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RESEARCH

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African women and young people as agriculture service providers—business models, benefits, gaps and opportunities

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Abstract

We use a combination of a global desk review of the literature with information from an on-going action research in Kenya to provide insights into the main characteristics, benefits and shortfalls of business models for engaging women and young people in agricultural service provision in Africa. The findings demonstrate that the engagement of African women and young people in agricultural service provision is not a panacea to the challenges they face. However various business models have been successful in contributing to economic empowerment, to increasing entrepreneurial activities and to upskilling of women and young people engaged as service providers. Business models that are successful are place-based and people-focused, market-driven and focused on value chains. Challenges however abound due to various factors, hence for sustainability there is need for multi-sectoral inter-institutional collaboration that pulls in funding and which makes a case for private sector buy-in. Future research should focus on increasing the evidence base to understand if successes with inclusion of women and young people in agricultural service provision has an influence on emerging agricultural policy. Research should also rigorously assess the extent to which successful agricultural service provision business models are engendered, provide sufficient levels of renumeration and the extent to which they impact farmer outcomes.

Keywords Action research, Desk review, Kenya, Entrepreneurship, Rural development, Rural circularity, Informal sector, Market linkages, Agribusinesses

Introduction

Women and young people are of critical importance in African agriculture. Emerging evidence estimates that women contribute between 24% and 56% of the crop production labour force in different countries across Africa (Palacios-Lopez et al. 2017, 2018). In sub-Saharan Africa specifically, it is estimated that approximately 40% of the agricultural labour force is provided by women (Christiaensen and Demery 2018). Young people make up a large proportion of the general population and therefore of the agriculture labour force in the region (Mueller and Thurlow 2019; Sumberg et al. 2021). Despite the critical role of women and young people in African agriculture, they remain on the periphery of decision-making processes, have limited control over productive resources and are predominantly engaged in low paying and/or non-remunerated roles within the sector (Mnimbo et al. 2019; Geza et al. 2021; Quisumbing et al. 2021).

One way of overcoming this is the engagement of women and young people as service providers within

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the agriculture sector in their communities. Agricultural service provision is recognized as a source for income generation, employment creation and development of rural communities. In addition, engaging young people in the agricultural sector, in a lucrative manner, has been shown to incentivize them to stay in the sector (Mulema et al. 2021). Also, young people's engagement in agri-preneurship has been shown to contribute to reducing rural–urban migration, to positively contribute to food security and to curb the disenfranchisement of young people with agricultural livelihoods (Franzel et al. 2020; Babu et al. 2021). At the same time, engaging women as agricultural service providers within their communities has potential to result in economic empowerment, which has been shown to have positive benefits for families, households and communities. Furthermore, supporting women and young people as service providers in agriculture enables the introduction of new technologies and concepts. For the young people, this enables them as future farmers, to be aware of and promote emerging innovations. For example, service providers can be trained on the identification and diagnosis of pests and diseases in targeted value chains, and in the safe use and handling of pest control products to ensure the supply of safe and high quality locally produced foods and/or to reduce the use and misuse of pesticides. Service providers can also be concurrently trained on biopesticides, thus enabling them to promote alternatives to synthetic pesticides.

Effective engagement of women and young people in the agricultural sector manifests differently, but it generally includes training and capacity building (Valerio et al. 2014; Maïga et al. 2020; Adeyanju et al. 2023), access to technology for modernizing agriculture production (Lohento and Ajilore 2015; Babu et al. 2021; Jolex and Tufa 2022) and facilitating engagement in policy-making processes (Kadzamira and Kazembe 2015; Geza et al. 2021). In addition, making finance accessible is key for enabling agri-preneurship, which includes agricultural service provision. Currently there are many business models that aim to include women and young people in agricultural service provision but there is limited robust documentation and understanding of their common characteristics, actual benefits and shortfalls. This therefore limits replicability and further development. This study aims to address this gap, by providing insights—for practitioners and policy makers—into the main characteristics and benefits as well as the prevailing shortfalls and gaps of business models for engaging women and young people in agricultural service provision.

Conceptual framework

Figure 1 presents a conceptual framework for understanding service provision in the agriculture sector that is inclusive of women and young people. In general, agricultural service provision is envisioned as a circular business model (Kadzamira et al. 2022), centred around enabling collaboration between diverse and independent actors along a specific value chain. Business models that include women and young people enable them to deliver a range of agricultural services, such as linking farmers to input and output markets, insurance, finance and credit services (Coulter et al. 1999). In some cases, these services are bundled with agronomic advice and/or general advisory services. Women and young people can do this semi-autonomously while linking and collaborating with other actors within the value chain. These semi-autonomous last-mile service providers work independently, and they range from those delivering only one type of service to their farming community, to those delivering a range of services (Fig. 1a). An example of the former is spray service providers; individuals owning a sprayer and protective clothing, trained by extension services or private input providers, who then charge farmers to spray their fields (Ekeleme et al. 2016; Tafida et al. 2021). On the other hand, those providing a range of services have the potential to become full-fledged small-and-medium enterprise (SME)-led Farmer Service Centres (FSC) (Baklit 2015; Huger 2017). Semi-autonomous service providers are independent in that they are paid directly by their clients (be they individual farmers or farmer groups) for the services rendered.

At the same time, in some cases women and young people engaged in agricultural service provision are either embedded within an agribusiness such as a farmer cooperative (Fig. 1b) or are affiliated with an agribusiness along the value chain i.e. not necessarily embedded within it. In situations in which they are embedded, they themselves are members of the agribusiness, and they provide a range of services to other members within the cooperative but are free to provide services to non-members within their community. They are paid by the cooperative to deliver these services to members, with payment coming from fees that the members pay to their cooperative or association. In the case in which a service provider is affiliated to an agribusiness, they simply are part of the agribusiness marketing network—for example an agro-input supply company. In this case they are paid a commission by the agribusiness based on sales of the product that the agribusiness is marketing. Commission levels vary, as it is determined by one's own active engagement of the farming community and ability to make sales.

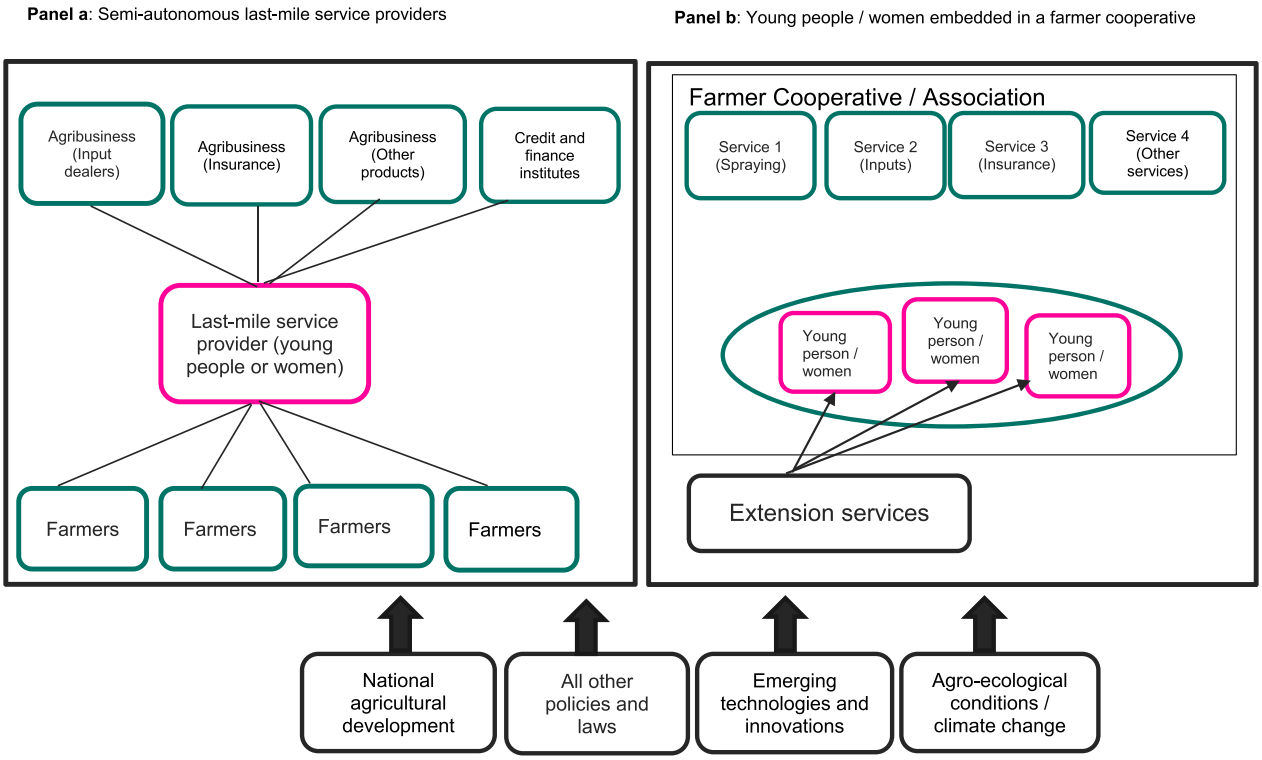

Fig. 1 Youth-and-women inclusive agricultural service provision—conceptual framework (Source: Author conceptualization)

In almost all cases, women and young people engaged in service provision are provided with initial basic training in the specific technical area in which they are rendering services, by either local public extension services, non-governmental organizations or via the agribusinesses to which they are affiliated or embedded in. A good business model for agriculture service provision results in much-needed better services in local communities, which contributes to increased productivity, better yields and accessible relevant information (Coulter et al. 1999). This then enables farmers to make profits from their farm endeavours through diversified cropping and stronger off-farm market linkages (Coulter et al. 1999; Charman 2008), while concurrently creating income-generating opportunities or jobs for the large population of under or unemployed women and young people.

Study approach

A qualitative multi-method research approach combining literature and document review, key informant interviews and action research was used to conduct the assessment. There is growing evidence that qualitative multi-method research approaches have advantages over single method techniques (Roller and Lavrakas 2015; Seawright 2016).

First, we documented and reviewed 30 initiatives promoting business models for agriculture service delivery with women and young people in Africa. This was done via key informant interviews with promoters of business models as well as a desk review of both published and grey literature. In addition to these 30 initiatives from across Africa, we conducted a literature review of published and grey literature on assessments of business models for engaging women and young people as service providers. From the literature review and the key informant interviews we gathered insights on the different types of benefits that the various business models provide for women and young people, as well as the gaps or challenges of the different business models. Prior to the document and literature review, starting in early 2022, action research was initiated (Fig. 2) to identify and test agricultural service provision business models that engage women and young people in rural areas to support farmers.

The action research was implemented as a series of continuous exercises that facilitate learning and testing of the selected business model. Entry into an area is initiated via a scoping exercise in which discussions are held with women and young people to determine their aspirations for engaging in agricultural service provision, analyse potential service areas based on local agricultural

Fig. 2 Action research approach (Source: Author conceptualization)

production and farmer needs, and assess skill gaps. The initial scoping exercise results in goal setting, development of a training strategy and mapping of potential industry partners and agribusinesses. The initial scoping exercise, conducted by CABI with government officials, is followed by industry engagement which involves engagement of potential partners in the geographical area where scoping has taken place. This activity entails discussions around the business model for engaging women and/or young people as service providers with relevant private sector organizations (agro-input manufacturers, agribusinesses), farmers' organisations and cooperatives, researchers as well as civil society working with young people/women in the area. It can also be used to analyse commercial viability for agribusiness and private sector organizations with whom women and young people in a specific geographical area might be affiliated. During this phase, depending on service provision agreements that have been brokered with industry and agribusinesses, women and young people will be organized into relevant groups for training and collaboration.

This is followed by implementation, with women and young people supported by engagement of the community to enable them to provide services. During this period there is regular and consistent monitoring of progress either through the agribusiness to which service providers are affiliated or farmer cooperatives or by local agricultural extension officers. This is followed by consultative meetings and field visits that include both the women and young people engaged as service providers, and farmers, private sector organizations, front line extension staff and government staff from various departments. Field visits are used to showcase the work of the service providers in the community; but also to gather feedback from farmers who have used services provided by the women and young people. Feedback is also sought from the service providers themselves in order to get their viewpoints of the business, constraints and potential areas for improving their enterprise. During this process, front line extension services are also consulted, as they are essential to act as mentors and to provide technical advice for the service providers in their area. The consultative meetings act as an innovation platform (World Bank 2007) for all stakeholders in the specific geographical area, and involves reviewing performance of the service providers, sharing success stories, and incorporating improvements in the enterprises as well as analysing and incorporating feedback from all actors including farmers.

The action research elaborated in this work is mainly from work undertaken in Nakuru and Mukueni

counties in Kenya by CABI over a 1-year period. Experiences from the ongoing action research are anecdotal at best, but are presented only to illustrate, from on-going work, the logical conclusions that are made in the research from the literature review. The use of anecdotal evidence to substantiate and complement formal research evidence (i.e. the literature review) and statistics is common, and in some cases essential to better understand research evidence (Enkin and Jadad 1998; Sterns et al. 1998; Moore and Stilgoe 2009; Hornikx 2018; Sazanavets 2019). The focus of the action research by CABI in Kenya has been to determine and implement the type of business models that can support smallholder farmer production of higher quality, safer and more nutritious food, by engaging women and young people to provide services to facilitate access to and use of low-risk crop protection products and practices. The desk review on the other hand is not limited to crop production and/or food safety, thus drawing lessons from across the sector relevant for a broad range of practitioners and agricultural policy makers in Africa.

Results and discussion

What has worked well

Types of business models

The most successful agricultural service provision business models—those that provide tangible benefits, and which are sustainable—have several key characteristics in common (Fig. 3). This is the case despite having diverse objectives, implementation approaches and/or geographical focus. The key characteristics are not mutually exclusive, with the most successful business models often built on seemingly contradicting characteristics.

First, almost all these successful business models are 'place-based and people-focused', with many focusing on locally driven solutions and collaboration with local communities. In practice, this means these business models engage target communities in co-creation of any initiatives aimed at supporting specific groups within that community (rural young people and women) and as such contextualize the business model from the onset. These business models bring together local communities with the private sector and relevant government bodies. This can be a formal partnership using for example innovation platforms (World Bank 2007). The business models also build the capacity of the community to help themselves and to support each other even in the absence of

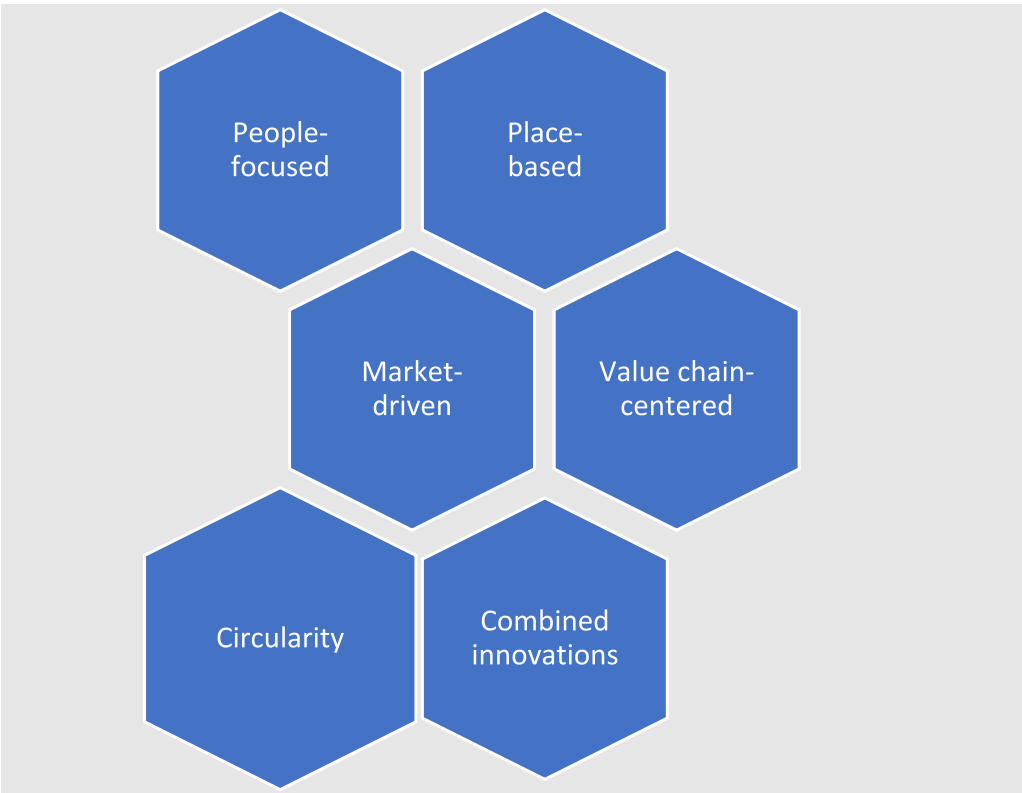

Fig. 3 Characteristics of successful business models (Source: Author compilation)

donor funding—with varying degrees of success. Finally, these initiatives carve out a space for community heroes to champion the cause, thus enabling them to mobilize the local community to action and to hold each other accountable. In practice, the 'place-based and people-focused' business model manifests as an articulation of the geographical location or sub-location of the initiative such as 'rural young people and women' (Table 1). This can also specify geographical areas that fall within these places and the target population. Examples include: Vijabiz—the Youth Economic Empowerment through Agribusiness project in Kenya which specifies that they worked with young people in 'Kilifi and Nakuru counties' (Lohento 2021); or the Livelihoods Improvement for Women and Young people (LIWAY) programme which states that it works in 'Addis Ababa' targeting women and young people (Yemane 2022). The place that is articulated in formulating a business initiative determines the planning for implementing, budgeting and entry point into a community.

This is because the assets, services and governance structures that exist differ from one place to another, thus those business models that are most successful have been those that recognize this and thus contextualize their approach to the place where they will work. This is done while concurrently recognizing that people have different skills and socio-cultural backgrounds that can affect their business endeavours. In some cases, this is a matter of stating the target (young people, women) or their skills, interests or current occupation (agri-preneurs, agricultural graduates, small-scale farmers) (Table 1). This approach therefore leads to successful business models incorporating training in technical areas i.e., spraying, soil testing, drone operation as well as in soft skills such as marketing and customer service. Soft skills training helps entrepreneurs to reach out into communities and access their clients and grow opportunities. These business models add on these types of training because they recognize that the people they are targeting (young people, women), in a specific place (rural Africa) who are engaged in specific occupations (agri-prenuers, agricultural graduates, small-scale farmers) as a population group (women, small-scale farmers) are traditionally ill-equipped for entrepreneurship and business (Naituli et al. 2006; Chinomona and Maziriri 2015).

A second common characteristic of the most successful business models is that they are market-driven solutions hence inherently self-sustaining (Franzel et al. 2020). Young people and women are trained to assess their community to determine gaps in service provision and then offer their services as a solution. For this approach to work, service providers must be innovative and flexible, thus changing their services over time and in response to the emerging needs of their clientele. Furthermore, entrepreneurs must be multi-skilled thus enabling them to provide a variety of services over the course of a farming season or calendar year as the needs of their clients change. Evidence from the action research in Kenya shows that spray service providers only provide spraying services for 4 months of the year. Those spray service providers that are therefore able to sustain a satisfactory level of income throughout a calendar year are multi-skilled, able to offer other services to farmers, including in the off-season, as their clients' needs change. Specifically, in the action research in Kenya, we found that other services offered to farmers included linking farmers to produce buyers and input providers, agriculture machinery services and providing links to finance and credit services. Unlike the spraying services which are fee based (either per number of pumps or per unit area of land), market linkage services are on a commission basis.

Third, we find that most market-driven solutions are also value-chain focused. Value-chain focused business models are conceptualized to respond to gaps in service provision within a specific target value chain. Hence young people and/or women are thus provided with specialized training and skills to enhance their ability to engage within a targeted value chain. The primary aim of these business models is to intervene in the target value chain, with income generation and economic empowerment for young people and women as a positive, but secondary, outcome. Cases of these types of business models are widespread in Africa. Examples include the mechanization of the bean value chain in Tanzania by

Table 1 Place-based and people-focused business models—articulation of target

Place-based	People-focused	Enterprise-centred	Sub-sector focused
Rural	Women	Young agri-preneurs	Small-scale farmers
Peri-urban	Youth	Young agricultural graduates	Smallholder farmers
Urban	Youth (male and female)	Youth and women entrepreneurs	Smallholder groups
Specific geographical area/city	Young men and women	Women entrepreneurs	
	Youth and women	Business start-ups	
	Women and young people	Youth and women-led agribusinesses, small businesses	

the Pan African Bean Research Alliance (Lutomia and Nchanji 2022) and the improvement of peri-urban vegetables value chain in Ghana (Osei et al. 2022). From the action research in Kenya, we found that having young people affiliated to an agribusiness worked well as it had a clear renumeration path for young people providing the services but also the benefits to farmers were tangible and documented—as facilitated by the agribusiness. We also found that those young people that invested more in their enterprise were better able to generate more income and to sustain their income over a cropping season. For example, in both Nakuru and Mukueni counties, we found that 6 months after the initial training, young people who had been trained in Integrated Pest Management (IPM) had bundled the selling of lower risk pest management products with free training of farmers in IPM. The latter led to increased farmer knowledge about lower risk products and the hazards associated with use of toxic pesticides—ultimately resulting in increased demand for the lower risk products. In the same area, spray service providers that increased their renumeration were those that personally invested in acquiring motorized pumps.

Finally, the most successful business models are those that are circular in nature. Traditionally circular business models are focused on sustainability—delivering products and services while considering ecological and social impacts (Kadzamira et al. 2022). In the case of business models aimed at positioning young people and women as service providers, the focus is one component of circularity, enabling collaboration between diverse and independent actors along the value chain. In practice, this manifests in different ways, but the principle is to carve out a niche market for young people and women. For example, young people and women can be linked to local communities or farmer groups/cooperatives. A case of this is the Service Provider Enterprise (SPE) (Ndambi et al. 2020) which trains young people to provide specialized services such as silage making, fodder establishment and cow management to the Kenyan dairy value chains via links to various dairy farmer cooperative societies in the country (Ndambi et al. 2020). In other cases, there is certification and promotion in target catchment areas in which services are being provided. In Nakuru county, Kenya, for example, young people were trained by the national pest control board in collaboration with government extension services and other civil society working in the area on proper use of protective equipment, safe use of pest control products, how they can effectively advise farmers to use pest control products, on good agricultural practices, and on proper disposal of leftover chemicals and empty containers. These service providers are not only affiliated with an input supplier in their area, but they also received certification by the national public pest control board and front-line government extension officers subsequently promoted them in the local area amongst farmers. In Mukueni county, youth were trained by CABI in collaboration with the county government and a local farmer fruit processing cooperative. The fruit processing cooperative wanted to have skilled service providers in the area to provide their members with support in combating pests and diseases. Youth were thus trained not only in Integrated Pest Management and in plant health diagnostics, but also in fruit orchard management as a direct response to the needs of the local farmer cooperative.

Other business models facilitate the formation of groups, through which capacity building, training, and credit and finance are delivered. Young people and women can deliver services as a group, but often they may collaborate in, for example, credit and financing arrangements (i.e. forming a group for lending and saving or training purposes but delivering and marketing their services as individual service providers). These combined innovations result in diversity in service provision by women and young people and they enable local, informal and rural circularity in agricultural service delivery. All of these are an integral part of successful business models, especially in the face of diverse places, people, markets and value chains.

Benefits for young people and women as service providers

The main benefit of various business models that deliberately engage women and young people as agriculture service providers is that there is demonstrated economic empowerment through the establishment of entrepreneurial activities and creation of business opportunities, and in some cases, the generation of opportunities for gainful employment. Entrepreneurial and business opportunities are direct outcomes of the business models with most entrants able to self-generate income, where previously they had little or none (Lutomia and Nchanji 2022). The market-based approach of service provision means that those entrants that are highly self-motivated and innovative can succeed and thrive, even when the formal programme/donor funding has ended. This is the case with successful entrants generating demand for their services—hence as they respond to the needs of their clients (the farming community), they get more business. Innovative service providers also use their platform to introduce products that will help their clients to have higher agricultural productivity, thus increasing their purchasing power and/or demand for the services being provided.

The generation of employment on the other hand, is an indirect outcome for some of the business models that are inclusive of women and young people. Examples

are emerging of cases in which rural agricultural service providers 'successfully' exit from service provision and find gainful employment using the skills they gained as part of their training (Kothari et al. 2023). In some cases, as the service providers expand their services, they can hire others from their community, mainly young people, to support them regularly in their enterprise—this has been observed in Nakuru county with spray service providers expanding into motorized pumps and hiring fellow youth. But in general, programmes/business models specifically aiming to create employment in Africa have exhibited lacklustre outcomes and effects (Kluve et al. 2017; Maïga et al. 2020).

Apart from economic empowerment, there are also other tangible benefits from young people-and-women inclusive service provision business models. These benefits are however not common across all business models—as an outcome or a goal—as is often the case with economic empowerment. First there is the upskilling/capacity building of women and young people either by promotors of business models or an agribusiness or government. Most initiatives have a training component to allow young people and women to provide skilled services, with technical training provided free of charge or at very minimal cost. Practitioners and policy makers recognize technical training as one of the critical factors for the success of agricultural entrepreneurship (Juma and Spielman 2014), and thus it is often part of any successful agri-entrepreneurship program, although it will differ by value chain and specific services being promoted. In addition, service providers will also benefit from soft skills and business skills training (Gowland-Mwangi et al. 2010; Berengu 2012). Capacity building is beneficial personally, for the women and young people, as they are then able to compete for business or job opportunities with older men who are traditionally more skilled. In both Nakuru and Mukueni counties, emerging evidence shows that young people who have been trained are being regarded as technical leaders in their communities and are increasingly being consulted by fellow community members and public administration officials. This has resulted in greater networking, increased self-esteem and improved confidence enabling them to articulate on technical issues with others—on a one-on-one basis with a client but also in community meetings. Despite these benefits, training/capacity building efforts should not be blanket for all engagement with young people, even for the same technical area or geographical location, but should be contextualized to the specific young people that one is dealing with. This is because young people in agriculture are not a homogeneous group but differ due to numerous factors (Maïga et al. 2020; Geza et al. 2021; Madende et al. 2023).

What has not worked well?

There are several overlapping challenges to the engagement of young people and women in Africa as agricultural service providers (Fig. 4). First, challenges with the clientele, including the target clientele—farming community—having low purchasing power. This manifests as the inability of the target customers to pay for services at market rates or in payment delays, resulting in low margins and commissions for service providers (Kramer et al. 2021). This agrees with several studies which show that many agricultural interventions that aim to engage rural women and young people provide inadequate income earning opportunities (Geza et al. 2021). There is also the transferability of skills to the farmers, thus service

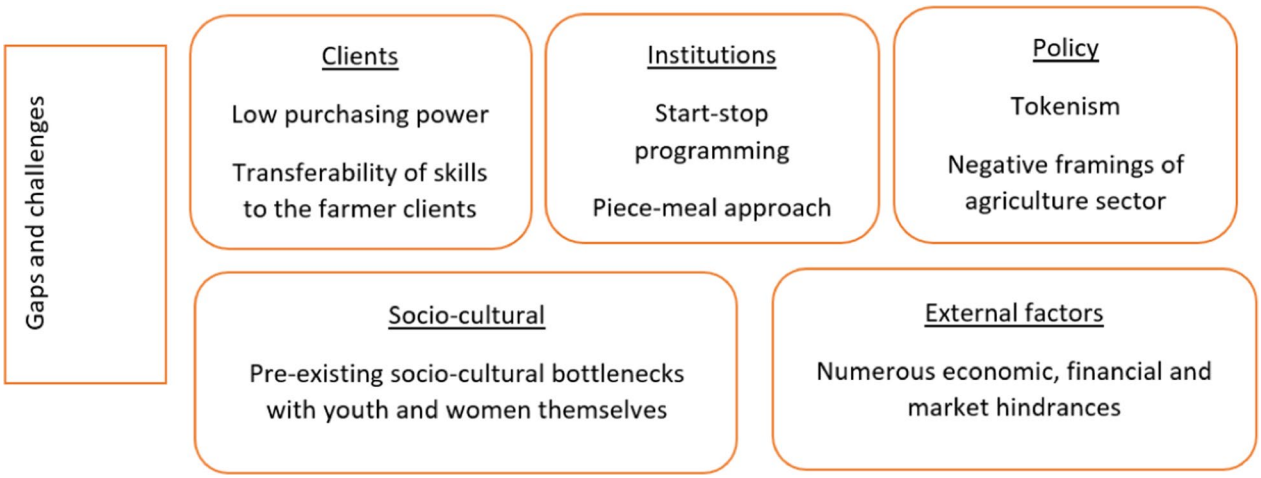

Fig. 4 Young people and women as service providers: gaps and challenges (Source: Author compilation)

providers lose business because their clients become independent and no longer need them. This was recorded in Nakuru county in Kenya. Finally, there is also emerging evidence showing lack of or low willingness-to-pay by farmers for only agricultural advisory information (Mwaura et al. 2010; Ulimwengu and Sanyal 2011; Spencer et al. 2018; Hidrobo et al. 2022). This is not only prevalent amongst African farmers but has also been found to be the case globally (Charatsari et al. 2011; Chivers and Collins 2022).

Second, institutional level challenges with business models that are in place, or which are being promoted to engage young people and women in agriculture service provision. This includes start-stop programming because of donor funded initiatives and/or lack of long-term financial commitment and smallness of initiatives. This makes it difficult to prove the case of the business model or to gauge its sustainability as service providers are made to 'graduate' from the programme and expected to become self-sufficient within a short period of time. This time and resourcing are often misaligned with emerging evidence about how long it takes, and the resources required for an African SME to succeed (Fatoki 2014).

Third, the challenge of low market potential. Often service providers never reach their full market potential, due to the lack of skills to effectively conduct market demand forecasts and planning (Fatoki 2014). This is attributed to many factors including competition from well-established private companies providing similar services and/or inputs; low literacy and numeracy skills which make it hard for young people and/or women to sustain their enterprise and in some cases lack of self-motivation and mistrust between farmers and service providers (Kramer et al. 2021). In Nakuru and Mukueni counties, anecdotal evidence shows that high self-motivation, willingness to take risks and innovativeness were key for success. This was the case with the most successful spray service providers investing a substantial amount of their time and finances into their enterprise. Those that excelled stated that they had pumped extra funds into their business to buy motorized pumps and to pay other young people a small wage as a means to expand their business operations. This however implies that these service providers had finances that they used for this additional investment. Other studies have substantiated these findings, showing that certain behaviours (including self-motivation, risk taking and innovation); as well as financing are some of the key factors for success in agri-entrepreneurship (Mmbengwa et al. 2013; Kanayo 2021; Pliakoura et al. 2021; Kadzamira et al. 2023), under which agricultural service provision falls.

Finally, there are several external factors that have hindered the engagement of women and young people as service providers in agriculture in Africa. These are external to and outside of the control of the business model, the farming community clientele and/or the entrepreneurs themselves. These include lack of effective engagement of young people and women in policy making processes and implementation as well as negative framings of not only the agriculture sector but also of young people and women as actors within the sector (te Lintelo 2011; Anyidoho et al. 2012; Kadzamira and Kazembe 2015. Cases in which young people and women are engaged in the policy making processes reek of tokenism (Samndong 2018; Douglas 2023), thus young people and women remain on the periphery of agricultural policy making process (Kadzamira and Kazembe 2015). In practice, this manifests in service provision business models that do not fully understand or take on board the diverse challenges and aspirations of young people and women who serve as service providers in agriculture in Africa. Efforts have been made to situate agriculture in a positive light, however the outcomes of people whose livelihoods are tied to the agriculture sector speaks louder than any positive framings. These challenges are confounded by many other factors that constrain not only young people and women as service providers in agriculture, but African entrepreneurship in general. These include but are not limited to high cost of doing business, inadequate natural resources, poor infrastructure, inadequate financing and economic downturn, government bureaucracy and fluctuating market prices (Igwe et al. 2018; van Klyton and Rutabayiro-Ngoga 2018; Nkwabi and Mboya 2019), and more recently the COVID-19 pandemic (Kadzamira et al. 2023). These factors are worsened by the seasonality of African agricultural production and the vagaries of a changing climate. Both affect farmers' productivity and income (Guido et al. 2020), thus their ability to pay for services and the profitability of service provision.

Opportunities

Systematic data on the extent to which either youth or women are engaged as agriculture service providers in Africa, the enterprises they engage in and the renumeration they earn is hard to find. However, some trends and emerging facts provide a picture of their engagement in the agriculture sector as service providers. Sumberg et al. (2021) states that more than 130 million young people in rural areas of sub-Saharan Africa (SSA) are engaged in agriculture in some way. If we assume population trends amongst young people are similar to national population trends of African countries, then approximately 50% of this population is young women (Njobe 2015). Most of the young people are however mainly engaged in primary agricultural production with only a few engaged

as agri-preneurs along the value chain (Sumberg 2021). Other studies have shown that young people's participation in agriculture varies across the continent and ranges from just over 27% of the entire population of young people (in Nigeria) to over 63% (in Niger) (Maïga et al. 2015, cited by Ameyaw and Maiga 2015). Furthermore, there is evidence of the existence of agri-preneurial intentions amongst agricultural university graduates (see Bosompem et al. 2017; Jemal 2017; Kaki et al. 2023). Although these studies demonstrate the potential of agri-entrepreneurship as an opportunity for galvanizing youth engagement in the sector, most have small sample sizes, hence generalization to SSA is difficult. Furthermore, they contradict findings from Sumberg et al. (2017); Elias et al. (2018); Geza et al. (2021) and Chipfupa and Tagwi (2021) who show that most young people in SSA aspire for livelihoods outside the agriculture sector. Furthermore, whether the agri-entrepreneurial intentions manifest after university graduation or are also found amongst school-leavers and certificate holders; the extent to which those that start agribusinesses are satisfied with the level of renumeration; and whether those who aspire for wage employment also end up starting agribusinesses due to a lack of wage employment opportunities, are all areas requiring further research.

In terms of actual opportunities for the engagement of women and young people, we highlight a few based on the review of the literature and engagement with women and young people in the action research in Kenya. First, there are opportunities for service provision to farmers with women and young people potentially able to provide bundled, paid for and value-added services. We have given examples of some of these services from across the continent in this paper, hence this is something that women and young people are already doing. But there are many remote and under-served communities in Africa that can benefit from such services (Davis et al. 2020), and which are essentially an untapped opportunity for agri-preneurship. Although remote communities represent both an opportunity (to serve farmers struggling to access inputs and advice) and challenge (in that density of clients in an area is low), service provision can take two different pathways. It can be either direct via support to farmers to improve primary production (land preparation, input provision, spray service provision etc.) or service provision through micro-enterprises along agricultural value chains (e.g. market facilitation, aggregation, transportation, etc.). Both these pathways are feasible as evidence exists of farmers' willingness to get such services from private providers including women and/or young people (OECD 2018; Adebayo and Worth 2022).

Second, there is limited availability yet high demand for extension services by farmers, especially in remote and under-served areas (Mbo'o-Tchouawou and Colverson 2014). Women and young people can therefore facilitate the delivery of quality agricultural last-mile extension services, training and information to farmers within their communities as village-based advisors or community-based facilitators (Kansiime et al. 2018). However, as willingness-to-pay for extension services is low, these must be bundled with other services that farmers are willing to pay for e.g. seed, fertilizer and low risk plant protection products (Ajayi 2006; Horna et al. 2007; Ali et al. 2020; Hidrobo et al. 2022; Tesfaye et al. 2023). Third, young people in Africa are tech-savvy (Counted and Arawole 2015) with a strong entrepreneurial mindset (Dodaro 2023), hence they can benefit from delivering services and goods using digital tools and emerging technology (Cueto et al. 2022). Apart from delivering services, women and young people can also be supported to establish high-value agribusinesses related to commodity production, with a focus on the production of crops that require small pieces of land, at low capital and shorter maturation periods and with readily available markets. Such support needs to include on-going technical backstopping and mentorship. This focus would align to the realities and challenges faced by women and young farmers in Africa (Chinsinga and Chasukwa 2012; AGRA 2015; Kidido et al. 2017; Elias et al. 2018). There is also an opportunity to engage in the production and/or manufacturing of inputs (such as seed, organic fertilizer and biological control agents).

These opportunities demonstrate that engagement of women and young people in agriculture service provision has the potential to address prevailing economic, social and environmental challenges, fostering a resilient and inclusive sector. But tapping into the available opportunities requires targeted investment, financing and market linkages, coherent policies, and technical and business modelling capacity enhancement (Chinomona et al. 2020).

Conclusion and policy recommendations

This study has combined a global desk review of both published and grey literature with insights from an ongoing action research in Kenya to provide insights on the main characteristics and benefits as well as the prevailing shortfalls and gaps in business models for engaging women and young people in agricultural service provision in Africa.

It is evident from the study that the engagement of African women and young people in agricultural service provision is not a panacea to the challenges they face. However, it is a step in the right direction, especially in those cases in which efforts are made to ensure they are engaged as agricultural service providers in a manner

that is self-sustaining via market-driven efforts. Benefits of engaging women and young people in agricultural service provision include economic empowerment via the establishment of entrepreneurial activities, job creation and upskilling/capacity building. The latter has been seen to result in greater social networking, increased self-esteem and improved confidence of the women and young people engaged. For sustainability, any efforts to engage women and young people in agricultural service provision must recognize the diversity of African farming communities, markets and value chains in which women and young people must serve. In addition, there is need to recognize the heterogeneity of the service providers themselves—in terms of both technical and soft skills, life stage and aspirations. Furthermore, the many factors confounding African agriculture in general, including the policy environment, prevailing market systems and the vagaries of climate change must be taken into account when developing and implementing initiatives for engaging women and young people as agricultural service providers.

For sustained and effective engagement of women and young people in agricultural service provision, there is need for multi-sectoral inter-institutional collaboration. This requires long term dedicated funding from governments and development partners. Dedicated funding should include components for continuous capacity building as well as provision of low-cost credit for the service providers. Any capacity building programme should budget to provide potential service providers with multiple skills, for them to respond effectively to the evolving needs of their communities, value chains or industry, thus enabling them to earn a sufficient level of income over a cropping season. In addition, there is need for buy-in from industry and the private sector to deliberately incorporate women and young people in their business plans and marketing networks. This requires a clear articulation of how the market-driven approach would contribute to the bottom line of the agribusiness while concurrently tapping into a locally available and underutilized human resource.

Future research should focus on increasing the evidence base to understand if successes with inclusion of women and young people in agricultural service provision has an influence on agricultural policy—hence catalysing scaling up and out and impact at scale. There is also need to rigorously assess the extent to which successful agricultural service business models are engendered—given the prevailing gender gap in the agricultural sector and the fact that service provision in agriculture is still predominantly delivered by men (Quaye et al. 2019). Such research should aim to contribute to the identification of comprehensive strategies for training and engagement of women, young or otherwise, as agricultural service providers and for increasing women's access to agricultural services once they are made available. This research should also aim to understand how promoters can work to overcome the socio-cultural barriers, institutional constraints and financial bottlenecks that make it harder for women to enter or to stay in agriculture service provision in Africa. Finally, there is need for robust transdisciplinary research to ground truth the various insights emerging from the action research reported in this study as well as similar numerous efforts available as grey literature. Focus should be on quantifying actual renumeration to service providers, and clientele's (farmers) willingness-to-pay for services rendered by local women and young people versus their willingness-to-pay for services rendered by other service providers. In addition, efforts should be made to qualify what personal characteristics and behaviours are key for success in agricultural service provision in an African agrarian context. There is also a need to measure and quantify impacts at farmer level of the engagement of women and young people as agricultural service providers.

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Author contributions
MK: conceptualization, methodology, writing, visualization. CS: conceptualization, writing. MB: field data collection, action research implementation. FC: field data collection, action research implementation. MK: conceptualization, paper review. JM: project administration, research supervision, data curation. DR: conceptualization, visualization, review. LL: field data collection, action research implementation. DM: visualization, paper review.

Availability of data and materials
There is no data associated with this work.

Declarations

Ethics approval and consent to participate
Secondary data was used to meet study objectives. Participants in the action research were informed, at the onset of the work, that the work is voluntary, and they are free to leave or drop out of the action research at any point in time.

Consent for publication
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