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Opportunities and pitfalls for researchers to contribute to the design of evidence-based agricultural policies: lessons from Uganda

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ABSTRACT

Agricultural policies in sub-Saharan Africa have paid insufficient attention to sustainable intensification. In Uganda, agricultural productivity has stagnated with aggregate increases in crop production being attributed to expansion of cultivated land area. To enhance sustainable crop intensification, the Ugandan Government collaborated with stakeholders to develop agricultural policies using an evidence-based approach. Previously, evidence-based decision-making tended to focus on the evidence base rather than evidence and its interactions within the broader policy context. We identify opportunities and pitfalls to strengthen science engagement in agricultural policy design by analysing the types of evidence required, and how it was shared and used during policy development. Qualitative tools captured stakeholders' perspectives of agricultural policies and their status in the policy cycle. Subsequent multi-level studies identified crop growth constraints and quantified yield gaps which were used to compute the economic analyses of policy options that subsequently contributed to sub-national program planning. The study identified a need to generate relevant evidence within a short time 'window' to influence policy design, power influence by different stakeholders and quality of stakeholder interaction. Opportunities for evidence integration surfaced at random phases of policy development due to researchers' 'embeddedness' within co-management and coordination structures.

KEYWORDS

Sub-Saharan Africa; stakeholder engagement; policy development process; agricultural service provision

Introduction

Policy processes in developing countries are often considered as centralized and less open (Basheka, Namara, & Karyeija, 2012; Grindle & Thomas, 1991; Mbonye & Magnussen, 2013). In East Africa, Sustainable Crop Intensification (SCI) policy processes exhibit weak structures for aggregation of stakeholders' interests and mechanisms for open circulation of ideas, poor dialogue, lack of policy support which results in mistrust among policy actors over hidden interests of actors (Yami & Van Asten, 2017). Furthermore, the inability of policy makers to take well-informed policy decisions using evidence

has been reported (Newman, Capillio, Famurewa, & Siyanbula, 2013). In Uganda, research is often produced independently of decision-making during policy processes (Egulu & Ebanyat, 2000; Kinsman, 2010). Research utilization is constrained as researchers do not have the capacity to better communicate priority areas of research interest to policy-makers (Solesbury, 2001).

More recently, the Government of Uganda (GoU) exerted efforts to improve policy development capacity within the country's policy fraternity by formulating policy development guidelines (Cabinet

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secretariat of Uganda, 2005, 2013). However, policy processes are still characterized by limited awareness of these procedures (Tumwesigye, Nakanjako, Nanyenze, Akol, & Sewankambo, 2013), and often sectorial policy processes are underfunded (Egulu & Ebanyat, 2000). Hence, Uganda's national level consultations are frequently dominated by technical staff and exclude local actors (Yami, van Asten, Hauser, Schut, & Pali, 2018). Furthermore, in the past, policies that promoted commercial agriculture were driven by principle (Bategeka, Kiiza, & Kasirye, 2013) in the absence of a supportive SCI policy framework to boost sustainable productivity. Subsequently, Uganda has become a hotspot for hunger (Lal, 2013) despite increasing trends in crop production. These increases occur at the expense of land expansion and wetland reclamation (Turyahabwe, Kakuru, Tweheyo, & Tumusime, 2013). Drawing from Godfray et al. (2010), we define sustainable intensification as the process of 'producing more food from the same area of land while reducing on the environmental impacts' and from Cassidy, West, Gerber, and Foley (2013) to define productivity as production per unit area of land. Uganda is characterized as a low-input country with fertilizer use averaging 1.2 kg/ha (Sheahan & Barrett, 2017), poor use of quality seed (MAAIF, 2015) and poor coverage of extension services (Barungi, Guloba, & Adong, 2015). According to Mbowa and Mwesigye (2016), potato yields have the potential to increase by 158% with the use of good quality seed and inorganic fertilizer and can result in an income of 485 million USD to Uganda annually.

This study examines an approach to agricultural policy development within Uganda's political system. We contribute to knowledge about inclusive approaches to evidence utilization required to develop and strengthen the National Agricultural Extension Policy (NAEP) and the National Seed Policy (NSP). Policies as defined by Dye (2013) are whatever a government decides to do or not to do. Policy development requires research, analysis, consultation, synthesis of information to evaluate policy options. Appropriate and well-informed policies form the basis for many sustainable intensification challenges in Africa (Schut et al., 2016), as policy differences largely explain the variation in agricultural input use compared to other factors across countries in sub-Saharan Africa (Sheahan & Barrett, 2017).

In the next section, we outline the conceptual framework underpinning this study followed by the

Sections 'Methodology' and 'Results'. The last two sections discuss the results and discussion after which study conclusions are drawn.

Conceptual framework

Evidence and evidentiary sources in policy development processes

Over the past two decades, there has been more clarity about the rationale for evidence-based policy-making with an increasing focus on the evidence base (Allison & Zelikow, 1999; Bowen & Zwi, 2005; Rigtenik & Schomerus, 2016; Sanderson, 2002) but less on the circumstances within the policy environment that enhance its utilization. For example, it is known that policy-makers require evidence on the need and support for policy action, whether a policy works, what works (Dobrow, Goel, & Upshur, 2004), and what its anticipated cost-efficiency is (Bowen & Zwi, 2005; Sanderson, 2002). However, evidence must interact with context to be fully adopted into policy and practice (Bowen & Zwi, 2005; Dobrow et al., 2004; Head, 2015). Context is a multi-faceted concept which renders it dynamic and complex but it is critical to policy processes. Aspects of context include evidentiary input, type of participant interaction, requirements for consensus, nature and extent of background preparations, support structure (Lomas, 1991), power relations and nature of the problem (Schut, van Paassen, & Leeuwis, 2013). Context and evidence are fundamental components of an evidence-based decision (Dobrow et al., 2004).

Two strands of arguments have evolved in the debate about evidence and its sources in policy processes over the years. Initially, the highly valued 'gold standard' for formal and quantitative sources of evidence was widely reported (Cash et al., 2006; Schut, van Paassen, Leeuwis, & Klerkx, 2014, p. 216; Williams & Glasby, 2010). These include the randomized control trials that address the effectiveness and efficiency of public programs to evaluate program accountability and performance attributes (Sanderson, 2002) and contribute to program design as they determine policy options that inform decisions on appropriate policy action (Carroll, 2010; Head, 2015). These approaches are often faulted over their exclusionary and costly nature and inapplicability to a diversity of circumstances.

A follow-up aspect suggests that despite the emergence of qualitative approaches that contribute to

evidence-based policies there is a lack of understanding of the full range of tested, adapted and appropriate tools required. Systematic reviews of past studies, for instance, provide information about approaches that have worked elsewhere (Head, 2015) that are applicable to different stages of the policy cycle (Rigtenik & Schomerus, 2016). However, the Cost–Benefit Analysis (CBA), logical frameworks and traditional project management tools may not be used in isolation as they do not account for the existing externalities (Young & Mendizabal, 2009). The outcomes-based approach may improve the extent of evidence utilization in policy processes but focuses on outputs rather than whether interventions address the needs of citizens (Paine Cronin & Sadan, 2015). Hence, the emergence of concerns about approaches that enhance stakeholder dialogue and inclusion transpired such as engagement of affected communities through evidence-based dialogues incidence or anecdote in the absence of an effective problem, needs and options analysis (Paine Cronin & Sadan, 2015). These approaches are unconventional and different to other approaches (Frieberg & Carson, 2010), their integration into the policy process is unknown and furthermore, there is a lack of understanding about the optimal levels of knowledge use during these processes (Paine Cronin & Sadan, 2015).

A related element of evidence-based policy literature concerns the role researchers play in the evidence-based policy debate. Earlier frameworks were advanced to better integrate the roles and contributions of research to policy development processes in the African agricultural sector (Kristjanson et al., 2009; Omamo, 2003; Reardon, Barret, Kelly, & Savadogo, 1999) but recently arguments surfaced about how active contribution between researchers and policy-makers can enhance their effective contribution to the policy process (Schut et al., 2013). Schut, Leewis, and van Paassen (2010) reveal that research can benefit from a negotiation based approach depending on contextual factors. However, there is a lack of insight into how researchers can closely interact with policy development to improve research effectiveness. This study focuses on researchers' integration into policy development to enhance evidence utilization.

Evidence delivery and utilization in policy development processes

Literature uncovers a series of frameworks and pathways to evidence-informed policies that explore

evidentiary sources, delivery and utilization – i.e. evidence uptake and knowledge translation (Landry, Amara, Pablos-Mendes, Shademani, & Gold, 2006; Orem, Mafigiri, Nabudere, & Criel, 2014; Orem, Marchal, Ssengoba, Macq, & Criel, 2012) with consideration to context (Bowen & Zwi, 2005; Williams & Glasby, 2010). The context-based evidence-based framework advanced by Dobrow et al. (2004). Figure 1 illustrates how internal and external contextual factors affect introduction, interpretation and application of evidence and its sources within the policy decision-making context. Situational aspects that explain how context influences evidence utilization include evidence supply requirements, inadequate non-aligned research findings to policy-makers' needs, low trust of external information hence the low relevance of researchers and evidence to policy-makers and processes (Head, 2015).

While effective evidence-delivery mechanisms and systems administer, assess and disseminate information (Rigtenik & Schomerus, 2016, p. 3), they do not necessarily guarantee ownership, acceptance and application of evidence by decision-makers. The application of evidence according to Orem et al. (2012) is ensured by coordinating evidence generation using mainstreaming mechanisms for information exchange. These mechanisms include the creation of specialized state offices to oversee research studies, evaluation of state policy and performance audits (Head, 2015, p. 478). Also, the use of credible and local researchers is essential to ensure contextualized, timely, high-quality evidence, alongside feasible recommendations to guarantee higher evidence adoption and implementation (Orem et al., 2012). Framing policy challenges more laterally, understanding the policy networks of actors and concentrating focus on spaces at a range of scales also assume equal precedence (Keeley, 2001).

Evidence delivery relates to the institutional interplay between policy actors to engage them through collaborative networks at different scales, addresses information asymmetry issues, generates sustainable solutions and reduces power imbalances (Cash et al., 2006). Co-management of the policy development process by stakeholders, for example, enhances evidence delivery, where a continuum of arrangements that rely on various degrees of power and responsibility from stakeholders including governments and local communities, and boundary or bridging organizations focus on the intermediary role between arenas and scales to facilitate the co-production of knowledge

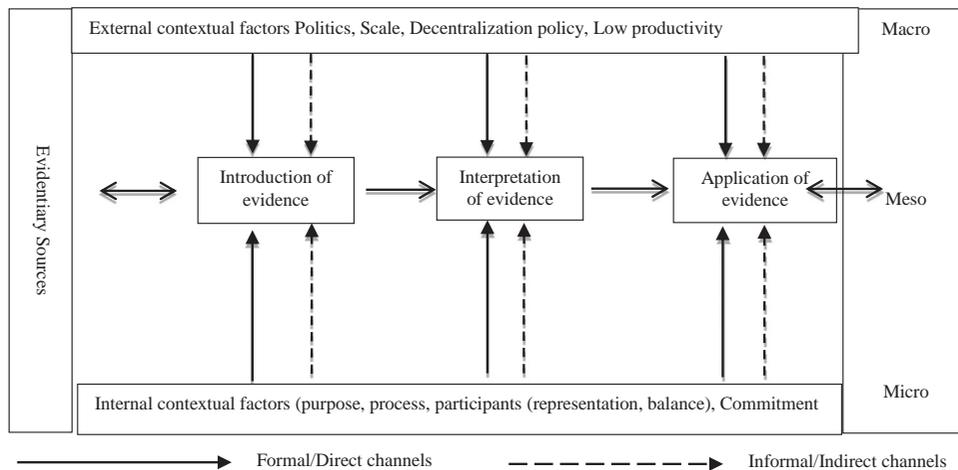


Figure 1. Conceptual framework for SCI context-based evidence-based decision-making. (Source: adapted from Dobrow et al., 2004, p. 216).

(Cash et al., 2006). Such interactions contribute to institutional strengthening (Orem et al., 2012). Knowledge exchange mechanisms used within such engagement methods include facilitated meetings, face-to-face regular exchanges, consultations between decision-makers and researchers and interactive and multi-disciplinary platforms and networks (Head, 2015, p. 487).

We adapt the framework presented by Dobrow et al. (2004) in this study to include evidence integration at micro (farm level), meso (regional/ district level) and macro (national) levels as it makes little reference to the multi-level scales of policy-making. Challenges associated with scale include the focus of scientific research at a single scale, and national policies which adversely constrain local policies. Furthermore, interactions at various scales cause a change in strength and direction over time which generates 'dynamics of cross scale and cross level linkages' (Cash et al., 2006). According to Cash and colleagues (2006), failure to recognize heterogeneity in the way that scale is perceived and valued by different actors – the challenge of plurality – is associated with deriving a best characterization of the scale and level challenges that better applies to the system wide context.

Methodology

Study location

The research focused on support to public policy processes relevant to SCI namely the National Agricultural

Extension Policy (NAEP) and the NSP in Uganda. These policies were used as specific examples to integrate SCI research using evidence from potato and rice crops grown in south-western and eastern regions of Uganda, respectively (Figure 2). Justification for the selection of rice and potato research is outlined in Walukano et al. (2016).

Data collection tools

Primary data: surveys

Primary data were collected at plot, household, value chain, policy and institutional levels using quantitative and qualitative surveys coordinated by researchers from several national and international agricultural research institutions. These included the National Agricultural Research Organization (NARO), the Economic Policy Research Centre (EPRC), International Food Policy Research Institute (IFPRI), the International Institute of Tropical Agriculture (IITA), the Africa Rice Centre (AfricaRice), the International Potato Centre (CIP), under the oversight of the Uganda Bureau of Statistics (UBOS) and Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).

Household level data collection methods for the household survey on the potato are delineated in van Campenhout, Vandevelde, Walukano, and van Asten (2017), while those for rice are outlined in van Campenhout, Bizimungu, and Birungi (2016). Value chain data collection methods are presented in Mbowa and Mwesigye (2016) and plot level data collection methods for the agronomic survey are defined in Walukano et al. (2016) while policy and

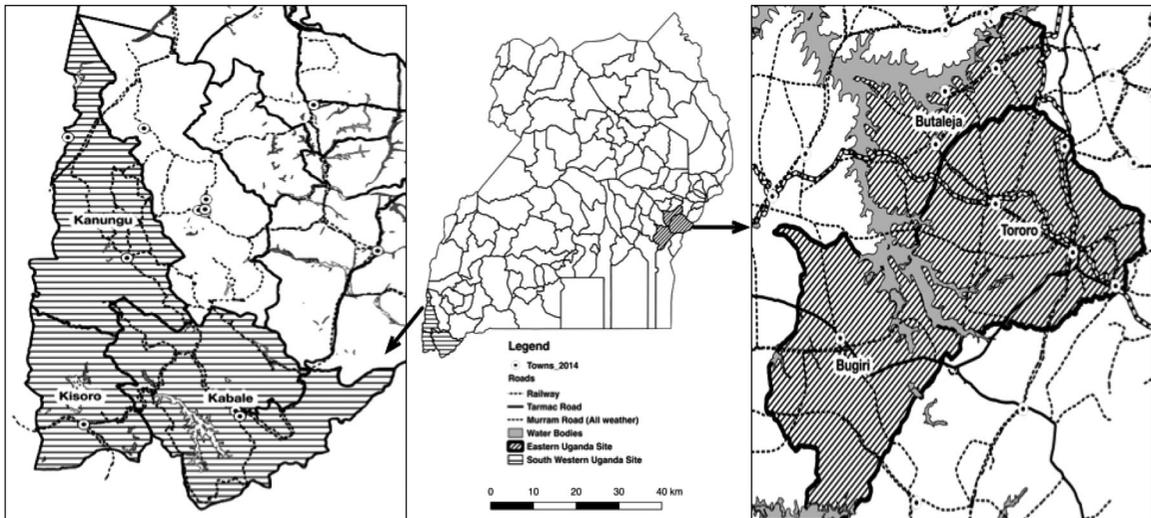


Figure 2. Map of study sites used for multi-level studies.

institutional data collection methods are outlined in Yami et al. (2018).

Secondary data: engagement and evidence dissemination workshops

Secondary data were collated from reports (NAPF, 2015; PASIC, 2014a, 2014b, 2014c, 2016) that were generated from stakeholder engagement meetings during the policy development process. Secondary data on (i) the aims of the meeting, (ii) participation by different actors and their affiliations, (iii) facilitation processes used, (iv) results and recommendations were collated.

Three broad categories of engagement included: (1) Joint vision setting and policy action for seed and extension policies, (2) Analysis of bottlenecks of the policy cycle, and (3) Evidence integration into policy development. In total, 11 workshops were held.

A meeting on joint vision setting and policy action was initiated by stakeholders to identify perspectives on issues and challenges to agricultural policy in Uganda, perspectives and priority areas for policy action in SCI, modalities and priorities for joint engagement. Policy action workshops were led by MAAIF to ensure that the seed and extension policies and assessment of policy options (Regulatory Impact Assessment (RIA) were validated.

A technical workshop that analysed policy cycle bottlenecks created dialogue amongst stakeholders on the status of the NAEP and NSP development and suggestions for relevant areas for intervention to advance policy development.

Evidence integration meetings were led by researchers. Multi-level study results were validated and disseminated during the collective learning workshops, the national agricultural policy forum (NAPF) at national level and sub-national evidence feedback meetings.

Data analysis

Participation data by different actors and organizational affiliation were analysed using Microsoft Excel program to match each stakeholder category with their consistency of participation (i.e. one time participation in 11 engagements) and frequency of repeated participation in stakeholder (2 workshops), NSP (3 workshops, NAEP (2 workshops) and evidence feedback engagements (4 workshops). Stakeholders were categorized based on their (i) salience in the SCI agenda, (ii) actor relevance and (iii) roles. The stakeholder categorization only considered one principal role stakeholders played as stated during workshop registration. These categories were farmers and farmer associations, policy actors at national and sub-national levels, non-Governmental organizations (NGOs) and civil service organizations (CSOs), development partners and projects and researchers. These data provided statistics of consistency and frequency of repeated participation. A template was used to extract data from workshop reports, which derived information such as the workshop objective, outcomes, conclusions and recommendations.

Results

Evidence and evidence sources in SCI policy development

In this section, we present results of evidence utilization during the development of NAEP and NSP process in which the former was passed and the latter was submitted for approval. We discuss information pertaining to consensus building, stakeholder interests and mechanisms for the circulation of ideas within this process.

Figure 3 outlines the trajectory of stakeholder engagements, and evidence generation into the development of the seed and extension policies. During national level stakeholder engagement workshops, development partners characterized the status quo of evidence-based policy-making in the Ugandan agricultural sector follows:

'lack of analytical underpinning of policies and data to support this and to ensure evidence-based policy making' particularly defined by lack of quality data and absence of (conventional economic, technical, social, financial, risk) analyses to support agricultural 'policies' more especially little or no evidence/monitoring findings to support the policy shifts. (PASIC, 2014a)

Stakeholders including researchers recognized that rigorous demand-driven evidence generation would ensure relevant research to address bottlenecks to the policy processes, and contribute to policy development and advocacy initiatives. According to the workshop participants, research evidence required included the extent of the yield gap, productivity and production constraints, and the economic effects of each policy to society.

Acronyms in Figure 3 denote Collective learning and Policy Action (COLPA), NSP, National Seed Strategy (NSS), National Agricultural Extension Policy (NAEP), National Agricultural Extension Strategy (NAES), NAEP Regulatory Impact Assessment (NAEP RIA), NAPF, NSP Regulatory Impact Assessment (NSP RIA), Feedback workshop (FW) and Quality Declared Seed (QDS).

Following a formal request for an extension policy by MAAIF in 2015, validation interactions for the NAEP and NAES occurred in March and April 2016, respectively. As part of a co-management process, MAAIF established a Thematic Working Group (TWG) to manage policy development. NAEP stakeholders built consensus on issues such as the single spine

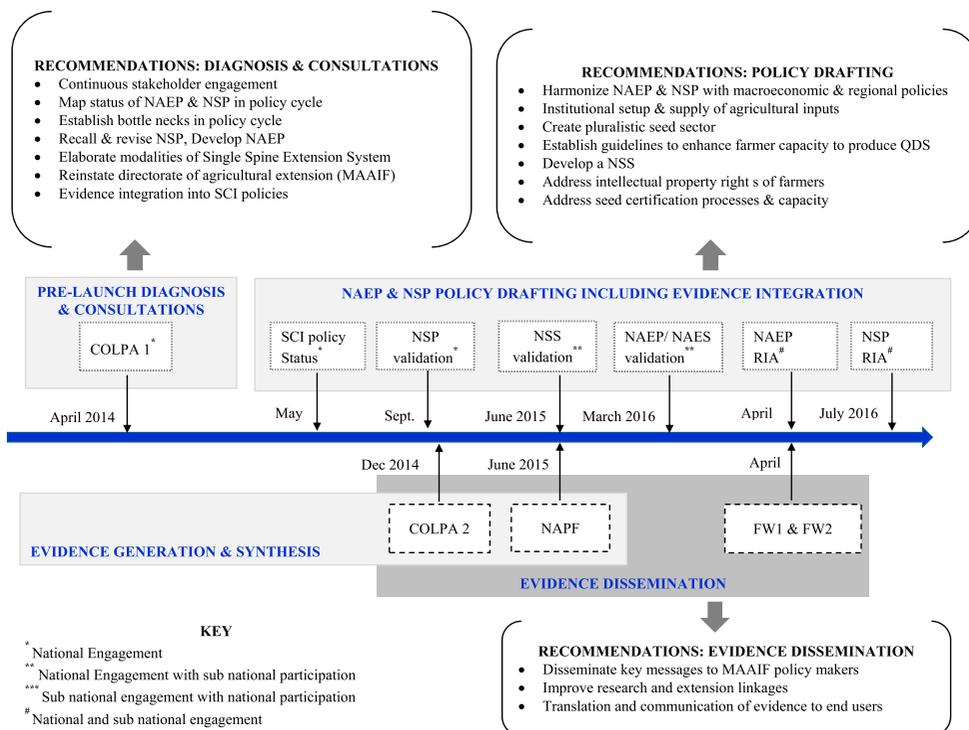


Figure 3. Timeline of stakeholder engagements, recommendations, evidence generation and integration into SCI policy development for NSP and NAEP (Source: adapted from PASIC, 2014a, 2014b, 2016).

extension services (SSES) modalities and overall coordination of private and public sector extension provision by the directorate of agricultural extension services (DAES). Once developed, NAEP was passed within a period of 6 months.

In the first workshop, stakeholders proposed that the TPM approved NSP version be revised to include synthesis of their proposals (Figure 3). Their proposals included a recognition of the formal and informal seed sector to create a pluralistic seed industry, establishment of an institutional framework to ensure an efficient, and effective and organized seed industry. The NSP, National Seed Strategy (NSS) and RIA for the NSP proposal were validated by stakeholders in September 2014, February 2015 and July 2016, respectively, after which they were submitted to MAAIF for approval.

Evidence delivery and utilization during SCI policy development

Consistency and frequency of attendance during policy development

During SCI policy development, the main mechanism for stakeholder interactions was facilitated workshops where participation by different stakeholders was through information sharing and consultation. During the first stakeholder engagement workshop (SE1), stakeholders noted inadequate stakeholder involvement during policy development processes in

the past – with respect to relevance, gender, quality of participation and diversity.

We show the consistency of participation trends disaggregated by gender and diversity of participants (Figure 4). In comparison with extension policy engagements, the NSP engagements attracted stakeholders from all categories and also attracted about 100 more participants. Across the policy development trajectory, farmers and farmers associations, sub-national and national policy-makers and researchers registered the highest numbers of attendees. However, statistics on the repeated attendance to each broad engagement by different stakeholder categories (Figure 5) reveal that different development partners attended all (11) SCI policy engagements. Sub-national policy-makers attended all except SE 1 and SE 2 engagements while national level policy-makers attended all extension policy meetings and researchers attended all seed policy engagements. An assessment of the onetime attendance shows that NSP and NAEP engagements attracted a diversity of stakeholders from all eight stakeholder categories, followed by the evidence generation engagements from seven categories (Figure 5).

Evidence utilization during the policy development process

Different types of (quantitative and qualitative) evidence were integrated into the policy development process for the NAEP and NSP (Table 1). At the national

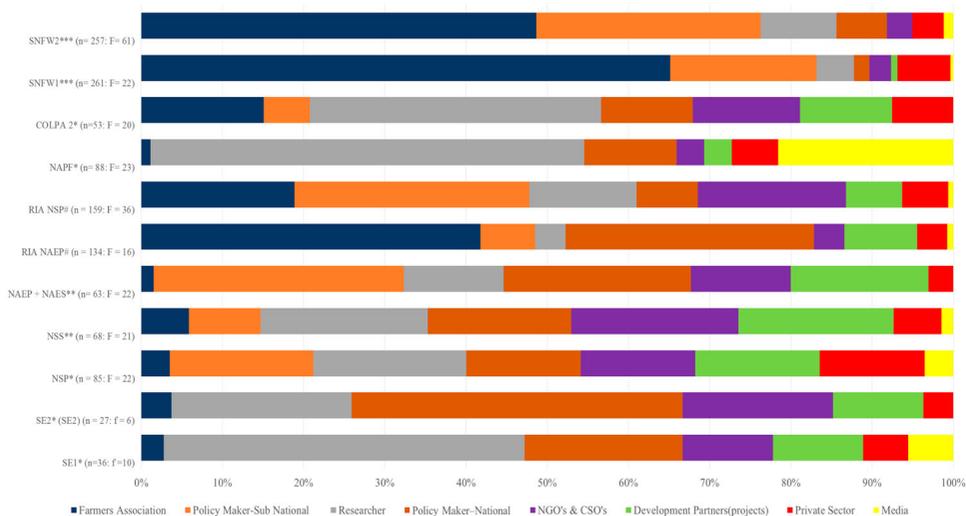


Figure 4. Consistency of stakeholder attendance during SCI policy engagements.

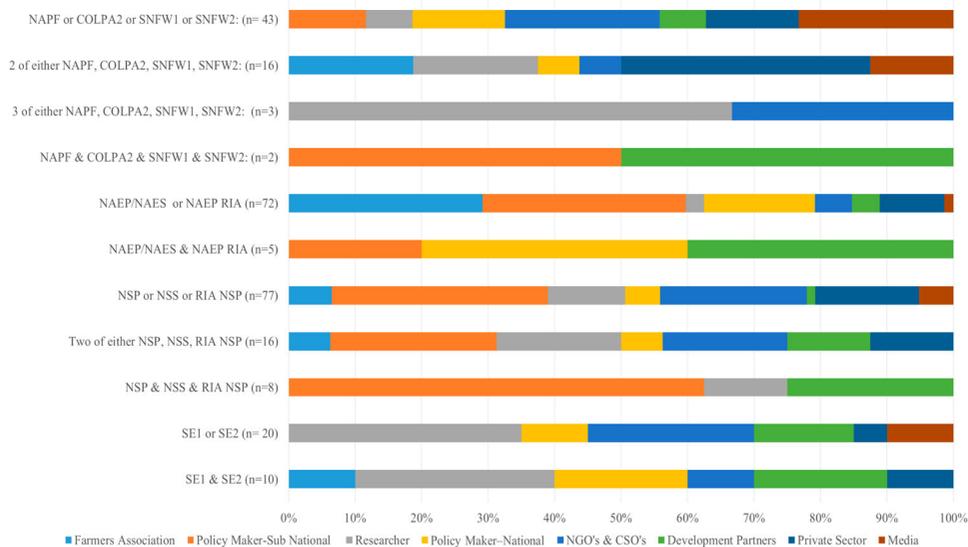


Figure 5. Repeated stakeholder attendance during SCI policy engagements.

scale prior to policy development, qualitative evidence was used to establish a collective understanding amongst stakeholders of policy processes, policy status and challenges and subsequently generate recommendations for further action (Table 1 and Figure 3).

Quantitative evidence provided facts about the magnitude of challenges relevant to SCI during the policy drafting and district planning phases. Data included information on production, the yield gap and constraints to production. Evidence on the value of the yield gap attributed to use of poor quality seed was integrated into the NSP RIA of 2016, and evidence of the contribution of the informal seed sector to Uganda's overall the seed sector into the NSP of 2015. Policy actors at sub-national-level integrated capacity development related to potato seed production and value addition into their district plans while rice sector stakeholders prioritized and integrated extension services on good agronomic practices, improved wetland use and management and promotion of mechanization into their district plans. These district plans were later approved at the sub-national level for public sector investment.

Discussion

Successes: evidence integration and utilization through stakeholder engagement

Several opportunities during policy engagement processes required quick action to develop policies but

also to integrate evidence into the policy design phase. Subjecting policy proposals to stakeholder scrutiny and validation led to opportunities for evidence utilization within the actual policy development.

The initial engagement processes and information sharing resulted in stakeholder demands to recall the NSP from TPM for review and validation. The NSP was integrated with evidence from the Integrated Seed Sector Development Programme (ISSD Uganda) to support the notion of a vibrant and pluralistic seed sector by recognizing seed classes and therefore providing opportunities for a pluralistic seed industry. The revised NSP of 2015 recognized that the informal seed sector was largely farmer supplied and a major contributor to the seed industry. Subsequently, the revised NSP ensured greater recognition to small-holder farmers especially women involved in commercial seed production. Evidence facilitated greater inclusion of the informal seed sector in the seed policy despite observations by seed companies that this informal sector was 'over represented at the expense of the formal seed sector' and regulatory controls over the informal seed sector were required.

Stakeholders' articulated that there was a lack of political will to develop and implement public policy on SCI (PASIC, 2014a). However, increased support to the policy process by MAAIF contributed to the refinement of the policy development processes, stakeholder inclusion, interactions and therefore information flows between stakeholders. The establishment of TWG's, committing human resources including technocrats

Table 1. Stakeholder engagement, application of evidence and outcomes in the policy development process.

Evidentiary sources	Evidence-delivery pathway (Introduction, interpretation and application)	Application of evidentiary sources: contribution to knowledge	Outcomes	How did evidentiary sources lead to outcomes?
Status quo of policy arena relevant to intensification (SE1)				
<ul style="list-style-type: none"> • <i>Qualitative evidence</i> sourced from stakeholders 	<ul style="list-style-type: none"> • Interactions during facilitated workshops, • Stakeholder presentations, • Stakeholder contributions and discussions 	<ul style="list-style-type: none"> • Collective understanding of five key areas for joint collaboration on advocacy, capacity development, stakeholder and policy mapping, knowledge management, evidence to inform policy and advocacy 	<ul style="list-style-type: none"> • Acknowledgment by stakeholders of key areas of policy action, the need for research in policy development, advocacy initiatives and bottlenecks in the policy process 	<ul style="list-style-type: none"> • Collective identification of key challenges in policy development processes in Uganda. • Stakeholders' identification and analysis of five key areas for joint collaboration
Status of policies relevant to intensification (SE2)				
<ul style="list-style-type: none"> • <i>Qualitative evidence</i> sourced from policy makers 	<ul style="list-style-type: none"> • Interactions during facilitated workshops, • Presentations by policy makers, • Stakeholder contributions and discussions 	<ul style="list-style-type: none"> • SCI Policy Analysis: understanding the status of the policies in the policy cycle and the bottlenecks in the policy process 	<ul style="list-style-type: none"> • Charted a way forward for SCI policy development processes which sparked a willingness of stakeholders to develop and validate the NAEP and NSP 	<ul style="list-style-type: none"> • Stakeholder determination of action plans and timelines to advance policies through the policy cycle • Correspondence from Government of Uganda to stakeholders with requests to develop NSP and NAEP
NAEP and NSP RIA validation				
<ul style="list-style-type: none"> • <i>An Economic Appraisal of policies</i> conducted on costs and benefits of policy implementation and policy options (Mwesigye, 2016). • <i>Academic Research</i> evidence co-opted into both RIA documents • <i>Process evidence</i> of stakeholder consultation, numbers participating and emanating issues at macro, meso and micro levels as required by the RIA 	<ul style="list-style-type: none"> • Interactions during facilitated workshops, • Presentations by facilitator/consultant, • Stakeholder contributions and discussions • Behind the scenes co-management of evidence integration in to policy documents and policy development processes 	<ul style="list-style-type: none"> • Multi stakeholder consultations used to support for technical assessment of policies for effectiveness and efficiency 	<ul style="list-style-type: none"> • Increased chances of approval of the NAEP and the NSP proposals by the Top Policy Management of MAAIF • Submission of certificates of financial implications to GoU • NAEP passed (Amia, 2016) • Increased participation of stakeholders in development of the NAEP and NSP • Declaration by Permanent Secretary MAAIF that the ministry would recruit/engage extension staff to implement the NAEP (Amia, 2016) 	<ul style="list-style-type: none"> • Met cabinet requirements for submission of NAEP to TPM and cabinet. • Quotation of evidence in NAEP policy introduction and in NSP RIA documents • Documentation of Thematic working group meetings led by MAAIF that outline next actions • Requests by, and support from, GoU to convene stakeholder meeting to validate RIA for the NSP and NAEP • Received support on need for economic appraisal of policy through Newspaper article by Ladu (2014)

(Continued)

Table 1. Continued.

Evidentiary sources	Evidence-delivery pathway (Introduction, interpretation and application)	Application of evidentiary sources: contribution to knowledge	Outcomes	How did evidentiary sources lead to outcomes?
Evidence dissemination (PASIC, 2016) <ul style="list-style-type: none"> • <i>Academic Research</i> evidence disseminated in national workshops • <i>Research evidence</i> from PASIC multi-level studies 	<ul style="list-style-type: none"> • Interactions during facilitated workshops, • Scientist presentations, at national and sub-national levels • Stakeholder contributions and discussions • Behind the scenes collaboration with sub-national policy makers to integrate research into planning process 	<ul style="list-style-type: none"> • Understanding of the key drivers of intensification in the rice and potato sectors • Understanding of the production and productivity problem with reference to rice and potato sectors 	<ul style="list-style-type: none"> • Evidence integrated into district plans for 3/6 districts • Positive acknowledgements about passage of SCI policies made by the minister of state of agriculture during evidence feedback workshops gave reassurance about imminent changes to the SCI policy arena (NAPF, 2015) 	<ul style="list-style-type: none"> • 3/6 evidence-based DDP's approved by district councils

Source: Amia (2016), Ladu (2014), Mwesigye (2016), NAPF (2015), PASIC (2014a, 2014b, 2014c, 2016).

from cabinet secretariat and providing guidance on cabinet requirements for policy development quickened submission and approval processes of the NAEP. Repeated engagement of researchers ensured an understanding of opportunities where research could be integrated into policy proposals. For example, administrative levels played a critical role in creating opportunities for bottom-up approaches to evidence-based investment planning. Based on sub-national consultation on the extent of the production and productivity problem, meso and micro level stakeholders from three districts developed and integrated interventions into the district plans for public sector investment which could increase production and productivity of rice and potato at the farm level.

Pitfalls: timing of evidence generation, types and delivery

Although the reported 'successes' were rewarding in terms of ability to demonstrate next-user outcomes, policy engagement as a process is challenging. As posited by Schut et al. (2014), we learn that there are difficulties in generating relevant evidence in a short-time 'window' to influence policy design. In our case, public policy on SCI was non-existent in 2013, with exception to a draft NSP. Multi-level data synthesis was completed in 2015/2016, yet the policy development process began in September

2014. Researchers often take months or years to generate their desired evidence while policy actors often have a few days or weeks of 'opportunity' to use this evidence and influence debates. This suggests that rigorous multi-level evidence generation needs to occur prior to rather than concurrently with the policy development process, however, in the absence of quantitative research, 'evidence' from other sources (e.g. systematic reviews and opinion polls) can be used.

Results show a high level of participation during SCI policy dialogue between different policy actors, but lack of repeat attendances to all engagements could have affected the contextualization and evolution of strategic issues. Furthermore, the quality of discussions, including open and free expression, was not documented during SCI policy development. Development partners attended all engagements throughout the SCI policy development agenda and particularly contributed to the discussions on financing aspects of the NSP institutional set-up. In Uganda, development partners finance development activities where national resources are deficient and can influence government decisions (Bategeka et al., 2013). In particular, traditional and non-traditional donors shift their influence between associated changes in agricultural development policy in Uganda (Hickey, 2012).

Also, despite regular attendance by advocacy partners who often produced thought-provoking debates,

they often conducted independent policy consultations and critics on seed legal and policy framework (e.g. SEATINI, 2014). Such actions could culminate in a low impact due to uncoordinated efforts to policy development. A study conducted in South Africa and Uganda found that few CSOs were consistently engaged in public policy processes or made significant differences to policy outcomes (Robinson & Friedman, 2007).

Evidence delivery and contextual factors of policy development

Evidence integration and utilization are an important but not a determinant of policy decisions. Qualitative data on the status of NSP and NAEP were valuable to policy actors who provided a recommendation on further action. However, quantitative data on the production and productivity levels resulted in the development of district development plans approved for public sector investment which would result in increased awareness on improved production practices at the farm level. Data on the cost of the policies and the policy options included in the NSP and NAEP RIA provided evidence to MAAIF TPM and Cabinet for approval. The NAEP was passed in 2016 during the same period in which the two policies were developed and validated. Therefore, one key question we ask is, why has the NSP development process which began over a decade earlier not been passed yet the NAEP development process which began in 2015 was passed in December 2016? A general response could be that internal delays in the stakeholder validated NSP development process occurred due to communication delays on cabinet requirements for the submission seed policy supportive documents (the NSS and RIA for the NSP). These requirements later became eminent during the NAEP development process.

Further analysis shows that a lack of consensus amongst stakeholders with different interests. On the initial TPM approved NSP, civil society actors advanced debates on genetically modified organisms (GMO's) and outlined fears of seed sector influence and penetration by large multi-national companies which they suggested would destroy the diversity and biological diversity of Ugandan food production and undermine farmers intellectual property rights (Ladu, 2014) – however, policy actors referred these discussions to the Plant Genetic Resources for Food and Agriculture policy (PGRFAP) and the National Biotechnology and Biosafety bill. Stakeholders also advanced debates on

QDS that is produced by smallholders which in the opinion of some stakeholders would undermine the formal seed sector. In addition, there were debates on the institutional framework for the NSP which, according to policy-makers, would not be approved by Cabinet. The latter two issues of contention suggest a need for further stakeholder interaction for consensus building and sharing of in-depth evidence on strengths and weakness of different seed systems and the cost of implementing the required institutional framework.

Gaining consensus on a host of institutional issues posed a challenge during policy development. At the time, intra ministerial (MAAIF) opinions intertwined with institutional mandates and the conflict between mandates of new and old departments within the Directorate of Crop Resources (DCR) could have been a challenge to NSP approval. The placement of the proposed Uganda Plant Health and Protection Agency (UPHPA) – a body perceived to be better placed in a higher policy than the NSP by public sector actors but which had high chances of potential for funding by development partners under the auspices of an autonomous or semi-autonomous body. Concerns amongst extension stakeholders were also raised about the establishment of the National Agricultural Promotion Agency (NAPA) which could be a semi-autonomous body. As MoFPED (2006, p. 51) note, in Uganda, semi-autonomous bodies were initially temporary responses to bureaucratic weaknesses but turned into a long-term system for institutional development hence creating islands of efficiency. Kassami (2002) observe that Uganda has 70 semi-autonomous bodies mostly created with development partner support.

Conclusions

Policy processes are often not linear. They can suddenly stagnate, move or divert based on shifting public debates, political and government interests and donor investment. We investigate the notion of using effective engagement processes to create opportunities for evidence integration in policy development processes. We adapt the context-based evidence-based decision-making framework by Dobrow et al. (2004) to integrate evidence at sub-national and national scale to cause policy and planning influence principally at the formulation and legitimation phases of policy development. We analyse the use of engagement methods such as co-management to facilitate co-production of knowledge (Cash et al., 2006).

This study is important to development policy influence in scenarios where (1) mainstream mechanisms of evidence integration are under capacitated to conduct relevant policy research (e.g. systematic reviews, and policy options to inform decisions on policy actions to take and piloting new policies, low influence to policy outcomes by CSO's due to poor coordination), (2) holistic national policy frameworks are non-existent or incomplete, and (3) policy development processes are unknown to stakeholders and the general public and often assume a top down approach and (4) where researchers generate evidence independently of policy making processes. We therefore depict the next best means through which evidence integration can occur at (ex-ante) policy design phase, i.e. through researcher collaboration and close interactions with interdependent stakeholders under Government leadership and oversight.

We confirm that policy-making processes are truly opportunistic due to uncertain and unpredictable environments (Schut et al., 2014). In our case, opportunism emanated from researchers keeping abreast of policy processes, co-management and oversight structure activities to ensure opportunities to enhance evidence integration into policy development. We observe that effective stakeholder engagement through facilitated discussions at different scales and 'setting the stage' is required. However, setting the stage requires a deeper understanding of real-time evidentiary sources and requirements, stakeholder mapping, how to engage stakeholders and what patterns their social networks exhibit as the policy development process evolves.

Further research is required to understand how to effectively and adequately engage and collaborate with advocacy partners to integrate different forms of research with advocacy and lobbying activities and create a wider scope of awareness and how to track the impact of evidence in policy implementation. Diversifying mechanisms for information exchange to ensure free expression is another area for further research (Yami & Van Asten, 2017). However, researchers should be more opportunistic and forthcoming to contribute to the achievement of policy outcomes and should also deal with the syntax, semantics and protocol of policy actors.

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