The MERIAM Initiative – Advancing predictive analytics to fight malnutrition in South Sudan.

The Republic of South Sudan gained independence in 2011 following decades of civil war. Though independent, the nation and its citizens continue to experience the adverse impacts of conflict and climate-induced shocks. Despite the continued support of the international community, malnutrition prevalence remains alarmingly high in South Sudan. The intersection of multiple hazards within a fragile political context makes it particularly challenging to effectively prevent malnutrition. Addressing this complex problem requires proactive approaches and strategies informed by advanced data analytics to guide resource allocation and inform policy change. The Modelling Early Risks Indicators to Anticipate Malnutrition (MERIAM) initiative emerges as a groundbreaking approach designed to fill critical gaps in early warning capabilities, especially in provision of reliable forecasts of acute malnutrition prevalence rates and caseloads. Using advanced statistical and computational modelling techniques, MERIAM aims to provide stakeholders with easy-to-use forecasts to enhance the effectiveness of nutrition programming and enable anticipatory measures. The project's vision is simple yet transformative: to save lives by utilizing existing data to improve decision-making through innovative analytics. The initiative is generously supported through a project financed by the German Federal Foreign Office (GFFO).

Key Achievements:

1. **Stakeholder Engagement and Collaboration:**

The MERIAM initiative in South Sudan adopted an inclusive approach from the beginning, engaging key stakeholders across government, humanitarian agencies and academia. A stakeholder sensitisation meeting was conducted on 12 September 2023, bringing together representatives from the Ministry of Health (MoH), Ministry of Agriculture and Food Security (MoAFS), Ministry of Humanitarian Affairs and Disaster Response (MHADR), Ministry of Water and Irrigation (MoWI), the National Bureau of Statistics (NBS) as well as global partners, namely UNOCHA, WFP, FAO and UNICEF. This was followed

Group photo of stakeholders at MERIAM Sensitization Meeting

by the formation of a data review and acquisition committee on 29 September 2023 to streamline the identification and sharing of critical datasets for the modelling process. To ensure robust review of data collection and management tools, on 23 April 2024, the MERIAM team presented its data-sharing framework to the Nutrition Information Working Group (NIWG), a body that coordinates the generation and dissemination of nutrition information, thus setting the stage for collaborative ownership of MERIAM outcomes. Stakeholders appreciated MERIAM's inclusive approach: as one MoH official noted: "*This project is a game changer. It integrates the expertise of all relevant actors to create something truly impactful*".

2. **Formative Research and Design Insight:**

To ensure the model forecasts' relevance to the contextual needs of actual users, a formative research study was conducted to solicit and incorporate stakeholders' perspectives of what they wish the model should entail. The research was aimed at gaining a deeper understanding of stakeholders' experiences with current information resources, current challenges and expectations of any new information resources such as MERIAM. The process of capturing stakeholder views and preferences was central to shaping the subsequent model development. The MERIAM formative research was conducted from April to June 2024 and engaged 18 key informants from institutions such as government line ministries, UN agencies, international and local NGOs whose collective views enhanced the identification of critical gaps that and informed a better tailored development of the MERIAM model.

In terms of strengths, the current tools such as SMART surveys, and Food Security and Nutrition Monitoring System (FSNMS) were found to have comprehensive coverage and quality. Nevertheless, challenges such as fragmented data systems and at times outdated information highlighted the need for innovative solutions that would avail frequently updated information, as MERIAM aims to do. Stakeholders also identified

Senior Data Analyst presenting formative research findings

systematic barriers, including insufficient funding, lack of trained personal and data management gaps. As a representative from NBS remarked, "*our fragmented systems make it difficult to track emerging issues efficiently*". Respondents called for tools offering *real-time*, *multi-sectoral data integration*, emphasizing that *timeliness* and *accessibility* are crucial for effective interventions in South Sudan.

3. Advancing Data Acquisition and Management:

In South Sudan, accessing historical data is a significant challenge due to the fragmented nature of data sources and lack of centralised data repositories. Despite this challenge, MERIAM was able to

Data mapping exercise conducted with stakeholders

engage stakeholders to create a centralized data repository to support the model development. Following the stakeholder sensitisations, a data review and acquisition team was formed, comprising of seconded line ministerial staffs with in-depth understanding and relations with partner organisations that collect and host relevant datasets. By late 2023, critical datasets began to trickle into the MERIAM datahub. To ensure proper storage and utilisation of the

acquired datasets, a data acquisition, management and use protocol was developed ensuring ethical

and efficient use of resources. By October 2024, over 80% of the collected datasets had undergone cleaning, development of logbooks, identification of variables and assignment of sensitivity levels, laying a strong foundation for predictive modelling. These efforts have already begun to bridge critical information gaps. As one FAO participants stated, "this *repository will provide the real-time insights we've long needed to plan effective responses*".

4. Modeling Early Warning and Decision Support:

The MERIAM models integrate socio-economic, climatic, conflict and nutritional indicators to provide actionable forecasts for acute malnutrition. The models are tailored to address specific challenges of South Sudan's multi-risk environment, emphasizing a holistic, multi-sectoral approach. Stakeholders envision that the resulting forecasts will support the Integrated Food Security Phase Classification (IPC) processes, Humanitarian Needs Overview (HNO) and Anticipatory Action Plans. An ACF representative summarised MERIAM's potential: "*By predicting trends before they escalate, we can allocate resources more effectively and prevent crises rather than reacting to them*". Other stakeholders also shared hopes that MERIAM will help to markedly improve humanitarian efforts in the nutrition sphere: "*The timeliness and frequency of data from MERIAM will revolutionise how we address malnutrition*" said a UNICEF Senior Staff. "*Integrating this system into our national frameworks will enhance our ability to act proactively, saving countless lives*" shared a representative from the Ministry of Agriculture. A national organisation representative echoed, "*MERIAM tools will empower us to address root causes and not just symptoms*".

ACF Research Coordinator presenting MERIAM use case

Call to Action:

MERIAM demonstrates the transformative potential of technology and collaboration in addressing malnutrition. However, to scale and sustain such innovations, there is need for increased investments in such vital initiatives as well as resources to respond proactively before forecasted crises materialize. We thus invite governments, donors and stakeholders to join hands in supporting this novel yet visionary course of action to save the lives and livelihoods of vulnerable children across South Sudan. By financing the MERIAM initiative, you are not only addressing immediate needs but also contributing to laying the foundation for building resilient health system through which the future of every child in South Sudan is assured of an opportunity to thrive.

As per the words of Benjamine Franklin, "*An ounce of prevention is worth a pound of cure*". Anticipatory action is vital in addressing hazards that can be forecast before they escalate, and MERIAM embodies this proactive approach that is highly needed in South Sudan. We encourage everyone willing to support this initiative as we strive to enhance evidence-based decision making and improve outcomes for the vulnerable populations. To learn more about MERIAM and its progress, kindly reach out to the project coordinator (ikipkemoi@actionagainsthunger.org). We will be happy to provide further details of our work.