Journal of Agriculture and Rural Development in the Tropics and Subtropics
Vol. 121 No. 1 (2020) 99–112

https://doi.org/10.17170/kobra-202005281298 ISSN: 2363-6033 (online); 1612-9830 (print) – website: www.jarts.info

Scaling up community-based goat breeding programmes via multi-stakeholder collaboration

Wilson Kaumbata [a,b,*], Helen Nakimbugwe [c], Aynalem Haile [d], Liveness Banda [a], Gábor Mészáros [b], Timothy Gondwe [a], M. J. Woodward-Greene [e], Benjamin D. Rosen [e], Curtis P. Van Tassell [e], Johann Sölkner [b], Maria Wurzinger [b,f]

[a] *Department of Animal Science, Lilongwe University of Agriculture and Natural Resources, Malawi*
[b] *Department of Sustainable Agricultural Systems, BOKU-University of Natural Resources and Life Sciences, Austria*
[c] *Kyambogo University, Uganda*
[d] *International Centre for Research in Dry Areas (ICARDA), Ethiopia*
[e] *United States Department of Agriculture (USDA), USA*
[f] *Centre for Development Research, BOKU-University of Natural Resources and Life Sciences, Austria*

Abstract

Community-based livestock breeding programmes (CBBPs) have emerged as a potential approach to implement sustainable livestock breeding in smallholder systems. In Malawi and Uganda, goat CBBPs were introduced to improve production and productivity of indigenous goats through selective breeding. Scaling up CBBPs have recently received support due to evidence-based results from current implementation and results of CBBPs implemented in other regions of the world. This paper explores strategies for scaling up goat CBBPs in Malawi and Uganda, and documents experiences and lessons learned during implementation of the programme. A number of stakeholders supporting goat-based interventions for improving smallholders' livelihoods exists. This offers an opportunity for different actors to work together by pooling financial resources and technical expertise for establishment and sustainability of goat CBBPs. Scaling up strategies should be an integral part of the pilot design hence dissemination partners need to be engaged during the design and inception stages of the pilot CBBPs. Creation of self-sustaining CBBPs requires early collaborative programme planning, meaningful investment and long-term concerted and coordinated efforts by collaborating partners. Permanently established actors, like government agencies and research and training institutions, are better placed to coordinate such efforts. The overall goal of the scaling up programme should be creation of a financially sustainable system, in which smallholders are able, on their own, to transact and sustain operations of their local breeding institutions using locally generated revenue/ resources. Since CBBP scaling up is a 'learning by doing process', an effective monitoring and evaluation system should be an integral part of the process.

Keywords: community-based institutions, dissemination partners, scaling up strategies, selective breeding, smallholders, stakeholder engagement

1 Introduction

Community-based livestock breeding programmes (CBBPs) have emerged as a viable option to implement livestock breeding in smallholder systems (Ahuya *et al*., 2005; Kahi *et al*., 2005; Peacock, 2008; Gutu *et al*., 2015; Haile *et al*., 2019). Currently, CBBPs are commonly implemented among keepers of small ruminants of local breeds (Mueller *et al*., 2015) in developing countries. CBBPs are distinct in a few important ways: First, farmers in these programmes determine which traits to select for and are trained to incorporate these traits into their breeding practices. Secondly, farmers work together as a group thereby creating a bigger and more diverse flock, and they receive support from scientists/researchers to set up local recording systems to monitor the performance of their animals on the selected traits over a period. Finally, CBBPs

* Corresponding author – wilk18@yahoo.com

Published online: 28 May 2020 – Received: 5 April 2019 – Accepted: 1 May 2020

include substantial interaction between farmers and scientists as they evaluate different breeding options so that decisions on herd management are informed and collaborative (Feed the Future, 2014). More specific and detailed guidelines for designing CBBPs, tailored for small ruminant systems in Africa, and performance of selected CBBPs in developing countries are given by Haile *et al*. (2018) and Mueller *et al*. (2015), respectively.

In the framework of Feed the Future Initiative, funded by the United States Agency for International Development (USAID) and led by United States Department of Agriculture (USDA) in collaboration with the African Goat Improvement Network (AGIN), goat CBBPs were introduced in Mzimba and Nsanje districts in Malawi and in Hoima and Nakapiripirit districts in Uganda in 2014. The goal of the programme was to improve production and productivity of indigenous goats through selective breeding, improved nutrition and animal healthcare. The model integrates scientific and indigenous knowledge where selection of breeding bucks is based on statistical data and farmers' visual appraisals (Gutu *et al*., 2015; Haile *et al*., 2018) of the selected candidates for the predefined traits. Preliminary evaluations of the programme in the two countries show: elimination of 'negative selection' (where fast growing animals are sold out for slaughter leaving inferior ones for breeding), improved average 6-month live weight (average of 16 to 19 kg), increased percentage of kid survival (72 to 89 %), improved twining rates (8.2 to 16.7 %) and improved prices (€ 21.6 to € 30.1) per adult animal (unpublished reports). Elsewhere, similar CBBPs for dairy goats (Mexico and Kenya), sheep (Ethiopia and Peru), Angora goats (Argentina) and local pigs (Vietnam) have shown that not only is the approach effective in genetic improvement, but it builds local capacity and ownership and can be very sustainable given the right level of organisation and support among the participating farmers (Mueller *et al*., 2015; Gutu *et al*., 2015). Hence scaling up the CBBP initiative has recently received strong support because of the evidence-based results which have demonstrated that this participatory model can help smallholder farmers implement and build CBBPs that are sustainable and potentially scalable over time. The purpose of this paper was to explore strategies for scaling up goat CBBPs in Malawi and Uganda, to provide a description of the process and to document challenges encountered and lessons learned for future improvement of similar endeavours. Different definitions and dimensions of scaling up were drawn from literature. The paper concludes by discussing and recommending key requirements that need to be in place for successful scaling up of CBBPs and sustainability of the associated positive impacts to smallholder livestock farmers.

1.1 Definitions and types of scaling up

The World Health Organization (WHO, 2010) defined scaling up as "efforts to increase the impact of a technical solution successfully tested in pilot or experimental projects to benefit more people and to foster policy and programme development on a long term basis". This can be in form of expanding, replicating, adapting and sustaining successful policies, programmes, or projects in a geographic space and over time to reach a greater number of rural and urban poor (Fatunbi *et al*., 2015). In covering a wider geographic area and number of people, Gündel *et al*. (2001) viewed scaling up as having two dimensions; horizontal and vertical. Franzel *et al*. (2004) defined horizontal scaling up as the spread of the successfully tested innovation across geographical areas to benefit more people; while vertical scaling up as being institutional in nature, involving different types of organisations with different functions from farmer groups to extension services, training and research institutions, policymakers, private companies and national and international organisations. In this article, the definition by Franzel *et al*. (2004) was adopted. For simplicity, the term 'scaling up' has been used throughout the text to refer to both horizontal and vertical scaling up. A specific term (horizontal scaling up or vertical scaling up) is used where special emphasis is needed. It must be noted however that horizontal and vertical scaling up often take place simultaneously. In practice, involving more beneficiaries is often associated with involving more organisations and broadening functional objectives. Hence, success in scaling up rests on finding a good balance between horizontal and vertical approaches and a continuous evolution of the combination (Jacobs & Ubels, 2016).

2 Materials and methods

2.1 CBBP and the scaling up strategy

The introduction of goat CBBPs in Malawi and Uganda led to the establishment of two pilot CBBP sites in each country, hence increasing the number of CBBP sites and number of participating farmers was the first target. The CBBP model was subjected to a three-step Scaling Scan (PPPLab, 2018), a practical tool to determine scalability of innovations/models. Step 1 involved construction of the scaling up ambition (Figure 1) followed by a system and responsibility check. The system and responsibility check is an analysis of the potential changes that could be brought by scaling up the model which might have implications (both positive and negative) on society and the environment. Step 2 involved an analysis of the attributes of the model and the external factors that determine the potential for scalability of

the model. The factors are referred as 'scaling up ingredients' and are listed in Figure 1. Step 3 involved analysis of key potential challenges which could negatively affect the realisation of the scaling up targets.

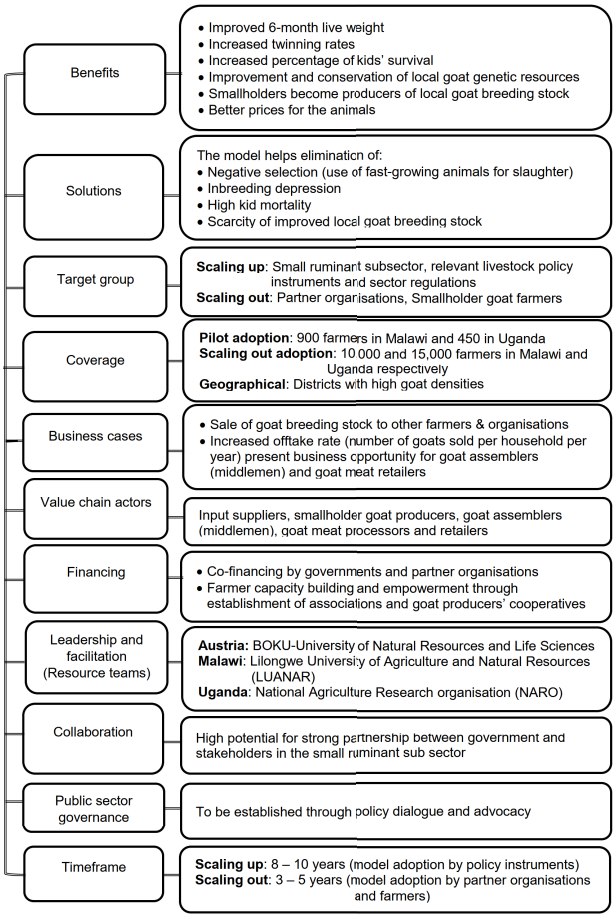

Fig. 1: *The goat community-based breeding programme (CBBP) scaling up ambition.*

The results of the Scaling Scan and the nature of the goat CBBPs demonstrated that the CBBP model could potentially be scaled by integrating the model into similar programmes and projects run by other organisations. This necessitated identification and establishment of partnerships with relevant stakeholders in the small ruminant subsector for the goat CBBP scaling up process in the two countries.

2.2 Stakeholders identification and engagement in Malawi and Uganda

The Rapid Appraisal of Agricultural Knowledge Systems (RAAKS) analytical tool (Engel & Salomon, 2002) was used for identification and selection of relevant key partners for the goat CBBP scaling up process. The processes were facilitated by the CBBP resource teams in both countries (9 team members in Malawi and 7 members in Uganda). The resource teams were composed of pilot project members and other co-opted individuals from livestock research and extension systems involved in pilot project implementation. In Malawi, the work was implemented from July to September 2017 and in Uganda, from February to April 2018. It involved consultations with potential partners and a series of resource team meetings for execution of the Scaling Scan and the RAAKS analytical tools. Three meetings were conducted in Malawi and five meetings in Uganda. The number of meetings varied with location (distances) and number of identified partners. The stakeholder ranking matrix (Morris & Baddache, 2012) was adapted and used to rank the partners/ stakeholders. The partners were ranked on a subjective, but relative ordinal scale of 0 – 3. A score of 3 denotes a very important stakeholder with respect to potential for contributing to successful scaling up, and a score of 0 means unimportant stakeholder. The stakeholders were assessed on the following parameters: Relevance, expertise, sustainability, resource mobilisation, coordination/collaboration and influence. The specific range of the mean scores and corresponding interpretations are given in Table 1, while Table 2 provides a detailed description of the parameters.

The scoring process was done by assessing stakeholders' potential for contributing to a specific parameter in relation to scaling up the goat CBBPs. The assessment was done through a debate and consensus for joint score, conducted by the resource teams. The non-parametric Wilcoxon rank-sum test (Wilcoxon Mann-Whiney U-test) was performed using SAS version 9.4 (SAS Institute, 2012) for pairwise comparisons of stakeholders and to determine significant differences regarding potential contributions to successful scaling up of goat CBBPs. The stakeholder selection and ranking were followed by stakeholder mapping and engagement. The stakeholder mapping involved personal interviews with 27 selected stakeholders (12 from Malawi and 15 from Uganda) to validate the parameters detailed in Table 2 and to identify specific goat production/research related projects/programmes and understand their goals and objectives. The interviews also assessed the stakeholders' perspectives concerning CBPPs and helped development of stakeholder management strategies. A semi-structured questionnaire was used to capture data for the parameters. Stakeholder con-

Table 1: *Parameters on which potential stakeholders were assessed and interpretation of the mean score range.*

	Potential stakeholders (scores)			
Parameters	*A*	*B*	*C*	*D*
Vertical scaling up				
Relevance				
Expertise				
Sustainability				
Resource mobilisation				
Coordination				
Influence				
Category mean scores				
Horizontal scaling up				
Relevance				
Expertise				
Sustainability				
Resource mobilisation				
Coordination				
Influence				
Category mean scores				
Overall mean scores range	0–0.9	1.0–1.9	2.0–2.4	2.5–3.0
Mean score interpretation	Un-important	Slightly important	Important	Very important

Table 2: *Parameter description.*

Parameter	*Description*
Relevance	Relevance of stakeholder/ partner organisation to goat CBBP e.g. involvement of indigenous goat production in their programmes/projects for livelihoods improvement of smallholder farmers
Expertise	Availability of personnel with skills and technical expertise instrumental for implementing goat CBBPs
Sustainability	Availability of the partner organisation for long-term facilitation and potential to support and/ or implement CBBPs and empower target communities for sustainability of the programme
Resource mobilisation	Capacity of the partner organisation to mobilize financial and materials resources to support CBBPs
Coordination & collaboration	Capacity of the partner organisation to coordinate scaling up activities and collaborate with other partners
Influence	Potential for the partner organisation to positively influence other organisations for action in CBBPs scaling up process

sultative workshops (one workshop in each country) were then conducted to facilitate stakeholder engagement and action planning. The workshops were designed to achieve the following:

- Bring awareness of the potential and achievements of CBBPs in the current pilot projects and from previous projects implementation.
- Jointly determine how CBBP can fit into the stakeholders' existing rural livelihoods improvement programmes.
- Collectively identify specific potential sites for scaling out the programme.
- Jointly evaluate and improve the goat CBBP scaling up ambition (Figure 1).

The workshops also provided a platform to get feedback from the partner organisations on the best approaches for scaling up the programme, earmark areas of possible improvements and participatory analysis of potential challenges associated with the scaling up process and development of possible solutions. During the workshops, participants were randomly divided into three groups to undertake an in-depth discussion of these issues and this was followed by group presentations and plenary discussion. The consultative workshops were then followed by special follow-up meetings to get and consolidate specific action plans for integrating the goat CBBPs into the identified projects and programmes from the stakeholders who expressed commitment to support and take up implementation of goat CBBPs. Interviews with smallholder goat farmers were conducted by the resource teams in selected potential sites (for CBBP horizontal scaling up) identified by stakeholders during the workshops. Local veterinary officers proficient in the local language in respective sites were recruited as interviewers. A semi structured questionnaire was used to capture data. A total of 278 goat farmers in Malawi and 197 in Uganda were interviewed. A snowball sampling method was used to identify the respondents. The interviews were designed to assess farmer's perceptions and willingness for participation in the programme and to understand a number of demographic, technical, socio-economic and socio-cultural, environmental and production system parameters. Although this was not the main focus of the study, the information obtained was instrumental in adapting CBBPs implementation to suit the prevailing production systems and situations existing in different areas in the two countries.

3 Results

3.1 Stakeholder characterisation, selection and ranking

Figure 2 shows types of stakeholders identified for the goat CBBP scaling up process in both countries. Results of

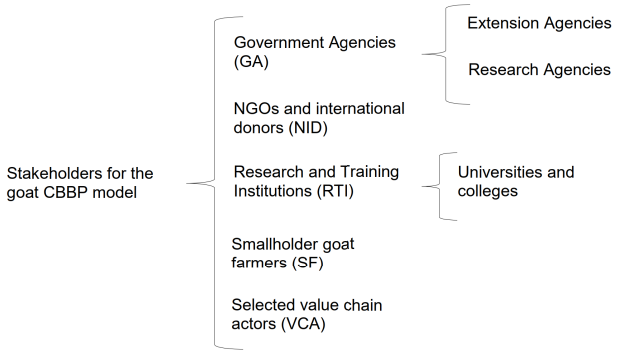

Fig. 2: *Stakeholders identified for scaling up the community-based goat breeding programme.*

pairwise comparisons of stakeholders on parameter scores used to rank stakeholders in Malawi and Uganda are given in Table 3. As described in Table 1, an overall mean score of 2.5–3.0 means that the stakeholder has great potential for significant contribution to successful scaling up and sustainability of the goat CBBPs, while a score of 0–0.9 denotes insignificant contribution. Stakeholders were significantly different (Malawi $p < 0.0166$; Uganda $p < 0.0107$) regarding potential contribution to specific parameters important for goat CBBPs scaling up process. Government agencies and research and training institutions received the highest mean scores followed by smallholder farmers and NGOs and international donors, reflecting the potential contribution of these stakeholders for establishment and sustainability of the goat CBBPs.

Although there were minor variations for individual parameter scores between the two countries, the overall scores generally showed similar results for the two countries. The ranking was instrumental for determining the level of attention during the engagement process and development of stakeholder management strategies. Table 4 gives detailed information on the roles and relevance of each stakeholder, their development agendas, proposed management strategies and expected responsibilities in CBBP scaling up process. Figure 3 shows a common cross-cutting agenda shared by all key stakeholders which is also the overall goal for the goat CBBP model.

Table 3: *Pairwise comparisons of stakeholders on parameter scores instrumental for scaling up goat CBBP in Malawi and Uganda.*

Item	*Malawi*		*Uganda*	
	P-value	*Sign.*	*P-value*	*Sign.*
Global hypothesis (H0)	0.0166	*	0.0107	*
Pairwise comparisons				
GA[1] – NID[2]	0.0094	*	0.1131	n.s.
NID – RTI[3]	0.0157	*	0.0146	*
VCA[4] – RTI	0.0164	*	0.0023	*
GA – VCA	0.0164	*	0.0131	*
GA – SF[5]	0.2291	n.s.	0.2535	n.s.
RTI – SF	0.2291	n.s.	0.0325	*
NID – SF	0.2835	n.s.	0.8151	n.s.
VCA – SF	0.2156	n.s.	0.1938	n.s.
NID – VCA	0.5760	n.s.	0.1959	n.s.
GA – RTI	0.9520	n.s.	0.1482	n.s.

Mean scores[6]	*GA*	*NID*	*VCA*	*RTI*	*SF*
Malawi	2.92^{a}	2.00^{b}	1.50^{b}	2.83^{a}	2.25^{ab}
Uganda	2.83^{ac}	2.08^{ab}	1.33^{b}	3.00^{c}	2.17^{ab}

[1] Government Agencies; [2] NGOs and International Donors; [3] Research and Training Institutions; [4] Value Chain Actors; [5] Smallholder Farmers
*Significance at $p < 0.05$; n.s. = non-significance
^{abc} Means with different superscripts within a row are significantly different at $p < 0.05$
[6] An average score of 0 – 0.9, 1.0 – 1.9, 2.0 – 2.4 and 2.5 – 3.0 means unimportant, slightly important, important and very important stakeholder, respectively.

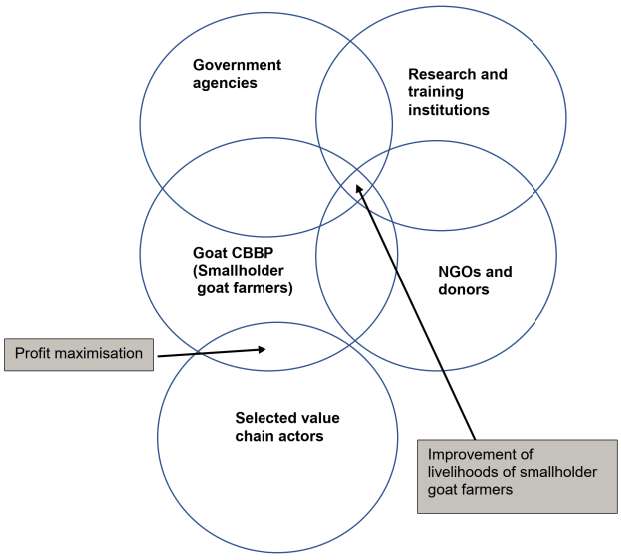

Fig. 3: *The common cross-cutting agenda for CBBP collaborating partners and the CBBPs model*

Table 4: *Mapping and characterisation of stakeholders in the small ruminant sub-sector in Malawi and Uganda.*

Name of stakeholder	*Stake in scaling up CBBPs*	*Why are they critical in scaling up CBBPs*	*Major development agenda (interests and objectives)*	*Stakeholder management Strategy (motivation to participate)*	*Responsibilities*
Goat producers/ farmers	• Owners of the goat genetic resource	• CBBPs not possible without their participation	• Improved livelihoods • Recognition of socio-economic and cultural use of goats	• Clear benefits of CBBPs • Capacity building • Ownership • Regular support	• Management of animals • Cooperate with scientists and facilitators • Management of farmer organisations (cooperatives and associations)
Government (Livestock research and extension support system)	• Livestock technology development • Provision of livestock extension services	• Programme implementation and institutionalisation • Programme sustainability	• Improved livelihoods of livestock farmers • Ensure a nation self-sufficient in safe animal products • Promotion of climate resilient animal production	• Clear benefits of CBBPs • Harmony with existing government policy/ development agenda • Early programme involvement • Capacity building • Conservation of AnGR	• Adopting and supporting scaling up CBBPs • CBBP integration into policy and programmes • Farmer capacity building
Research and training institutions	• Data management and feedback • Capacity building	• Have necessary capacity for data management, analysis and feedback	• Capacity building • Livelihoods improvement through outreach and on-farm research	• Availability of researchable areas in CBBPs • Availability of student research funds in the programme • Availability of conducive working environment for students	• Technology development for efficiency in product generation and marketing • Capacity building • Data management, analysis and feedback
NGOs/donors	• Provision of extension services, material and financial support	• Have the necessary capacity for resource mobilisation	• Improved livelihoods of smallholder farmers	• Clear benefits of CBBPs • Harmony with their development agenda • Access and use of information generated from the programme	• Material and financial support • Linking farmers to potential markets • Provision of extension services
Private sector (selected value chain actors)	• Provision of services • Potential market	• Provision of various services • Potential market	• Profit maximisation	• Availability of attractive business cases in CBBPs	• Service provision • Provision of market for the products

3.2 Stakeholder engagement and action planning

In both countries the consultative workshops were attended by representatives of the following organisations: government agencies, research and training institutions, NGOs and international donors (Table 5).

Table 5: *Number of stakeholders who turned up for the consultative workshops.*

Type of stakeholder	*Number of stakeholders*		
	Malawi	*Uganda*	*Total*
Government agencies	12	7	19
Research and training institutions	1	3	4
NGOs	1	4	5
International donors	0	1	1
Total	14	15	29

Although the workshops were well patronized, the turnup of stakeholders particularly from the NGOs sector in Malawi was below expectation relative to the list of invited potential organisations (1 turned up out of 9 invited potential NGOs). Later it was found that this was due to lack of involvement during pilot activities implementation. During the workshop, stakeholders recommended the establishment of a special CBBP taskforce to spearhead important tasks in the vertical scaling up process and to act as a steering committee for the whole process. Some partner organisations were therefore nominated to be members of the taskforce to facilitate policy dialogue with relevant government agencies. The nominations were conducted by participants of the stakeholder workshop guided by the results of stakeholder characterisation and ranking. For sustainability of the CBBPs, stakeholders recommended implementation of the following strategies:

- Integration of the CBBP model into government's small ruminant development programmes in the two countries (90 % of the stakeholders).
- Capacity building and empowerment of the targeted beneficiaries along with establishment of community-based institutions (associations and cooperative) (100 % of the stakeholders).
- Establishment of a reliable and sustainable financing mechanism for the scaling up process (100 % of the stakeholders).
- Continuous mobilisation and engagement of new partners to leverage additional technical capacity and resources to further pursue the scaling up agenda (80 % of the stakeholders).

Hence regular workshops were recommended to be an integral part of the process. Regular meetings will be an important monitoring and evaluation platform for reviewing implementation progress, share experiences, lessons, challenges, and possible solutions. February and September every year were earmarked for annual review workshops for Uganda and Malawi, respectively. Several partner organisations committed to adopt the goat CBBP by integrating the model into their rural livelihoods improvement programmes. They included: CARITAS-Uganda, Iowa State University-Uganda Programme, and three climate resilient programmes funded by FAO-Uganda and implemented by Makerere University, the National Agriculture Research Organisation (NARO) and the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). In Malawi four programmes coordinated by the Ministry of Agriculture were earmarked for integration of the CBBP model (Table 6). Only projects/ programmes which were at inception stage were targeted for incorporation of CBBP to allow smooth budgetary integration. Action plans detailing the integration processes were drawn. These included specific tasks relating to the process of setting up goat CBBPs (farmer sensitisation and mobilisation and capacity building, identification of the breeding population which involves tagging of all animals under the programme, recruitment and training of enumerators and data entry clerks, etc.). Expected outputs for each task, responsible organisations and the timeframe when the tasks were expected to be completed were drawn (Table 6). However, long and bureaucratic project logistics associated with project inceptions delayed the commencement of the integration processes. In some cases, the integration processes were postponed to subsequent new programmes so that CBBPs are incorporated in the designing stage of the new programmes. Personnel transfers (transfers of contact resource persons to different offices) through promotions and retirements affected progress of the integration processes particularly for projects in government agencies in Malawi. Inadequate availability of facilitation funds during implementation of initial CBBP integration activities also affected progress in both countries. Therefore, a special funding was requested from the donor (USDA), funding pilot CBBPs to fast-track implementation of integration activities in the two countries.

Table 6: *Potential projects for incorporating CBBPs and expected output for the integration processes.*

Country	*Project*	*Brief project description*	*scaling out sites (districts)*	*Action Plans*		
				Expected outputs	*Responsibility*	*Timeframe*
Malawi	Sustainable Agricultural Production Programme (SAPP)	Promotes crop/ livestock integration for sustainable food production	Neno	Farmers trained, base population identified, recording system in place etc.	Blantyre ADD[1]	By June 2019
	Malawi Drought Recovery and Resilient Programme (MDRRP)	Strengthens livelihoods of farmers in drought/ floods prone areas	Chikwawa	Farmers trained, base population identified, recording system in place etc.	Blantyre ADD	By April 2019
	Small ruminant Improvement Research	Programme to improve productivity of small ruminants	Salima	Farmers trained, base population identified, recording system in place etc.	Chitara Research Station	By April 2019
	Presidential Initiative for Small Stock Programme (PISSP)	Enhance ownership of livestock through "pass-on the gift" initiative	Mzimba	Farmers trained, base population identified, recording system in place etc.	Mzuzu ADD	By March 2019
Uganda	Sustainable Rural Livelihoods-Uganda Programme	Enhance food and nutrition security	Namasagali Bugulumbya	Farmers trained, base population identified, recording system in place etc.	Iowa State University Uganda Programme	By April 2019
	Hoima Sustainable Agricultural Programme	Promote food production and sustainable agriculture	Hoima	Farmers trained, base population identified, recording system in place etc.	CARITAS-Hoima	By June 2019
	Regional Pastoral Livelihoods Resilient Programme.	Improve livelihoods among the pastoralists	Napak Nakapiripirit	Farmers trained, base population identified, recording system in place etc.	MAAIF[2] and NARO[3]	By April 2018
	(GCCA+) – Scaling up Agriculture adaptation to climate change in Uganda	Improve income and climate resilient livelihoods in a gender-responsive manner	Sembabule	Farmers trained, base population identified, recording system in place etc.	NARO and Makerere University-CAES[4]	As soon as possible
	Agricultural Climate Resilience Enhancement Initiative (FAO and WMO)	Strengthens capacity for resilient livelihoods of smallholder farmers	Isingiro	Farmers trained, base population identified, recording system in place	NARO	As soon as possible

[1]Agricultural Development Division; [2]Ministry of Agriculture, Animal Industry and Fisheries; [3]National Agricultural Research Organisation; [4]College of Agriculture and Environmental Sciences

4 Discussion

The existence of stakeholders promoting and supporting indigenous goat production and research in the small ruminant subsector in both Malawi and Uganda, offers an opportunity for different actors to work together by pooling financial resources and technical expertise for the establishment and sustainability of goat CBBPs. It was noted during the study that there were numerous projects and programmes facilitated by government agencies, NGOs, research and training institutions, international donors and faith-based organisations with an overarching goal of enhancing smallholders' livelihoods using goat-based interventions. This was an opportune prospect to bring the goat CBBP to scale by integrating the CBBP model into such programmes. Therefore, the goat CBBP scaling up efforts were initiated to incorporate the CBBP model into these projects/programmes as a means of adding value to the programmes and spreading the benefits of CBBPs to more communities while spreading the costs to more organisations.

4.1 Engaging the right partners

Success in this endeavour necessitated the identification of dissemination partners and establishment of effective partnership between the stakeholders in the small ruminant subsector. Partnerships are an important strategy to bring innovations to scale, as they combine the competencies of different actors to address difficult development issues, create breakthroughs, and combine different types of financing to create and sustain solutions (Jacobs & Ubels, 2016). CBBP like any livestock breeding programme requires meaningful investment (Haile *et al*., 2019) and long-term concerted and coordinated efforts by collaborating partners. Permanently established actors, like government agencies and research and training institutions, are better placed to coordinate such efforts. Although NGOs and donors are vital partners to provide financial resources and other technical backstopping, their support are usually limited by projects/ programmes' timeframe. Hence, stakeholder analysis and ranking were instrumental in identification and recruitment of relevant partners to provide context-specific technical knowledge, influence and marketing-related needs. This was reinforced by bringing together partners which shared a common goal with the goat CBBP model. It was envisaged that such alignment will underpin and drive the partnering endeavour forward, create synergy and engagement, and foster the emergence of collective efforts (PPPLab , 2018). The results were primarily visible during the stakeholder engagement workshops and follow-up action planning meetings. Government agencies, research and training institutions and development partners in both countries acknowledged the need for collective and concerted efforts to pool financial resources and technical capacities for the improvement and conservation of the local goat genetic resources through goat CBBPs in the two countries and in Africa as a whole. This is because animal genetic diversity is critical for sustainable food and nutrition security, poverty reduction and rural development (AU-IBAR, 2019). Therefore, given the potential for significant future changes brought by climate change in production conditions and in the objectives of livestock production, it is essential that the options value provided by the local goat genetic diversity be secured (Hoffmann, 2010). Stakeholders therefore reiterated the need for more awareness campaigns to create demand for the model and mobilize more partners to leverage financial resources and technical capacity for the scaling up process. Smallholder goat farmers in the scaling up sites also expressed willingness to participate in the goat CBBPs for improved performance of their animals.

4.2 Scaling up requires early engagement of dissemination partners

Stakeholders noted that the scaling up efforts by the CBBP resource teams were ill-timed. Such efforts were required to commence right from the inception of the pilot projects which had not been the case with the pilot goat CBBPs in both countries. This could be a contributing factor to the low turn-up of potential NGOs in Malawi during the workshop and the challenges experienced during integration of CBBPs into partners' programmes. Scaling up requires that potential dissemination partners and other stakeholders be sensitized, mobilized and engaged during inception of the pilot implementation process (Gündel *et al*., 2001; Hartmann & Linn, 2007; Wigboldus *et al*., 2016). Just as creating programme ownership and sustainability requires early and full involvement of farmers in the research process (Wurzinger *et al*., 2011), dissemination partners also require involvement during pilot implementation for them to support its subsequent scaling up. Engagement during pilot inception helps dissemination partners to be conversant with the model's implementation requirements and to see the model's practical field performance in terms of generation of benefits and potential challenges (WHO, 2011). It is therefore imperative to ensure collaborative development of scaling up strategies during the design and inception phases of pilot development/ research projects (Hartmann & Linn, 2007; Wigboldus *et al*., 2016) and reinforce a continuous and collective refinement of the strategies based on experiences and lessons learned throughout the pilot implementation process. The strategies should include but are not limited to: Identification of the right target groups, early engagement of policy makers and engagement of key dissemination partners

(WHO, 2011). An assessment should however be conducted to determine the feasibility and cost effectiveness of engaging potential dissemination partners and policy makers during pilot implementation phase (UNDP, 2013; Zomahoun *et al*., 2019).

4.3 Scaling up requires a clear financing strategy

The challenges experienced during the CBBP integration process (inadequate and unavailability of funds leading to delays in rolling out the integration processes) suggest that development of the financing strategies for scaling up process had not been adequately addressed. Integration of the cost of CBBPs into existing programmes entailed significant budgetary modification and realignment of the implementation timeframe. Hence the processes took substantial time to commence especially in donor funded programmes which usually are accompanied by fixed budgetary regulations or require long bureaucratic process to effect budgetary revisions. As mentioned earlier this approach requires early (during pilot inception) and collaborative development of financing plan for the scaling up process. The PPPLab (2016) noted that joint development of financing strategy is one of the critical factors that determine scaling up success and model sustainability. Hence when planning for CBBP model scaling up, three important financing strategies need to be considered. 1) Strategies for financing the scaling up process, 2) an assessment and improvement of financial services to support vulnerable value chain actors (smallholder farmers) and 3) a clear financial sustainability strategy after external support is phased out. A medium- or long-term financial commitment from donors or government is required to finance CBBP scaling up process (Haile *et al*., 2018; Haile *et al*., 2019). Non-negotiable short-term financing or 'pet' donor projects should be avoided (Wurzinger *et al*., 2011; UNDP, 2013). Recently, co-financing has become common for projects/ programmes requiring long-term investments. Two or more collaborating partners can agree to co-finance a model concurrently, or a phased financing strategy can be agreed where organisations commit to provide financial support at different time periods of the model's implementation timeframe. The collaboration and networking among various development agencies, should be maintained sufficiently long enough to allow the breeding programme to incubate and reach a sustainable stage (Haile *et al*., 2018; UNDP, 2013). However, such long-term agreements require affirmative actions in terms of participatory programme planning and signing of written agreements detailing the funding modalities (UNDP, 2009).

Access to formal financial services for small ruminant farmers in rural areas in most developing countries is a challenge because commercial banks do not consider them as viable clients (Miller *et al*., 2012) or the service centres are located very far away from their communities. In the pilot goat CBBPs, a provision for establishment of village saving and credit scheme (VSCS) was included in the project design. This has been instrumental for enhancing access to credit at affordable interest rates and other financial services for goat producers in the programme. Such arrangements should be extended to the scaled programme. Community animal health workers (CAHWs) and goat assemblers (middlemen) can access credit from such facility to expand their veterinary services and goat businesses, respectively. Another option is to collaborate with an existing microfinance institution in an area for provision of services to people who are investing in small ruminants production (Miller *et al*., 2012). It is important to lay-down concrete plans on how recurrent costs of the programme and the breeding cooperative's activities will be financed after donor/government financing is phased out. The following options, or combination of these, could be considered: assisting the cooperatives to acquire reliable income generating assets, introducing value-added fee on sold products or negotiating for government subsidy and/or any other strategy that will guarantee sustainable revenue generation. It is essential to realize that the overall vision for the whole programme should be to create a financially sustainable system in which smallholders are able to transact and sustain activities of their breeding cooperatives using internally generated revenues. Participation of the private sector, e.g. establishment of small ruminant abattoirs, participation of processors and retailers of small ruminant products can boost incomes of smallholders contributing to sustainability of smallholder breeding programmes. For this to materialize, initial long-term investments and government incentives are essential. Such incentives could include, but are not limited to: tax exemption on inputs for specific period, access to credit facilities and land (Haile *et al*., 2019).

4.4 Scaling up requires creation of an enabling environment

Establishment of the special CBBP taskforces during the stakeholder workshops was to facilitate dialogue with government decision makers to lobby for integration of the CBBP model into relevant government policy instruments and sector programmes. This was an important move considering that enabling policies are crucial to bring operations to scale and require special emphasis, as non-conducive policies may significantly hinder project performance and scaling out efforts (Hartmann & Linn, 2007; Ajayi *et al*., 2018). Raussen *et al*. (2001) argued that poli-

cymakers, at both local and national levels, are often an untapped vital resource in scaling up efforts. Hence deliberate efforts must be made at an early stage to facilitate development of policy incentives that may help promote adoption, and policy makers should be engaged to promote or even finance scaling up activities. Therefore, Franzel *et al*. (2004) highlighted the importance of policy research and dialogue to create a better enabling policy environment for successful scaling up natural resource management innovations/ models. The special CBBP taskforces were therefore set up to facilitate and catalyse policy change through collaborative and formal dialogue with important policy and decision makers at local, regional and national levels in the two countries. For comparison, in Ethiopia this process was successfully accomplished and the sheep CBBP model has been integrated into the Ethiopian National Livestock Master Plan (Shapiro *et al*., 2015).

Capacity building of the targeted beneficiaries and establishment of functional community-based institutions (associations and cooperatives) in goat CBBP sites was one of the strategies recommended by the stakeholders as a step of building sustainable CBBPs. It was emphasized during the stakeholder workshops that establishment and operationalisation of such institutions should be given priority and special efforts should be made to ensure that activities related to such an output are implemented within the project's timeframe. Lessons from pilot and scaled sheep CBBPs in Ethiopia and elsewhere, demonstrated that community-based institutions (CBIs) are instrumental for success of rural livelihoods improvement programmes and sustainability of the benefits associated with such initiatives (Kahi *et al*., 2005; Kosgey *et al*., 2006; Wurzinger *et al*., 2011). Gutu *et al*. (2015) observed that overall performance of sheep CBBPs in regions where cooperatives were established were much better than those in regions where there were no cooperatives. In Malawi and Uganda similar community-based institutions are still under development in both pilot and scaled goat CBBPs. Functional CBIs have the potential to enhance business cases in the goat CBBP model and making the CBBP more attractive to potential users, policymakers and other development practitioners for increased adoption, support and sustainability of the model (Mueller *et al*., 2015; Haile *et al*., 2019). Special efforts must therefore be made by the partner organisations participating in scaling out goat CBBPs to ensure that the CBIs are successfully established and operationalized in all the targeted sites. CBIs are instrumental for empowering rural farmers to effectively participate in animal products value chains (Miller *et al*., 2012) and are a foundation for local communities to lobby for their interests and consolidate their bargaining power. The Vulnerability and Adaptability Programme (2009) noted that in developing countries, it is often very difficult for smallholder farmers to engage in either new or existing value chains in a manner that will benefit them. Even if demand is high, such vulnerable farmers first need to have their capacity built in production, business skills and entrepreneurship to develop their activities to an enterprise level that will equip them to engage in the value chain in a meaningful manner (IFAD, 2013; Heifer Project International, 2013). Such capacity empowerment can best be nurtured under strong and functional CBIs. Therefore, investment in this regard, to facilitate institutionalisation of CBIs in CBBPs, is indispensable. However, establishment of such functional institutions in a typical rural setting require an efficient extension service to provide continuous technical support and usually takes substantial time which in most cases fall outside projects' funding timeframe (Mueller *et al*., 2015; Haile *et al*., 2018). Therefore, sustainability strategies outside the timeframe of external support should be put in place until such a time when the CBIs are independent and self-sustaining. This is an important area where governments in collaboration with partner organisations involved in goat CBBP scaling up should commit adequate resources to support the institutionalisation process beyond the programme's external support. In the pilot goat CBBPs in Malawi and Uganda, extension officers have been instrumental in facilitating implementation of the project. Besides provision of animal healthcare services, they have been a useful link between farmers and researchers and for facilitating farmers' capacity building through technical and leadership trainings, farmer to farmer learning through exchange visits, on-farm demonstrations, field days and agricultural/ animal shows. During the interviews with smallholder goat farmers in the new sites for horizontal scaling up of goat CBBPs, extension officers were recruited as interviewers and will continue to work hand in hand with researchers for the scaling up programme. However, improvements need to be made on reducing the area covered by one extension officer (particularly in Uganda) by recruiting more officers. The CBBP taskforce was mandated to initiate dialogue with relevant authorities (Ministry of Agriculture) on how to provide the solution for the challenge.

4.5 Scaling up require monitoring and evaluation

Effective monitoring and evaluation is a critical component of an effective scaling up process (Brizzi & Mangiafico, 2014). However, monitoring and evaluation of scaling up processes differs from monitoring and evaluating results of pilot CBBPs. A scaling up monitoring system needs to monitor the scaling up intermediate goals, rather than

the defined CBBP project outputs and outcomes. Monitoring and evaluation of the pilot programme assesses whether the tested model has been successful, and lessons of what worked and did not work, have been established while monitoring system for the scaling up process provides feedback on whether right conditions and enabling environments for scaling up are being created for scaling up to succeed, and whether the programme will be sustainable (Hartmann & Linn, 2008). The special CBBP scaling up taskforces were set up and mandated to facilitate and carry out regular monitoring and evaluation of CBBP scaling up progress. Specifically, the taskforces in collaboration with the resource teams in the two countries were responsible for monitoring whether prerequisite requirements for scaling up (adoption of the CBBP model by dissemination partners, progress and challenges of the integration process, dialogue with government agencies for integration of CBBP with relevant programmes and legal frameworks, establishment and capacitation of CBIs etc.) are being created to permit the scaling up efforts to proceed as planned; and if not, to identify possible causes and take necessary remedial actions. WHO (2010) recommended that while scaling up goals and objectives need to be kept fixed, the scaling up processes should be implemented with a 'learning by doing' culture/ attitude, one that values adaptation, flexibility and openness to change. Therefore, the goat CBBP scaling up monitoring system was designed to capture important feedbacks from processes, dissemination partners, beneficiaries, communities and field-based staff. These were to be discussed collectively and regularly so that learning and adjustments can take place. February and September every year, were set for annual review workshops where among other things special monitoring and evaluation reports were to be presented and discussed.

5 Conclusions

The existence of stakeholders promoting and supporting indigenous goat production and research in the small ruminant subsector in both Malawi and Uganda, offers an opportunity for different actors to work together by pooling financial resources and technical expertise for the establishment and sustainability of goat CBBPs. Scaling up strategies should be an essential component of the pilot design. Engagement of potential dissemination partners during the design and inception of the pilot project will enhance smooth adoption and integration of goat CBBPs into the partners' programmes. To facilitate creation of self-sustaining community-based breeding institutions, meaningful investment in time and other resources are required to build smallholders' capacity, and to develop or strengthen local breeding institutions. Investments in institutional/policy reforms, early collaborative programme planning and long-term, concerted and coordinated efforts by collaborating partners are essential. Permanently established actors, like government agencies and research and training institutions, are better placed to coordinate such efforts. Although NGOs and donors are potential partners to provide financial resources and other technical backstopping, their support are usually limited by projects/ programmes timeframe. The overall goal of the scaling up programme should be the creation of a financially sustainable system, in which smallholders are able, on their own, to transact and sustain the operations of their local breeding institutions using locally generated revenue/ resources. Since the CBBP scaling up is a 'learning by doing process', an effective monitoring and evaluation system should be an integral part of the process. The monitoring and evaluation system should encourage feedback from beneficiaries/ communities and field-based staff for the learning and adjustments to take place.

Acknowledgements

This work was done with funding from the Feed the Future Project: Improving Livestock Productivity through Enhanced Breeding Programmes (Agricultural Research Service/USDA Project No.:8042-31000-001-02S). All financial and technical supports are gratefully acknowledged.

Conflict of interest

The authors declare that they have no conflict of interest.

References

Ahuya, C. O., Okeyo, A. M. & Peacock, C. (2005). Developmental challenges and opportunities in the goat industry: The Kenyan experience. *Small Ruminant Research*, 60 (2005), 197—206. DOI: 10.1016/j.smallrumres.2005.06.013

Ajayi, T., Fatunbi, O. & Akinbamijo, Y. (2018). Strategies for Scaling Agricultural Technologies in Africa. Accra Ghana: Forum for Agricultural Research in Africa (FARA).

AU-IBAR (2019). The State of Farm Animal Genetic Resources in Africa. AU-IBAR publication.

Brizzi, A. & Mangiafico M. (2014). Scaling up results. Available online: https://www.ifad.org/documents/10180/3b9385c2-242f-492f-bed4-f33bc4d777ee. Last accessed: 22.05.2020.

Engel, P. G. H. & Salomon, M. L. (2002). Networking for innovation: A participatory actor-oriented methodology. Royal Tropical Institute, The Netherlands.

Fatunbi, A. O., Ajayi, M.T., Obi, A., Odularu, G.O, & Adekunle, A. A. (2015). Spreading the Gains of Agricultural Innovations in Africa: A Strategy to Scale-out and Scale-up the IAR4D Concept. Forum for Agricultural Research in Africa (FARA), Accra, Ghana.

Feed the Future. (2014). Scaling Up Community-Based Breeding Programmes. Available online: https://feedthefuture.gov/article/scaling-community-based-breeding-programmes-through-local-capacity-development. Last accessed: April 12, 2019.

Franzel, S., Denning, G. L., Lillesø, J. P. B. & Mercado, A. R. (2004). Scaling up the impact of agroforestry: Lessons from three sites in Africa and Asia. *Agroforestry Systems*, (2000), 329—344.

Gündel, S., Hancock, J. & Anderson, S. (2001). Scaling-up strategies for research in natural resources management: A comparative review. Available online: https://www.ircwash.org/sites/default/files/Gundel-2001-Scalingup.pdf. Last accessed: 22.05.2020.

Gutu Z., Haile A., Rischkowsky, B., Mulema A.A., Kinati W. & Kassie G. (2015). Evaluation of community-based sheep breeding programmes in Ethiopia. ICARDA, Addis Ababa, Ethiopia. Available online: https://core.ac.uk/download/pdf/46137405.pdf. Last accessed: 22.05.2020.

Haile, A., Amer, P. & Rischkowsky, B. (2019). Community - based breeding programmes are a viable solution for Ethiopian small ruminant genetic improvement but require public and private investments. *Animal Breeding and Genetics*, 2019:1–10(December 2018). DOI: 10.1111/jbg.12401

Haile A., Wurzinger M., Mueller J., Mirkena, T., Duguma G., Rekik M., Mwacharo J., Mwai O., Sölkner, J. & Rischkowsky, B. (2018). Guidelines for setting up community-based small ruminants breeding programmes Second edition. ICARDA, Beirut, Lebanon.

Hartmann, A. & Linn, J. F. (2007). Scaling up A Path to Effective Development. 2020 Focus Brief on the World's Poor and Hungry People. International Food Policy Research Institute, NW, Washington, USA.

Hartmann, A. & Linn, J. F. (2008). Scaling up: A Framework and Lessons for development Effectiveness from Literature and Practice. Working Paper 5. Wolfensohn Center for Development, Berlin, Germany.

Heifer Project International. (2013). Goat Value Chain Toolkit. Available online: http://www.iga-goatworld.com/uploads/6/1/6/2/6162024/scaling-up_successful_practices-part05.pdf. Last accessed: 22.05.2020.

Hoffmannn, I. (2010). Climate change and the characterization, breeding and conservation of animal genetic resources. Animal Production Service, Animal Production and Health Division, Food and Agriculture Organization of the United Nations, Rome, Italy.

International Fund for Agricultural Development (IFAD). (2013). Sustainability of Rural Development Projects: Best Practices and Lessons Learned by IFAD in Asia. Available online: https://www.ifad.org/documents/10180/538441f4-bb55-4e99-9e23-854efd744e4c. Last accessed: 22.05.2020.

Jacobs, F. & Ubels. J. (2016). Scaling: From simple models to rich strategies. Available online: https://ppplab.org/wp/wp-content/uploads/2016/12/PPPLab-Explorations04-DEF.pdf. Last accessed: 22.05.2020.

Kahi, A. K., Rewe, T. O. & Kosgey, I. S. (2005). Sustainable community-based organizations for the genetic improvement of livestock in developing countries. *Outlook on Agriculture*, 34(4), 261—270. doi: 10.5367/000000005775454706

Kosgey, I. S., Baker, R. L., Udo, H. M. J. & Arendonk, J. A. M. Van. (2006). Successes and failures of small ruminant breeding programmes in the tropics: a review. *Small Ruminant Research*, 61, 13—28. doi: 10.1016/j.smallrumres.2005.01.003

Miller, B. A., Dubeuf, J., Luginbuhl, J. & Capote, J. (2012). Scaling Up Goat Based Interventions to Benefit the Poor: A Report by the International Goat Association based on the IGA / IFAD Knowledge Harvesting Project , 2011–2012. Available online: http://www.iga-goatworld.com/uploads/6/1/6/2/6162024/scaling_up_goat_based_interventions.pdf. Last accessed: 22.05.2020.

Morris, J. & Baddache, F. (2012). Back to Basics: How to Make Stakeholder Engagement Meaningful for Your Company. Available online: http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Back+to+Basics+:+How+to+Make+Stakeholder+Engagement+Meaningful+for+Your+Company#0. Last accessed: 22.05.2020.

Mueller, J. P., Rischkowsky, B., Haile, A., Philipsson, J., Mwai, O., Besbes, B. & Wurzinger, M. (2015). Community-based livestock breeding programmes: Essentials and examples. *Journal of Animal Breeding and Genetics*, 132(2), 155—168. doi: 10.1111/jbg.12136

Peacock, C. (2008). Dairy goat development in East Africa: A replicable model for smallholders? *Small Ruminant Research*, 77(2—3), 225—238. doi: 10.1016/j.smallrumres.2008.03.005

PPPLab. (2018). Partnering with governments for SDGs. Available online: https://ppplab.org/wp/wp-content/uploads/2018/07/0705_PPPLab-PWG-Formatting-Tool.pdf. Last accessed: 22.05.2020.

Raussen T., Ebong G. & Musiime J. (2001). More effective natural resources management through democratically elected, decentralized government structures in Uganda. *Development in Practice*, 11 (4): 460—470.

SAS Institute Inc. (2012). SAS (Statistical Analysis System). SAS, Cary, NC, USA.

Shapiro, A., Gebru, G., Desta, S., Negassa, A., Negussie, K. & Mechal, H. (2015). Ethiopia livestock master plan. Roadmaps for growth and transformation. Available online: https://cgspace.cgiar.org/bitstream/handle/10568/67259/LMP_moa-ilri_2015.pdf;jsessionid=7D6815A325849EC108BA5E06B4510938?sequence=4. Last accessed: 22.05.2020.

UNDP. (2013). Guidance Note Scaling Up Development Programmes. Available online: http://www.undp.org/content/undp/en/home/librarypage/poverty-reduction/participatory_localdevelopment/guidance-note--scaling-up-development-programmes.html. Last accessed: 22.05.2020.

UNDP (2009). Handbook on planning, monitoring and evaluating for development results. Suazion, Inc., New York, NY, USA. Available online: http://www.undp.org/eo/handbook. Last accessed: 22.05.2020.

Vulnerability and Adaptability Program. (2009). Vulnerability and Adaptation experiences from Rajasthan and Andhra Pradesh: Community Based Institutions. SDC V&A Program, India, 1–28. Available online: https://www.eda.admin.ch/content/dam/countries/countries-content/india/en/resource_en_192483.pdf. Last accessed: 22.05.2020.

WHO. (2011). Beginning with the end in mind: Planning pilot projects and other programmatic research for successful scaling up. WHO Press, Geneva 27, Switzerland.

WHO. (2010). Nine steps for developing a scaling-up strategy. World Health Organization. II.ExpandNet. https://www.who.int/immunization/hpv/deliver/nine_steps_for_developing_a_scalingup_strategy_who_2010.pdfLast accessed: 22.05.2020.

Wigboldus, S., Klerkx, L., Leeuwis, C., Schut, M., Muilerman, S. & Jochemsen, H. (2016). Systemic perspectives on scaling agricultural innovations. A review. *Agronomy for Sustainable Development*, 36(3). doi: 10.1007/s13593-016-0380-z

Wurzinger, M., Sölkner, J. & Iñiguez, L. (2011). Important aspects and limitations in considering community-based breeding programmes for low-input smallholder livestock systems. *Small Ruminant Research*, 98 (2011) 170-–175. doi:10.1016/j.smallrumres.2011.03.035

Zomahoun, H.T.V., Charif A.B., Freitas, A., Garvelink, M.M., Menear, M., Adekpedjou, M.D.R. & Légaré, F. (2019). The pitfalls of scaling up evidence-based interventions in health. *Global Health Action*, 12 1. doi: 10.1080/16549716.2019.1670449