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RESEARCH

Action Research in Agricultural Development Projects: Case Study of a Dairy Project in Ethiopia

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Abstract
For development projects, an action research approach is often encouraged to enhance participation of end-users or beneficiaries at various stages of the project to realize the desired social transformation in the target communities. The project under consideration in this study adopted action research for some of its activities. A review of the project action research activities was conducted as part of the strategic reflection for lesson learning and to inform modification where necessary. The objectives of this study were (i) to assess the relevance of action research approach to implementation of project activities and, (ii) to draw lessons for agricultural development projects applying participatory approaches. Fifty-one participants involved in the project action research activities were interviewed on their understanding of action research, its strengths, weaknesses, opportunities and threats, and level of participation in action research activities. The perception of the participants interviewed regarding action research approach was that it is relevant and important for the project, and that it has provided a good platform for learning by all participants. Some key lessons from this study for development projects when applying action research approach include the need to focus on a limited number of issues or activities that can produce social transformation in the target communities, and the necessity of adequate planning for monitoring and documentation of learning by participants. From our study, action research is a pertinent approach in community development projects, but it should be well-planned to achieve the desired objective of social transformation in the target communities.

Keywords Agricultural development · Dairy sector · Stakeholder participation · Participatory learning · Ethiopia

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Introduction

In view of the action-oriented feature of action research and the necessity of participation of the potential beneficiaries for any development project to achieve social change in the target communities, a dairy project in Ethiopia entitled, "Building Rural Income through Inclusive Dairy Business Growth in Ethiopia" with the acronym "BRIDGE", adopted action research as one of its main approaches. Action research approach was applied to the project components on forage development and feeding, dairy products marketing and value addition, and consumption of milk by school children. The project had a duration of 5 years (September 2018 – October 2023) with the overall goal of improved well-being for dairy farmer households and improved dairy sector performance in Ethiopia. By adopting an action research approach for the above-mentioned components, the emphasis of the project is on co-learning, capacity building and empowerment of the target communities. This implies that issues being addressed by the project come from and are of importance to the target communities.

Action research as a methodology can be applied in many contexts, such as community development, professional education, health education, organizational transformation, biodiversity conservation, and agricultural development (McNiff 2013; Reason and Bradbury 2008). For development projects, an action research approach is often encouraged to enhance participation of end-users or beneficiaries at various stages of the project (planning, implementation, evaluation and closure) to realize the desired social transformation in the target communities (Aragón and Glenzer 2017). Besides, action research is commonly advocated to ensure the integration of the knowledge and expertise of community members into local development projects (Kindon et al. 2007) based on the epistemological premise of existence of plurality of knowledge in a variety of institutions and locations. Applying an action research approach also ensures focus on the pursuit of practical issues that are of concern to the project target communities (Kindon et al. 2007).

Since the 1990s, action research has been on the rise as a leading paradigm within the social and environmental sciences to promote participation and working together of different stakeholders (McNiff 2013). In sub-Saharan African contexts, action research has been applied to various projects, such as a soil fertility management project in Tanzania (Mponela et al. 2023) as an approach to foster transformation of knowledge systems and learning among smallholder farmers; a tourism development project in Kenya as a vehicle to engage people in interactive learning processes to facilitate individual and societal change (Jernsand 2017); and a project on local forms of child protection in Ethiopia to reflect on the learnings from women in Ethiopia's Southern Nations, Nationalities and Peoples (SNNP) region (Lackovich-Van Gorp 2017; Martinez 2017). Rasheli (2017) also reported using an action research approach to address problems related to procurement management in two local government authorities in Tanzania, while Omondi (2020) highlighted the potential presented by participatory rural appraisal techniques, an offshoot of action research, to enhance collaborative learning and improve community knowledge for climate change adaptation in Kenya. Action research approach was also used in projects on AIDS prevention among school youth in Jinja, Uganda (Walakira 2010) and in Kajiado, Kenya (Ahlberg et al. 2016). Isobell et al. (2016) also reported using participatory action research in two community-based projects on violence prevention and peace promotion in South Africa. These publications show the relevance of action research to different research and development projects in sub-Saharan Africa, its action-oriented feature, and the broad contexts it

can be applied to (Brydon-Miller et al. 2003). The guiding principles for action research in these development projects include inclusivity of relevant stakeholders, joint ownership of co-produced knowledge, participatory planning and effective facilitation of the action research process (Khan et al. 2013).

In this paper, action research is used as a family of approaches that pursue both action and research outcomes as reported by some authors (Brydon-Miller et al. 2003; Reason and Bradbury 2008; Beylefeld 2010; McNiff 2013). This implies that action research covers different hybrid approaches that have emerged in the past two decades including participative action research, practitioner action research, collaborative action research, participatory learning and action, and emancipatory action research (Kindon et al. 2007; McNiff 2013; Fahy 2015). Differences among these approaches are largely based on different level of commitment and influence of participants, and in the research process (Fahy 2015). Some similarities among these approaches are active participation, open-ended objectives, and commitment from the researchers and the participants to the research problem and active learning (Fahy 2015). In addition, it can be argued that the above mentioned action research hybrid approaches are part of a continuum of naturalistic, post-positivist, and systemic research methodology (McNiff 2013). This position of seeing action research as a family of approaches is consistent with the trend of many action researchers who are increasingly focusing on the points of convergence of these approaches (Fahy 2015). Regarding the emergence of different action research hybrid approaches, McNiff (2013) raised concern on an increasing tendency to compartmentalise action research with the perhaps inevitable consequences of territorialism. The associated danger with this, according to the author, is "losing touch with the voices of people in the streets and workplaces, which is what action research should be all about". In the context of the BRIDGE project, action research approach is applied based on the principles of participation, inclusion and shared learning to enhance collaboration, empower participants, advance knowledge acquisition, and social change (Fahy 2015).

As reflection is a key and distinctive element of action research (McNiff 2013), a review of the BRIDGE project action research activities was conducted as part of the strategic reflection to inform lesson learning, modification or redesign of participatory action research approaches where necessary, and to facilitate proper alignment of the action research to the project implementation. The review of the action research activities of BRIDGE forms the core of this paper. The objectives of this study were to: (i) Assess the relevance of the action research approach to implementation of BRIDGE project activities by identifying the strengths, weaknesses, opportunities and threats of the various action research approaches applied. (ii) To draw lessons from this case study for agricultural development projects applying the action research approach, based on its strengths and weaknesses. In addition, the present study aims at contributing to the limited literature about perception of participants on action research (Niyobuhungiro and Schenck 2022) with focus on agricultural development projects in sub-Saharan Africa.

Methodology

Action Research Approach as Applied by BRIDGE

The action research approach as applied by BRIDGE followed the classic cycle of action to reflection as articulated by Lewin (1946), which entails a cycle of planning, acting, observing and reflecting. The action research process followed by the project for some specific activities listed in Table 1 is presented in Fig. 1. In addition to the action research approach, the BRIDGE project also used value chain development approach to strengthen the nodes in the dairy value chain, a pluriform extension approach involving both public and private extension services for engagement with dairy farmers, and policy dialogue and influencing approach for engagement with policy makers.

As presented in Fig. 1, the action research process of the BRIDGE project began with the planning phase, which entailed stakeholders' meetings involving development practitioners, extension services at district and regional levels, researchers, partners from Ethiopian universities and research institutes in the project areas, dairy farmers, and agro-input dealers to explain the overall goal of the project and to conduct participatory situation analysis regarding dairy production in the project areas. This phase led to joint identification of key issues for the project to focus on regarding feed and forage, silage making, access to forage seed, milk collection, conservation and consumption, milk quality and safety, and input and output markets. For some of these activities, there was participatory design of the on-farm demonstration trials, for example improved forage cultivation.

The acting phase focused on implementation of the jointly agreed activities to address the key issues identified in the planning phase, such as training of the farmers on planting

Table 1 Project activities in which the action research approach was used

Project outcome	Action research activity	Action research type
1. Improved milk production	Improved forage cultivation	On-farm testing and demonstration, support to scaling
	Silage making	On-farm experimentation and demonstration, support to scaling
	Crop residue treatment	On-farm experimentation
2. Improved dairy markets (input and output)	Assessment of milk cooling facilities	Assessment/study
	Milk quality along the value chain	Assessment/study
	Dairy farm benchmarking	Assessment/design and on-farm testing of tool
	Forage seed smart subsidy model	Assessment/design and testing of model
3. Improved nutrition	School milk programme	Piloting of intervention
	Consumer insight study on potential of probiotic yoghurt	Assessment/study

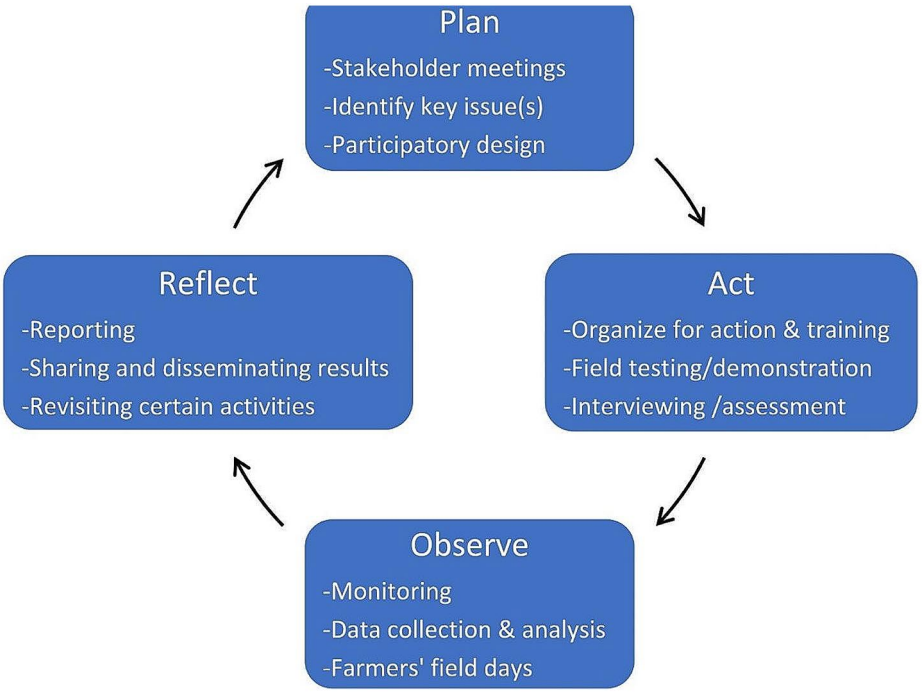

Fig. 1 Action research cycle as applied to BRIDGE project activities

of the improved forage seed, on-farm demonstration of improved forage species, and interviewing of the participating farmers. In addition, assessments or studies were conducted on some jointly identified key issues, such as milk quality along the value chain, milk cooling facilities, and a consumer insight study on the potential of probiotic yoghurt. The observing phase involved monitoring of the activities being implemented, including data collection and analysis, and organization of the farmers' field day and visits to show the improved forage demonstration plots to a wide array of stakeholders. The reflecting phase entailed reporting, sharing and disseminating main findings from the action research activities, and revisiting certain activities. Learning by the stakeholders occurred at all phases of the action research cycle. The project activities to which the action research approach was applied are presented in Table 1.

Conceptual Framework of the Study

As part of the reflection on the BRIDGE action research activities, a review was conducted between October and December 2022 by the first author who was new to the project to ensure a non-biased investigation. This was necessary to ensure validity and reliability of the findings about the action research activities. The review started with the planning phase, which included reading of the relevant project documents and publications on action research, particularly in the context of development projects (Table 2). This was followed by development of terms of reference for the review and drafting of guide questions for the interviewing of project participants. The investigating phase of the study consisted largely

Table 2 Framework for the conduct of review of action research activities of the BRIDGE project

Step	Activity
1. Planning	• Review project reports • Conduct literature search • Develop terms of reference • Develop guide questions for the interview
2. Investigation	• Preliminary meeting to introduce the objective of the review of action research activities • Individual interviews with stakeholders (project staff, government extension officials, and university partners) • Visit to and interviews with dairy farmers, cooperatives and agro-input dealers • Note taking of the interviews and taking pictures during the field visits
3. Analysis	• Reviewing the notes taken and seeking clarifications where necessary • Analysis of the data collected • Drafting of report
4. Reflection	• Presentation of key findings to project management • Sharing of recommendations on the project action research activities and discussion

Table 3 Distribution of participants interviewed on action research activities of the BRIDGE project

Category	Number	Background
Project staff at headquarters	9	Research, advisory service, monitoring and evaluation, project management
Project staff at regional offices	6	Advisory service, project management
Government extension officials	5	Livestock advisory service
University staff (lecturers & students)	7	Animal production
Dairy cooperatives	6	Milk collection, conservation, and sale to processors
Agro-input dealers	2	Commerce
Dairy farmers	16	Mixed crop-livestock farming
Total	**51**	

of individual interviews of the project participants and field visits to project sites in Oromia and Amhara regions of Ethiopia. Fifty-one participants were interviewed consisting of project staff, government extension officials, Ethiopian university partners, dairy cooperative members, agro-input dealers and dairy farmers (Table 3).

The participants who were interviewed had varied professional backgrounds, such as research, project management, advisory service, commerce, and mixed crop-livestock farming. The interview was semi-structured based on guide questions that were developed in advance (Table 4). Some of the questions asked focused on description of the action research, activities conducted using an action research approach, the strengths, weaknesses, opportunities and threats (SWOT) of different participatory action research techniques, and lessons learnt from application of action research. Notes were taken during the interviews

Table 4 Guiding questions for interviews during the review of action research activities

1.	How will you describe action research?
2.	Which activities have been conducted under BRIDGE using action research approach?
3.	What are the success stories from action research activities and the challenges faced?
4.	What are the Strength, Weakness, Opportunity and Threat (SWOT) of using the action research approach?
5.	What are the lessons learnt from application of the action research approach to project activities?
6.	What are the action research techniques used in the implementation of different activities?
7.	What are the specific outputs or innovations from action research activities?

and pictures were taken during the field visits. For the farmers and dairy cooperatives, the questions focused mainly on their perception of the benefits and disadvantages of using an action research approach for the implementation of certain project activities. The analysis phase entailed reviewing the notes taken and seeking clarifications where necessary, and analysis of data collected. The last phase of the review was to draft a report and share the main findings through a presentation and discussion. Recommendations from the review were also shared with the BRIDGE project management.

Results and Discussion

Description of Action Research by the Interviewees

As action research tends to be defined differently based on the discipline of the individual (Reason and Bradbury 2008), the individual interview started by asking the respondent's understanding of action research. From the discussions with BRIDGE project staff and partners, action research was described as follows:

(i) *A research conducted involving the end-users with purpose of providing practical information for implementation of project activities.*

The emphasis from this description is on participation of the end-users in implementation of research activities. As participation of different stakeholders is a critical element of action research, this description is consistent with definitions in the literature by McNiff (2013), and Lebesby and Benders (2020). Participation of different stakeholders is necessary in giving voice to the end-users and to enhance ownership of both the process and the outcomes (Loo 2014; Schulz et al. 2021). In stressing the importance of participation in action research, Brydon-Miller et al. (2003) observed that research conducted without a collaborative relationship with the relevant stakeholders is likely to be incompetent. Another key point from this definition by the project participants is action, that the research should be action-oriented to address practical issues of importance to the stakeholders. This is consistent with one of the tenets of action research, that is, it is research that leads to action (practice) and effects change or leads to innovation (Brydon-Miller et al. 2003). The "action" in "action research" is critical to testing knowledge in action or putting theory into practice

(Brydon-Miller et al. 2003). The action to be undertaken by the relevant stakeholders may be both remedial and developmental (Kenefick and Kirrane 2022).

(ii) *Action research is a learning platform to inform implementation or specific action by the stakeholders.*

The emphasis of this description of action research is on learning that takes place along the action research cycle. This learning is by all stakeholders including researchers. The emphasis on learning in this description by the BRIDGE participants is consistent with observations in the literature on action research that learning is a fundamental element (McNiff 2013; Kindon et al. 2007). With involvement of different participants in a project, diverse opportunities for learning exist through interactions among the stakeholders, based on the premise that multiple types knowledge are available. This implies that researchers are not the only source of knowledge in action research. In BRIDGE, the researchers in the team brought their technical or propositional knowledge to action research activities, such as knowledge on forage agronomy for cultivation of improved forage species, feed resource management and ration formulation for silage making, knowledge on post-harvest management for milk conservation and processing, and knowledge on human nutrition for the school milk programme. The extension services used their practical knowledge on improved dairy husbandry, particularly on forage cultivation and feed conservation, to translate research findings into extension messages for dairy farmers. The indigenous knowledge of dairy farmers was useful in joint identification of constraints to dairy production in their communities and strategies to address the problems, like use of locally available feed resources. The dairy farmers also contributed to action research on crop residue treatment through use of locally available tools for physical treatment of crop residues. In addition, the farmers used their local knowledge in identification of a local brewery by-product called "atela" as a source of fermenting sugar for silage making instead of molasses which has become expensive and unavailable. So, different kinds of knowledge are used in BRIDGE with emphasis on transformation knowledge which produces practical solutions to the pressing concerns of the people (Brydon-Miller et al. 2003). For co-learning to take place, it is therefore necessary that issues that need to be addressed are jointly identified and co-implemented by all stakeholders, rather than being imposed by the researchers as in conventional research. In support of the "action" in action research, one of the respondents observed that: *"There is a research fatigue among farmers, where researchers just come to collect data and disappear. Hence, there is need for research that translates into practical action, thereby contributing to improvement of the livelihood of farmers."* (Respondent PS 5).

From the above descriptions, it is obvious that many of the BRIDGE staff and partners have a good understanding of the action research approach, although the emphasis may differ from joint planning to participatory learning. This is not surprising, as development assistance agencies and non-governmental organizations have been good at applying the values and practices of action research to development projects, though they may not be able to articulate quite well the underlying theories, as observed by Mead (2002). One important element of action research that was missing from above descriptions is that of reflection, which may suggest that the reflection part of action research was weak in the action research activities of the project. From the discussion on the general understanding of the action research approach by the respondents, the most frequent keywords or phrases used

were "learning platform", "co-implementation", and "technology demonstration" (Fig. 2.). Action research was also described as a linkage between research and extension. Again in the keywords/phrases used, there was nothing on reflection or participatory evaluation. This is not unexpected for a development project, where project monitoring and evaluation is often top-down and extractive. In this regard, participatory evaluation may not be included as element of action research activities.

Perception of Action Research Approach by the Participants

The perception of the respondents regarding the action research approach of the project in our study was that it is relevant and important for implementation of project activities. It was also observed by most respondents that some of the action research activities are visible and widely adopted by farmers, for example, forage cultivation and silage making. Another impression of the action research approach was that it has brought different disciplines together to work on project activities. One of the respondents put this clearly: *"Action research has removed working in silos and has bridged the disciplinary gap in the project"* (Respondent PS 2). This observation is consistent with the interdisciplinary nature of action research (Brydon-Miller 2003).

Another common observation by the respondents was that action research has provided a good platform for learning by BRIDGE project staff, university partners, extension services and farmers. Through BRIDGE action research activities, knowledge was generated through processes of observation, inquiry, reflection and engagement by the participants. For example, through participants' observation of and inquiry on improved forage demonstration plots, the dairy farmers learnt agronomic practices on cultivation of forage species which led to establishment of their own forage plots to address the problem of feed scarcity for their cows. Through demonstration of how to make silage, the farmers not only gained knowledge on how to make silage, but also learnt how to substitute molasses, the fermenting sugar for silage, with a local brewery by-product called "atela". From the assessment of school milk programme, results showed that parents' attitude towards consumption of dairy products changed positively within 6 months when they learnt about benefits of milk consumption to children and saw the effects on their children. For example, a parent said: *"My daughter's appetite for dairy products was very low, and we believed that milk would*

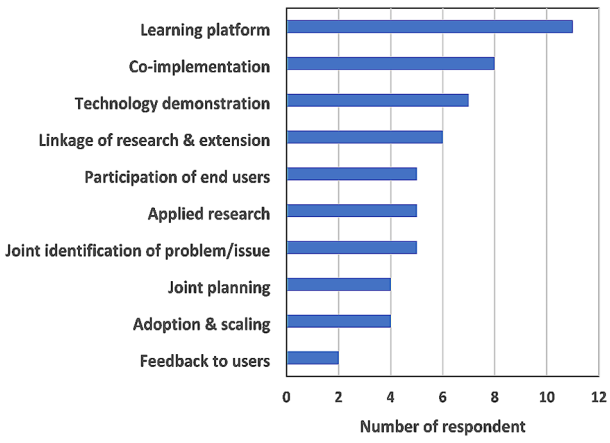

Fig. 2 Key words or phrases used in describing action research by the respondents

make her feel sick, but this was not the case when she joined the school milk programme. In fact, my daughter's health has improved, her skin and hair are shining, and she has a lot more energy. Her performance at school has also improved" (Respondent PP6). The participants from extension service also reported that they have learnt skills on how to facilitate group discussion and collective action by the community through action research on improved forage cultivation. The researchers also gained knowledge on farmers' innovation in forage cultivation. For example, in addition to technical advice from the researchers and extension service on forage cultivation, the farmers modified the guidelines by planting fruit trees, particularly avocado and vegetables (for example, hot pepper), along with the improved forage in one of the project locations in Amhara region. The rationale for this was to optimize land use (which is scarce), thereby maximizing returns, according to the farmers interviewed.

The observation that action research has provided a platform for learning is consistent with one of the descriptions of action research presented above. Nearly all the external partners of BRIDGE who were interviewed, acknowledged that they learnt about an action research approach for the first time through the project. One of the project partners said that: *"Action research has put focus on research that addresses practical issues of the dairy farmers"* (Respondent PP 5). This observation again re-emphasizes the "action" pillar of action research, as it is not a basic theoretical research, but applied, with focus on practical issues. In this regard, the action research activities in BRIDGE focused on addressing constraints to dairy production in the project locations. For example, the action research on forage cultivation, silage making and crop residue treatment was to address problem of feed scarcity for dairy cows. The school milk programme was in line with the Ethiopian Government policy on human nutrition to reduce malnutrition among children due to low consumption of animal source protein. The assessment of milk cooling facilities addressed the challenge of post-harvest losses through poor conservation of fresh milk. However, by focusing on practical issues affecting the target communities there is the danger that action research may become "all action" and "no research", especially when applied to development projects. So, it is important that action research practices should be informed by theory (Reason and Bradbury 2008).

The perception of the participants that BRIDGE action research activities provide a good platform for learning, bridges disciplinary gaps and puts a focus on the practical issues affecting the participants is consistent with reported findings from applying an action research approach to development projects in sub-Saharan Africa (Wood and Govender 2013; Niyobuhungiro and Schenck 2022; Pittalis et al. 2023). Wood and Govender (2013) observed that there is learning through the action research process, as already discussed above. According to Pittalis et al. (2023), feedback from the action research participants based on their perception could provide support for the design of a locally relevant and contextualized intervention. In addition, this can contribute to co-development of knowledge, which requires collaboration of different groups of stakeholders, and this gives voice to the concerned communities on issues that affect them. However, the challenge from making use of the perception on action research of the participants is that there can be differences in the way individuals interpret and understand action research process, which may sometimes be difficult to synthesize for action planning for contextualized intervention (Niyobuhungiro and Schenck 2022).

Common Action Research Methods Used by BRIDGE

The most common methods or techniques used in action research activities by BRIDGE were Farmers' Field Days (FFDs), on-farm demonstrations, and training (Fig. 3). FFDs and demonstrations were commonly used for cultivation of improved forage varieties and silage making in all the four project clusters. The Farmers' Field Days and on-farm demonstrations for forage cultivation were based on four to eight forage plots of 0.25 ha each per project community, established and managed by dairy farmers with advisory support from extension service to serve as a learning platform for other farmers. Through these FFDs and on-farm demonstrations, improved forage species such as Napier grass, Desho grass, Panicum, oat, vetch and alfalfa have been cultivated on 4,733 ha of land by about 35,000 dairy farmers as at the end of 2022 in Amhara, Oromia, and Sidama regions of Ethiopia where BRIDGE activities were carried out, according to the project 2022 annual report (Unpublished). These techniques have been reported as common elements of participatory action research (Kindon et al. 2007) and they may enhance co-production of knowledge according to Omondi (2020). Other action research methods used by the project included training on different project related subjects, farmer to farmer learning, and campaigns, for example on milk safety. The least common techniques used in action research activities were laboratory analysis for feed and milk, rapid field tests for milk adulteration, and on-farm experimentation. Some of these methods are context-specific, such as campaign on milk safety, rapid field testing of milk quality, messaging to farmers, and sharing of extension packages, while others included adaptation of traditional social science methods like interviewing and surveying.

Participation in BRIDGE Action Research Activities by Stakeholders

Participation at all stages is fundamental for any action research project, as this is essential for fostering learning and achieving social transformation (Omondi 2020). Using the participation continuum proposed by Pretty et al. (1995), different action research activities by the BRIDGE project were mapped (Fig. 4). Another conceptual framework for participation that could be used in this study is the "ladder of stakeholder participation" developed by Arnstein (1969) based on examples from three US Federal social programmes for citizens.

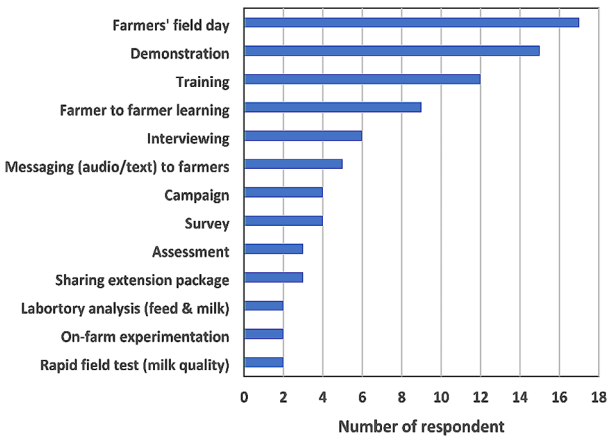

Fig. 3 Common action research methods used by the project

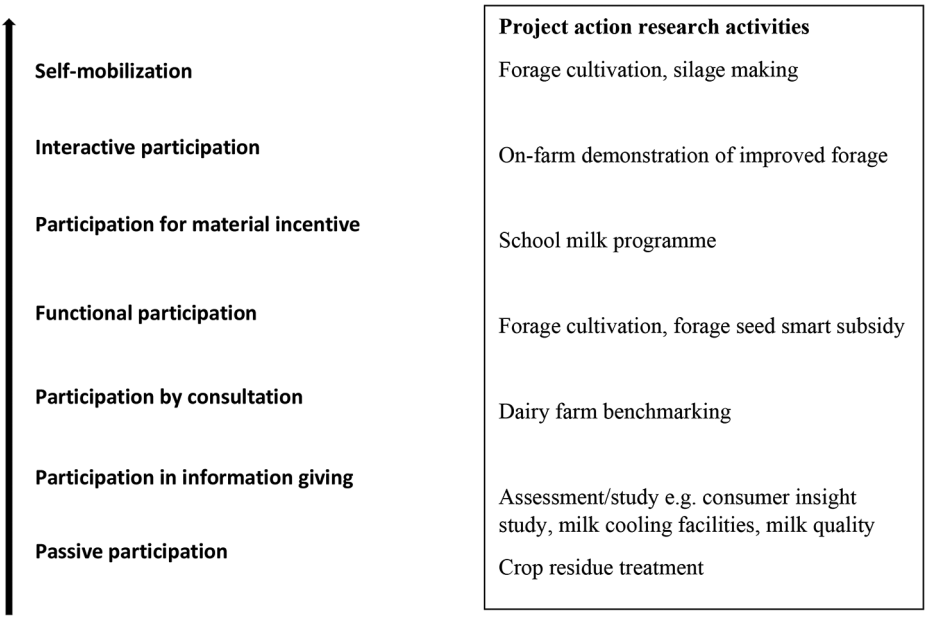

Fig. 4 Participation continuum of project action research activities

We used the participation continuum by Pretty et al. (1995), as it is more suitable for action research in development projects. As expected, the level of participation by different stakeholders varied for different action research activities. The level of participation ranged from passive participation for on-farm experimentation on crop residue treatment to self-mobilization for improved forage cultivation and silage making, which dairy farmers adopted and carried out on their own. The high degree of participation in forage cultivation and silage making shows that when the benefit to stakeholders, in this case dairy farmers, is obvious and immediate, the level of participation in action research can be high.

For meaningful and effective participation in action research activities, Kindon et al. (2007) proposed three core ethical principles to be adhered to, namely respect for participants, beneficence, and justice or equity. Respect for participants implies that people are treated as autonomous agents and that vulnerable participants are protected. Participation should not lead to domination by the community elites or to reinforcement of the pre-existing power hierarchies, which has not been beneficial to the community (Kindon et al. 2007). For many development projects, this is always a challenge, i.e., how to handle the existing power hierarchies in the community to prevent domination by the elites (Aragón and Glenzer 2017). The principle of beneficence, according to Kindon et al. (2007), should go beyond 'doing no harm', but maximize beneficial outcomes for participants and the community. Action research activities by BRIDGE, such as forage cultivation and silage making, were beneficial to dairy farmers in the project sites, as these led to significant increase in milk yield and consequently household income. The respondents also observed that the level of participation varied at different stages of the action research cycle for the project activities. For example, co-implementation of the action research activities generally tended to involve more and diverse participants, whereas design of specific interventions from

jointly identified problem(s) tended to have fewer participants. The danger inherent in a low level of participation at any stage of the action research cycle is retention of researchers' control, which can adversely affect ownership of the process and the outcomes (Brydon-Miller et al. 2003).

To ensure effective participation of stakeholders in environmental management, Reed (2008) proposed eight best practices, which are also valid for stakeholder participation in action research. These best practices include having an underpinning philosophy of participation that emphasizes empowerment, equity, trust and learning; embedding participation in the action research activities right from the onset, adequate representation of different groups of relevant stakeholders, and having clear objectives for the participatory process. Other best practices according to Reed (2008) are appropriate methods tailored to the local context, effective facilitation, integration of local and scientific knowledge, and institutionalization of participation. These best practices were applied to BRIDGE action research activities, though to a varying degree. For example, all relevant groups of stakeholders were adequately represented in BRIDGE action research activities (see Fig. 5. with a picture of participants at Farmers' Field Day) and the methods were tailored to the local context. However, the institutionalization of participation needs to be strengthened.

SWOT Analysis of BRIDGE Action Research Activities

The action research activities covered in this SWOT analysis included forage cultivation, silage making, crop residue treatment, design of milk quality and safety programme, assessment of milk cooling facilities, assessment of dairy farm benchmarking, assessment of forage seed smart subsidy model, school milk programme, and consumer insight study on the

Fig. 5 Farmers' Field days on improved forage at Mecha, West Gojam district, Amhara Region, Ethiopia (Photo credit: Abule Ebro)

potential of probiotic yoghurt (Table 5). Again, the common strength of the action research approach as mentioned by the interviewees for these activities was that of providing a platform for learning by different stakeholders. Learning by all participants in action research activities is essential for knowledge development, which could lead to purposeful individual and community action for socio-economic transformation (McNiff 2013). Lebesby and Benders (2020) observed that the primary purpose of action research is to produce practical knowledge for everyday life of the participants. The importance of learning by participants through action research was also reported by Omondi (2020) as essential for co-production of knowledge on climate change adaptation in the Mara River Basin in Kenya. The other reported strengths of BRIDGE action research activities were activity-specific. For example, strong participation was reported as one of the strengths of action research activities for forage cultivation and silage making (Table 5). This suggests that the degree of participation in an action research project or activity depends on its type or nature, potential benefit and cost, and socio-cultural contexts (Kindon et al. 2007).

The common weakness of BRIDGE action research activities mentioned by the respondents was the absence of systematic monitoring and documentation of learning by participants (Table 5). The challenge with such monitoring and documentation is a common issue when action research activities are led by researchers whose preoccupation about data collection is on technical parameters at the expense of collecting data on processes. Omondi (2020) observed this challenge in her study that most researchers may not be familiar with the elements of self-critique and reflection, which are fundamental for monitoring and documentation of learning while collecting data in an action research project. In addressing this challenge of the competence of researchers in conducting action research, Brydon-Miller et al. (2003) suggested that there should be changes in researchers' practices. For example, the traditional epistemological methods of research, which tend to be extractive in nature, may be inadequate to capture the processes of learning by participants in an action research project. Other reported weaknesses of BRIDGE action research activities tended to be activity-specific.

Some opportunities of using an action research approach for the BRIDGE project activities, as reported by the respondents, included enhancement of farmers' innovation, awareness raising, and strong interest in the action research approach by public extension services and research partners. The project research partners acknowledged during the interview that they learnt about action research through the project and that their capacity in participatory action research techniques has been enhanced. This response by project partners on enhanced capacity is consistent with the observation by McNiff (2013) that action research projects often leave behind enhanced capacities of the participants in view of the emphasis on collaboration and learning. The enhancement of farmers' innovation through participatory action research reported by the respondents has also been reported by Mponela et al. (2023) for a project on soil fertility management in Tanzania. For example in BRIDGE, farmers' innovations in forage cultivation included planting of fruit trees and vegetables along with improved forage cultivars on the demonstration plot. According to the farmers, these innovations were to optimize land use in view of land shortage. In general, opportunities of action research activities were also activity-specific.

The main threat to action research activities by the project as reported by the respondents is government policy, particularly on land use, which generally tends to favour crop farming. This can undermine forage cultivation. One of the participants put it clearly: *"Government*

Table 5 Strength, weakness, opportunity and threat analysis of the project action research activities

Activity	Strength	Weakness	Opportunity	Threat
Forage cultivation	• Demonstration plots managed by farmers • Strong participation in Farmers' Field Day (FFD) • Provides platform for learning • Facilitates adoption by farmers • Support by extension services	• Over-reliance on FFD as platform for learning • Poor monitoring and quality of data collected • Slow response to emerging issue	• Enhances farmers' innovations • Awareness raising and strong interest in action research approach by public extension services and research partners	• Demonstration / FFD fatigue as it takes time • Government land use policy that favours use of land for crops
Silage making	• Provides platform for learning • Good linkage to forage cultivation • Enhances adoption • Strong participation at demonstration during FFD • Support by extension services	• Limited technical knowledge • Over-reliance on FFD as platform for learning • Poor monitoring and quality of data collected • Weak documentation of learning	• Availability of input service by agro-input dealers • Can be a viable business • Strong interest by commercial dairy farms	• Demonstration / FFD fatigue as it takes time • Government land use policy
Crop residue treatment	• Good monitoring and data collection • Building capacity of young researchers • Provides platform for learning, to a limited extent	• Limited in scale • Limited participation by farmers • Often researcher-managed • Weak documentation of learning	• Networking with relevant stakeholders • Collaboration with research partners	• Relevance for practical application • Funding of the on-farm experimentation
Assessment of milk cooling facilities	• Focused and in-depth • Informs practical recommendations on specific issue • Can provide platform for learning though to a limited extent	• May lack holistic perspective • Tends to be extractive – collecting data from respondents • Absence of documentation of learning • Slow feedback to actors	• Can facilitate policy dialogue • Can help identification of priority areas for implementation • Opportunity for networking with experts on issue being addressed	• On the shelf reports, which may not be used • Respondents' fatigue with answering questions
Milk quality and safety programme	• Provides platform for learning • Effective campaign on milk quality on awareness of milk adulteration • Addresses public health issue	• Regularity of milk sample collection for lab analysis • Absence of documentation of learning	• Alignment with regulations by regional government on food safety • Strong interest by the government on food safety • Increasing consumer awareness	• Influence of milk traders, which can undermine milk safety campaign • Implementation of government policy on food safety

Table 5 (continued)

Activity	Strength	Weakness	Opportunity	Threat
Dairy farm benchmarking	• Provides platform for learning • Facilitates professionalization of dairy farm operations	• Limited technical knowledge • No systematic monitoring and data collection • Weak documentation of learning	• Openness of commercial dairy farmers to innovations • Availability of feed cost reducing technologies, e.g., silage making • Commercialization of dairy farm	• Government land use policy, which favours crop cultivation • Increasing competition for land • Profitability of dairy farm enterprise
Forage seed smart subsidy model	• Can provide platform for learning to a limited extent • Kick-starting forage seed marketing • Incentive for cultivation of improved forage	• Absence of systematic monitoring and data collection • Weak documentation of learning	• Incentive for private sector engagement in forage seed market • Scalability of the model • Commercialization of dairy enterprise	• Weak national forage seed systems • Government policy on seed systems
School milk programme	• Provides platform for learning and for timely feedback • Good linkage of different actors • Strong interest by students, parents and teachers	• School coverage is small as it is still at pilot stage • No systematic monitoring and data collection • Weak documentation of learning	• Well aligned with government policy to improve child nutrition and health • Complements government School Feeding programme • Can be funded through Corporate Social Responsibility	• Volatility in milk price • Quality of milk supplied for School Milk programme
Consumer insight study on potential of probiotic yoghurt	• Focused and in-depth • Can provide platform for learning • Informs practical recommendations on consumption of dairy products	• Tends to be extractive • Absence of documentation of learning • Slow feedback to actors	• Increasing consumer awareness • Alignment with government nutrition policy	• Implementation of recommendations from study • On the shelf reports which may not be used

officials see the grazing land for livestock as a waste, especially near Addis Ababa, the capital, and would rather prefer that it is used for cropping" (Respondent PS 6). The increasing competition for land is driven partly by demographic pressure, leading to expansion of crop fields into grazing areas in order to produce more food to feed the rapidly growing population (Balehegn et al. 2020). Other threats mentioned by the respondents were specific to different action research activities. For example, the reported potential threats to the school milk programme were volatility of price and quality of milk supplied to the school.

The results of the SWOT analysis of the action research activities of BRIDGE are generally as expected for a development project. Maximizing the strengths, minimizing the weaknesses and utilizing the opportunities of these action research activities are critical to social transformation and developmental changes in the project target communities. Generally, these results on strengths and weaknesses of, and opportunities and threats for action research as applied by BRIDGE are context-specific, depending on the activity and location. These findings are consistent with the observation of Brydon-Miller (2003) that one of the weaknesses of action research is its localism, which makes it difficult in intervening in

large-scale social change efforts. This implies that action research may produce a great good in a local situation, but may sometimes be difficult to extend beyond that local context. To enhance scaling of action research, a good documentation of the processes and the outcomes of action research activities is indispensable. Martin (2008) opined that two key challenges to be addressed to apply action research on a larger scale are sensemaking of the suitability to the project or project activities, and project design and implementation processes. For sensemaking, Martin (2008) proposed a number of questions to address, such as: Who are the players? Where is the power? What will motivate the larger public to take interest in any change? The author further elaborated on the second challenge that the design and implementation processes should allow for engagement of multiple perspectives and support inquiry and learning. For large development projects applying action research, these two challenges enumerated by Martin (2008) must be adequately addressed.

Lessons for Applying Action Research Approach to Agricultural Development Projects

Generally, the use of an action research approach by BRIDGE has contributed significantly to implementation of some project activities and has produced visible results, which are widely appreciated and adopted. These include for example cultivation of improved forage varieties and silage making. However, there was the impression from some of the respondents that the action research activities by the project are rather many, and that there should be focus on fewer key issues or activities that can produce social transformation in the target communities. Given that the action research approach can be applied to a wide array of issues and fields, the danger is always that it may be applied even where other research methods may be more suitable. The romanticization of action research as a participatory approach may lead to de-legitimization of other research methods that are not participatory, which is one of the criticisms of action research (Kindon et al. 2007). On the issue of suitability of an action research approach to different project issues, one of the interviewees said: *"Action research is suitable in addressing practical issues at farm and community levels, but at higher scale (regional, national) another approach is needed"* (Respondent PS 7). For community development projects where stakeholders' participation is paramount, action research is not only relevant, but necessary to achieve the desired goal of community empowerment and social change. However, when it comes to issues such as policy dialogue and influencing, and development planning, other approaches may be necessary, as these require data aggregation at higher levels.

Action research requires patience from the researchers and other participants as it often takes significant time (Kindon et al. 2007). This was pointed out by some of the respondents during the interview. One of them said: *"Action research activities tend to take too much time as the pace of implementation is slow"* (Respondent PS 3). One of the interviewees asked rhetorically: *"When do we exit the action research cycle as we cannot continue in the cycle perpetually?"* (Respondent PP 4). This observation underscores the importance of a clear exit strategy for action research activities. Though the need for participation of all relevant stakeholders in action research activities is obvious, there should be some guiding rules or principles for stakeholders' participation to avoid a tedious travelling through a winding alley during the action research process. This raises the need for necessary skills by the facilitators of the action research activities to achieve the jointly pre-defined objectives

within the stipulated time. The length of time for action research activities should also be aligned with the project duration.

Another lesson from this study is the necessity of keeping focus on the bigger picture of the project. Following an action research approach may sometimes lead to new cycles of activities, which in principle is good, but has the danger that multiplied activities can lead to loss of focus on the bigger picture of the project. For example, in our study action research activities on farm-level demonstrations of improved forage cultivation may be difficult to communicate in terms of the bigger picture of dairy sector transformation in Ethiopia for the BRIDGE project. The need for focus on the bigger picture of the project necessitates prioritization of action research activities, as this will facilitate communication with policy makers.

As part of lesson learning from this study, it is important to emphasize the need for adequate planning for monitoring and documentation of learning from the action research activities. It should be clarified that monitoring of learning by the action research participants is not the same as monitoring or tracking progress of the project activities in relation to the defined milestones, which is often well-planned by the project management. Generally, the development agencies and non-governmental organizations are good in the conventional monitoring and evaluation in the context of project performance-based accountability in response to growing demand by donors for demonstrated success of development projects (Estrella and Gaventa 1998). The focus here is on monitoring and systematic documentation of learning at different phases of action research cycle, for example farmers' innovations to introduced technology. This monitoring and documentation of learning is one of the major weaknesses reported by the respondents in this study. Therefore, there should be a clear plan right from the onset of the action research on how to monitor and document learning by the participants, as this is necessary for critical reflection and participatory evaluation of the activities being carried out. Lack of documentation of learning during the different phases of action research cycle can be an obstacle to innovative and wider use of all that action research can offer (Kindon et al. 2007). To aid planning of monitoring and documentation of learning, a few guide questions should be addressed. First, what monitoring and learning activities should be done? Second, who should do what? Third, how should it be done? Fourth, when should it be done? Fifth, how much will it cost per activity? Besides, participatory monitoring and evaluation of action research activities is necessary to enhance participation of stakeholders, to share experience among the stakeholders through systematic documentation of processes and outcomes, and to empower the local people to initiate, control and take collective action (Estrella and Gaventa 1998; Dodd et al. 2023). Dodd et al. (2023) suggested that participatory monitoring and evaluation should be built on the foundational elements of local cultures and trust-based relationships among the stakeholders.

For many development projects in sub-Saharan Africa, action research activities are donor-driven and often face funding problems at the expiration of the project (Isobell et al. 2016). Therefore, building capacity of key stakeholders in participatory action research approaches is necessary to be able to continue with essential activities in the target communities after the end of the project, and it is a form of empowering them which will facilitate institutionalization of the action research approach. The capacity building should include both the theory and practice of action research; it is important that the trainees have a conceptual understanding of action research, so that activities are not carried out haphazardly (Khan et al. 2013).

From the results of this study, our advice for developing similar action research projects is that there should be a good planning to ensure having right mix of stakeholders and for effective implementation of action research activities to achieve the objective of social transformation in the target communities. A clear exit strategy for action research activities, adequate budgeting as well as ensuring that the activities are informed by theory, should be part of the planning. However, there should be room for flexibility to adapt the plan to accommodate necessary emerging issues in the course of project implementation.

Conclusion

For development projects, an action research approach is often encouraged to enhance participation of end-users or beneficiaries at various stages of the project, and participatory learning and co-production of knowledge to realize the desired social changes in the target communities. In this regard, the project under consideration in this study adopted action research for some of its activities. The perception of the participants interviewed regarding the action research approach under the project was that it is relevant and important for implementation of project activities. Besides, the respondents reported that the action research approach has brought different disciplines together to work on project activities and that it has provided a good platform for learning by project staff, university partners, extension services, and farmers. Other strengths of action research reported by the respondents were activity-specific. The major weakness of action research as applied by the project is absence of systematic monitoring and documentation of learning by participants at all stages of the action research cycle. Some opportunities of using an action research approach for the BRIDGE project activities, as reported by the respondents, included enhancement of farmers' innovations, awareness raising, and strong interest in action research approach by public extension services and research partners. Some key lessons from this study for development projects for applying an action research approach include: the need for focus on a few key issues and/or on activities that can produce desired socio-economic changes in the target communities; the importance of a clear exit strategy for action research activities to avoid a non-ending cycle of activities; the necessity of staying focused on the bigger picture of the project; the need for adequate planning for monitoring and documentation of learning from the action research activities; and building capacity of key local stakeholders in action research to ensure sustainability of project interventions. Action research is a pertinent approach in community development projects, but it should be well planned to ensure effective implementation to achieve the objective of social transformation in the target communities.

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Data Availability The data that support the findings of this study are available from the corresponding author, Ayantunde, upon reasonable request.

Declarations

Competing Interests The authors declare no competing interests.

References

Ahlberg BM, Maina F, Kubai A, Khamasi W, Ekman M, Lundqvist-Persson C (2016) 'A child, a tree'': challenges in building collaborative relations in a community research project in a Kenyan context. Action Res 14:257–275. https://doi.org/10.1177/1476750315607607

Aragón AO, Glenzer K (2017) Untaming aid through action research: seeking transformative reflective action. Action Res 15:3–14. https://doi.org/10.1177/1476750317700253

Arnstein SR (1969) A ladder of participation. J Amer Inst Planners 35:216–224

Balehegn M, Duncan A, Tolera A, Ayantunde AA, Issa S, Karimou M, Zampaligré N, André K, Gnanda I, Varijakshapanicker P, Kebreab E, Dubeux J, Boote K, Minta M, Feyissa F, Adesogan AT (2020) Improving adoption of technologies and interventions for increasing supply of quality livestock feed in low-and middle-income countries. Glob Food Secur 26:100372. https://doi.org/10.1016/j.gfs.2020.100372

Beylefeld AA (2010) The challenge of creating knowledge through action research. South Afr J High Edu 19:1321–1333. https://doi.org/10.4314/sajhe.v19i7.50235

Brydon-Miller M, Greenwood D, Maguire P (2003) Why action research? Action Res 1:9–28

Dodd W, Wyngaarden S, Humphries S, Lobo Tosta E, Portillo VZ, Orellana P (2023) How long-term emancipatory programming facilitates participatory evaluation: building a methodology of participation through research with youth in Honduras. Action Res 0:1–19. https://doi.org/10.1177/14767503231160960

Estrella M, Gaventa J (1998) Who counts reality? Participatory monitoring and evaluation: A literature review. IDS Working Paper 70. Institute of Development Studies, Brighton, UK

Fahy F (2015) Participatory Action Research in Environmental and Ecological Studies. In International Encyclopedia of the Social & Behavioral Sciences (Second Edition), p 535–539

Isobell D, Lazarus S, Suffla S, Seedat M (2016) Research translation through participatory research: the case of two community-based projects in low-income African settings. Action Res 14:393–411. https://doi.org/10.1177/1476750315626779

Jernsand EM (2017) Engagement as transformation: Learnings from a tourism development project in Dunga by Lake Victoria, Kenya. Action Res 15:81–99. https://doi.org/10.1177/1476750316678913

Kenefick D, Kirrane M (2022) A little less conversation, a little more action: participatory insider action research in an executive team. Syst Pract Act Res 35:453–469. https://doi.org/10.1007/s11213-021-09580-x

Khan KS, Bawani SAA, Aziz A (2013) Bridging the gap of knowledge and action: a case for participatory action research. Action Res 11:157–175. https://doi.org/10.1177/1476750313477158

Kindon S, Pain R, Kesby M (2007) Participatory action research approaches and methods: connecting people, participation and place. Routledge – Taylor & Francis group, London, UK; New York, USA

Lackovich-Van Gorp A (2017) Unearthing local forms of child protection: positive deviance and abduction in Ethiopia. Action Res 15:39–52. https://doi.org/10.1177/1476750316679240

Lebesby K, Benders J (2020) Too smart to participate? Rational reasons for employees' non-participation in action research. Syst Pract Act Res 33:625–638. https://doi.org/10.1007/s11213-020-09538-5
Lewin K (1946) Action research and minority problems. J Soc Issues 2:34–46
Loo C (2014) The role of community participation in climate change assessment and research. J Agr Environ Ethic 271:65–85
Martin AW (2008) Action research on a larger scale: Issues and practices. In: Reason and Bradbury (eds.), Action research: Participative inquire and practice. Sage Publications, Los Angeles, USA; London, UK. Pages 394–406
Martinez E (2017) Invisible in plain sight: a reflection on the potential and perils of an action research study of "positive deviants". Action Res 15:53–56. https://doi.org/10.1177/1476750317700477
McNiff J (2013) Action research – Principles and practice. Third edition. Routledge – Taylor & Francis group, London, UK; New York, USA
Mead G (2002) Developing ourselves as police leaders: how can we inquire collaboratively in a hierarchical organizations. Syst Pract Act Res 15:191–206
Mponela P, Manda J, Kinyua M, Kihara J (2023) Participatory action research, social networks, and gender influence soil fertility management in Tanzania. Syst Pract Act Res 36:141–163. https://doi.org/10.1007/s11213-022-09601-3
Niyobuhungiro RV, Schenck C (2022) Exploring community perceptions of illegal dumping in Fisantekraal using participatory action research. South Afr J Sci 118:33–39. https://doi.org/10.17159/sajs.2022/12563
Omondi LA (2020) Learning together: participatory rural appraisal for coproduction of climate change knowledge. Action Res 0:1–13. https://doi.org/10.1177/1476750320905901
Pittalis C, Drury G, Mwapasa G, Borgstein E, Cheelo M, Kachimba J, Juma A, Chilonga K, Cahill N, Brugha R, Lavy C, Gajewski J (2023) Using participatory action research to empower district hospital staff to deliver quality-assured essential surgery to rural populations in Malawi, Zambia, and Tanzania. Front Pub Health 11:1186307. https://doi.org/10.3389/fpubh.2023.1186307
Pretty J, Guijt I, Thompson J, Scoones J (1995) Participatory learning and action: a trainer's guide. International Institute for Environment and Development, London, UK
Rasheli GA (2017) Action research in procurement management; evidence from selected lower local government authorities in Tanzania. Action Res 15:373–385. https://doi.org/10.1177/1476750316653813
Reason P, Bradbury H (2008) The SAGE handbook of action research – participative inquiry and practice. SAGE, Los Angeles, USA; London, UK
Reed MS (2008) Stakeholder participation for Environmental Management: A literature review. Biol Conserv 141:2417–2431. https://doi.org/10.1016/j.biocon.2008.07.014
Schulz R, Sense A, Pepper M (2021) Combining participative action research with an adapted house of quality framework for the stakeholder development of performance indicators in local government. Syst Pract Act Res 34:307–330. https://doi.org/10.1007/s11213-020-09534-9
Walakira EJ (2010) Reflective learning in action research: a case of micro-interventions for HIV prevention among the youth in Kakira-Kabembe, Jinja, Uganda. Action Res 8:53–70. https://doi.org/10.1177/1476750309335210
Wood L, Govender B (2013) You learn from going through the process: the perceptions of South Africa school leaders about action research. Action Res 11:176–193. https://doi.org/10.1177/1476750313479411