SUSTAINABLE DIETS FOR ALL

REFLECTIONS SERIES

Using food diaries within a citizen agency framework

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SUSTAINABLE DIETS FOR ALL REFLECTIONS SERIES: STORIES OF CHANGE

Sustainable Diets for All (SD4All) is an advocacy programme designed to improve access to healthy and sustainable diets for low-income communities, while highlighting the important link between food and climate. Coordinated by Hivos and the International Institute for Environment and Development (IIED), the programme works in partnership with civil society organisations and citizen groups in Bolivia, Indonesia, Kenya, Uganda and Zambia. The programme is part of the Citizen Agency Consortium, which is funded by the Dutch Ministry of Foreign Affairs under its Dialogue and Dissent programme.

The SD4All reflections series is a set of papers that discuss achievements, challenges and lessons from the SD4All programme. The series explores the legacy left by the initiative in the following areas: citizen agency, multi-actor initiatives, informal markets, food system analysis, gender and capacity development. The lessons shared are based on the expected and unexpected results of research, lobbying and capacity development.

In the wake of the COVID-19 pandemic, the SD4All themes of production, consumption and the markets that connect them, in particular informal markets, are more relevant than ever.

The series is aimed at advocates, researchers, policymakers, citizens and decision makers seeking change in local and national food systems around the world. It will be of particular interest to organisations that bring people into policymaking spaces where their lived experience of growing, buying and selling food can shape policy.

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ABBREVIATIONS AND ACRONYMS

CSO	civil society organisation
DDS	dietary diversity score/s
HCES	household consumption and expenditure survey/s
KRC	Kabarole Research and Resource Centre
SD4All	Sustainable Diets for All programme (Hivos & IIED)

SUMMARY

Food diaries are a well-established methodology within nutrition studies to gather information about people's diets. When participants are responsible for collecting their own data they can have a greater degree of ownership and agency. The Sustainable Diets for All (SD4All) programme aimed to strengthen capacity of civil society organisations and citizens to influence policy, shape local food systems and advocate for their own priorities in pursuit of sustainable diets. As part of this programme we explored how self-reported food diaries could be used within a citizen agency and advocacy framework and enable poorer citizens to lobby more effectively to change their food systems.

Drawing on SD4All studies in Jember, Indonesia and Fort Portal, Uganda, this paper reflects on the experiences of using food diaries to generate dietary data with citizens, and the usefulness of this data for advocacy. We also highlight the importance of dietary data for effective policymaking and interventions related to food systems and nutrition. We conclude that this type of dietary survey method could be a useful tool for providing detailed dietary information at low cost, and for strengthening citizen agency and advocacy within food systems. This could be done by empowering citizens themselves to change their diets through the research process, and, indirectly, through the lobbying activities of CSOs who work with them. Finally, we suggest some adaptations and improvements to the method and make recommendations for future research.

1. INTRODUCTION

The idea that human diets should be environmentally sustainable, as well as nutritious and affordable, has become a significant global ambition. Although there are many possible interpretations of what a 'sustainable diet' is, policy and expert agendas tend to be dominated by just a handful of definitions. These have largely been shaped by experts and with little meaningful input from citizens, especially low-income citizens, and may be disconnected from the realities of how people eat, and why they eat what they do. As a result, interventions to improve the sustainability of diets and food systems may be misdirected, based on assumptions about what citizens' priorities are, and what they know about food, nutrition and the environment (Vorley et al., 2020).

As part of the Sustainable Diets for All (SD4All) programme, we sought to strengthen the capacity of civil society organisations (CSOs) and citizens to influence policy, shape local food systems and advocate for their own priorities in pursuit of sustainable diets (Box 1). One way in which the programme approached this was through the collection and use of data, particularly data generated by citizens (Vorley, 2018). By engaging with the production of evidence that captured the reality of how they lived, and how they experienced food systems, we thought that citizens — particularly poor citizens — would be able to lobby more directly and effectively around their priorities for changing these food systems. Moreover, by gathering high-quality, detailed data about people's diets, we aimed to build a more grounded definition of 'sustainable diets' which could meet people 'where they are' (Vorley, 2020: p.13).

Food diaries, including self-reported diaries, are a well-established methodology within nutrition studies (Bingham et al., 1994; de Castro, 1987). Because respondents — rather than a third party — are responsible for collecting their own data, self-reported food diaries offer the possibility of a greater degree of ownership and participation, potentially lending themselves well to 'citizen science' approaches. Citizen science broadly refers to the involvement of non-scientists in scientific research (Eitzel et al., 2017; Sui et al., 2013). Depending on how it's done, citizen science could help build citizen *agency*: the capacity of people to act freely and independently, and shape their own development. However, citizen science has made few inroads into nutrition research. The SD4All programme therefore sought to explore how self-reported food diaries, as a form of citizen-generated evidence, could be used within a citizen agency and advocacy framework.

In this paper we reflect on the use of food diaries as a method for generating dietary data with citizens, drawing on experiences from SD4All in Indonesia and Uganda. Section 2 highlights the importance of dietary data for effective policymaking and interventions related to food systems and nutrition. We define the concepts of citizen science and citizen agency, and discuss the role of citizens in generating dietary data. In Section 3 we provide an overview of the design and methodology of two food diary studies in Jember, Indonesia and Fort Portal, Uganda. We discuss the challenge around a lack of appropriate dietary indicators that reflect the 'triple burden' of malnutrition (undernutrition, overnutrition and micronutrient deficiencies) in all

demographic groups, and describe innovations adopted by the programme to address this challenge. Section 4 then reflects on the success and utility of the method in terms of the quality of the data produced and the investigator and participant burden. We also consider how well the approach to using food diaries performed against the programme's citizen agency aims, reflecting on the nature of citizens' participation and the usefulness of the data for advocacy. Finally, the paper offers some suggestions for adapting food diaries for citizen science and contributing to debates around the need for metrics to assess the triple burden of malnutrition.

Box 1 : Sustainable Diets for All

Sustainable Diets for All (SD4All) was an advocacy and capacity building programme implemented by Hivos, IIED, and local civil society organisations (CSOs) in Uganda, Zambia, Kenya, Indonesia and Bolivia. The programme ran from 2016 to 2020 and aimed to build the advocacy capacity of CSOs to challenge unsustainable practices and incentives in food production and consumption. Evidence generated by citizens was taken directly to policymakers to inform development of policies, legislation and market practices in order to promote diets that are diverse, healthy, fair and based on environmentally sustainable production methods. Tailored facilitation methodologies such as 'food change labs' encouraged multiple actors to share knowledge, evidence and ideas, and to jointly develop local, national and international examples of how food systems can be transformed.

2. DIETARY SURVEYS AND CITIZEN PARTICIPATION

High-quality, individual-level, comparable dietary data are needed in order to understand what people eat and why, before attempts can be made to improve the sustainability or nutritional quality of diets. Dietary data are also needed to better understand the links between food systems, diets and nutrition outcomes, including challenges around the 'triple burden' of malnutrition. However, even where data are available, they are usually gathered through expert-driven approaches, which may not always reflect the full story of people's diets.

Few low- and middle-income countries undertake nationally representative dietary surveys at the individual level (Coates et al., 2017; Huybrechts et al., 2017). Instead, estimates are often drawn from secondary sources, such as food balance sheets. This involves using data on food production and trade to estimate per capita consumption. Household consumption and expenditure surveys (HCES) are also commonly used to estimate individual consumption (Huybrechts et al., 2017; Coates et al., 2017). However, neither availability nor expenditure provide an accurate estimate of individual-level consumption, and neither method is well suited to capturing age- and sex-disaggregated data, which is needed to target at-risk population groups through policy and health interventions (Micha et al., 2018).

Using indirect approaches to understand what people eat and how this has changed over time can lead to ineffective policy and programming responses, and slow progress in alleviating the global burden of disease. Moreover, in the absence of adequate evidence about diets, assumptions are made in the policy arena that can result in missed opportunities for change.

Among the most widely used direct approaches for collecting individual-level data is the 24-hour dietary recall survey. It is usually administered by a trained interviewer and requires respondents to report all the foods they consumed during the previous day. The dietary diversity questionnaire is another low-cost survey method, which can be administered at the household or individual level. It involves counting the number of food groups consumed in a given time period, and then deriving dietary diversity scores (DDS). Importantly, DDS only count foods that contribute positively to nutrition, and do not account for unhealthy food choices, such as ultra-processed foods. This reflects a wider challenge around the lack of a validated indicator related to all aspects of malnutrition, including those related to 'overconsumption' and the triple burden.

Whether direct or indirect, dietary surveys driven and applied by professional researchers tend to be extractive, in the sense that they only engage with citizens insofar as data collection is concerned, but do not necessarily share the findings with them or facilitate their active participation in food system and dietary change. However, if citizens themselves record their own data — and even design how it is collected, analyse it and control how it is used — this could be more engaging for individuals and communities.

Citizen science has the potential to contribute to citizen agency. Involving citizens in the production of scientific knowledge can encourage local ownership over evidence and provide communities with the tools to advocate more effectively for their own priorities, rather than relying on external actors to set agendas for change. Armed with scientific data which reflects their own needs and desires, citizens can 'speak the same language' as policymakers (Vorley, 2018).

Working with citizens to define how their evidence will be used for advocacy is a critical part of moving from citizen science to citizen agency. This includes creating space for citizens to interact with policymakers and speak up for themselves in decision-making processes. The SD4All programme sought to test the potential for citizen-generated dietary data to contribute to an advocacy planning process and build citizen agency. In the following section we provide an overview of how a food diaries method was developed and applied in Indonesia and Uganda.

3. IMPLEMENTING FOOD DIARIES IN INDONESIA AND UGANDA

Food diaries were used in 2015, before the start of SD4All, by the Kabarole Research and Resource Centre (KRC), a Ugandan CSO and later SD4All partner working in the Rwenzori region of Western Uganda. They supported 200 women to keep a seven-day food record, in order to better understand the diets of rural households near Fort Portal in Kabarole District (Boerwinkel and Vorley, 2016). The experience showed promising signs of involving the community in evidence generation, because, unlike traditional surveys, the participants themselves had volunteered to keep a record of their own diets. Building on these experiences, two similar food diaries studies were incorporated into SD4All's advocacy planning process in Uganda and Indonesia, with the initial aim of using the findings to identify advocacy priorities and drive local agendas for food systems change. Below we provide a brief overview of the methodological approach taken in Uganda and Indonesia and summarise the results of the surveys.

3.1 Study design and methodology

The studies discussed here were carried out in 2017 in Uganda, and replicated a year later in Indonesia, with some differences. In Indonesia the research was carried out by the Faculty of Public Health at the University of Jember, and Tanoker, a CSO based in the Ledokombo subdistrict of Jember Regency that advocates for healthier eating. In Uganda KRC carried out the research.

Two-stage sampling was carried out in both countries — first at the community level and then at the household level. Some of the participating households were already part of the SD4All programme and its activities. Diary data were recorded for seven consecutive days by the person responsible for meal preparation, but support for participants was also provided by project staff. In Uganda data were reported only at the household level, while in Indonesia they were recorded at the individual level, ie for each household member separately.

For each meal consumed over the course of seven days, participants listed all the ingredients of composite dishes in detail. Participants were also asked to note the source of the ingredients, ie whether they came from a street food vendor, a local market, or their own garden or land, as well as the cost of food. Focus group discussions and interviews were conducted to understand the motivations and food choices of participants.

Household DDS (which are a broad indication of access to food) were computed for the Uganda data, and individual DDS (which reflect micronutrient adequacy) were computed for Indonesia (Kennedy et al., 2013). While the individual DDS can give some clues about micronutrient intake, it does not reflect consumption of ultra-processed foods containing high levels of sugars, fats and processed carbohydrates. In Indonesia, we reported separately on the frequency of consumption of ultra-processed foods and monosodium glutamate. Dietary species richness was also computed in both countries to assess diversity within food groups, for example, how many different types of staple foods were consumed (Lachat et al., 2018).

Data were computerised and analysed in Uganda by KRC and in Indonesia by the University of Jember; further analyses were carried out by IIED. Early analyses of the data were used to present the results back to communities, to inform IIED's analysis and to give participants the opportunity to reflect on the experience of participating in the project, and on their own diary data. Initial reports were produced in both countries and the information was fed back to communities by the project staff. Analysis conducted by IIED for both countries was published in two reports (Mayer et al., 2019; Mohammed et al., 2020). Finally, participants and staff in both countries took part in a follow-up survey in July 2020 to evaluate the success of the food diaries method.

3.2 Dietary survey findings

Seven-day food diaries were completed by 409 households in and around Fort Portal in Western Uganda. Household-level data showed that diets are largely built around a core of starchy staples including matooke (plantain), cassava and maize, in addition to beans and groundnuts. Fresh fruits and green vegetables are a common but less frequent component of diets, and milk is the most common, and almost exclusive, source of animal protein. On average, households consumed six out of 12 food groups over the seven-day period, with few differences between urban and rural households. Dietary diversity was positively correlated with the level of weekly food expenditures, a proxy for household income. Follow-up interviews found that despite the low levels of dietary diversity, people were largely satisfied with their diets, although many aspired to eat more meat. Cash scarcity and cost of food were common challenges to accessing a more varied diet.

In Jember Regency in East Java, 97 households (328 individuals) completed food diaries. The results showed that 35% of adults and 39% of children aged between five and 18 did not meet the daily recommendation for consumption of at least five out of ten food groups. More than half of the adults and children consumed ultra-processed foods and sweets more than three times per week. Although 160 different food species were recorded, diets were generally monotonous. For example, 67% of cereal consumption was rice, and 84% of legumes was soybeans. Food choice was driven by factors including cost, habits, health, time and food availability.

3.3 Challenges

The process of collecting data was not without its challenges. Even though participants recorded their own dietary data, the food diaries project in its present form was still expensive due to the high cost of data entry and analysis, which required substantial researcher time and support from IIED staff.

Researchers and partners in Indonesia reported that the distance and language barriers between Indonesia and the UK also led to a complex, lengthy and resource-intensive research process. For UK-based researchers, it was also difficult to appreciate the nuances of the data with limited understanding of the local context. Indonesian researchers expressed a desire for greater local ownership of the food diaries, including managing the research locally. This suggests that at least in some respects, the programme did not live up to its aims around citizen-generated evidence and community buy-in, which we will discuss further in the next section.

4. DISCUSSION

In this section we reflect on how both the process of data collection and its advocacy outcomes lived up to the programme's ambitions around building food systems advocacy and citizen agency. We also discuss the quality and utility of the dietary data generated by the food diaries studies, including the wider contribution to nutrition studies of our methodological innovations.

4.1 How did the food diaries contribute to advocacy activities?

The data collection activities in Kabarole and Jember were part of an advocacy plan intended to shape programme activities and local priorities for food systems change. Evidence generation ran alongside the activities of local CSOs, KRC and Tanoker, and explored questions related to diets and the food environment which are relevant to their work. The resultant data have been used by researchers and CSOs in both countries, contributing to successful lobbying and advocacy outcomes.

In Jember, Tanoker used the dietary data in its advocacy work with the Ministry of Health and other local government agencies. Dietary data disaggregated by geographical area were noted as being particularly useful for advocacy by some partners.

Evidence from the food diaries and the research process was used to develop the Children's Forum Module, a local children's platform for capacity building and advocacy. Data on children's consumption of unhealthy foods in the school environment were also used as the basis for healthy canteen initiatives, in cooperation with local schools and government agencies. This was further strengthened by the formal declaration of 800 schools in Jember as 'child-friendly schools' — with one of the criteria being the provision of healthy diets. Combined with other lobbying and advocacy activities, this later contributed to Jember receiving the Child Friendly City award by the Ministry of Women, Empowerment and Child Protection, and to the designation of Jember Regency as a leader in public health. Evidence from the food diaries also contributed to the design of educational and public health programmes delivered by Tanoker to parents and children.

Beyond the data themselves, the partnership between Tanoker and the University of Jember, established as part of the food diaries project, has led to further collaborations and outcomes between academics, community advocates and citizens. For example, lecturers from the Faculty of Public Health have teamed up with a local kindergarten and grandparents' group to deliver programmes on sustainable, healthy diets.

Partners in Uganda found the evidence from the food diaries useful for lobbying the Kabarole District Council to amend the District Nutrition Action Plan and other ordinances related to food production and consumption. Data on the consumption of individual foods and micronutrients, as well as the diversity scores disaggregated by sub-county, were particularly useful for advocacy activities. Food diary data related to low dietary diversity, in particular, were successfully used to support ongoing advocacy efforts to establish a community seedbank in one of the sub-counties where the research took place, working with leaders at the sub-county and district level. The community seedbank will increase the availability of indigenous seeds to local food producers, which has been linked to agrobiodiversity and dietary diversity.

In addition to lobbying and advocacy, the results and process of the food diaries in Uganda contributed to a number of activities with KRC and the community. KRC used its radio station to discuss healthy diets and specific insights from the exercise, and many listeners were able to call in and participate in the debate. Furthermore, the food diaries prompted discussions about healthy and nutritious diets with community groups, including the *orugali* — a group of households engaged in learning about and promotion of traditional foods.

4.2 How did the food diaries contribute to citizen agency?

A follow-up survey showed that participants were able to learn about and reflect on their diets through the process of completing the food diaries. In some cases participants learned how repetitive their diets were and how reliant they were on staples. Others learned that even small gardens could increase availability of fruit and vegetables for cooking. A number of participants in both Uganda and Indonesia recognised the need for more education and training on diets and growing and cooking food.

The experience of taking part in the diaries exercise, as well as other programme activities, contributed to changes in food-related attitudes and behaviours, and prompted some citizens to change their diets. A small number of participants said they were more motivated to cook after completing the diaries, in order to have greater control over the ingredients because they had become aware of some of the unhealthy choices available in the market. In general, participants found the diaries easy to complete and expressed an interest in repeating the exercise to see the effect of changes they had made.

As noted above, evidence from the food diaries contributed to positive changes to local food systems, through the advocacy activities of SD4All's CSO partners. These activities were in some cases shaped by citizens themselves, through the engagement of CSOs with local communities. However, overall the food diaries studies were not citizen-led, and citizen participation was mostly limited to the more common role of data gathering. Although citizens were consulted at different stages of the research, the study design, analysis and presentation of the findings were undertaken by CSO partners and researchers at IIED and Hivos. In part this was due to the complexity of the data, which demanded substantial research expertise and analysis methods. Moreover, delays to the analysis were a constraint on citizen ownership of the data, with the findings being fed back to participants late in the programme.

SD4All's approach to food diaries therefore fell short of a vision of citizen science in which citizens are active on all stages of the research, and in which they have full ownership and control over the data. Although the food diaries studies contributed to building citizen agency in the domain of diet-related behaviours and practices, such as food purchase and utilisation, they had a limited and perhaps only indirect impact on building citizen agency in a broader sense, as it related to food systems change.

4.3 How well did the food diaries meet the challenge of collecting high-quality, detailed data?

The studies in Uganda and Indonesia went some way towards addressing the gap in high-quality, individual-level dietary data in the regions where the research was conducted. Running the diaries for seven consecutive days, rather than a single 24-hour period, gave a rich dataset and a more detailed and complete picture of dietary patterns in the two study areas. In Indonesia, dietary data were recorded separately for each individual, making it possible to highlight dietary issues specific to different demographic groups. And because all foods were recorded individually, the dietary species richness indicator could be used to measure within-food group diversity. This could be used in future studies to explore the links between agrobiodiversity and nutrition.

Capturing information about the source and cost of food also enabled researchers and CSOs to explore the relationship between diet and the food environment. In Uganda, for example, data on the sources of food showed that rural households depend more on the market than we assumed, and that urban households continue to rely to some extent on family connections in the countryside to complement what is available in the market. Collecting more detailed data on market availability, seasonality, local food production and food policies — which we were not able to do — would have produced more insights about the relationship between consumption and the food environment.

The SD4All studies developed a way to report on consumption of ultra-processed foods, which are an important contributor to overweight and obesity. However, there are no validated indicators or recognised dietary guidance available that relate to all forms of malnutrition. There were also no available data with which to compare our findings on aspects of malnutrition related to overweight and obesity. The lack of an indicator for consumption of unhealthy foods is a serious gap considering the accelerating prevalence of overweight and obesity globally. There needs to be a consensus about the best way to assess this part of the triple burden; the current dietary diversity indicators relate more closely to micronutrient deficiency. Collecting more detailed data on diets using food diaries would be useful to develop and validate new indicators once this consensus is reached. Our iteration of the food diaries method could go some way towards addressing the challenge of measuring the triple burden of malnutrition.

5. RECOMMENDATIONS

The use of self-reported food diaries as part of the SD4All programme suggests that this established dietary survey method has potential to be adapted for citizen science. At the same time, we are aware that citizen science is a broad term; the extent of citizens' participation can range from simply crowdsourcing data to more active engagement across all stages of the research (Sui et al., 2013). If citizen participation is limited to data collection, with no input into the research problem or outcomes, this can raise ethical questions around the use of citizens as unpaid data gatherers.

Our own programme's approach fell short of generating evidence by involving citizens in all stages of the research process. We worked closely with CSOs, who aimed to represent their interests, and meaningfully involved the community in data gathering and to some extent in data interpretation. However, the contribution of the dietary data to successful advocacy outcomes in Uganda and Indonesia suggests that self-reported food diaries are a promising tool for fostering citizen agency within food systems — both directly, by empowering citizens to change their diets through the research process, and indirectly, through the lobbying activities of CSOs who work closely with citizens.

With some further adaptations, self-reported food diaries could make citizen science a much more widely used approach in nutrition and dietary studies. In addition to their potential for strengthening citizen agency and advocacy, self-reported food diaries can provide detailed dietary information at low cost. Moreover, given the restrictions on travel due to the COVID-19 pandemic, methods that rely on citizens for data collection and interpretation may acquire increased relevance.

Based on our experiences and reflections of using the food diary method, we propose the following considerations and innovations for future research:

Data entry

The data entry process was time-consuming; researchers in Uganda and Indonesia expressed the desire for data entry to be automatic. This could be achieved by using an application for smartphones or tablets. It would also simplify the process of data analysis, possibly allowing participants themselves to do this too. Additional time and resources would be required to programme and design such an app, but it would save time in data collection and reporting. Limited access to this technology, as well as low literacy levels, could constrain the use of digital data entry, so care should be taken to ensure that low-cost alternatives are available, and that support is available for filling out data forms.

Diary length and frequency

There was little variability in diets across the seven days, so three days could be adequate to capture the dietary patterns of a household or individual. Collecting data in one season only may not reflect seasonal food system changes, so we recommend that information is collected in different seasons. Three days of data collection should be more feasible than seven. Researchers in Uganda also expressed interest in running the diaries over longer periods of time, in order to monitor change and evaluate interventions.

Measuring food quantities

Quantities of food were not recorded in our studies. Researchers in both Uganda and Indonesia expressed an interest in collecting these data in future iterations of the method, in order to better understand diet adequacy. However, this would likely add to the complexity of data collection, as well as the burden on participants and researchers.

Dietary indicators and metrics

With no validated indicator or recognised dietary guidance available that relates to all forms of malnutrition, we had to decide ourselves on a way to report on aspects of the diet that relate to 'over-consumption. There were also no available data with which to compare our findings. Dietary indicators that reflect the triple burden of malnutrition need to be urgently developed.

Food system linkages

The data need to be analysed and presented in relation to the food system context. This includes market information about availability and trade, as well as information about local production, including volumes and the state of agrobiodiversity. This would help to better understand how the food system shapes dietary choices.

Citizen participation

Ideally the research process should meaningfully involve citizens in all stages of research. If CSOs are mediating the needs of citizens, steps should be taken to ensure that CSOs genuinely represent citizens' views. Establishing a process early on for consulting citizens at every stage of the research, including objective setting and design, could help to improve participation, and foster greater agency. Failure to properly engage citizens beyond the data collection phase risks falling into a more extractive model, with citizens doing unpaid work but getting little in return.

Planning for advocacy and use of data

We suggest that a process needs to be in place for how to use the data for advocacy, which properly accounts for citizen needs and priorities, for example, a community inquiry leading to an agreed advocacy plan. This plan will need to take into consideration the fact that advocacy is only one of the possible ways in which people may decide to use insights from dietary surveys. Some may prefer informal discussions with their peers, and others will be happy with the personal experience. In every case, these possibilities should be anticipated, planned for, and discussed with the community. This includes establishing a protocol for citizen ownership and control over the data, including any plans for data to be made available to other citizens and researchers in the public domain.

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