UNICEF RWANDA @ 40 · PAN-AFRICAN STUDENT COMPETITION

AMBERE

Explainable machine learning for early prediction of child malnutrition in Rwanda

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The problem

27% Stunted

6% Underweight

Children under five · Rwanda DHS 2025

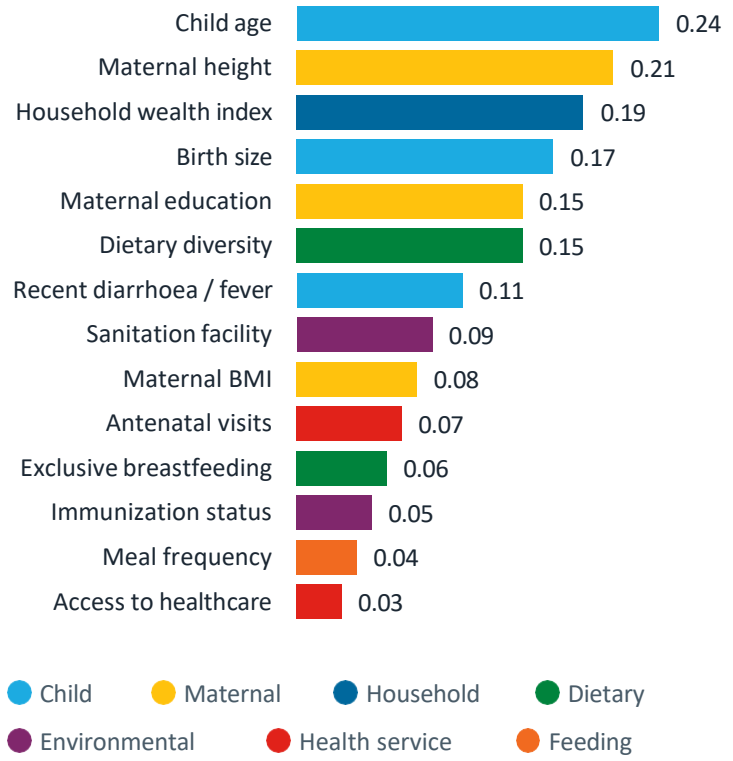
Screening detects malnutrition only after deficits appear.

Our solution

AMBERE learns from national survey data to spot children at risk of malnutrition **before signs appear**. It gives each child a risk score and explains why, so health workers can step in early.

What drives risk

Mean |SHAP| value



Early model performance

Underweight model: ~9 in 10 at-risk children detected

Outcome · model	Accuracy	Bal. acc.	Sens.	Spec.	Prec.	F1	ROC-AUC	PR-AUC
Underweight LightGBM	**96.33**	93.99	91.21	96.77	70.94	79.81	0.9805	0.9135
Stunting CatBoost v3	**85.07**	82.07	72.52	91.62	81.90	76.92	0.9002	0.8287

WHO BENEFITS

Children & caregivers
Early assessment, referral

Schools, ECD & health facilities
Screening, counselling, follow-up

Policymakers & researchers
Data-driven decisions

Metrics in %, AUCs as decimals · Thresholds: underweight 0.370, stunting 0.521 · Development: RDHS 2019–2020 · Temporal validation: RDHS 2025