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Towards a data users' framework to advance Sustainable Development Goal 2

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Abstract: Ensuring effective accountability mechanisms will be a pre-requisite for achieving food and nutrition security and thus, advancing the progress towards Sustainable Development Goal 2 (SDG2). Here we discuss and summarise the findings of the ONE Campaign-facilitated accountability working group for data users, which deliberated between November 2015 and February 2016, and involved expert consultations from civil society organisations, research institutions, and academia. We provide an overview of the key challenges identified by data users in relation to nutrition and food security, propose a novel conceptual framework within which these challenges should be analysed, and offer a set of concrete policy and programmatic recommendations to address the recurrent bottlenecks. The paper concludes by providing a summary of key findings within the larger context of relevant global initiatives and processes, such as Nutrition for Growth Summit, the Global Open Data for Agriculture and Nutrition network, and the United Nations General Assembly.

Keywords: food security, nutrition, SDG2, accountability, data use

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1. Introduction

Addressing accountability will be a pre-requisite for the achievement of the Sustainable Development Goals (SDGs). Accountability constitutes a critical part of effective governance, and as such it has been placed at the centre of the new development agenda (United Nations, 2014; United Nations, 2015a, United Nations, 2015b). It can be defined as "the obligation of power-holders to take responsibility for their actions" (UNDP, 2010: 8) and refers to the rights and responsibilities between

the citizens and the institutions which have an impact on their lives and well-being. Accountability is strongly associated with good governance (Bovens, 2007). An effective accountability framework will therefore need to consider and address multifaceted challenges that are linked to data collection and data use, legal and regulatory frameworks, policy tools, social participation at different levels, including of the youth, and monitoring and evaluation frameworks which would allow tracking progress against specific commitments (Potts, 2008; Potts and Hunt, 2008). Accountability mechanisms are also critical in ensuring that human rights of individuals are met (Potts, 2008). As a cross-cutting and multi-scale issue, accountability will need to translate into incorporating specific mechanisms within the thematic policy areas at regional, national, and global levels. While tailored to different geographic contexts, universal accountability principles and mechanisms are required as guiding principles.

More specifically, effective accountability mechanisms will also be critical to ensuring progress towards the achievement of SDG2 — "End hunger, achieve food security and improved nutrition, and promote sustainable agriculture" (United Nations, 2015a). Accountability can and should be part of the projects, programmes and policies aiming at eliminating hunger, reducing malnutrition and promoting food security. As with health and education, the right to food has been recognised to be a basic human right (Osmani, 2000; Szabo, 2016), and as such, access to safe and nutritious food should be guaranteed by the state. While hunger and famines have been proven to be associated with unfair distributional policies and lack of social protection (Devereux, 2009; Sen, 2009), increasingly obesity prevention has become a key public health priority in many developed and developing countries (Popkin, Adair, and Ng, 2012; Swinburn, Caterson, Seidell *et al*., 2004). The economic power of food industry and its influence on market dynamics and public policy has meant less accountability towards consumers and governments (Swinburn, Kraak, Rutter *et al*., 2015). It has been recognised that strengthening the accountability mechanisms is a precondition for achieving progress in reducing obesity rates and the prevalence of non-communicable diseases (NDCs) (Swinburn, Kraak, Rutter, *et al*., 2015).

Accountability and data revolution are intrinsically linked. As part of the pre-SDG agenda setting, policy makers and citizens called for a data revolution which would involve making data more available, accessible and disaggregated (IEAG, 2014). Data standardisation and disaggregation will become increasingly critical with the ever greatest focus on socio-economic inequalities (United Nations, 2015a; United Nations, 2015b). The implications of the availability or lack of quality data on inequalities and wider human development can be twofold. First, poor data hinder evidence generation; thus, preventing effective policy design and decision making. Second, unequal access to data can prevent citizens from access to information, thus limiting their engagement in social actions and political processes (IEAG, 2014). These barriers in access to data are also linked to inability of the poor to purchase or use ITC services, because of lack of resources, remote location or lack of education (IEAG, 2014).

This paper summarises the results of the discussion and analysis undertaken by ONE Campaign-facilitated working group on accountability for SDG2, and in particular the data users sub-groups. ONE Campaign is an international campaigning organisation which aims to fight extreme poverty and preventable diseases, mainly in Africa. The paper's key objective is to contribute to the current debate on SDG2-related accountability mechanisms, by providing a novel conceptual framework and a set of concrete policy recommendations on how to overcome data challenges in nutrition, agriculture, and food security. The paper starts by highlighting key accountability challenges for data collectors and data users with references to specific programmatic examples. We then propose a new accountability framework for data users and collectors. Finally, we provide a set of operational and policy solutions to address accountability obstacles for data users and collectors by applying a chart of principles approach.

2. Data User Experiences and Challenges

Quality data are the necessary foundation for strategic decision-making amongst governments,

donors, and private sector investors alike (IEAG, 2014). Yet the extent and quality of data for analysis and progress tracking require significant improvement. As part of the ONE Campaign-facilitated accountability working group's mandate, the authors undertook extensive analysis and expert consultations in order to identify specific challenges faced by data users, which are likely to hamper accountability and thus, progress towards the achievement of the SDGs. Here, we provide specific examples of data challenges identified within selected global and national projects and activities related to monitoring progress in commitments to improve food and nutrition security. A table summarising key challenges is provided as supplementary material.

2.1 Ending Rural Hunger Project

The Ending Rural Hunger project is a first attempt at providing a tool to review and follow-up on Sustainable Development Goal 2: end hunger, achieve food security and improved nutrition and promote sustainable agriculture. The Ending Rural Hunger project was created by the Global Economy and Development division of the Brookings Institution in 2015. The project was a collaborative effort benefiting from the input of over 120 experts. The project gathers and curates the data necessary to review and follow-up on a key aspect of SDG2: Ending Rural Hunger. In the developing countries' needs assessment, the analysis is directly tied to the specific targets of SDG2 (2.1, 2.2, 2.3, 2.4). Before arriving at the database with 106 indicators for 145 countries, an assiduous review of available sources was undertaken, to exclude data deemed inaccurate or unreliable. Three over- arching challenges were encountered: availability, reliability, and difficulty in measurement.

First, some crucial food and nutrition security (FNS) indicators are not measured and available (see Table 1). While the SDGs explicitly call for doubling the productivity of small-scale farms, at present there are no comparable, cross-country data specifically on the productivity of small-scale farms. Similarly, very little country-specific data are available on how much food is lost or wasted (post-harvest or post-market) in developing countries, although rough regional estimates have been compiled. Systematic data on domestic private investment in agriculture, a key driver of progress, are not available. Very few agricultural indicators are disaggregated by gender, even though many key FNS indicators may vary systematically between men and women. An initial database on access to rural insurance has been discontinued on the grounds that it did not adequately reflect ground realities. Other variables are available for certain countries or regions but have limited coverage. Of the 80 indicators used, 15 were available for fewer than half of developing countries.

Second, even where data are available, reliability is an issue in terms of quality and comparability. The statistics collected and published by the Food and Agricultural Organization (FAO) are based on reporting from national statistical agencies. But due to a lack of reliable reporting from member countries, FAO data experts have had to generate their own estimates of basic production data for nearly 70 percent of African countries (FAO, 2008). This means that even straightforward production data for most African countries could be unreliable. This presents a challenge to strengthen national statistical offices, something that the Paris 211 initiative and the new Global Partnership for Sustainable Development Data are responding to.

Data on more complex or nuanced issues such as under nutrition, the capital stock in agriculture, or the environmental impact of agricultural production are often derived from modelling and extrapolation rather than real data collection. Data on governments' domestic public spending on agriculture are also out of date and of questionable comparability because the various statistical agencies take different approaches to include or exclude line items like "rural roads" that serve multiple purposes (FAO, 2008, pp.8,36). According to the Partnership in Statistics for Development in the 21st Century, a number of issues and priorities are important for FNS but are inherently difficult to measure and quantify. For example, strong leadership — among politicians, government bureaucrats, and entrepreneurs in the private sector — is a crucial ingredient in designing and implementing a successful national strategy for ending hunger, but good metrics for capturing leadership are hard to find. And when it comes to trying to estimate the effects of climate change on agricultural productivity, so many factors and assumptions must be built into agro-climatic models that ultimately we must accept that there will always be high levels of uncertainty in such projections.

Table 1. Global FNS Data Gaps

Developing Countries	
Indicator	**% of countries missing data**
Cold Storage	78%
Food Consumption Score	73%
Percent of Area Devoted to Modern Varieties	72%
Official Flows to FNS-Brazil	66%
Relative Rate of Assistance	65%
Trade Bias Index	62%
Access to Agricultural Extension Services	61%
Time-Bound Nutrition Targets	61%
Governments Promote Complementary Feeding	61%
Nominal Rate of Assistance	60%
Family Farm Prevalence	59%
Consumer Tax Equivalent of Farmer Support	59%
Welfare Reduction Index	59%
Trade Reduction Index	59%
NGO	58%
Share of Female Researchers	54%
Agricultural R&D as Percent of Agricultural GDP	53%
Share of Researchers with PHD	53%
Developed Countries	
Indicator	**% of countries missing data**
Support to Biofuel Production	31%
Simple Average Applied MFN Tariff, Biofuels	31%
Support to the Marine Sector	24%
Support to the Marine Marketing and Processing Sector	24%
Support to the Aquaculture Sector	21%

Source: End Rural Hunger project

There are reasons to hope that agricultural data will improve in the future. For example, new technologies such as cell phones may decrease data collection costs. More rigorously designed and implemented household and agricultural surveys have potential for better measuring the production and consumption of small-scale farms (Carletto, Jolliffe, and Banerjee, 2015). Satellite imaging can potentially provide cheaper, more accurate, and more regionally disaggregated data on physical and environmental issues. There are efforts to create agreed protocols for how to measure food loss and waste. Increasing political attention is being devoted to the issue. For instance, the United Nations (UN) has recently launched an Inter-Agency and Expert Group on Food Security, Agricultural and Rural Statistics to document good practices and guidelines on concepts, methods, and statistical standards. A Global Open Data for Agriculture and Nutrition program (GODAN) has brought together 100 partners to improve data (GODAN, 2016). The open data successes of the GODAN efforts will be shared during the GODAN summit during this year's United National General Assembly (UNGA) in New York.

2.2 The Global Agriculture and Food Security Program

The Global Agriculture and Food Security Program's (GAFSP) Monitoring and Evaluation (M&E) framework is designed to strengthen the partnership for sustainable development, with an overarching program goal (Tier – I) to focus on improvement of incomes and food security of a significant number of rural communities in the world's poorest countries, in support of the SDGs to end hunger and poverty. As a part of the M&E process — and while awaiting for the final SDG indicators agreed by the UN Statistical Commission — the GAFSP team has performed extensive analytical exercise to validate indicators for food security/nutrition measurement at a country/national level using standardised scores derived from experience-based methods. As data users, accountability for measurement of results in nutrition remains challenging for multiple reasons.

First, data coverage for some of the key nutrition-specific indicators is sparse. Indicators central to SDG2 theory of change, such as minimum dietary diversity (proxy indicators of diet quality/access), need to be tested for cross-country comparisons. For the purpose of monitoring, evaluation, and targeting, careful validation of these indicators must be undertaken, which remains challenging. Second, food consumption scores, diet quality, and diversity merit more comprehensive and standardised measurement across all developing countries. This will also help and expedite the process of external validation. This also includes standardisation of recall approach for better comparison. Finally, a transparent and credible tracking and disclosure of financial resource requirements for monitoring of nutrition indicators must be in place. Currently, identifying the cost implications of implementing and advocating certain indicators at project level, where a stand-alone DHS, LSMS, MICS surveys are not available (or possible), remains a challenge.

2.3 Budget Analysis to Track Commitments to Nutrition

Budget analysis has been increasingly undertaken as a means to monitor nutrition commitments at national and local levels. The Scaling up for Nutrition (SUN) Secretariat works with SUN countries and technical partners to perform financial tracking by relying on a standard methodological framework for routinely and systematically collecting country budgetary data relevant to nutrition known as the Three-Step Approach (SUN, 2015). The three phases of the approach include: (i) identification of relevant budget-line items through a strategically created key word search; where possible, the initial search should be related to relevant outcomes and actions as presented in national plans for nutrition, (ii) categorisation assessing whether the identified budget-line items correspond to nutrition-specific or nutrition-sensitive programs and excluding those that are found not to be relevant (after further consultations), and (iii) weighting or applying an attributed percentage of the allocated budget-line item to nutrition where the percentage is based on the step-two categorisation as well as consultation with national experts. This Three-Step Approach allows countries to view changes in budgetary allocations (and actual expenditures when possible) over time. While the results do not directly allow for comparisons across countries, the Three-Step Approach is designed to identify the gaps between cost estimations for reaching World Health Assembly (WHA) nutrition global targets and future financing (SUN, 2015b).

In 2015, 30 out of 56 SUN Countries have applied this "three-step" approach to analyse nutrition related expenditures within their national budgetary systems (SUN, 2015b). 16 countries identified more than ten budget line items (averaging 23 items), while 6 countries reported more than 80 budget line items. 22 countries were able to identify integrated health programmes and categorized them as nutrition-specific budget allocations. 25 countries were able to identify nutrition-sensitive budget allocations across more than four of the key sectors (health, agriculture, education, social protection, and Water, Sanitation and Hygiene (WASH). 10 countries were able to identify allocations for nutrition governance, covering costs for coordination, research, and nutrition information systems. Lastly, 7 countries were able to provide sufficient detail to review funding sources permitting a better understanding of who is investing where.

As a result of these analyses, four challenges were identified. First, a key difficulty in conducting a budget analysis that seeks to account for nutrition-related expenditures is how to identify and assess personnel costs such as salaries, benefits, and overheads. Second, there is often misalignment or variance between plans and budgets which inhibits the development of a comprehensive framework for financial tracking. Third, the fact that addressing malnutrition requires multi-sectoral and multi-stakeholder actions (SUN, 2015b) effectively blurs the boundaries of what and what not to include for nutrition relevant budget-line items. Fourth, and following from the third challenge, it is crucial for financial tracking to identify the levels of government in order to be clear on who is responsible for public spending. Allocation and spending data at lower government levels are normally not included in the national budget. If transfers from the national government are in the form of block grants or similar, the budget data will not provide details on sector or program spending. This is especially troubling given that many countries are undergoing a process of devolution where service delivery is being transferred to regional and/or local governments.

Similar analyses were undertaken by Save the Children. The challenges encountered throughout the process included access to data and data alignment. Access to digital data can be particularly difficult and hence manual data entry is often required, which tends to be a resource intensive exercise. Organisation of the data across countries is also a challenge in terms of alignment and comparability. For example, Niger's budget proposal (*Plan d'Action Annuel*) is structured differently to Zambia's budget.

2.4 Tracking ODA to Nutrition Using OECD DAC Data

The principal and most comprehensive source of nutrition official development assistance (ODA) data is the Development Assistance Committee's Creditor Reporting System (DAC CRS). This reporting is compulsory for DAC members. Donors report each project under the purpose code that best represents the main objective or sector of their initiative. This approach avoids double-counting, but limits the ability to further breakdown projects with multiple objectives. Only a sub-set of development assistance is reported to the CRS as only DAC members have obligation to report. Countries that report voluntarily do not necessarily provide enough details. Other countries do not report to the DAC CRS at all. In addition, ODA is an essential resource available to developing countries, but the development finance landscape has become more complex and varied, including other resources, national and international, public and private. How these resources contribute to improved nutrition and how ODA works in complementarity with them is difficult to ascertain as data on this wider landscape are scant or difficult to access.

More detailed analysis based on project descriptions in the CRS and on project documents can provide a clear picture on nutrition ODA. Development Initiatives (DI) used this approach to track nutrition spending using the SUN Donors Network methodology and to assess the reach, coordination and coherence of DFID`s nutrition portfolio. The study found that, while some assessment was possible, future exercises would benefit by better data quality and coverage in the CRS and in project documents. The report presented some sub-national data on the location of DFID's activities using data published by the International Aid Transparency Initiative (IATI) registry (IATI, 2015). IATI data provided insights on projects location, proximity, and reach. But coverage was limited to a sub-set of projects and quality of information reported to the IATI standard was quite varied.

Similar challenges have been identified in the work carried out by Thousand Days. The main issues are pertaining to lack of easy access and standardisation. For example, when analysing DAC data for nutrition commitments and disbursements (code 12240), users found that the webpage was not user friendly, difficult to find and locating information on nutrition investments was challenging. Lack of standardisation is related to how such DAC data are produced. Reporting periods are not always the same for all donors, so what is reported might not be the actual amount disbursed. The United States Agency for International Development (USAID), for example, has very different re-

porting timelines than those of UK, and they only report funds as disbursed when projects end. As could be observed by some users, real amounts invested according to some donors did not match with those we found in DAC data files. Specific codes for nutrition-sensitive and nutrition-specific investments were also lacking.

3. Towards Evidence-based Accountability: A Framework

As one of the outcomes of the review of challenges pertaining to data use and data standard setting, the working group suggested a new conceptual framework which illustrates a data centred accountability process. The four main pillars of the framework are data standard setting, data collection, data use, and policy and practice. The framework draws from the work by Kraak *et al*. (2011) and Swinburn *et al*. (2015), which focuses on the agreed objectives, processes and outcomes, and accounts for the key role of legal accountability framework and communication with different stakeholder groups (Swinburn, Kraak, Rutter *et al*., 2015).

The very initial step in this accountability approach is the assessment step — where evidence is being generated, including through primary data collection, common measures, such as Body Mass Index (BMI) and the WHO's Non-communicable diseases (NCDs) Global Monitoring Framework. The second step involves communication with key stakeholders, including beneficiaries, which can happen through formal and informal process. Swinburn *et al*. (2015) provide an example of the European Union's (EU) consultation process on the EU-USA trade agreement and the recommendation of evidence-based interventions, such as tax on sugar-sweetened beverages. Legal mechanisms constitute an integral part of an efficient accountability framework because by definition they imply enforcement of agreed rules and principles, and as such, can act as incentives and disincentives for individual and group behaviour. Finally, continuous improvements of accountability mechanisms are keys to ensure specific accountability approaches and tools that respond to the changing realities. In our proposed framework (Figure 1), we adapt the four principles of the discussed above framework, but focus on the fundamental role of data for accountability.

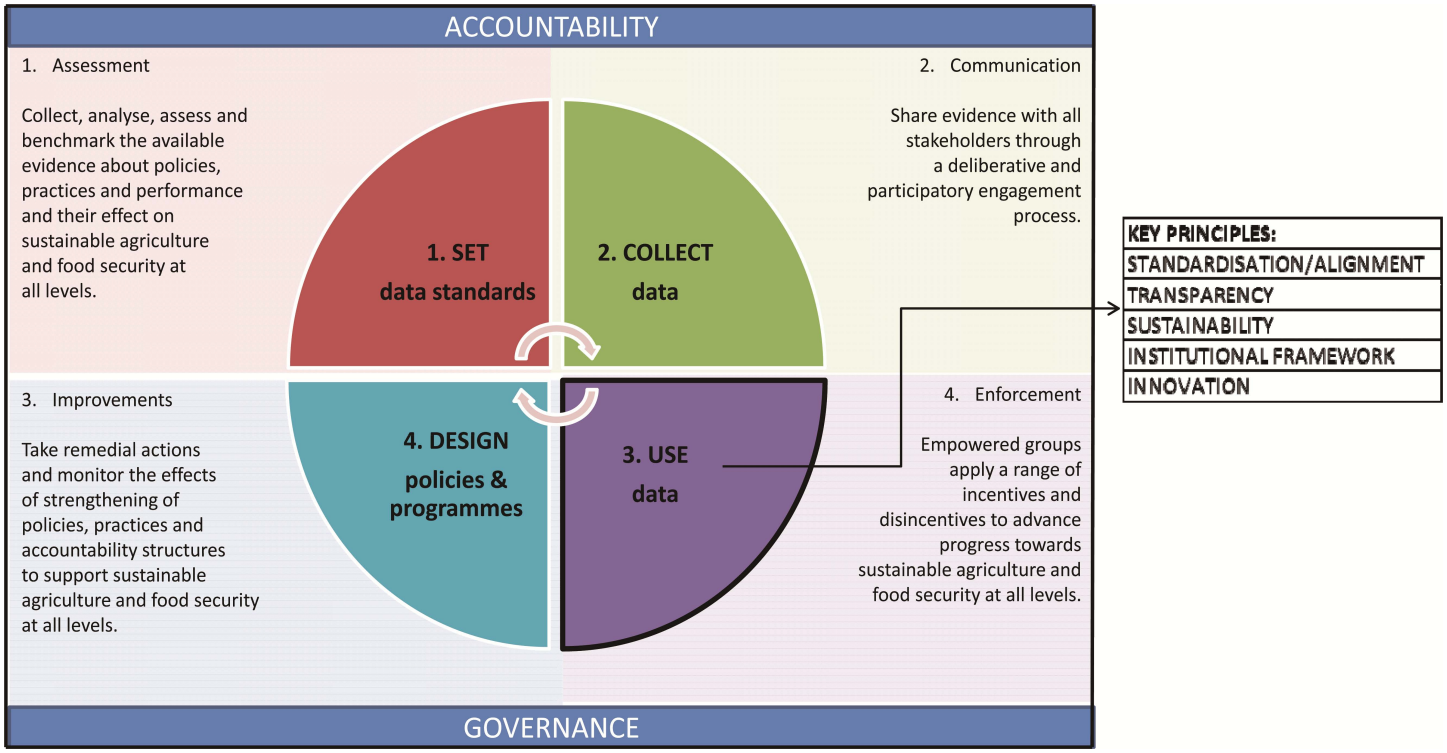

Figure 1. Data centred accountability framework for SDG2. Source: Adapted from Swinburn *et al*. (2015).

The framework draws from the working group's key assumption that achieving accountability for SDG2 is not possible without scaling up efforts in investments throughout the full data cycle, including from standard setting to designing evidence based policies. While the assessment part seems intuitively the most critical element of the data centred framework, other aspects are also dependent on the availability of quality data. Both communication and enforcement mechanisms can operate effectively only if there is reliable evidence supported by data at the different levels. Communicating about local and national budget allocations for nutrition specific and nutrition sensitive interventions can only happen if supported by validated results. Improvements to policies and practices pertaining to nutrition and food security and sustainable agriculture require regular monitoring and evaluating, and best practices can be developed and applied if relevant empirical evidence is available. Global nutrition related indices, such as the Access to Nutrition Index and Hunger and Nutrition Commitment Index, tend to be regularly re-evaluated and re-calculated, and methodological improvements can be made based on new data, tools, and methodological advances.

4 Towards Evidence-based Accountability: A Charter of Principles

We find that the following principles are most relevant from the data users' perspective: standardisation/alignment, transparency, innovation, institutional framework, and the overarching principle of sustainability. Summary of suggested policy solutions for data users is provided in Table 2. In terms of standardisation/alignment, the key questions are around best legal and regulatory practice and licensing agreements which should be put in place for data collectors, data users, and data standard setters to adhere to. Here, it is critical to develop a detailed set of standard food security and nutrition (FSN) related indicators and innovative measurement tools. Creation of the UN Inter-Agency and Expert Group on Food Security, Agricultural and Rural Statistics to document best practices and create guidelines, concepts, and methods constitutes a positive example of tackling challenges related to gaps in standardisation. Another relevant example is FAO's work on developing new guidelines for the 2020 World Programme for the Census of Agriculture for the Period of 2016–2025 (UNSC, 2015). From an IT perspective, a unified application program interface (API), such as onedata.org, could act as a mediator and façade between the users of the API (decision makers, civil society organisations and researchers) and changes to the core source systems (various AgFSN reports and datasets provided by sectoral experts, NGOs) that provide the data. This would shield users of an API from changes to those source systems as an API could implement logic to maintain the structures and methods that applications have been developed against. For example, JavaScript Object Notation (JSON) is a schema-less standard which is particularly suited to allowing new data to be incorporated without impacting previously developed solutions.

Second, transparency involves open data formats used by all organisations providing data. The reports and datasets must be available in open data formats in real-time, or at least as close to real-time as possible, to allow for the latest data to be extracted from all reports. PDF reports and other closed datasets limit the use of data, and the common tried and tested formats for such data are in XML and JSON formats. JSON is quickly becoming the *de facto* data format for web and mobile applications, due to its ease of integration into both browser- and server technologies that support JavaScript. JSON also allows for an easier integration with web-based mapping technologies such as Google Maps and Open Street Map, which is particularly important, giving the data users' aim to geolocate the information within the accountability framework. The data that are made available and used within the accountability framework must be designed with customer-facing (local community, decision maker) applications in mind and the data's output is designed to be easily understandable, and supportive of common customer-facing application use cases.

Implementing effective solutions would not be possible without innovative approaches and technologies. Hence, the third suggested principle is around innovation, in particular the innovative use

of technologies. Continuous innovations in both data collection and data use are critical to ensure efficiency gains. Innovative data use techniques include the use of mobile applications for progress monitoring. An example of such an initiative developed by the Myanmar Nutrition Technical Network which uses mobile applications to monitor the status of implementing of the code for marketing breast milk substitutes in the country. Another example is the development of a micro-tasking platform run by volunteer scientists to monitor the state of tropical forests. This project combines innovative approaches for data collection, dissemination, and data use by combining science, volunteering, and advocacy. It proposes a new approach for conservation by allowing larger public to gain access to data on deforestation of tropical forests, including high resolution satellite images of forested regions and the levels of deforestation (Civicus, 2016).

Fourth, institution framework constitutes an underlying principle for accountability, including in relation to data use. Two terms define the concept of institutional accountability in the health and social sectors, i.e., answerability and enforceability (George, 2003). They are equally relevant when considering FNS data. Answerability refers to information that should be provided to various stakeholders to keep them abreast of issues, while enforcement involves the mechanisms that are needed when there is lack of or ineffective action. This concept adopts a human rights based approach that directly links providers and users (through dialogue and negotiation) and can be effective if improved transparency is promoted as a crucial mechanism to improve services (McNeil and Mumvuma, 2006; Joshi, 2013).

For example, in 2014, Nigeria created an independent body to help track progress towards achieving the goals of the maternal, newborn, and child health (MNCH) roadmap. The modality the Nigeria Independent Accountability Mechanism (NIAM) adopted was to use a scorecard and directly interface with the government led steering Committee on MNCH. NIAM comprised of representatives from the media, civil society, and health professionals have begun to appraise government's efforts to achieve its commitments and goals (Garba and Bandali, 2014). While NIAM is facing a daunting task, one key recommendation being made is for the current administration of Muhammad Buhari; to set up a Presidential Taskforce on Data for Accountability and Development as part of his change mantra. Until and unless information and data can be generated before and after the variables, the attempts to evaluate change would be whimsical and transient. Based on the work undertaken in the area of MNCH, policy makers should draw from NIAM to advance accountability in nutrition, food security, and agriculture. Linking the data and accountability mechanisms across nutrition, health, and agriculture would allow data users to conduct more integrated analyses; thus, leading to further advancing evidence for both nutrition and MNCH.

Finally, as data users' experience has shown, better data on financial resources for improved nutrition and more details on how these resources reach people on the ground would advance both accountability and evidence-based decision-making. Data production and reporting practices affect the availability and quality of data; therefore, affecting the ability to conduct meaningful analysis. While progress occurred in recent years, data gaps still exist. Substantial improvements can result from increased granularity. Reporting by activity rather than by project and geo-coded information would allow a more accurate tracking at national and sub-national level. More granular information on beneficiaries would increase knowledge on who can be reached by which interventions, supporting better targeting to the people most in need. Disaggregation should be done by gender, age, income, disability, geography (including sub-national) and displacement status. Financial information reporting should favour disbursements as they represent how much each donor has actually spent in a given year. While commitments are useful information, they represent just how much a country agreed to spend in a given year, often over a given period of time. A timelier reporting system would allow a more rapid assessment of resources allocation and improve the effectiveness of accountability mechanisms.

Table 2. Summary of solutions for data users to ensure accountability and achieve SDG2

Examples of challenges	Proposed solution	Related principle
Unavailable or unmeasured indicators Small scale farms: No comparable, cross-country data specifically on their productivity. Little or no country specific data on Food Loss and Waste (FLW), post-harvest or post-market, but rough regional estimates exist. Systematic data on domestic private investment in agriculture. Agricultural indicators are not disaggregated by gender. Access to rural insurance indicators has been discontinued. Poor data availability, e.g., out of 80 indicators in the Ending Rural Hunger (ERH) developing country database, 15 are available for fewer than half of developing countries.	More rigorously designed and implemented household and agricultural surveys have potential for better measuring the production and consumption of small-scale farms. Efforts to create agreed protocols on how to measure food loss and waste. Increasing political attention is being devoted to the issue. For example, the UN has recently launched an Inter-Agency and Expert Group on Food Security, Agricultural and Rural Statistics to document good practices and guidelines on concepts, methods, and statistical standards.	I. Standardisation/ alignment II. Institutional framework III. Sustainability
Reliability is a challenge in terms of quality and comparability The nature of self-reported data, e.g., due to a lack of reliable reporting from member countries. FAO data experts have had to generate their own estimates of basic production data for nearly 70 percent of African countries. Presents a challenge to strengthen national statistical offices.	Paris 21 initiative and the new Global Partnership for Sustainable Development Data are responding to the need to strengthen national statistical offices. New technologies such as cellphones may decrease data collection costs.	I. Standardisation/ alignment II. Institutional framework III. Sustainability
Data on more complex or nuanced issues such as undernourishment, the capital stock in agriculture, or the environmental impact of agricultural production are often derived from modelling and extrapolation rather than real data collection. Data on governments' domestic public spending on agriculture are also out of date and of questionable comparability because the various statistical agencies take different approaches to include or exclude line items like "rural roads" that serve multiple purposes.		
Inherent difficulty of measurement and quantification Strong leadership is a crucial ingredient in designing and implementing a successful national strategy for ending hunger, but good metrics for capturing leadership are hard to find. Effects of climate change on agricultural productivity; because many factors and assumptions must be built into agro-climatic models that ultimately there will always be high levels of uncertainty in such projections.	Satellite imaging can potentially provide cheaper, more accurate, and more regionally disaggregated data on physical and environmental issues.	Institutional framework Innovation
Data are not open In some countries, data of budgetary allocations and spending are not publicly available and difficult to obtain.	GODAN is promoting opening data sets for transparency	Transparency Institutional framework

5 Conclusions

This paper summarises the findings of the data user working group on the accountability framework for SDG2 facilitated by the ONE Campaign. The paper describes key accountability challenges with specific programmatic examples and proposes a novel framework for professionals working with data. Finally, the paper provides concrete operational and policy solutions to address accountability obstacles by applying a chart of principles approach. Accountability constitutes a critical part of ef-

fective governance, and as such, it has been placed at the centre of the new development agenda (United Nations 2015a; United Nations 2015b). Effective accountability mechanisms will ensure progress towards achieving SDG2. To achieve these goals, the development agenda calls for a data revolution with increased availability, accessibility, and disaggregation of data.

We conducted expert consultations to identify specific challenges faced by data users, which are likely to hamper accountability and thus, progress towards the achievement of the SDGs. Specific bottlenecks were identified within selected global and national projects, including activities related to monitoring progress towards commitments made. Most challenges are due to a lack of availability, reliability, and transparency of data. Cross country comparison, validation, and difficulty in measuring (e.g. leadership) of some indicators remain a challenge. Availability and accessibility to data are the bottlenecks that have been identified when tracking commitments to nutrition using budget analyses. Reporting investments in the OECD DAC is also challenging due to a lack of standardisation for data reporting, timing of disbursements, lack of specific codes for nutrition-sensitive and nutrition-specific investments, and poor project data. Tracking OECD investments is also challenging for users because the website is not user friendly.

In response to the challenges, a four-pillar accountability framework is suggested. The main pillars are data standard setting (involves assessment), data collection (requires communication), data use (requires enforcement), and policy and practice (involves improvement). This framework (see Figure 1) focuses on the fundamental role of data use for accountability with the assumption that achieving accountability for SDG2 is not possible without scaling up investments throughout the full data cycle. For data users, key principles for a common accountability framework include: standardisation, consistency and alignment, transparency, sustainability, institutional framework, and innovation. A clear accountability framework helps to conceptualise the inter-linkages between different accountability mechanisms as related to data use. Failure to apply a robust accountability framework for SDG2 may trigger risks related to the progress towards this goal and hampers wider sustainable development agenda.

Availability of quality data is critical to ensuing and measuring accountability, and the lack of data and robust evidence is likely to prevent effective policy design and decision making. Accessibility to data is also important for citizen engagement in social actions and political processes, since the lack of it can prevent or limit citizen engagement in social and political change. Disaggregation of data is crucial for understanding and addressing socio-economic inequalities. Ongoing global processes such as GODAN, the Nutrition for Growth Compact (UK Gov., 2013), and the United Nations General Assembly in September 2016 present important engagement opportunities for improving accountability. Additionally, the SUN Movement is strengthening accountability at country level (IFPRI, 2015), GODAN is progressing on filling existing gaps in open data, and ONE Campaign is developing an accountability framework for SDG2. To firmly measure progress and for long-lasting sustainable accountability, more work is needed. Data use plays a cornerstone role requiring more institutional frameworks, improved standardisation, consistency/alignment, transparency, and innovation. All these are possible with the proposed framework.

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Author Contributions

Sylvia Szabo designed the study and contributed the most of the first draft of the manuscript. Sinead Mowlds, Joan Manuel Claros, Anuja Kar, William Knechtel, Mariella di Ciommo, and Ima Kashim contributed in the writing of the initial draft and subsequent revisions.

Ethics Statement

No ethics approval was required for this study.

Disclaimer

The views expressed in this work are those of the authors and do not necessarily represent those of the Save the Children UK, Scaling- Up Nutrition (SUN) Movement Secretariat, Global Agriculture and Food Security, Brookings Institution, Development Initiatives or Thousand Days, and are not necessarily attributable to their organisations.

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