Centre for Rural Development (SLE)

SLE METHOD BRIEF 3 - 2021

Participatory Sustainability Hot Spot Analysis - Zambia

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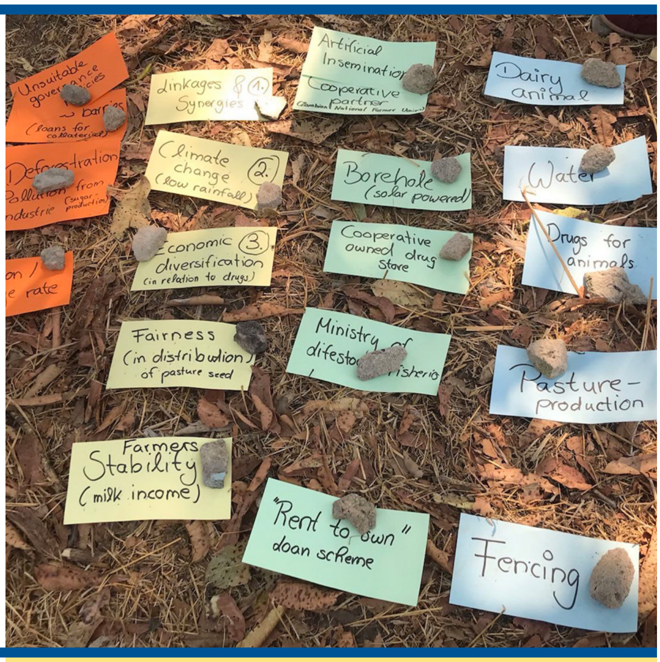
Abstract

Several methods and tools have been developed in the context of sustainability assessment of food value chains (VC). These are frequently considered to lack a holistic approach and stakeholder involvement, and/or their application is deemed too complex and top down. This paper focuses on the design and implementation of the participatory Sustainability Hot Spot Analysis (pSHSA), an adapted version of the Sustainability Hot Spot Analysis (SHSA) developed by the Wuppertal Institute, which is used to identify priority areas for interventions along VCs. After outlining the main features of the pSHSA and its methodological approach, this brief summarises the experiences of the design and empirical application of the method in the case studies of the dairy and groundnut VCs in Zambia promoted by the Green Innovation Center under the ONEWORLD No Hunger initiative of the Federal Ministry of Economic Cooperation and Development (BMZ). It concludes that the pSHSA offers a holistic and participatory tool for assessing food VCs, enabling the integration of local knowledge in a participatory fashion, and allowing for co-ownership of the research and co-creation of knowledge between VC stakeholders and researchers.



Introduction

Existing approaches to define and assess sustainability in the context of food value chains (VC) development are often considered complex and time-consuming, frequently limit stakeholder participation, and are usually implemented top-down (Mauser et al., 2013). In an attempt to overcome the conceptual and practical challenges related to sustainability assessment along VCs, the Wuppertal institute proposed a Sustainability Hot Spot Analysis (SHSA) (Bienge et al., 2009). In this respect, the SLE overseas project in Zambia, as part of the Sustainability of Modern Agri-Food Systems (NAMAGE) research project at SLE, developed a holistic, participatory, and feasible method to assess the sustainability of food VCs: the participatory Sustainability Hot Spot Analysis (pSHSA). This is an adapted version of the SHSA developed by the Wuppertal Institute (see Bienge et al., 2009; Rohn et al., 2014).

The pSHSA was developed and applied by the

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The Centre for Rural Development (SLE) is affiliated with the Albrecht Daniel Thaer-Institute for Agricultural and Horticultural Sciences in the Faculty of Life Sciences at the Humboldt-Universität zu Berlin. Its work concentrates on four branches: international cooperation for sustainable development as a post-master degree course, training courses for international leaders and experts in the field of international cooperation, research on sustainability issues, and advisory services for universities and organisations.

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SLE research team in the dairy and groundnut VCs in Zambia promoted by the Green Innovation Center under the ONEWORLD No Hunger initiative of the Federal Ministry of Economic Cooperation and Development (BMZ). This method helped to identify sustainability hot spots (SHS) along the two VCs and to suggest potential solutions. The case study areas of the targeted VCs were in two different locations: Southern Province for the dairy VC and the Eastern Province for the groundnut VC. The research team in Zambia, hereinafter referred to as "we", was an international and interdisciplinary team composed of SLE-affiliated and Zambian researchers, whose breadth of expertise along with knowledge of local contexts and customs contributed significantly to the research process and to the successful use of pSHSA.[1]

This brief paper focuses on the design and implementation of the pSHSA. The aim is to share practical insights into the methodological experiences of the SLE project in Zambia using pSHSA. After briefly describing the method and the suggestions implemented by the team, we present the overall methodological approach and provide details related to the application of pSHSA in the empirical context, including methods for data collection and analysis. In the final sections, we draw attention to the lessons learned from the use of this assessment method and provide conclusions.

Description of the original method

The Hot Spot Analysis (HSA) is a method originally developed by the Wuppertal Institute for Climate, Environment and Energy (Bienge et al., 2009). Compared to most technical life cycle assessment methods that require high levels of expertise, resources, and data, the HSA aims to provide a quick, simple, and cost-effective alternative to highlight the most pressing issues within a product VC through stakeholder involvement (Rohn et al., 2014).[2] Initially looking only at resource intensity across VC stages (Wallbaum & Kummer, 2006), the HSA has since been broadened to integrate social aspects and is now often labeled Sustainability Hot Spot Analysis (SHSA) (Bienge et al., 2009). In a qualitative estimation of the social and ecological impacts of a product's life cycle, it is geared toward informing decision-making processes by identifying key priority areas for action, or "hot spots" (Liedtke et al., 2010).

In its existing versions, the SHSA is conducted in five steps (see Bienge et al., 2009; Rohn et al., 2014):

Step 1: The VC stages (life cycle phases) and the categories to be assessed are defined. Depending on the product, these stages might include raw material extraction, production, aggregation, processing, distribution, consumption, and waste, but are usually limited to four or five phases. Categories are determined according to project objectives.

Step 2: The relevance of these categories in each VC stage is assigned as inapplicable (score 0), low (score 1), medium (score 2), or high (score 3).

Step 3: The impacts of the phases are determined against each other on the same scale.

Step 4: The scores of steps 2 and 3 are multiplied to identify sustainability hot spots, which now have a minimum score of 6 (3x2) or a maximum score of 9 (3x3).

Step 5: Stakeholders and experts review and validate the results. Apart from the stakeholder review and evaluation to ensure the robustness of the results, all steps are mainly based on a literature review and occasional individual expert interviews.

Methodological change

Limitations of the Wuppertal Institute's SHSA

Although the Wuppertal Institute's HSA takes a multidimensional approach, the identification of the sustainability aspects as well as their assessments have, up to now, been dominated by scientific data and biased by external perceptions, determining to a great extent, whether an aspect is considered a hotspot or not. Commonly, its sustainability aspects are acquired by extensive literature review or derived from international standards such as the Global Reporting Initiative and the United Nations Environmental Programme SETAC Life Cycle Initia-

1 A twin project conducted in Uganda has also adapted the Wuppertal SHSA in a different methodology called SHSA 2.0. For details about the SHSA 2.0, please compare the Method Brief 2, 2022

2 For instance, Material Input Per Service Unit Analysis (Bienge et al., 2009), Environmental Life Cycle Assessment (ISO 14040, 2006), and Social Life Cycle Assessment (UNEP & SETAC, 2009) and Sustainability Assessment of Food and Agricultural systems (SAFA) (FAO, 2014), among others.

tive (Bienge et al., 2009; Brown, 2011; UNEP & SETAC, 2009). Although the developers of the method proposed consulting stakeholders and experts to review and validate results of the analysis, their methodology lacks a participatory approach that involves VC stakeholders right from the start of the research process.

Sustainability assessments based on expert-led and top-down approaches, on the one hand, push for quantifiable indicators that allow for regional comparisons. On the other hand, they present potential shortcomings, such as the alienation of local communities and failure to capture views from diverse stakeholders (Fraser at el., 2006). Community engagement in sustainability assessment procedures assures the selected indicators are relevant and context-specific and evolve over time with the community. Participation leads to empowerment and to the building of capacity for communities to address emerging challenges in their local environment (Fraser at el., 2006). To facilitate participation and include evidence-based assessments informed by both primary and secondary data, we proposed the participatory Sustainability Hot Spot Analysis (pSHSA).

Methodological contribution: Participatory and systemic SHSA

We aspired to balance the importance of academic exploration with the importance of the perceived realities of the involved actors. Thus, we proposed adapting the original SHSA by focusing on participation and local knowledge as part of the agroecological principles (HLPE, 2019) by integrating the perceptions of the farmers as early as the stage of conceptualizing sustainability categories/aspects. This step is followed by a participatory assessment of significance and impact assessments. The added value we foresaw is the opportunity for participants' acquired social agency, perceived ownership, and compliance to the concept's results. This adds impetus to the generation and diffusion of innovations needed to sustainably improve value chain functionality (Valencia et al., 2012).

The second contribution to the method was to render the approach within a framework. This was done by emphasizing system functionality as a key concept for sustainable livelihoods (Ibisch & Hobson, 2014).

System functionality correlates the basic resources required to ensure a sustainable and successful dairy or groundnut production to the socio-economic and ecological systems ensuring those resources. The objective is to reveal the necessity of conserving specific sustainability categories/aspects such as healthy soils, ecologically stable climate conditions, equitable land distribution, or knowledge sharing as prerequisites of the sustainability and accessibility of those systems and their services (Ibisch & Hobson, 2014; Neven et al., 2017). The key concept of system functionality thereby emphasizes the multidimensional character of sustainability (ecological and socio-economic) as it draws each single sustainability category/aspect (such as healthy soils or fairness) into the picture of sustainable groundnut or dairy production. It does so by emphasizing the importance of each category/aspect being in place to ensure whole-system functionality.

Following the principles of participation and systemic frameworks, the method can be summarized as a people-centered and system-based approach (Ibisch & Hobson, 2014) since it includes participants' sustainability perceptions in a systemic manner. Considering the farmers' participation in collecting data on perceived realities, the method follows a clear assessment scheme ensuring replicability as well as comparability of various value chains. Furthermore, a time criterion was incorporated into the assessment, rendering the assessment of the sustainability aspects into a greater perspective, as situations' temporal trends are considered. The project's orientation to the promotion of sustainable livelihoods for small-scale farmers through participation in VCs led to greater emphasis of the production phase of the VC life cycle.

Participants were clustered into focus groups (youth, women, and men), each consisting of about six people. This allowed us to conduct plenary sessions with less than 20 people in adherence to mandatory Covid-19 control restrictions on group gathering sizes. Under normal circumstances, focus group sizes could include a maximum of 10 people to ensure time and space for constructive exchange of opinions. The focus groups were intended to capture perceptions influenced by age and biological sex, allowing effective clustering and documentation of local knowledge.

Transect walks, seasonal calendars, and Venn diagrams were used to complement the qualitative data set to support a comprehensive understanding of sustainability as perceived by the farmers. Semi-structured interviews with key informants from other VC stages were conducted to collect dense and reliable information on specific topics along the VC.

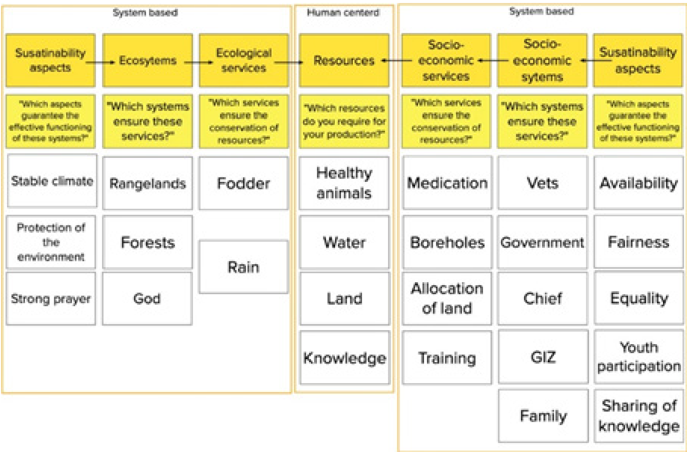

Figure 1: The resources and ecological and socio-economic services and systems that farmers identified as necessary for dairy/groundnut production in Zambia

Figure 3: The systemic analysis of sustainability aspects to ensure sustainability of dairy production, carried out by a women focus group in Monze

Hot spot identification during the interviews was conducted using the same criteria as used during the focus groups. A validation workshop was held in Lusaka with stakeholders from the processing, aggregation, distribution, and marketing VC phases as well as representatives from supporting agencies (German Corporation for International Cooperation GmbH, Ministry of Fisheries and Livestock, Ministry of Agriculture, Golden Valley Agricultural Research Trust).

Implementation of the method (steps and examples)

Here, we outline the two steps used in analysis: identification of sustainability aspects and identification and evaluation of indicators (threats) that reduce the overall functionality of the sustainability aspects.

Identification of sustainability aspects

To embed sustainability aspects into this people-centered and system-based livelihood assessment, methodological elements from the Marisco

Figure 2: Freelisting during a focus group session (Quinlan, 2017).

approach were taken into consideration (for further elaboration, see Ibisch & Hobson, 2014) leading to four steps executed within each focus group session: identification of 1) resources required for production, 2) services that ensure conservation of the identified resources, 3) systems that provide the identified services, and 4) sustainability aspects that support system function. In each case, emphasis is placed on both ecosystem and socio-economic system components.

Those steps are executed by the method of freelisting within focus groups (Fig. 2 & Fig. 3). Freelisting provides a glimpse of individuals' mental inventories of items within a given category, allowing the cultural salience within stakeholder groups and variations in individuals' knowledge across groups to unfold (Quinlan, 2017). The simplicity and accuracy of freelisting, enables data collection on specific knowledge and perceptions from relatively large samples. This was ideal in the case of numerous groundnut and dairy farmers. However, participants may not mention common items within a category. Researchers should therefore establish sub-categories for discussion. For example, in the first step of the category "basic resources required for production", physical, safety, social, cultural, ethical, and individual resources might be suggested. Among literate actors, freelisting allows rapid data collection, while among illiterate actors, the method can be easily adapted as an oral exercise.

The resources, services, systems, and sustainability aspects noted during freelisting are written on cards and clustered. For example, the resource "healthy animals" was clustered with the service of "medication", the system "veterinarians", and the sustainability aspect of "availability of veterinarians".
Similarly, the dairy VC resource of "animals" was

Figure 4: Identification of threats to sustainability aspects and their evaluation in terms of scope, severity, permanence, and trend.

identified as supported by the service of "fodder", the system of "rangelands", and the sustainability aspect of "healthy soils" and "stable climate".

Hot spots: Identification and evaluation of threats jeopardizing sustainability aspects

To identify sustainability hot spots, the identified sustainability aspects were evaluated by each focus group along four criteria (see Fig. 4) as potential indicators or threats. For example, the women's focus group in Livingstone evaluated the key aspect of "availability of veterinaries" and identified "lack of infrastructure" and "the prerequisite to pay for veterinarians' transport and lunch" as threats. A hot spot could, therefore, be "lack of government extension services in rural areas". A further example was provided by the youth focus group in Monze who examined the aspect of fairness and identified "chieftainship" as a system-level sustainability aspect since chiefs are responsible for land distribution, a basic resource for dairy farmers. The youth identified "nepotism" as a threat to fairness, resulting in a hot spot being defined as "poor community leadership".

Having identified threats, their impact and significance was assessed by focus group participants along four criteria: scope, severity, permanence, and trend.

Each criterion is ranked from high to low significance and assigned a score (low = 1, medium = 2, high = 3), as shown in Figure 5.

The highest result possible is twelve (if four criteria are each rated as three), while the lowest result possible is four (if four criteria are each rated as one). We therefore considered a ranking of 4-6 as a mild spot, 7-9 as a moderate hot spot which needs attention, and 10-12 as a hot spot which requires intervention.

SCOPE: How widespread is threat?		
1	2	3
The threat is only a problem in a few villages (<50%)	The threat is a problem in quite a lot of villages (50%)	The threat is a problem almost everywhere >50%)

PERMANENCE: How fast does the threat dissapear?		
1	2	3
Disapears spontaneously without management	Needs internal management	Needs external management

SEVERITY: How bad is the threat?		
1	2	3
Consequences moderately affect the aspect	Consequences badly affect the aspect	Consequences severely affect the aspect

TREND: How common is the trend compared to the past?		
1	2	3
Less common than in the past	Same as in the past	More common than in the past

Figure 5: Evaluation scheme: Scope, severity, permanence, trend.

For example, in the case of the aspect of "availability of vets" and its identified threat "paying vet's transport and lunch", spatial distribution was evaluated as a three, indicating that this is a pervasive problem in the province. Severity was rated three, indicating the crucial impact the lack of vets in rural areas has on the dairy farmers. Permanence was also ranked three, meaning that external management is needed to ameliorate this problem. Trend was evaluated at three, meaning that the problem is worsening. The sum of rankings is twelve, which indicates a hot spot.

Why this change matters

Our main methodological contribution over the original SHSA is the application of an intrinsic participatory and systemic approach, especially at the VC production stage. Farmers could easily relate their knowledge to the approach, as the steps relied on progressively identifying the elements and resources that they required in their dairy or groundnut production.

The approach puts the farmer at the center of the analysis, drawing a holistic picture of the production phase and incorporating farmers' perceptions of sustainability at an early stage. This participatory approach improves the study's robustness and sustainability, as data, knowledge, and strategies originating from it can be drawn straight back to the farmers, ensuring that measures taken by governments and development corporations meet identified needs and create palpable differences on the ground. Knowledge, perceptions, and results are not imposed, but onboarded by and for the people affected. This creates a substantial advantage as farmers experience agency over their resources and food system as well as ownership of the process and the results, which is assumed to improve the long-term establishment of the strategies proposed by development cooperation in response to the pSHSA.
The participatory approach also ensures that indicators/threats are directly applicable to the specific

context and VC as both are defined by affected people instead of site-, VC-, and system-unspecific literature. Considering the variety of VCs and their characteristics, indicators suggested in literature may not be adequate.

Freelisting aspects and indicators has a clear advantage over the predefined lists derived from international standards and academics that is proposed by the original SHSA. Freelisting allows for creative thinking and identification of contextually significant aspects as different farmer groups share their own perceptions of local sustainability, free from academic bias. In this context, a key element of the approach is the classification of the data from farmer focus groups by youth, female and male,3 as each group might has different perceptions due to their social and power role within community hierarchy structures.

Boundaries and challenges

This adapted approach of Wuppertal Institute's HSA captures local knowledge through focus group discussions in local vernaculars.

While this systemic and participatory approach enjoyed success in the production life cycle, it is less suitable for subsequent life cycle phases. Semi-structured interviews turned out to be challenging when it came to the identification of sustainability aspects, as no systemic framework within the FGD was at hand. Experts' limited time made the one-hour time allocation for a FGD unfeasible. Aspects identified in the production life cycle phase were presented to and reviewed by stakeholders in the aggregation, processing, and distribution phases. This allowed for comparison of VC actors' perceptions of the complexity of sustainability aspects and threats. It should be argued that the focus on the production life cycle phase is owed to the project's orientation towards the promotion of sustainable livelihoods of small-scale farmers through the participation in VCs.

Conclusion and recommendations

While Wuppertal Institute's HSA serves as a well-elaborated desk analysis, it fails to reflect realities on the ground reported by farmers. The pSHSA is a crucial step to identifying aspects and indicators that meet the needs and perceived realities of the people involved.

Validation workshops to capture additional sustainability aspects to complete the sustainability picture and balance divergences between practitioners and academics are highly recommended. Knowledge gaps can be considered in validation workshops as an opportunity to collect additional data to complement the dataset.

Lastly, an evidence-based literature review is recommended to triangulate empirical data and data generated during the validation workshop with scientific data and to provide insights on hot spots that were not revealed during the pSHSA. This should be done as a final step to avoid influencing or changing the perceived logic of the data.

While the original approach is a rapid way to produce reliable scientific data, our participatory method adds to the understanding of interrelations between livelihood and food systems, the need for their conservation, and the need to bolster the resilience of food systems. While the pSHSA involves additional effort at the field level, this will pay off substantially in terms of local agency and, thus, sustainability in the long term.

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3 Focus groups were purposely disaggregated by sex and not by gender to avoid potential harm in exposing people who identify as gender non-binary.

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