ACTION
AGAINST
HUNGER

INNOVATIONS IN NUTRITION INFORMATION SYSTEMS

INTRODUCTION

SUMMARY

Information systems in nutrition are systems designed to continuously collect, analyse, interpret and share nutrition-related data[1]. Nutrition information systems play a key role for targeted action in population, nutritional health and food insecurity. Useful for advocacy, planning, budgeting, program design, and monitoring and evaluation, nutrition information systems serve many purposes. In more detail, nutrition information supports measuring changes in the nutrition status of vulnerable people, namely women and children, tracking progress in the implementation of actions, helping the prioritisation of responses[2]. Nutrition information assists in decision-making on policy and nutrition programme design, legislation, channelling of resources and implementation. Above all, the functioning of nutrition information systems determine how and what nutrition programmes are prioritised[3]. In order to make these decisions, actors must understand why people are deprived. Such understanding requires timely and accurate evidence based information. Whereby, the availability of reliable data, statistics and information, adequate capacity to analyse the available information and good communication skills to inform decision-makers are paramount (3). Therefore, well-organised and functioning nutrition information systems and tools are critical for timely, effective nutrition responses.
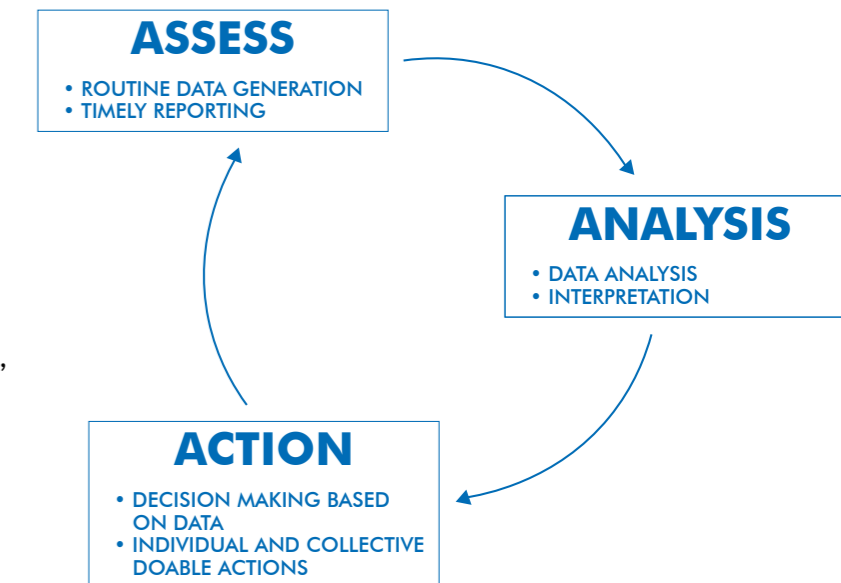
Nutrition information systems should ideally respect a continuous or cyclic process, following the principle of the triple A.

- **ASSESSMENT** Service generated data recording and timely reporting

- **ANALYSIS** Analysis and interpretation of the data based on the national guidelines and procedure

- **ACTION** Decision-making, dissemination and implementation using the information, followed by further assessment.

This analysis reviews nutrition information tools used in the field, with a particular emphasis on innovations in nutrition information systems that support collection, analysis and dissemination of nutrition data to assist decision making in nutrition programmes. his report mainly focuses on nutrition and health specific tools, branching out to general tools that are also used in the context of nutrition.

Disclaimer: The information collected on the tools were only collected on line except for the Action Against Hunger ones.

ASSESS
- ROUTINE DATA GENERATION
- TIMELY REPORTING

ANALYSIS
- DATA ANALYSIS
- INTERPRETATION

ACTION
- DECISION MAKING BASED ON DATA
- INDIVIDUAL AND COLLECTIVE DOABLE ACTIONS

TRIPLE A CYCLE: HOW EACH ELEMENT OF THE CYCLE IS CONNECTED TO THE OTHER

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1 Health Education and Training (HEAT) (2011) Nutrition Module: Session 13. Nutrition Information System.

2 Scaling Up Nutrition (2014) Scaling Up Nutrition In Practice – Information Systems for Nutrition.

3 Food and Agriculture Organization of the United Nations (FAO) (2015) Information Systems for Food Security and Nutrition.

COLLECTION

ANALYSIS

DISSEMINATION

ICONS LEGEND

NUTRITION AND HEALTH-SPECIFIC TOOLS

COMMCARE www.dimagi.com/commcare/

WHAT THE TOOL IS

CommCare is an open-source (albeit not free) mobile health platform, provided by Dimagi Inc., which provides both a mobile phone app and a web interface for data collection.

USES OF THE TOOL

Non-governmental organisations, public health organisations, research institutions and governments mostly are the targeted audience of this tool, whereby health programs can store and access patient information and perform case management for at-risk patients. Featured in the Health Compendium Volume 5 of USAID, CommCare also contains checklists and educational prompts to aid health workers in the promotion of preventative ill-health measures, nonetheless the tool requires training for Community Health Workers (CHWs) and Health Programme (HP) coordinator[4].

EXAMPLE OF WHEN USED

The platform is used by MSF as a data collection tool for Community Health Workers (CHWs) in supporting non-communicable disease (NCD) patients. The CommCare mobile platform was used to create the Integrated eDiagnostic Approach (IeDA), implemented by Terre des hommes (TdH). IeDA is a suite of diagnostic support and mobile data collection tools to support nurses in the Integrated Management of Childhood Illnesses (IMCI) in Burkina Faso, in order to reduce diagnostic error through the automation of assessments. The tool is deployed in 30% of all health clinics (over 620) in Burkina Faso, with the aim of reducing under-5 child mortality. Most recently, a consortium between TdH, World Vision and Action contre la Faim was launched to include the management

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4   USAID (2013) Scaling CommCare – A DIV-funded startup becomes a leading solution for mobile health.

of malnutrition[5]. This collaboration has led to development of Alliance for integrated e-DIAgnostic (AleDIA), which is in its designing phase. It is an adaptable digital solution to improve quality of health services and reduce childhood mortality in low resource settings. The tool includes e-diagnosis and clinical decision support, e-learning and capacity building and real-time data collection[6].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

Dimagi Inc. advertises that CommCare can support a variety of nutrition programmes such as Growth Monitoring Promotion (GMP), Community-based Management of Acute Malnutrition (CMAM) and Positive Deviance/Hearth (PD/H). Dimagi Inc. suggests that CommCare can respond to limitations for the different actors and throughout different levels of nutrition programming (i.e. programmes and organisations, frontline workers, and beneficiaries). With regards to nutrition programmes and organisations, CommCare can respond to problems of out-of-date data, and consequently resource misallocation, through accurate, complete and real-time data, in addition to the capacity for record sharing in order to track referrals in the case of CMAM programmes. For frontline workers, CommCare provides features such as anthropometric calculations, interactive multimedia, or data validation to reduce errors and time-consuming tasks and enhance protocol adherence, data completeness, and timely referrals. Finally, the platform enables the tracking of beneficiaries throughout visits, notifies them regarding the availability of nutrition programs locally, and engages them about positive health practices with behaviour change messaging.

EXAMPLE OF WHEN USED CommCare is used in projects run by various nutrition organisations. For example, World Vision implemented CommCare applications in nine countries in Africa, Southeast Asia and the Middle East to support CHWs in the screening of children for nutrition status and related illnesses[7].

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5   Terre de Hommes (2018) IeDA – An innovative online technology to save children's lives.

6   World Vision (2018) AleDIA: Alliance for integrated e-DIAgnostic.

7   Dimagi Inc. (2018) CommCare for Nutrition.

DEVINFO   http://www.devinfo.org/libraries/aspx/Home.aspx

WHAT THE TOOL IS

DevInfo is a powerful integrated desktop and web-enabled database system for monitoring human development indicators. This database is an interagency initiative, developed under the support of United Nations (UN) System, and managed in its behalf by United Nations International Children's Emergency Fund's (UNICEF) Data, Research and Policy with the support of United Nations Development Group (UNDG)[8].

HOW IT WORKS

The software is free to download and distributed royalty-free to UN member states and agencies. DevInfo provides access to both stand-alone and online databases, and encompasses data presentation tools and methods. The latest version allows data browsing, uploading, visualising (e.g. extended mapping features to produce high-quality thematic maps) and sharing of socio-economic data and human development indicators [9] (8; 9).

USES OF THE TOOL

DevInfo was designed for the collation, dissemination and presentation of human development indicators (9). Originally developed as ChildInfo to monitor the World Summit for Children, and later upgraded with the purpose of monitoring the progress towards the Millennium Development Goals (MDGs), the data has been used to feed into the Sustainable Development Goals (SDGs). DevInfo can be used as a tool to store, collate or disseminate and present data in a uniform manner to enable and facilitate data sharing across government departments, UN agencies and development partners (8; 9).

EXAMPLE OF WHEN USED

The ministry of Health in Rwanda created a database in DevInfo to support and monitor the implementation of the multi-sectoral District Plans to Eliminate Malnutrition (DPEM) at the sub-national level after declaring the fight against malnutrition a national emergency[10]. DevInfo allows tracking of all major indicators, plans and activities, allowing districts to generate quarterly progress reports, drawing information from the health management information system and community sanitation information system, community-based nutrition programmes, and rapid SMS messages from community health workers. District hospitals are in charge of analysing and disseminating the data for their health centres, sectors and communities.

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

The database compiles Nutrition Country Profiles, presenting indicators to monitor child and maternal nutrition progress. The indicators include, but are not limited to wasting, stunting and underweight data (burden and trends) for children under 5 years, Infant and Young Child Feeding (IYCF) practices data (e.g. breastfeeding, weaning), micronutrient data (e.g. vitamin A supplementation, anaemia), water and sanitation coverage, and maternal BMI data[11].

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8   UNICEF (2004) Statistics and Monitoring – DevInfo.

9   UNICEF (2009) Facts on DevInfo.

10   DevInfo (2011) News – Rwanda: using DevInfo to Combat Malnutrition.

11   DevInfo (2017) di Profile – Nutrition Profiles.

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DHARMA https://dharma.ai/

WHAT THE TOOL IS

The Dharma tool, co-founded by Jesse Berns and Michael Roytman, and owned by Dharma Platform Inc., is a data management platform designed to manage all activities at once (i.e. all-in-one platform), with the objective of supporting data driven decisions in the health, logistic and research sectors. Epidemiologists, scientists and field practitioners developed the platform during the West Africa Ebola epidemic[12].

USES OF THE TOOL

The Dharma application integrates with collection, management, secure storage, analysis, and visualisation features to manage projects, staff, identify and collect information, and to analyse and share

it in real time. It allows the building of sophisticated forms and workflows, as well as doing sophisticated data analysis, all in one portal. Dharma responds to the needs: (a) to build different types of surveys (one-shot, repeated data collection overtime/follow-up of beneficiaries at health facilities, follow-up food distribution, water ponds etc.), (b) for a data collection tool and (c) for advanced data analysis.

EXAMPLE OF WHEN USED

MSF have used the software platform Dharma in their Health Surveillance Programme (HSP), in response to their need for a mobile data collection tool in difficult settings (e.g conflict affected zone) with no regular surveillance program in

place. A review of the MSF HSP in crisis affected areas of the Middle East found that using Dharma improved decision-making, resource allocation, and operations targeting compared to anecdotal data models (often paper-based methods) due to timeliness and accuracy of information enabling staff to better understand conditions in real-time[13].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

The Dharma software can be used to support food security and nutrition-related programs, such as nutrition needs assessments, clinical trials, and electronic nutritional health records.

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12   Business Wire (2018) Dharma.ai Appoints David Muse as CEO and Kristen Clark Chief Growth Officer.
13   MSF (2016) MSF Scientific Days Innovation - Actionable data from difficult settings: end-to-end data management systems for surveillance in crisis affected areas of the Middle East.

DISTRICT HEALTH INFORMATION SYSTEM 2 (DHIS2) https://www.dhis2.org/

WHAT THE TOOL IS

DHIS2 is a free, open-source, web-based Health Management Information System developed by the Health Information Systems Program (HISP) at the University of Oslo (UiO)[14]. It was firstly implemented in 2006 in India[15] and is a tool for collection, storage, validation, analysis, visualization and presentation of health information data[16]. Various mobile solutions are available such as SMS-functions and Android and low-end Java -apps for offline data collection[14].

HOW IT WORKS

Each country has its own platform and owns the application and data with guidance from the HISP (14). The tool enables real-time data visualization through dashboards, scorecards, pivot tables, maps and charts. A Dashboard App allows users to customize these features, analyse data and easily share it and communicate with others. The DHIS2

Tracker facilitates individual-level data collection over time, e.g. about nutrition, immunization, pregnancies or lab samples, often to establish digital health records with information on patient history, treatment and risks. An Android-App aids frontline workers where initial data is gathered in a simplified version working offline to ensure access in remote areas[15]. SMS-services can be applied to send reminders to patients about visits, enter health data, contact health workers and more[17].

USES OF THE TOOL

DHIS2 is endorsed by WHO as a global public good and is broadly used in more than 100 countries, e.g. in routine reporting for facility, district and community health, education, water, sanitation and agriculture[14], and is the national health information system in 67 countries. It is also used by many non-governmental organisations in managing routine data for their own programmes[15].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

It brings support to countries in strengthening their national health information systems collecting all data in one place as well as facilitating collaboration across countries, giving more accurate reporting of health data, and aiding in decision-making[15].

14   DHIS2 (n.d.) About DHIS2.
15   DHIS2 (2018). DHIS2 factsheet: June 2018.
16   UiO, The faculty of Mathematics and Natural Sciences, Department of Informatics (2017). Health Information Systems Programme.
17   DHIS2 (n.d.) DHIS Mobile.

EMERGENCY NUTRITION ASSESSMENT (ENA) SOFTWARE https://smartmethodology.org/

WHAT THE TOOL IS

The Emergency Nutrition Assessment (ENA) software is an analytical programme used in Standardized Monitoring and Assessment of Relief and Transitions (SMART) surveys to facilitate survey planning, data collection, analysis and reporting. It was first implemented by SMART in 2007 and most recently updated in 2015[18].

HOW IT WORKS

The software includes functions for automated sample size calculation and selection, plausibility checking and standardization for anthropometry measures with tables and graphs[18]. It focuses on anthropometric and mortality indicators and automatically creates analyses and reports[19].

USES OF THE TOOL

It is used when conducting SMART surveys, but does has some limitations. Therefore, software has been created combining ENA with Epi Info, providing simple questionnaire and database construction, data entry and analysis, applying epidemiologic statistics, and creation of graphs and maps, with the purpose of making field surveys easier and more reliable. Data is thus entered with Epi Info, evaluated through ENA and further statistically analysed with Epi Info. Analysis of food security is also available[18].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

Easy, reliable data collection and analysis for SMART surveys, focusing on anthropometrics and mortality.

18   SMART (2019) ENA Software For SMART.
19   NutriSurvey (n.d.) ENA for SMART 2011.

FAMINE EARLY WARNING SYSTEMS NETWORK (FEWS NET)

http://fews.net/

WHAT THE TOOL IS

FEWS NET[20] was created in 1985 by USAID and offers an evidence-based system for early warning on famine and food insecurity. It was designed to help decision-makers prepare for humanitarian crises and developmental projects. There is a website with information and maps on current and projected food insecurity, timely alerts on evolving or probable crises, and reports about climate, markets, trade, agriculture, livelihoods, nutrition, and food support.

HOW IT WORKS

FEWS NET works in 38 countries through national and international partnerships with governments and non-governmental organizations. Main activities include monitoring and analysing data related to food security - food security classification, administrative boundaries, livelihood zones, remote sensing imagery, and price and cross-border trade - provided by the FEWS NET Data Center. In-depth reports are published on the website, where each of the 38 countries has a page with up-to-date information. Projections are made using Scenario Development – an eight-step approach to combine the web of factors influencing food security and describing the scenario most likely to happen as well as classifying expected levels of food insecurity six to twelve months in advance[21].

USES OF THE TOOL

The tool is used for governmental or relief agency decision-making in early warning and planning responses to humanitarian crises. It is also used in reaching long-term development goals, e.g. poverty reduction and adaptation to climate change as well as anticipating new areas and populations becoming food insecure in the future[22]. Examples of use include assessment of impact of drought on poor farming households in Somalia, estimation of the effect of currency devaluation in Malawi on food security and project impact of extensive flooding in Nigeria on the regional market[23].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

It provides extensive evidence-based analyses of current and projected food insecurity, and both monthly and specialized reports on its impact on nutritional status of affected populations. This entails obtaining recent, accurate, reliable, and representative data on the current nutrition and/or mortality status of certain areas, exploring causes, contextualizing data and integrating it in the food insecurity classification[24].

20   FEWS NET (n.d.) About Us.
21   FEWS NET (2018). Scenario Development for Food Security Early Warning. Washington, DC: FEWS NET.
22   FEWS NET (2011). 25 years of food security analysis and early warning.
23   FEWS NET (n.d.) Scenario Development.
24   FEWS NET (2018). Integrating Acute Malnutrition and Mortality into Scenario Development. Washington, DC: FEWS NET.

NATIONAL INFORMATION PLATFORMS FOR NUTRITION (NIPN)

http://www.nipn-nutrition-platforms.org/

WHAT THE TOOL IS

The National Information Platforms for Nutrition (NIPN) is an initiative of the European Commission providing a country-led and -owned information platform for designing evidence-based policies and programmes to improve human nutrition. This involves facilitating multi-stakeholder and multi-sector dialogue to bring nutrition data and information together[25].

HOW IT WORKS

NIPN supports countries with a high burden of malnutrition in improving national management and analysis of data and disseminating findings to prevent malnutrition and linked consequences. It is embedded in national structures and consists of a policy unit defining platform priorities and posing questions for analysis related to governmental needs. There is also a technical unit finding the relevant data, analysing and interpreting it. NIPN uses existing evidence to create arguments on effectiveness of programmes, interventions, approaches and investments in prevention of malnutrition, as well as to improve knowledge of factors influencing nutrition, including drivers of national trends and information-gaps. It also supports monitoring of progress, outcomes and commitment of governments and donors[25].

USES OF THE TOOL

It is used to enhance country capacity to improve nutrition information systems and analyse data to inform decision-making on prevention of malnutrition and its consequences. NIPN is used in Bangladesh, Burkina Faso, Ethiopia, Guatemala, Ivory Coast, Kenya, Laos, Niger, Uganda and Zambia[25].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

NIPN is mentioned in the European Commission's Action Plan on Nutrition from 2018 as a strategic priority to strengthen expertise and knowledge-base in nutrition[26]. It is expected that NIPN will result in consistency and use of best practices in quality of data, management and analysis, measurements, variables and indicators, and combining learning in nutrition across countries[25].

25   National Information Platforms for Nutrition (2016) The NIPN Initiative.
26   European Commission (2018) Action Plan on Nutrition, Third Progress Report April 2017 – March 2018.

NUTRITION LANDSCAPE INFORMATION SYSTEM (NLIS) http://www.who.int/nutrition/nlis/en/

WHAT THE TOOL IS

The Nutrition Landscape Information System (NLIS) is a web-based tool which brings together WHO Global Nutrition Databases and other food and nutrition-related health and development data from partner agencies[27]. The NLIS was developed as part of the Landscape Analysis on Readiness to Accelerate Action in Nutrition, and is available on the World Health Organization (WHO) website[28].

HOW IT WORKS

The web tool brings together data in the form of automated country profiles and user-defined downloadable data, structured according to the UNICEF conceptual framework for causes of malnutrition[27]. NLIS currently draws publicly available data from the WHO, UNICEF, the UN Statistics Division, the UN Development Programme (UNDP), the Food and Agriculture Organization of the UN (FAO), Demographic and Health Surveys (DHS), the World Bank, the International Food Policy Research Institute (IFPRI), and the International Labour Organization (ILO)[28].

USES OF THE TOOL

The NLiS was established with the aim to bring together nutrition-related indicators in a standardised form, track changes over time and monitor progress, and generate country profiles that are easy-to-interpret (overview snapshot of a country's nutrition, health and development landscape)[28]. The data and resources from the NLIS can be used to gather information in order to develop country or region level nutrition policies, or baseline data before an emergency to make evidence-based decisions for nutrition interventions.

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

The NLIS provides access to comprehensive nutrition information combined from multiple sources leading to more integrated approaches to nutrition interventions and informed decision-making[28].

27   World Health Organisation (2018) Nutrition - Nutrition Landscape Information System (NLIS).

28   World Health Organisation (2012) Nutrition Landscape Information System (NLIS) – Country Profiles Indicators: Interpretation guide.

SCOPE CONDITIONAL ON-DEMAND ASSISTANCE (COPA) https://innovation.wfp.org/project/scope-coda

WHAT THE TOOL IS

SCOPE CODA is a World Food Programme (WFP) platform. It builds upon WFP's beneficiary management system SCOPE, to replace paper-based health information systems. Records are digitalised and personal smartcards mitigate inefficiencies and enable field staff and global stakeholders to make decisions based on real-time data. SCOPE CODA was implemented in 2018 and developed for Community-based Management of Acute Malnutrition (CMAM), but it can also be used in other programmes where decentralised health monitoring is needed. It is a unified platform for CMAM stakeholders to access and share programme information and potentially improve coordination to develop evidence-based strategies addressing malnutrition[29].

HOW IT WORKS

Frontline health workers can record and access information on nutrition and health status at individual level, identify recovery and estimate treatment success. It also includes referral systems between programme components, ensuring no one is lost and increasing recovery rates. This is done via an electronic database and personal smartcards that are given to beneficiaries at enrolment, enabling follow-up. Data is shared online; giving stakeholders updated information for decision-making[29].

USES OF THE TOOL

It is used in South Sudan, Uganda and Tajikistan to assess programme performance in real-time, improve operations and generate daily reports, even where there is low bandwidth, poor connectivity or limited electricity[29].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

It results in more efficient beneficiary information management as well as coordination between CMAM stakeholders to improve strategies targeting malnutrition. Moving forward, SCOPE CODA aims to improve data and system quality through SCOPE 2.0, use WFP's expertise in IT projects, capacity build, support country growth and new country implementation, and continue to increase stakeholder partnership building, including evidence generation, improved treatment, system strengthening, and reporting and analytics[30].

29   WFP (2018). Tackling malnutrition with real-time data.

30   WFP (2018). SCOPE CODA: A Data Revolution in Nutrition.

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STANDARDIZED MONITORING AND ASSESSMENT OF RELIEF AND TRANSITIONS PLUS (SMARTPLUS) https://smartmethodology.org/

WHAT THE TOOL IS

SMART+ is an integrated digital infrastructure that will combine the use of a mobile 3D diagnostic application for field staff with a synchronized global data dashboard and aggregator for analysts and policy makers. The core innovation of SMART+ is the provision of a complete end-to-end digital infrastructure that incorporates the entire data collection and reporting chain[31].

HOW IT WORKS

Surveys are first created in the survey management tool and sent to the mobile data collection apps. Data is then collected in the field via the apps and synchronized with the survey tool. Results will then be analyzed and quality-controlled where subsequent data is then shared with a central database, and summary statistics are visualized on a dashboard. The entire process takes only a few days. By managing the entire data collection process in a single digital system, the new method increases speed, transparency, data quality, and reduces cost.

USE OF THE TOOL

SMART+ is currently being developed and is expected to be ready in 2021: It uses 3D scans to provide fast, cheap and accurate child body measurements, analyzes incoming data and assures quality on a survey management tool, aggregates data into a central database, and visualizes results on a public dashboard down to sub-regional level[32].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

SMART+ provides a more accurate, streamlined approach to the previous analogue methods of malnutrition diagnosis and surveillance data collection. It is an innovative approach to addressing many of the gaps that currently exist within the data collection process such as reducing child distress, time, resources, and necessary staff. It automates data aggregation and provides visualization of malnutrition status and mortality rates for large populations using the SMART methodology. There is currently no platform for aggregated data within nutrition assessment at the subnational scale. Although versions of digital dashboards exist, they still require manual entry, lack sub-national data, and are not always publicly available. SMARTplus would address these issues through its automated, streamlined, and standardized approach while feeding into larger, multi-sectoral databases that apply machine learning for early warning.

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31 Jana Daher (2019) SMARTplus.
32 SMART (2018) Presenting SMARTplus.

THE STATE OF ACUTE MALNUTRITION https://www.acutemalnutrition.org/

WHAT THE TOOL IS

The State of Acute Malnutrition (SoAM) website is a coordination and resource platform supported by the No Wasted Lives (NWL) Coalition, accessible in both English and French. The No Wasted Lives Coalition is an interagency effort between Action Against Hunger, the Children's Investment Fund Foundation (CIFF), the European Commission Directorate-General for Humanitarian Aid and Civil Protection (ECHO), Innocent Foundation, the International Rescue Committee (IRC), the UK Department for International Development (DFID), UNICEF, and World Food Programme (WFP)[33].

HOW IT WORKS

The site combines data, resources, events, and information about ongoing research. The data feature gathers the latest available global and country data on acute malnutrition provided by UNICEF, WHO, and the World Bank (Joint Child Malnutrition Estimates and Nutridash), as well as subnational coverage data from Action Against Hunger's coverage database. The data maps over 20 indicators, including prevalence, incidence and burden. In terms of the resources, the website assembles reports, publications, policies, and toolkits published about acute malnutrition. The resource library can be searched by topic, country, or date or publication, and contains over 2,500 resources in English, French and Spanish. Finally, the ongoing research provides a mapping of current studies related to acute malnutrition, drawn from publicly available research protocols and databases, in an interactive diagram organised by thematic area of research and sub-themes[33].

USES OF THE TOOL

The data and resources form the SoAM website can be used to gather information regarding acute malnutrition to develop country or region level nutrition policies, or baseline data before an emergency to make evidence-based decisions. A newsletter can be subscribed to in order to receive updates, and data, events and resources can be submitted to contribute to the website.

WHAT THIS TOOLS BRINGS TO NUTRITION INFORMATION

The aim of the SoAM website is to coordinate data sharing, improve data quality and usage, and identify gaps in data. It brings together information on acute malnutrition from a range of sources, in order to provide on single point of access to the latest available material on the topic[33].

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33 The State of Acute Malnutrition (2018) the state of acute malnutrition website.

VITAMIN AND MINERAL NUTRITION INFORMATION SYSTEM (VMNIS) http://www.who.int/vmnis/

WHAT THE TOOL IS

The Vitamin and Mineral Nutrition Information System (VMNIS) is a web-based tool composed of a 'Micronutrient database' which summarises data published on the micronutrient status of populations in an interactive platform. The VMNIS was established in 1991 as the Micronutrient Deficiency Information System, in response to the request for a strengthened global surveillance of micronutrient deficiencies from the World Health Assembly[34]. The information system is managed by the Evidence and Programme Guidance Unit of the Department of Nutrition for Health and Development through WHO's network of regional and country offices[34].

HOW IT WORKS

The micronutrient database includes 40 indicators of the status of 17 micronutrients or micronutrient-related conditions, which cover both deficiency and excess, in the form of downloadable data, with the option to create prevalence maps. The database systematically retrieves and summarises data on vitamin and mineral status of populations representative at the national, regional and first administrative level. The data is downloadable and users can create maps[34].

USES OF THE TOOL

The VMNIS is useful for the assessment, monitoring and evaluation (surveillance) of micronutrient deficiencies at the global level, and track the progress towards eliminating micronutrient deficiencies. The data and resources from the VMNIS can be used to gather information to develop country or region level nutrition policies, or baseline data before an emergency to make evidence-based decisions specific to micronutrient deficiencies, or evaluate the impact of strategies[34].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

The VMNIS provides accurate and timely national, regional, and global data tailored for vitamins and minerals[34].

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34 World Health Organisation (2018) Vitamin and Mineral Information System (VMNIS).

WORLD HEALTH ORGANIZATION ANTHRO SURVEY ANALYSER
https://www.who.int/nutgrowthdb/software/en/

WHAT THE TOOL IS

The World Health Organization (WHO) Anthro Survey Analyser is an online tool to carry out analyses of anthropometric survey data for children under five years of age based on weight and height measures. It is developed by the Department of Nutrition for Health and Development of the WHO to increase country capacity in data collection, analysis and reporting regarding child malnutrition outcomes[35].

HOW IT WORKS

The tools builds on WHO Child Growth Standards and gives results for four different indexes: height-for-age, weight-for-age, weight-for-height, and body-mass-index-for-age. It includes measures of age, sex, type of residence, sub-regions/districts, wealth quintiles, mother's education, and other relevant country-specific factors. Calculations of confidence intervals and standard errors in estimates are available, and data quality can be assessed. Graphs and tables for visualization of findings, including z-score distribution and prevalence estimates by the various stratification variables, can be downloaded along with templates for quality assessment and summary reports[35].

USES OF THE TOOL – The tool is useful for analysis of anthropometric indicators among children under five years of age. It uses the methodology of the WHO Anthro Software – Nutrition Survey Module, but includes a range of additions[36].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

Promotion of best practices on data collection, analysis and reporting of childhood anthropometric indicators[35].

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35 World Health Organisation (2019) WHO Anthro Survey Analyser, Quick Guide.
36 World Health Organisation (2019) WHO Anthro (Version 3.2.2, January 2011) and Macros.

MOBILE HEALTH OR MHEALTH

Mobile Health (mHealth) is a general term involving the support of medical and public health practice trough mobile tools, such as mobile phones, patient monitoring devices, personal digital assistants, and other wireless devices. mHealth involves the use of voice or short messaging service (SMS), and other functionalities and applications, such as general packet radio service (GPRS), third and fourth generation mobile telecommunications (3G and 4G systems), global positioning system (GPS), and Bluetooth technology for the collection of health-related data[37].

By means of example, Rwanda developed Rapid SMS Rwanda as a system to continuously screen children to detect and treat acute malnutrition, where community health workers are equipped with mobile phones to enable them to collect and use real-time data on key maternal, neonatal and child health indicators[2].

For this article, we refer to mHealth as all applications that use mobile phones or other portable electronic devices to collect data.

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37   World Health Organisation (2011) mHealth – New horizons through mobile technologies.

CHILD GROWTH MONITOR https://childgrowthmonitor.org/

WHAT THE TOOL IS

Child Growth Monitor is a mobile application for diagnosing children under 5 with wasting and stunting, developed by Welthungerhilfe[38].

HOW IT WORKS

The application uses the mobile phone's camera and infrared functions to scan children, and provide immediate data on height and weight of children in order to identify key malnutrition indicators.

USES OF THE TOOL

The Child Growth Monitor is under development to improve diagnosis of different forms of malnutrition. It is open source to encourage wide use, including UN agencies, NGOs and government. The app interfaces allow it to be easily connected to existing software, such as ENA for SMART.

EXAMPLE OF WHEN USED

A pilot took place in India in 2018, with a target sample size of 10,000 children, the results of this are currently unavailable. There are also plans to pilot the app in a survey (such as SMART), with an emergency nutrition organisation and with a government partner.

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

The Child Growth Monitor app contributes to cheaply, quickly and accurately diagnosing malnutrition.

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38   Welthungerhilfe (2018) Child Growth Monitoring: Quick, accurate data on malnutrition.

MOBENZI https://www.mobenzi.com/index.html

WHAT THE TOOL IS

Mobenzi is a tool for digitising fieldwork, including a mobile based interface enabling frontline workers to collect streamlined data and web platforms to manage data and generate reports[39].

HOW IT WORKS

Complex forms and survey design is made easy through the Mobenzi Researcher where they can be generated in minutes and published to frontline workers. Offline mobile data collection and real-time data validation is possible, and filtering options allow for the data collected to be charted, mapped and exported in real-time. The frontline workers can search, retrieve and update records from their automatically synchronised caseload, e.g. patients or beneficiaries. Their work can be monitored by managers, and the communication tools enable easy organization and supervision of the teams. The Mobenzi platforms can be integrated with other tools, platforms and applications, e.g. DHIS, to customize to needs of users[38].

USES OF THE TOOL

Mobenzi has been used in hundreds of solutions across over 50 countries in Primary health care, e.g. as a digital solution for community health worker teams; in Education and Early Childhood Development, e.g. to monitor the School Breakfast Feeding Programme in South Africa; and in Field Research and Monitoring & Evaluation. Live reports and dashboards can be shared with stakeholders and be used in decision-making (38).

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

Digitalisation of fieldwork in an easy-to-use platform.

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39   Mobenzi (2019) Mobenzi.

MOBILE VULNERABILITY ANALYSIS AND MAPPING (MVAM)

http://vam.wfp.org/sites/mvam_monitoring/

WHAT THE TOOL IS

mVAM is a mobile technology tool to collect and monitor frequent food security data to support humanitarian decision making, launched in 2013 by the WFP[40]. An open-source database is available on the website.

HOW IT WORKS

It collects real-time data through phone-calls, SMS and Interactive Voice Response calls (IVR). Respondents are contacted by WFP via their phones where a mobile survey is done, data is anonymised, cleaned and stored in a database and analysed by a 'stats engine'. Reports and data are shared as a global public good to help humanitarian decision making. This is a two-way communication system, so respondents can also contact the WFP to hear more about the programme, e.g. food distribution dates and food prices, and provide feedback, which is recorded and used in decision making[41].

USES OF THE TOOL

mVAM has been used in over 40 countries with more locations planned. Country-pages are found on the website with country-specific reports and methodology. Automatically updated emergency dashboards for Syria and Yemen are available to be used by policy makers, programme officers, and the public. mVAM has been applied in several humanitarian settings, including areas of conflict and instability, e.g. Sudan, Somalia, Iraq and Yemen; displacement camps, e.g. Rwanda, DRC, Kenya and Niger; and contexts where face to face surveys were not possible, for example during the West African Ebola outbreak[42].

A new initiative, Humanitarian High Resolution Mapping, is created to help get a view of the food security situation in areas where no surveys have been done, using machine learning to train models to make predictions on food security and create maps based on the predictions, which eventually will be automated in an app[43].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

A fast, cheap tool for data collection and analysis, which also can be used in remote and dangerous areas at lower costs without field staff. This enables faster planning and response from humanitarian organisations.

40   WFP (n.d.) Mobile Vulnerability Analysis and Mapping (mVAM): Delivering real-time food security data through mobile technology.

41   WFP (n.d.) What is mVAM?

42   Nancy Mocka, Gaurav Singhal, William Olander, Jean-Baptiste Pasquier & Nathan Morrowa (2016). mVAM: A new contribution to the information ecology of humanitarian work. Procedia Engineering 159, p217-221.

43   MVAM: The blog (2019). mVAM in 2018: Faster, Higher, Stronger.

SAM PHOTO DIAGNOSIS APP
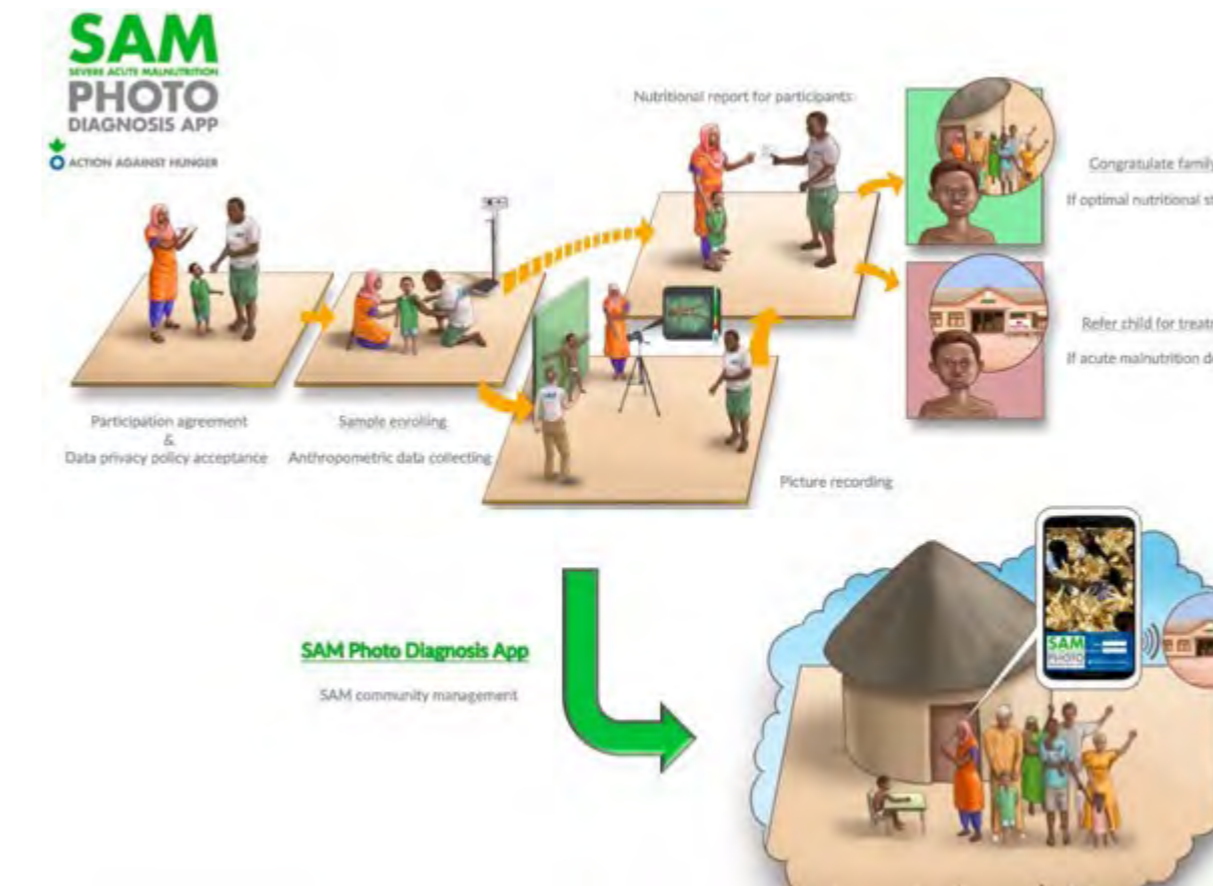
WHAT THE TOOL IS

The SAM (Severe Acute Malnutrition) photo diagnosis app, is an innovative and easy-to-use smartphone diagnostic tool based on Geometric Morphometric techniques and mobile phone technology developed by Action Against Hunger Spain and EPINUT[44].

HOW IT WORKS

A photo of a child under the age of 5 years is taken, and the app informs the user if the child suffers from acute malnutrition and to what degree. The mobile app applies geometric morphometric techniques to generate a quantifiable comparison of body shapes in documented healthy and marasmic children, permitting the accurate classification of the new photo in one of those groups. After the diagnosis is delivered, the app provides instructions for treatment referral[45].

44   Action Against Hunger (ACF) (2016) Annual Progress Report 2016.

45   Antonio Vargas (2018). SAM PHOTO DIAGNOSIS ACF.

USES OF THE TOOL

The SAM photo diagnosis app is under development to improve screening diagnosis and treatment of SAM, and strengthen the community management of malnutrition[46]. Designed to reduce the need for expert staff with specialised training in order to perform anthropometric measures to assess the nutritional status in children under five years, the app provides an alternative tool that requires little to no technical or health knowledge to diagnose SAM. In addition, this app could also be operated in the development of periodic surveys in communities, without the necessary presence of an NGO[43]. SAM photo diagnosis was also selected by the Aid and International Development Forum (AIDF) 2017 guide as a promising tool in the field of health equipment. The project will expand to include a platform for the sharing and dissemination of information, in order to aid decision making, make it more transparent to users and providing opportunity to conduct more complex analysis of data.

EXAMPLE OF WHEN USED

The SAM photo diagnosis app was trialled in Senegal, after the Geometric morphometric method was validated. The tool was assessed on a sample of 150 normal weight and 150 SAM children, in order to quantify morphological differences. This multi-context morphological study had the objective of analysing the app for accurate diagnosis of SAM. The results show that in the Senegalese population, the accuracy of diagnosis was above 93% when studying the whole body, increasing to 100% when analysing parts of the body separately[44].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

The SAM photo diagnosis app contributes to speeding and simplifying the diagnosis and treatment of SAM, reaching remote settings, promoting early recognition, prevention, and monitoring of acute malnutrition (43).

Currently the app is under development and further work includes scientific, technological and human-centred design approaches, such as testing the approach on a greater sample size to improve the accuracy of diagnosis, improving automated diagnostics functionalities (image registration processing and classification) and user friendliness, and integrating the functional app into routine health systems as an ehealth tool[44].

46   Field Exchange (2018) Development of a SAM photo diagnosis app.

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OTHER INFORMATION TOOLS USED OR THAT COULD BE USED IN NUTRITION

KOBO TOOLBOX https://www.kobotoolbox.org/

WHAT THE TOOL IS

The Kobo Toolbox is an open-source suite of tools for mobile data collection and analysis, adapted for challenging environments (i.e. humanitarian use), which is part of the ODK ecosystem. Kobo Toolbox was developed through a joint initiative between the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), Harvard Humanitarian Initiative (HHI) and the International Rescue Committee (IRC)[47].

HOW IT WORKS

The Kobo Toolbox support the whole data collection cycle, whereby form design, data collection and analysis. Kobo Tolbox delivers additional functionality such as an easy-to-use form builder to simply create questionnaires, question libraries (allows the use pf prepared questions or the re-use of questions and integrated data management, including rapid analysis of data collected through Excel, using labels included in the form.

USES OF THE TOOL

The Kobo ToolBox is specifically designed to aid data collection in challenging situations, such as humanitarian emergencies (e.g. earthquakes, typhoons), to quickly collect, record and analyse crucial reliable information, to enable humanitarian actors to make timely, evidence-based decisions or adapt on-going interventions[48]. The Kobo ToolBox helps remote management of teams through global positioning system (GPS) data collection (geotag) helps reduce errors in data collection and improve analysis.

EXAMPLE OF WHEN USED

Kobo ToolBox is being used in every major humanitarian disaster. By means of example, the tool is used by Action Against Hunger to carry out coverage surveys, most recently in the Cox Bazar refugee camp in Bangladesh. Similarly, MSF is using Kobo ToolBox to collect health and nutrition measurements and data in Borno state, Nigeria to tackle malnutrition[49].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

Much like ODK, Kobo ToolBox is not a nutrition specific tool, however the form-builder allows for adaptation to a nutrition survey, which improves quality and speed of nutrition data collection.

47   Humanitarian Response (2018) Kobo ToolBox.
48   KoBoToolbox (2018) KoBoToolbox website.
49   Doctors Without Borders/MSF-USA (2017) Using Smartphones to Tackle Malnutrition [Video].

NOMADEEC http://nomadeec.com/en/

WHAT THE TOOL IS

Nomadeec is an integrated, connected and mobile diagnostic and telemedicine tool, developed by Exelus, for clinical examination for field practitioners (e.g. emergency doctors, paramedics, rescuers, firefighters, nurses)[50].

HOW IT WORKS

The Nomadeec telemedicine tool is the link between a remote doctor and the field practitioner which can be integrated into the information system of a care structure. Nomadeec is a mobile application on a lightweight tablet interconnected via Bluetooth with medical devices according to practitioner needs, such as a blood pressure monitor, a pulse oximeter, a glucometer, a thermometer, and a digital electrocardiogram (ECG) (49). The tablet can capture emergency reports, which can be communicated in real-time, via the web app TelExpert, to remote medical coordination services[51].

USES OF THE TOOL

Nomadeec is a solution for communication between on-duty staff (nurses, care assistants, night watchmen) and medical care coordination services in an emergency and distant-care context. The tool has mainly been used in collaboration with ambulance services and medical dispatch centres (50).

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION

No examples were found of Nomadeec being used in nutrition, nonetheless the platform is innovative in the field of health, which is interlinked with nutrition. Nonetheless, the tablet could therefore be used specifically in the field of nutrition for centralisation of information and surveillance, such as for micronutrient deficiencies or NCDs.

50   Exelus (2017) Nomadeec Mobile telemedicine.
51   European Emergency Number Association (EENA) (2017) The who is who handbook in the public safety industry – here to connect the dots for you, November. Issue 4.

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OPEN DATA KIT (ODK) ECOSYSTEM https://opendatakit.org/

WHAT THE TOOL IS

Open Data Kit (ODK) is an ecosystem of open-source software, created by developers at the University of Washington's Computer Science and Engineering and members of Change. There are two suites of software (ODK1 and ODK2) as part of the ecosystem, with the aim that organisations can select and use the complementary tools from the ecosystem that best suit their needs.

HOW IT WORKS

The software/tools in the ODK suites allow data collection using mobile devices and data transmission to an online server, even when offline at the time of collection[52]. The ODK1 suite contains simple tools that are most commonly used (e.g. Ona, Enketo, Kobotoolbox, ELMO), whereas the ODK2 supports complex workflows. There are also ODK core tools such as, Build, Collect, Aggregate or Briefcase. ODK build that enables questionnaire creation using drag-and-drop designer or an excel spreadsheet, ODK collect that works as a mobile data collection application (collecting data in the form of text, numeric data, or media), ODK Aggregate for online data aggregation (storage, viewing and export), or ODK briefcase that allows data aggregation on the computer offline (51).

USES OF THE TOOL

This tool can be used for remote data collection using a computer, tablet or phone (without internet connection or cell carrier access), data visualisation as a map using Google Fusion Tables and Google Earth[53]. The tools provided by ODK can be used and customised by the user and therefore be used in multiple different contexts.

EXAMPLE OF WHEN USED

ODK was used by World Vision Kenya to develop a Standardised Monitoring Assessment for Relief and Transition (SMART) survey generic tool. Overall the project found that using ODK was a faster, cost-saving method for collecting and aggregating nutrition survey data[54].

WHAT THIS TOOL BRINGS TO NUTRITION INFORMATION – The ODK package is a general collection and analysis tool that can be adapted to be used in nutrition; nonetheless, it is not nutrition specific.

52   Open Data Kit Community (2018) ODK – Software.
53   Google Earth Outreach (2018) Mobile Data Collection Using ODK Collect.
54   Field Exchange (2018) Open Data Kit Software to conduct nutrition surveys: Field experiences from Northern Kenya.

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FOR FOOD.
AGAINST HUNGER AND MALNUTRITION.

FOR CLEAN WATER.
AGAINST KILLER DISEASES.

FOR CHILDREN THAT GROW UP STRONG.
AGAINST LIVES CUT SHORT.

FOR CROPS THIS YEAR, AND NEXT.
AGAINST DROUGHT AND DISASTER.

FOR CHANGING MINDS.
AGAINST IGNORANCE AND INDIFFERENCE.

FOR FREEDOM FROM HUNGER. FOR EVERYONE. FOR GOOD.

FOR ACTION.
AGAINST HUNGER.

ACTION AGAINST HUNGER