public-interest mandate.

Over time, and subject to performance and policy alignment, the project will explore complementary financing mechanisms that do not compromise access or equity, including:

- Corporate social responsibility (CSR) contributions
- Partnerships aligned with government and donor priorities
- Optional value-added services for non-core features only, introduced after the pilot phase

Core services, nutrition guidance, ANC/PNC reminders, and routine childhood immunization support will remain free at the point of use for primary beneficiaries.

13.4 Protecting Public Interest and Equity

As a mission-driven social enterprise, Alliance Health Tech operates under a public-interest delivery model. Safeguards are in place to ensure that sustainability efforts do not undermine equity, including:

- Separation of core RMNCH-N services from any future revenue-generating features
- Continued alignment with national health priorities
- Transparent governance and donor reporting

13.5 Managing Sustainability Risks

Potential sustainability risks, such as insufficient institutional uptake or funding gaps, are mitigated through phased implementation, early government engagement, and lean operational design. Lessons from previously discontinued digital health platforms in Ethiopia will be implemented, reinforcing the importance of ownership and system compatibility.

All activities are governed by safeguarding and child protection standards outlined in Appendix 5.

14. Strategic Partnerships

The EnatCare initiative is designed to operate within a multi-stakeholder ecosystem, where partnerships play a complementary role in strengthening alignment, reach, and sustainability. Partnerships are pursued to support technical alignment, implementation learning, and scale, rather than to duplicate existing service delivery or governance functions.

14.1 Government and Public Sector Partners

Key government institutions are engaged as technical and policy counterparts, ensuring alignment with national priorities and service delivery frameworks.
These include:

- Ministry of Health (MoH) - technical alignment with RMNCH-N priorities, nutrition, ANC/PNC, and immunization strategies
- Ethiopian Public Health Institute (EPHI) - potential collaboration on technical guidance, learning, and evidence generation
- Ministry of Innovation and Technology - alignment with national digital health and innovation frameworks
- Universities - research, learning, and evidence generation

Government partners do not assume implementation or fiduciary responsibility for the project. Their role is advisory and technical, supporting alignment and long-term institutional relevance.

14.2 Development and Multilateral Partners

EnatCare aligns with the strategic priorities of major development partners active in maternal and child health, nutrition, and immunization, including:

- UNICEF, GAVI, USAID

Engagement with these partners may include technical dialogue, coordination with existing programs, and a learning exchange. Any formal collaboration will be defined through clear scopes of work and data governance arrangements, subject to mutual agreement.

14.3 Foundations and Philanthropic Partners

Foundations with a focus on digital health innovation, nutrition, and immunization, such as the Bill & Melinda Gates Foundation and Rotary International, are considered potential funding and knowledge partners. Engagement is guided by alignment with public-interest objectives, national priorities, and evidence-based implementation.

14.4 Civil Society and Implementing Partners

Local and international NGOs, women's associations, and community-based organizations may support:

- Community engagement and trust-building
- Caregiver onboarding and feedback collection
- Localization of content and messaging

14.5 Private Sector and CSR Engagement

Selective engagement with private sector actors, such as mobile network operators or technology firms, may support:

- Technical infrastructure (e.g. messaging, connectivity)
- Corporate social responsibility (CSR) contributions aligned with maternal and child health goals

Any such engagement will be structured to protect data privacy, equity, and public interest objectives.

14.6 Partnership Principles

All partnerships under EnatCare are guided by the following principles:

- Clear role definition and accountability
- Alignment with national policies and public-interest objectives
- Data protection and ethical safeguards
- Avoidance of duplication and parallel systems

15. Capacity Building and Local Ownership

A core principle of EnatCare is the strengthening of local capacity and ownership, ensuring that digital innovation contributes to sustainable health system improvement rather than external dependency. Capacity building is integrated throughout the design, implementation, and scale-up phases.

15.1 Capacity Building Approach

Capacity building under EnatCare focuses on three interconnected groups:

- Frontline Health Staff and Health Extension Workers

Health Extension Workers are supported to use EnatCare as a digital counseling and follow-up aid, strengthening their ability to deliver consistent, guideline-aligned nutrition, ANC/PNC, and immunization messages. Training emphasizes practical use, integration into routine workflows, and reinforcement of national protocols rather than parallel systems.

- Local Health and Nutrition Professionals

Ethiopian nutritionists, clinicians, and public health professionals play a central role in content development, validation, and continuous refinement. This approach strengthens local technical expertise in digital health content governance and reduces reliance on external consultants.

- Local Technical and Implementation Teams

Platform development, maintenance, and iteration are led by local technical teams, with structured knowledge transfer and documentation to ensure continuity and long-term technical ownership.

15.2 Participatory Co-Design and Learning

Local ownership is reinforced through participatory co-design, involving caregivers, Health workers, and community stakeholders in testing, feedback, and refinement of the platform. User feedback is systematically captured and incorporated through iterative design cycles, supported by the project's Monitoring, Evaluation, and Learning framework.This approach ensures that the platform remains responsive to local needs, cultural contexts, and service realities across different regions.

15.3 Pathways to Local Ownership

As a mission-driven social enterprise, Alliance Health Tech operates with a public-interest mandate. Local ownership is supported through:

- Progressive transfer of operational knowledge and documentation
- Alignment with national systems and standards to enable institutional uptake
- Transparent governance and collaboration with government counterparts

These pathways ensure that EnatCare can be adapted, sustained, or institutionalized over time in ways that align with Ethiopia's health system priorities.

15.4 Contribution to Long-Term Sustainability

By investing in people, systems, and processes, EnatCare strengthens the foundation for long-term sustainability. Capacity building activities directly support the project's sustainability and financing strategy by reducing operational risk, improving service integration, and enabling scale without proportional increases in cost.

Conclusion

Ethiopia has made important progress in expanding access to maternal and child health services; however, persistent gaps in nutrition practices, antenatal care follow-up, and routine childhood immunization continue to limit health outcomes. Addressing these challenges requires solutions that strengthen household-level decision-making, reinforce frontline service delivery, and align closely with national systems.

EnatCare responds to this need by translating Ethiopia's nutrition, antenatal care, and immunization policies into practical, life-stage-specific digital support for women and caregivers. By integrating nutrition guidance, ANC/PNC reminders, routine immunization follow-up, and Health Extension Worker reinforcement, the platform strengthens continuity of care across the RMNCH-N continuum while complementing existing public investments.

Implemented by a mission-driven social enterprise and governed within a public-interest framework, EnatCare is designed for sustainability through system compatibility, local capacity strengthening, and disciplined governance. Its phased implementation and learning-focused approach enable the platform to demonstrate feasibility, effectiveness, and value before scale.

The initiative directly contributes to Sustainable Development Goal 3 (Good Health and Well-Being) and SDG 2 (Zero Hunger), with strong linkages to SDG 5 (Gender Equality) through women's empowerment and access to information, and SDG 10 (Reduced Inequalities) by prioritizing low-literacy and underserved populations. Through partnerships and system alignment, EnatCare also supports SDG 17 (Partnerships for the Goals).

Investment in EnatCare strengthens the effectiveness of Ethiopia's maternal and child health programs by improving informed caregiving, timely service utilization, and follow-up. With appropriate partnership and support, the platform offers a scalable model for responsible digital health innovation that advances national priorities and global development goals simultaneously.

Appendix

Appendix 1. Logical Framework Matrix
Appendix 2. Theory of Change Diagram
Appendix 3. Data Protection & Privacy Policy
Appendix 4. Monitoring, Evaluation & Learning (MEL)
Appendix 5. Safeguarding & Child Protection Policy
Appendix 6. Organizational Structure & Governance
Appendix 7. Detailed Budget breakdown

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