Enhancing Smallholder Farmers' Performance: An Integrative Review of Zimbabwe's Goat Value Chain in the Context of Regional Agricultural Trade

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ABSTRACT

The competitiveness of agricultural value chains is crucial for effective trade participation, particularly under the new African Continental Free Trade Area (AfCFTA). This study comprehensively assesses the value chain of goat smallholder farmers, exploring its current state and key competitiveness drivers in order to promote farmers' integration into local and regional value chains like AfCFTA. Using a descriptive research design and pragmatic integrative review, the research incorporated both qualitative and quantitative peer-reviewed literature, along with pertinent grey literature. Findings revealed substantial untapped potential in Zimbabwe's goat value chain, offering opportunities to enhance livelihoods, especially for subsistence farmers, youths and women. Nevertheless, enduring challenges persist, encompassing low investment, the absence of a robust goat farming business technical foundation, lack of cost-effective commercial breeds, insufficient market organisation, high input costs, limited financial access and lack of an enabling environment. The following six key drivers for smallholder farmers' performance and value chain enhancement were identified: improving market access, production capitalisation, government policy, capacity development, finance, and multi-stakeholder platforms. Unfortunately, these factors are currently inadequately addressed in the goat value chain. The study advocates for a holistic agri-food system approach for sustained goat value chain transformation. The findings of this study make clear the need for a strategic focus on the identified drivers to inform a transformative policy direction, contributing to Zimbabwe's broader economic development. Lastly, the research encourages active citizen participation in goat farming.

Keywords: goat value chain, smallholder farmers, commercial breeds, production capitalisation, market access, goat agribusiness

Introduction

Sustainable agricultural transformation and agriculture trade lie at the heart of inclusive economic development (Nhapi, 2022). Regional trade agreements like the African Continental Free Trade Area (AfCFTA) offer significant agriculture trade opportunities (Commission, 2022) that can immensely benefit Zimbabwean farmers, including the often excluded smallholder farmers (van Berkum, 2021). Integrating these farmers into modern local, and eventually, regional value chains is essential for sustainable development, poverty alleviation and economic growth (Seid, 2021; Fusacchia *et al*., 2022).

For smallholder livestock farmers in Zimbabwe, value chain integration and performance enhancement remain a challenge, requiring the reassessment of existing models (Chamboko & Mwakiwa, 2016). Ndlovu *et al*. (2020) argue that despite smallholder farmers being custodians of 97% of the national goats, 80% of all livestock (which produce leather and meat) and 50% of agricultural land

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(Kuhudzayi & Mettos, 2018), their lack of integration in prime value chains needs attention. Furthermore, research on smallholder farmers has noted the need for access to extension services, markets, finance, inputs and draft power as pivotal to their commercialisation and productivity improvement (Rubhara & Mudhara, 2019; Bandason *et al*., 2021; Ndlovu *et al*., 2020).

van Berkum (2021) underscores the need for successful inclusion through heightened domestic production, reskilling, diversification of production and markets, bolstering competitiveness and improving market access. Similarly, Seid (2021) and Bandason *et al*. (2021) have echoed the role of government in reducing transaction costs through trade facilitation, farmer empowerment and strategic investments in physical infrastructures such as ICT networks, roads, energy and storage facilities. Strategies to enhance goat value chain competitiveness must address the unique needs of 80% of small-scale farmers in Zimbabwe (Chawarika *et al*., 2022; ZimTrade, 2022), aligning with the potential positive trade outcomes under AfCFTA.

The study's focus on the goat value chain aimed to provide a comprehensive understanding and identify opportunities for improvement, contributing to a limited literature on trade and goat smallholder farmers in Zimbabwe. Through functional analysis, sustainability assessment and identification of key performance enhancement and integration drivers, the research aimed to identify policy opportunities and strategies for successful smallholder farmer integration, empowering them to capitalise on agricultural trade opportunities. The researcher anticipates that these findings will guide farmers and farmer organisations in navigating agricultural trade opportunities while enhancing overall performance.

Intergrative Review Methodology

This study employed a descriptive research design to assess the status of goat value chains. The descriptive research design, which aims to elucidate the nature and attributes of research phenomena (Coy, 2019), best aligns with the primary objective of portraying the status of goat value chains, encompassing opportunities, gaps and potential interventions. The review incorporated both quantitative and qualitative studies to comprehensively depict the value chains under study. Lessons from other countries were examined through a thematic literature review procedure. The procedure for selecting journal articles, and integrative review steps are delineated as indicated in Figure 1.

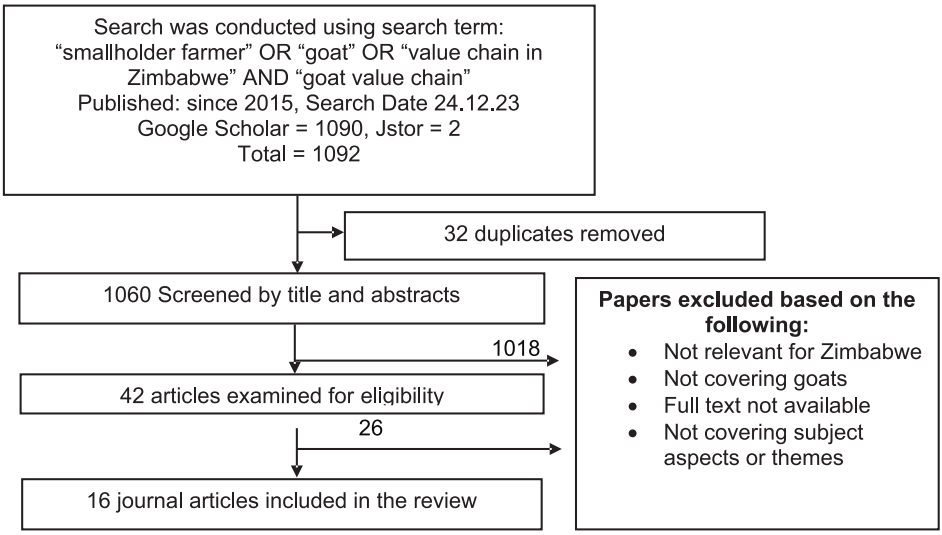


Figure 1: Defined procedure for goat value chains integrative review

Additionally, to compile a comprehensive list, government reports, development agencies and intergovernmental organisations were extensively searched, using Google. Key terms for the search included "smallholder farmers goat value chains", "goat value chains development", "goat agribusiness" and "goat production in Zimbabwe". Google Scholar served as the primary platform for scholarly work search, offering access to various libraries, making it suitable for comprehensive goat literature exploration across multiple databases.

The integrative review followed the selected value chains for development (VCA4D) methodology's elements as shown in Figure 2 (Fabre, 2021; Avadí *et al*., 2022).

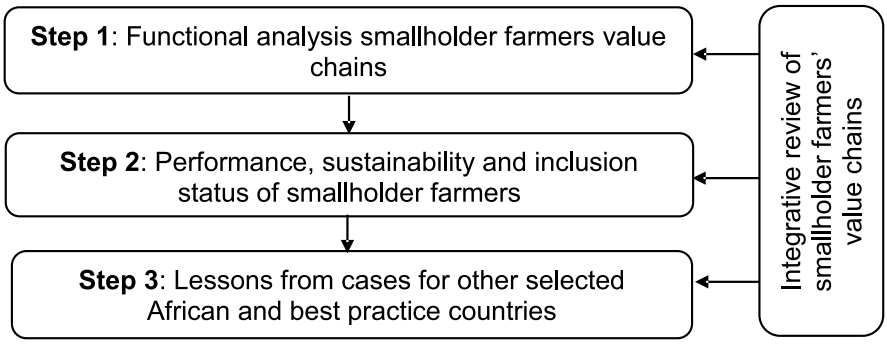


Figure 2: Steps that guided the integrative review

The choice of an integrative review facilitated a holistic perspective by synthesising diverse viewpoints from various research methods. In contrast to the constrictions inherent in a systematic review, the integrative approach empowered a more resilient analysis, fostering creative data collection from a broad spectrum of disciplines and methodologies (Snyder, 2019).

Review Results

Functional Analysis

Key Features of Goat Value Chain

The place of goats in the Zimbabwean and global economy is rapidly changing. Locally, chevon (goat meat) consumption is rapidly increasing, and goats represent an important source of livelihood for smallholder farmers (Sibanda *et al*., 2022). Goats are mainly important for meat, milk and leather, and as a source of both regular and emergency income for smallholder farmers (Ndlovu *et al*., 2020). They are important for smallholder farmers' food security and nutrition (VALUE, 2019). Crucially, the goat value chains exhibit substantial potential to meet export demand, particularly from Angola, South Africa and the Middle East (Ndlovu *et al*., 2020; VALUE, 2019; ZimTrade; 2022). This great potential needs to be developed and unleashed to the benefit of the Zimbabwean economy at large (VALUE, 2019).

The national goat population has steadily increased from approximately three million in the year 2012 to around four million in 2015, with further growth to nearly five million by the year 2020 (Dube *et al*., 2017; Ndlovu *et al*., 2020). Notably, 97% of this population is owned by smallholder farmers, who also possess 50% of agricultural land, providing them with a comparative advantage in commercial goat production (Kuhudzayi & Mettos, 2018; Ndlovu *et al*., 2020). Despite this, nearly 50% of rural households are engaged in goat farming, but lack commercial goat breeds such as Matabele, Mashona, Boer, Saanen and Angora goats, and also face many constraints (Ndlovu *et al*., 2020).

Past research shows constraints in goat farming, attributed to suboptimal management practices and elevated input costs (particularly drugs), leads to challenges like heightened kid mortality and deficient marketing strategies *(*Dube *et al., 2017;* Sibanda *et al*., 2022; Ndlovu *et al*., 2020). Sibanda *et al*. (2022) emphasise predominant informal market participation, which results in limited value accrual for impoverished farmers. Current production levels fall short of satisfying both regional and local demands (Dube *et al*., 2017). In this regard, VALUE (2019) underscores the need for substantial production enhancements, aiming to meet export requirements, with estimations indicating a weekly necessity of 1 500 goats for the United Arab Emirates and 25 tonnes for Angola alone. Consequently, initiatives to elevate production efficiency and integrate smallholder farmers are imperative.

Goats are widespread across the country, with a concentration in drier regions, particularly in agro-ecological regions IV, such as Matabeleland, Masvingo, and parts of Manicaland and Mashonaland Central and Mashonaland East (Dube *et al*., 2017). Matabeleland exhibits a notably higher average of approximately 45 goats per household compared to other provinces where some have as few as four goats per household (VALUE, 2019). In arid and semi-arid communal regions, goats are valued assets for their resilience in adverse conditions, notably during droughts (VALUE, 2019). These regions, especially Matabeleland which historically has been marginalised economically, can benefit from the economic empowerment and rural industrialisation associated with promoting goat farming (Tom, 2022; VALUE, 2019).

Goat Value Chain Organisation and Governance

The goat value chain encompasses input suppliers, production, trading, slaughter processing, retailing and final consumption (Dube *et al*., 2017). Input providers such as breeders, feed suppliers and medicine providers play a crucial role in this chain (Dube *et al*., 2017). Smallholder farmers are the primary producers, catering for both subsistence and commercial needs. They rely on a mix of informal and formal channels for selling their produce (Homann-Kee *et al*., 2022).

Trading channels, predominantly managed by middlemen, auctioneers and other farmers, form the backbone of the value chain. Middlemen, operating with considerable bargaining power, claim a significant share of the value — approximately 50% to 55%, leaving farmers with a modest 10% to15% (VALUE, 2019). Utilising preferential negotiations over auction systems, these traders may purchase goats for US$30 to US$60, subsequently selling them at substantial profits, either after fattening or immediately (Dube *et al*., 2017).

Transportation to slaughterhouses or distant markets proves inefficient and costly for farmers (VALUE, 2019). Many local councils impose levies on goat sales, thus increasing transaction costs. Cumbersome police clearance in providing movement permits complicates the selling process (Dube *et al*., 2017). Animal welfare and movement permits are regulated by the Department of Veterinary Services, while the Department of Agricultural, Technical and Extension Services (AGRITEX) offers market information and advisory services to farmers (Dube *et al*., 2017).

Slaughter processing and grading for the market occur in both formal and informal abattoirs such as Sox and Derrick Abattoirs in Matabeleland which supply butcheries and retail outlets (Dube *et al*., 2017). Goats may be auctioned, sold alive or transported for chevon export from certified abattoirs (Homann-Kee *et al*., 2022). Alternatively, chevon is sold to retailers, marking the final step in meat consumption. Service provision primarily relies on extension advisory services and the Department of Veterinary Services (Dube *et al*., 2017). However, financial services are difficult to access for farmers who frequently lack collateral for credit (Dube *et al*., 2017).

The goat value chain is inadequately institutionalised, lacking clear marketing channels, farmer groups and innovation platforms to mitigate information asymmetry (Homann-Kee *et al*., 2022).This results in weak value chain linkages, making it difficult for smallholder farmers to secure guaranteed or organised markets in rural areas (Homann-Kee *et al*., 2022). Consequently, smallholder farmers often rely on distant urban markets, thereby incurring high transport costs and facing profit exploitation by traders (VALUE, 2019). Approximately 60% of smallholder farmers resort to informal market channels (Dube *et al*., 2017), and this contributes to a poorly coordinated value chain marked by elevated transaction costs and deficient price quality mechanisms (Homann-Kee *et al*., 2022).

The value chain confronts a deficiency in governmental support for veterinary services and drug supply (Mhlanga *et al*., 2018). However, recent collaborative efforts between the government, non-governmental organisations and aid agencies aim to fortify these chains, recognising their substantial potential. This has resulted in the launching of initiatives such as the Zimbabwe Agriculture Growth Programme (ZAGP), the Zimbabwe Resilience Building Fund (ZRBF) and the Zimbabwe Livelihoods and Food Security Programme (Homann-Kee *et al*., 2022). Specifically, under ZAGP, ongoing programmes like the Value Chain Alliance for Livestock Upgrading and Empowerment (VALUE), a European Union-funded public-private partnership, have been launched. The focus is on training goat farmers, improving breeds, reducing production costs, ensuring animal nutrition and advancing market development (VALUE, 2019). These efforts operate under the leadership of AGRITEX and the Department of Veterinary Services (VALUE, 2019).

Moreover, past research also shows that enhancing market structure and promoting information flow encourage market-oriented behaviour among farmers, and this fosters improved inputs adoption such as better breeds, feed and health practices (Dube *et al*., 2017; Homann-Kee *et al*., 2022). This, in turn, contributes to improved income levels and increased retained investment in the goat farming business (Homann-Kee *et al*., 2022). However, the goat markets lack an effective enabling environment owing to inadequate regulation and a lack of national goat policy, highlighting the need for government intervention aimed at refining market structures and ensuring equitable value distribution (Sibanda *et al*., 2022; VALUE, 2019).

Sustainability, Performance and Inclusion of Smallholder Farmers in Goat Value Chains

Production Performance

Presently, smallholder farmers' goat production is predominantly subsistence-oriented, despite ongoing efforts from governmental and non-governmental entities striving for commercialisation (Homann-Kee *et al*., 2022; Sibanda *et al*.,

2022). Consequently, the productivity of smallholder farmers in goat farming falls below commercial standards (Homann-Kee *et al*., 2022). The majority of production systems adopt free-range grazing practices, accounting for over 50%, while only a limited proportion engages in semi-intensive and intensive methods (Dube *et al*., 2017). Intensive systems, primarily geared toward commercial purposes, involve indoor goat management with provisions for food, water and other inputs, focusing on fattening strategies (Mhlanga *et al*., 2018).

Production faces numerous constraints, including inadequate financing, subpar buck breeding traits, low buck-doe ratios, expensive inputs, poor animal husbandry practices and unfavourable market prices which discourage value chain investments (Mhlanga *et al*., 2018). Nationally, the 142 Department of Veterinary Service centres suffer from understaffing and a shortage of livestock drugs, hampering effective support (VALUE, 2019). Kid mortality, exceeding the acceptable standard of 10%, can reach as high as 30% (GoZ, 2022). Additionally, the lack of security in free-range grazing and inadequate housing renders goats susceptible to theft and predation by wild animals in rural areas (Homann-Kee *et al*., 2022; Mhlanga *et al*., 2018). The recurring challenges of droughts and climate change further strain feed and water availability, impacting the productivity of goat farming systems (Mhlanga *et al*., 2018).

Commercialising goat farming faces difficulties with high breeding stock prices and a lack of organised markets (VALUE, 2019; Musara *et al*., 2013; Mhlanga *et al*., 2018). A substantial 80% of goat marketing occurs through informal channels (Sibanda *et al*., 2022). Breeding stock, notably three-month-old Boer goats, incurs up to US$100 in production costs, impacting breeders' and farmers' accessibility (VALUE, 2019). Financial constraints affect research centres (for example, Matobos Research Centre, Grassland, Chris Grant, Zvikomborero Farm), breeders and farmers. Notably, the country lacks certified breeders for commercial goat breeds like Boers (VALUE, 2019). However, Homann-Kee *et al*. (2022) note that technologies for value addition of goat products like milk, hides and leather products have the potential to turn the fortunes of farmers and their business capitalisation.

Economic Performance

Past research highlights the lucrative nature of commercial goat production systems, emphasising their profitability and economic viability (Musara *et al*., 2013; Ndlovu *et al*., 2020; Sibanda *et al*., 2022; Homann-Kee *et al*., 2022). The gross profit margin can reach up to 40% (VALUE, 2019). In terms of national economic contribution, Sukume (2016) estimates that all livestock collectively contributes approximately 22% to the overall agricultural gross domestic product (GDP), with goats specifically contributing about 19% of the livestock agricultural GDP (VALUE, 2019). The growth and development of the goat value chain hold substantial potential to positively impact the lives of rural communities and contribute significantly to overall economic growth and development.

Goat profitability hinges significantly on factors such as breed type, with indigenous breeds generally yielding lower carcass weights compared to their exotic commercial counterparts, and this impacts their respective market prices. Mataveia *et al*. (2021) report that mature Boer carcasses average around 65 kgs and can reach up to 140 kgs, while local breeds like Matabele range from 30 kgs to 50 kgs, and Mashona from 20 kgs to 50 kgs. Local breeds typically fetch no more than US$100, whereas exotic commercial breeds can command prices as high as US$600, with a robust market for Boer and Kalahari Red breeds both locally and regionally (VALUE, 2019). Matabele-type Chevon has an excellent market in South Africa (VALUE, 2019). Commercial breeds exhibit high reproductive rates, with a nearly 60% chance of conceiving twins and triplets within three reproduction cycles every two years (Mataveia *et al*., 2021). Notably, effective market organisation is crucial for equitable value distribution in the goat value chain (Dube *et al*., 2017).

Zimbabwe holds significant potential for exporting goat meat within the region, boasting a competitive goat population in the SADC countries. According to Mataveia *et al*. (2021), Zimbabwe's 4.7 million goats position it favourably among neighbouring countries. In SADC, Mataveia *et al*. (2021) estimate that Angola has 4.7 million, Botswana 1.4 million, Malawi 8.9 million, Mozambique 3.7 million, Namibia 1.9 million, South Africa 5.2 million, Eswatini 2.4 million, Tanzania 18.9 million and Zimbabwe 4.7 million goats. Zambia has 5.7 million goats (Mamo, 2019). This advantageous position aligns with the export opportunities presented by AfCFTA.

Despite this potential, a major challenge to economic viability lies in the disproportionate value extraction by middlemen and the absence of financial and insurance support for goat businesses (VALUE, 2019). Most value-chain participants rely on self-financing, and the lack of formal records, collateral, and banking history discourages banks with low-risk appetites from investing in or lending to these small players (VALUE, 2019). Addressing this issue requires tailored financial solutions and insurance for smallholder agriculture, along with leveraging technologies such as blockchain for enhanced business capitalisation.

Smallholder Farmers Inclusion

Small ruminants have endured historical neglect in terms of governmental prioritisation, as elucidated by Sukume (2016). Consequently, the absence of robust institutional frameworks catering for goat farmers' integration into expansive value chains is not an unexpected phenomenon, thus rendering the business largely informal and predisposed to tax aversion (Dube *et al*., 2017). The predominant portion of the national herd, constituting 90%, comprises indigenous stock maintained at subsistence levels (Musara *et al*., 2013; Mhlanga *et al*., 2018).

The goat industry presents an immense prospect for fostering the involvement of women and youth in agribusiness, given that they possess ownership stakes in approximately 75% of the total herd, as underscored by the findings of VALUE (2019). It is, therefore, patently evident that the imperative for the establishment of goat farmer organisations, integrative institutions, regulatory frameworks and governmental policies is long overdue. The strategic implementation of these measures is vital for unleashing the latent economic opportunities within the goat farming sector and, concurrently, promoting inclusivity among marginalised demographic segments such as women and youth.

Social and Environmental Sustainability

Goats are perceived as the domain of women, embodying a form of feminine livestock (Dube *et al*., 2017). This assertion is corroborated by VALUE's (2019) estimation that over 50% of women in Zimbabwe are proprietors of goats. Despite this, cultural norms continue to encumber complete economic empowerment for women, particularly in the sphere of decision-making, as evidenced by the prevalent practice of seeking male consultation for the sale of their livestock (Dube *et al*., 2017). Youth engagement in goat husbandry, defined by individuals aged 18 to 35 years, has witnessed an ascendant trajectory, with at least one-fourth of participating farmers falling within this demographic (VALUE, 2019).

In its current state, the goat value chain is embryonic, given that it is marked by an overwhelming prevalence of informal employment arrangements that fall short of meeting the stipulated recommendations of the National Employment Council (VALUE, 2019). Moreover, the informality inherent in the chain compromises the rigorous adherence to food safety standards and veterinary public health requisites, as noted by Homann-Kee *et al*. (2022). This informalisation, particularly manifest in a disrupted cold chain, not only jeopardises the health and well-being of consumers, but also hampers opportunities for contributing to export initiatives (Dube *et al*., 2017).

From an environmental sustainability standpoint, ruminants, with goats being chief among them, emerge as prominent contributors to methane gas emissions — a potent greenhouse gas (Svinurai *et al*., 2018). Consequently, the envisioned development of the goat value chain carries the potential for a negative externality, potentially exacerbating the national emissions attributed to goats (Svinurai *et al*., 2018). Establishing intricate trade-offs between emissions and the growth of goat stocks, and their implications for the Paris Agreement Nationally Determined Contributions, demands further scholarly inquiry.

Addressing the environmental impact of goat husbandry, Patón (2021) underscores the tendency of goats to engage in deep-root grazing, an activity with potential ramifications for biodiversity in arid regions. While the existing body of research remains inconclusive regarding the extent of damage versus vegetation recovery during rain seasons, it is asserted that goats play a pivotal role in impeding the growth of invasive species, while concurrently offering significant contributions

in the form of goat manure (Patón, 2021). On a global scale, goat manure is a substantial source of nitrogen, providing 23% of the gross nitrogen input in mixed cropping systems (Mataveia *et al*., 2021).

Key Success Factors, and Conditions for Enhancing Smallholder Farmer Performance and Integration: Lessons from Other African Countries

Predominant goat meat producers in Africa are found in the Mediterranean and Sahel regions, notably within the Common Market for Eastern and Southern African Countries (COMESA) and the Community of Sahel-Saharan States (CEN-SAD) regional blocks in countries such as Chad, Sudan, Mali, Ethiopia, Kenya and Egypt (AU, 2013; Mamo, 2019). These nations exhibit a substantial economic impact from the livestock sector which contributes between 10% to nearly 50% to the overall agricultural GDP, with Sudan reaching as high as 80% and Mali up to 44% (AU, 2013). Mali has 32 million small ruminants, including goats (Wane *et al*., 2020), and Sudan, the second largest livestock-rich country after Ethiopia in Africa, has 32.2 million goats (Wane *et al*., 2020; Ibrahim *et al*., 2022).

The exports and livestock populations are substantial. Sudan exports an average of 200 000 live goats and 922 tonnes of goat meat annually (based on 2016 to 2020 data) to countries such as Egypt, Libya and the Middle East (Mamo, 2019; Ibrahim *et al*., 2022). Ethiopia, on the other hand, has a substantial population of 51 million goats (Mekuriaw & Harris-Coble, 2021). Over the period 2013 to 2018, it exported around three million live cattle, sheep, goats and camels, valued at US$770 million in formal markets, primarily to Somalia, Kenya, Egypt, Sudan, Djibouti and the Middle East (Mamo, 2019). This is besides annual meat exports which range between 19 000 to 20 000 tonnes, generating revenue close to US$100 million (Panel, 2020; Mamo, 2019). It also substantially exports hides and leather products (Legese *et al*., 2014; Mekuriaw & Harris-Coble, 2021).

Kenya and Uganda are also big players. With a goat population of 26.8 million, Kenya is a leading exporter of processed meats and chilled carcasses within COMESA (Mamo, 2019; Mbae *et al*., 2020; Wane *et al*., 2020). Based on the 2016 to 2019 data, its average annual exports of live sheep and goats total US$15.54 million (Mamo, 2019). The main export destinations are the Middle East and COMESA countries such as Comoros, Seychelles, Mauritius, Rwanda, Tanzania, Uganda, Egypt, Somalia and Ethiopia (Mbae *et al*., 2020). Uganda has 16 million goats and exported 187 000 kgs of livestock meat (beef, mutton and chevon) to destinations such as the Democratic Republic of Congo (DRC), Sudan and the United Arab Emirates in 2016 (Mamo, 2019). Additionally, exports of live goats can be as high as 9 000 annually destined for Rwanda, Burundi and the DRC (Mamo, 2019; Mbae *et al*., 2020). Goat production and export in these countries hold prime importance, and understanding the successful integration of smallholder farmers into commercial value chains in these livestock-focused countries becomes imperative.

The Mediterranean and Sahel regions emphasise the implementation of the African Union's (AU) policy framework for pastoralism in Africa (AU, 2013). These nations have made strides in implementing principles that revolve around reforming land tenure, land rights and land use planning (Armson *et al*., 2020). Furthermore, there is a focus on livestock mobility policies bolstered by robust disease surveillance and certification systems, improved public veterinary services, and the institutionalisation of risk management systems (AU, 2013; Namonje-Kapembwa *et al*., 2019). Other critical aspects encompass market organisation and regulation, tailored financial and risk-based insurance services, support for research, innovation and advisory services, and the strengthening of women's roles alongside the protection of natural resources (AU, 2013; Armson *et al*., 2020).

Nonetheless, diverse goat value chains across various African nations encounter similar challenges such as a lack of market price competitiveness, deficient veterinary services and disease management, inadequate infrastructure, and markets dominated by traders in an oligopolistic fashion (Abdinasir *et al*., 2021; Armson *et al*., 2020; Namonje-Kapembwa *et al*., 2019). The responses from these countries have exhibited parallels both at the intergovernmental and national levels. Government interventions primarily revolve around cultivating an enabling environment through the formulation of value chain development policies, deliberate inclusion of smallholder farmers, and the implementation of value chain upgrading strategies (Mayberry *et al*., 2018; Armson *et al*., 2020).

In Ethiopia, collaborative efforts between the government and development agencies have manifested in initiatives such as business incubation and youth entrepreneurship development training, cross-breeding programmes, and enhancements in livestock nutrition (Mayberry *et al*., 2018). In addition, the presence of established associations like the Ethiopian Meat Producer and Exporters Association and the Ethiopian Livestock Traders Association promote and facilitate exports within the COMESA framework (Mamo, 2019; Panel, 2020). In Morocco and Liberia, noteworthy successes have been observed where community-based breeding improvement programmes involving the cross-breeding of Boers and local goats, were meticulously planned, designed and executed by smallholder farmers in collaboration with technical service providers (Karnuah *et al*., 2018).

Sudan, on the other hand, has predominantly focused on providing input subsidies to bolster farmer asset capitalisation (Hasan, 2021). Additionally, key exporting stakeholders formed representative bodies that actively enhance livestock trade regionally and internationally, such as the Sudan Chamber of Commerce and Industry, and the North Eastern Africa Livestock Council (NEALCO) (Mamo, 2019; Mtimet *et al*., 2020). NEALCO, with members from Tanzania, Kenya, Djibouti, Ethiopia, Eritrea, Egypt, Sudan, South Sudan, Uganda, DRC, Rwanda, Burundi and Somalia, fosters coordination, information-sharing and advocacy for livestock

trade (Mamo, 2019; Mtimet *et al*., 2020). With such regional organisational architecture, these countries stand to benefit more from AfCFTA.

In establishing a robust veterinary services framework, Kenya has emerged as an exemplar for several Eastern African nations (Abberton *et al*., 2021). The implementation of specific policies and institutional mechanisms, including the establishment of the Kenya Centre for Disease Control and the adoption of the One Health approach model, have played a pivotal role in advancing animal health (Munyua *et al*., 2019). Kenya has demonstrated a commitment to comprehensive One Health training programmes for veterinary officers, offering a two-year Masters programme and fortifying surveillance and early detection systems (Munyua *et al*., 2019). The devolved governance system, coupled with enhancements in veterinary laboratories, mobile phone-based surveillance systems, and strategic feed and vaccination initiatives in both Kenya and Ethiopia, have emerged as integral pillars for enhancing support across the livestock value chain, including the goat sector (Abberton *et al*., 2021).

Kenyan exports are supported by numerous export-standard abattoirs, including the Kenya Meat Commission (KMC), Choice Meats and Hurling Butcheries, which produce chilled carcasses, prime cuts and processed meat for both local and export markets (Mamo, 2019; Ng'asike *et al*., 2020). Various livestock trade promotion platforms such as the Kenya Livestock Producers Association (KLPA), Kenya Livestock Marketing Council (KLMC) and North East African Livestock Council (NEACO) Kenya Chapter, play pivotal roles in enhancing production and stakeholder integration into local and regional export networks (Mamo, 2019). Private companies lead in exporting, along with meat producers cooperative societies and other associations (Mamo, 2019; Ng'asike *et al*., 2020).

Tanzania has achieved notable success in value chain upgrading, particularly in the commercialisation of goat milk through initiatives like the Twawose Cooperative, where goat milk is transformed into yoghurt (Msalya *et al*., 2021). Asset capitalisation programmes, involving the introduction of Norwegian dairy goats, coupled with the empowerment of farmers through the ownership of milk collection centres and processing equipment, have proven effective in elevating the goat value chain (Lie *et al*., 2012; Msalya *et al*., 2021). Another avenue for value addition and value chain upgrading is observed in the utilisation of goat hides (Msalya *et al*., 2021).

Vertical integration within the value chain has emerged as a pivotal strategy in the Sahel region, facilitated by the establishment of multi-stakeholder innovation platforms that converge all relevant stakeholders (Ayele *et al*., 2012). This collaborative approach has given rise to the formation of cooperatives or goat farmer business groups, as well as cooperative unions among goat farmers, exemplifying a form of vertical integration observed in countries such as Ethiopia, Kenya, Uganda, and even further afield in Nepal (Gezahegn *et al*., 2020; Neupane *et al*., 2022). The transformative impact of cooperatives extends to stimulating

commercial goat farming, fostering fodder farming, adopting innovative fodder technologies, and coordinating collective marketing efforts along with organising markets (Neupane *et al*., 2022; Ayele *et al*., 2012). Gezahegn *et al*. (2020) provided compelling evidence that these community-initiated cooperatives outperform those initiated by NGOs and governments.

In the context of goat farming risk mitigation, the drought index insurance for resilience in the Sahel and Horn of Africa has played a central role in bolstering smallholder capitalisation and hedging against drought-related risks (Kahiu *et al*., 2021). The widespread adoption of index-based livestock insurance (IBLI), as seen in countries like Kenya, Uganda, Ethiopia and Mongolia, has provided substantial support to smallholder farmers during periods of drought. This has resulted in payouts exceeding US$10 million in Kenya and Ethiopia for the drought periods of 2016 to 2017 and 2019 (Abberton *et al*., 2021).

Beyond risk mitigation, these insurance mechanisms have facilitated farmers' access to credit from financial institutions, primarily microfinance institutions (Fisher *et al*., 2019). Notably, various insurance facilities are blended with additional offerings, such as the Agriculture and Climate Risk Enterprise (ACRE) programme in Rwanda, Kenya and Ethiopia (Greatrex *et al*., 2015). This blended approach not only provides financial security during challenging periods, but also enables farmers to access loans for investments in technologies that enhance productivity and other climate-adaptive measures (Bobojonov *et al*., 2014; Fisher *et al*., 2019).

Efforts at the regional level to enhance goat value chains in COMESA align with the COMESA Livestock Policy Framework (Mamo, 2019). This regional policy emphasises public and private investments, livestock production, health, innovation, technology, capacity building, entrepreneurship, market access and value addition (Mamo, 2019; Boussini *et al*., 2021). COMESA supports many regional livestock trade programmes. For instance, with the support of the African Union Inter African Bureau for Animal Resources (AU-IBAR), COMESA has established the Regional Livestock Policy Hub (RLPH) crucial for effective animal health, production, capacity development, policy formulation and trade services in the COMESA region (Mamo, 2019). This innovation is now active in COMESA's seven member states: Comoros, DRC, Madagascar, Malawi, Mauritius, Seychelles and Zambia (Mamo, 2019; Boussini *et al*., 2021). COMESA has recently (2019 to 2022) supported Ethiopia, Sudan, Kenya, Uganda, Zambia, Egypt, Mauritius and Seychelles to link, collaborate and standardise livestock trading procedures and grading for improved trade value addition (Mamo, 2019).

These collaborative endeavours under COMESA uniquely position these nations to assume leadership roles in goat value chains within the framework of AfCFTA (Mamo, 2019). Additionally, it is noteworthy that numerous prominent goat-producing nations across Africa actively participate in international and inter-regional goat trade, with certain countries boasting well-established trade

frameworks. These nations may possess a comparative advantage within the context of AfCFTA. Furthermore, it is also evident that the potential for untapped market opportunities, which is expanded under the AfCFTA framework, remains substantial, underscoring the imperative for increased trade volumes and the advancement of formal trading protocols in livestock and related products.

Conclusion and Suggested Solutions

The untapped potential within the goat value chain in Zimbabwe remains to be fully harnessed, representing a lucrative and transformative business prospect for subsistence farmers, youths and women. The cultivation of this potential stands as an opportunity to elevate their livelihoods and enhance overall business outcomes. However, the existing value chain structure allocates a disproportionately meagre share, with producers receiving less than 15% of the overall generated value. Efforts towards restructuring and optimising this value chain are essential to unlock the true economic potential inherent in the goat value chain.

The value chain has many challenges, including the absence of commercially viable breeds like Boer and Kalahari Red, deficient market organisation, prohibitive costs of veterinary drugs, limited access to affordable finance and insurance, and inadequate infrastructure. Government support has historically favoured the beef sector, leaving the goat value chain under-supported. The prevailing regulatory and policy landscape further complicates business operations for goat farmers, obstructing access to new breeding stock, formal markets and commercial feeds. Critical shortcomings are evident in the absence of cold chain technologies within the value chain, coupled with lax monitoring of food safety and quality standards, thus potentially compromising compliance with export requirements.

Despite these challenges, the Zimbabwean goat value chain boasts unique strengths in the region, leveraging high goat numbers, favourable climatic conditions, and abundant land for the expansion of goat farming. Certain chevon varieties such as Matabele goats, have already secured niche markets in South Africa, serving as potential export opportunities. Markets in the Middle East, notably the United Arab Emirates and regional countries like Angola, present expansive prospects for local farmers, particularly in the context of the African Continental Free Trade Area (AfCFTA) and regional trade agreements.

Drawing insights from other African countries, it is evident that addressing goat value chain challenges requires a multi-faceted approach. Government initiatives, public-private partnerships and community engagement, have played pivotal roles in shaping and enhancing value chain development, upgrading and integration of smallholder farmers. Key strategies encompass empowering farmers, facilitating inputs supply and innovation, strengthening veterinary services, organising markets, establishing transparent pricing mechanisms, and providing financial and insurance support to smallholder farmers. These lessons provide a valuable

blueprint for Zimbabwe to address the complexities of its goat value chain and foster sustainable growth within the sector.

This review has synthesised six fundamental pillars crucial for enhancing the performance and integration of smallholder goat farmers within modern local and regional value chains. These key drivers encompass market access and organisation, production capitalisation, government policy and regulation, capacity development, finance and investment, and the establishment of multi-stakeholder innovation platforms. The following solutions are proffered for each driver.

Policy and Regulation

This review advocates for policy and regulatory interventions to address prevailing challenges in the goat value chain. The formulation of a dedicated goat policy is paramount to reducing operational costs and enhancing efficiency. Such policy initiatives should focus on developing community infrastructure, including cold chains, facilitating local farmers' integration into value chains, and formulating public procurement policies supportive of the goat industry. Additionally, the reduction of current licensing fees and levies within the goat value chain will alleviate the cost of compliance. Ensuring land security for goat farmers should be prioritised within the policy framework.

Finance and Investment

The financing landscape demands comprehensive attention to propel the goat farming sector towards sustainable growth. Short-term subsidies that do not distort the market are essential to facilitate production capitalisation, thereby addressing high transactional costs. The government is urged to establish a framework for specific smallholder farmers' finance mechanisms, coupled with other support measures for production capitalisation. Promotion of technologies like blockchain for credit collateral is also advised. The integration of financial support, particularly tailored smallholder agriculture finance bundled with index-based insurance, can significantly bolster prospects for goat farming.

Capacity Development

A critical avenue for transformation lies in enhancing the skills and capabilities of stakeholders involved in the goat value chain. At the forefront is the imperative to establish university breeding programmes to cultivate knowledge and expertise in goat research and development, thereby ensuring the availability of affordable goat breeds. Concurrently, investment in training programmes to enhance farmers' technical proficiency in goat husbandry is essential. This research noted the Zimbabwe Agriculture Growth Programme's efforts in this respect. More initiatives to nurture entrepreneurial and financial skills among farmers are deemed essential. Certified goat improvement centres, digital advisory and extension services, and training regulators on goat value chains and on health principles should be prioritised within capacity development programmes.

Multi-stakeholder Innovation Platforms (MIP)

The establishment of institutional innovations through MIPs is deemed indispensable for the transformative evolution of the goat value chain. MIPs can serve as conduits for securing finance and fostering public-private partnerships. Leveraging MIPs for connecting farmers to wider digital markets is emphasised, along with the promotion of farmer groups, cooperatives and business alliances. To fortify the impact of MIPs, the government is urged to institute these institutional mechanisms, including national farmer groups, and facilitate private sector participation in providing finance and contractual mechanisms supportive of goat farming.

Production Capitalisation

Enhancing production capabilities through augmenting access to commercial breeds such as Boer and Kalahari, veterinary drugs and land for feed growth, is indispensable. The incorporation of technology and internet access, provision of water access, and encouraging private goat farming contracting, are integral to production capitalisation.

Market Access and Organisation

Unlocking market access potentials requires a multi-faceted approach. Eliminating middlemen, establishing private off-taking arrangements for farmers, and improving goat meat hygiene standards are essential initiatives. Actions to alter customer preferences, promote local brands, establish goat auction markets and facilitate export chains are imperative. These market access strategies, grounded in a food systems perspective, necessitate systemic analysis, including system modelling to comprehend interactions, trade-offs and synergies. Identifying hotspots for private sector involvement becomes crucial for optimal impact.

References

Abberton, M. T., Abdoulaye, T., Ademonla, D. A., Aseidu, R., Ayantunde, A., Bayala, J., Cofie, O. O., Jalloh, A., Kane Potaka, J., & Lamien, N. (2021). *Priority interventions for transformational change in the Sahel*. CGIAR Research Program on Climate Change, Agriculture and Food Security Working Paper 353.

Abdinasir, U., Haji, J., & Tegegne, B. (2021). Analysis of structure, conduct and performance of live goats market: The case of pastoralists, Moyale District, Ethiopia. *International Journal of Sciences & Applied Research. IJSAR, 8*(5), 24-34.

Armson, B., Ekiri, A. B., Alafiatayo, R., & Cook, A. J. (2020). Small ruminant production in Tanzania, Uganda, and Ethiopia: A systematic review of constraints and potential solutions. *Vet Sci, 8*(1).

AU, A. U. (2013). *Policy framework for pastoralism in Africa: Securing, protecting and improving the lives, livelihoods and rights of pastoralist communities*. African Union.

Avadí, A., Cole, S. M., Kruijssen, F., Dabat, M.H., & Mungule, C. M. (2022). How to enhance the sustainability and inclusiveness of smallholder aquaculture

production systems in Zambia? *Aquaculture, 547*, 1-14.
Ayele, S., Duncan, A., Larbi, A., & Khanh, T. T. (2012). Enhancing innovation in livestock value chains through networks: Lessons from fodder innovation case studies in developing countries. *Science and Public Policy, 39*(3), 333-346.
Bandason, W., Parwada, C., Musara, J. P., Nyamushamba, G. B., & Kaseke, T. (2021). Unlocking the potential of value chains as climate change resilience strategies: Can macadamia nuts (macadamia integrifolia) offer the gateway? *South African Journal of Agricultural Extension, 49*(3), 62-75.
Bobojonov, I., AW-Hassan, A., & Sommer, R. (2014). Index-based insurance for climate risk management and rural development in Syria. *Climate and Development, 6*(2), 166-178.
Boussini, H., Wabacha, J., & Oppong-Otoo, J. (2021). *Mapping of the animal health actors and their intervention areas in Africa*. AU-IBAR.
Chamboko, T., & Mwakiwa, E. (2016). A review of smallholder dairy development in Zimbabwe 1983 to 2013: The effect of policies. *Livestock Research for Rural Development, 28*(6), 18.
Chawarika, A., Madzokere, F., & Murimbika, A. (2022). Regional trade agreements and agricultural trade: An analysis of Zimbabwe's agricultural trade flows. *Cogent Economics & Finance, 10*(1), 2048482.
Commission, A. U. (2022). Strengthening regional value chains in the African Continental Free Trade Area. In *AUC/OECD, Africa's development dynamics 2022: Regional value chains for sustainable recovery*. Paris: AUC, Addis, Ababa/OECD Publishing.
Coy, M. J. (2019). Research methodologies: Increasing understanding of the world. *International Journal of Scientific and Research Publications, 9*(1), 71-77.
Dube, S., Chakoma, I., & Bahta, S. T. (2017). *Analysis of the goat value chain in Beitbridge district of Zimbabwe*. ILRI Project Report. Nairobi, Kenya: ILRI.
Fabre, P., Dabat, M. H., & Orlandoni, O. (2021). M*ethodological brief for agri-based value chains analysis for development: Frame and Tools - Key Features.* Paris, France: Agrinatura. Available at https://europa.eu/capacity4dev/value-chain-analysis-for-development-vca4d-VCA4D.
Fisher, E., Hellin, J., Greatrex, H., & Jensen, N. (2019). Index insurance and climate risk management: Addressing social equity. *Development Policy Review, 37*(5), 581-602.
Fusacchia, I., Balié, J., & Salvatici, L. (2022). The AfCFTA impact on agricultural and food trade: A value added perspective. *European Review of Agricultural Economics, 49*(1), 237-284.
Gezahegn, T. W., Van Passel, S., Berhanu, T., D'haese, M., & Maertens, M. (2020). Do bottom-up and independent agricultural cooperatives really perform better? Insights from a technical efficiency analysis in Ethiopia. *Agrekon, 59*(1), 1-17.
GOZ, Ministry of Lands, Agriculture, Fisheries, Water and Rural Development, (2022). *Second round crop and livestock assessment report 2021/2022 season*. Available at: https://fscluster.org/sites/default/files/

documents/2022_second_round_crop_and_livestock_assessment_report_5_may_revised_1.pdf Accessed 25.12.22.
Greatrex, H., Hansen, J., Garvin, S., Diro, R., LE Guen, M., Blakeley, S., Rao, K., & Osgood, D. (2015). *Scaling up index insurance for smallholder farmers: Recent evidence and insights*. CCAFC Report No 14. Available online at: www.ccafs.cgiar.org.
Hasan, T. E. A. (2021). *Impact of agricultural production subsidy on livelihood of home farm growers, Alhigleig Village, Eastern Gezira State. Sudan.* University of Gezira.
Homann-Kee, T. S., Dube, T., Chakoma, I., Gadzirayi, C., Pfukenyi, D. M., & Dube, S. (2022). *Zimbabwe livestock market assessment report*. ILRI Project Report. Nairobi, Kenya: ILRI.
Ibrahim, A. N. A., Elimam, A. A., & Zülkadir, U. Livestock Status and Production SYSTEMS in Sudan (2022). 2nd International Conference on Sustainable Ecological Agriculture 2. Uluslararası Sürdürülebilir Ekolojik Tarım Kongresi, 2022. 245.
Kahiu, N., Vrieling, A., & Fava, F. P. (2021). A regional approach to drought index-insurance in Intergovernmental Authority on Development (IGAD) countries: Volume 3—Technical feasibility assessment. ILRI Research Report 77. Nairobi, Kenya: ILRI.
Karnuah, A., Dunga, G., & Rewe, T. (2018). Community based breeding program for improve goat production in Liberia. *MOJ Curr. Res. Rev, 1*(5), 216-221.
Kuhudzayi, B., & Mettos, D. (2018). A model for farmer support in Zimbabwe–Opportunity for change. *Cornhusker Economics 307060.*
Legese, G., Haile, A., Duncan, A. J., Dessie, T., Gizaw, S., & Rischkowsky, B. (2014). *Sheep and goat value chains in Ethiopia: A synthesis of opportunities and constraints*. ICARDA/ILRI Project Report. Nairobi, Kenya: ILRI.
Lie, H., Rich, K. M., Kurwijila, L. R., & Jervell, A. M. (2012). Improving smallholder livelihoods through local value chain development: A case study of goat milk yogurt in Tanzania. *International Food and Agribusiness Management Review, 15*(3), 55-85.
Malabo Montpellier Panel. (2020). *Meat, milk and more: Policy innovations to shepherd inclusive and sustainable livestock systems in Africa* Intl. Food Policy Res Inst.
Mamo, Y. (2019). Livestock trade in COMESA: Assessment of livestock market and mapping of Enterprises in Exporting and Importing Countries to establish basic data on import and export of live animal (beef cattle and small ruminants) and meat. Lusaka, Zambia: COMESA (Common Market for Eastern and Southern Africa).
Mataveia, G. A., Visser, C., & Sitoe, A. (2021). Smallholder goat production in Southern Africa: A review. In *Goat Science - Environment, Health and Economy*.
Mayberry, D., Ash, A., Prestwidge, D., & Herrero, M. (2018). Closing yield gaps in smallholder goat production systems in Ethiopia and India. *Livestock Science, 214*, 238-244.

Mbae, R., Kimoro, B., Kibor, B. T., Wilkes, A., Odhong, C., Dijk, S. V., Wassie, S. E., & Khobondo, J. O. (2020). *The livestock sub-sector in Kenya's NDC: A scoping of gaps and priorities*. UNIQUE Livestock sub-sector NDC Report. Global Research Alliance on Agricultural Greenhouse Gases (GRA) & CGIAR Research Program on Climate Change Agriculture and Food Security (CCAFS).

Mekuriaw, Z., & Harris-Coble, L. (2021). *Ethiopia's livestock systems: Overview and areas of inquiry*. Gainnesville, FL, USA: Feed the Future Innovation Lab for Livestock Systems.

Mhlanga, T. T., Mutibvu, T., & Mbiriri, D. T. (2018). Goat flock productivity under smallholder farmer management in Zimbabwe. *Small Ruminant Research, 164*, 105-109.

Msalya, G., Urassa, F., & Kifaro, G. (2021). Quality of milk from Norwegian dairy goats bred and raised in Mgeta division, Morogoro region, Tanzania. *Tanzania Journal of Agricultural Sciences, 20*(1), 54-62.

Mtimet, N., Grace, D., Wieland, B., Knight-Jones, T. J., Wanyoike, F. N., Rich, K. M., Perry, B. D., Kiara, H. K., Mutai, F., & Ballantyne, P. G. (2020). *Better enforcement of standards for safer trade in livestock and livestock products across the Red Sea: Feasibility study for a joint Horn of Africa-Arabian Peninsula initiative*. Paris, France: World Organisation for Animal Health.

Munyua, P. M., Njenga, M. K., Osoro, E. M., Onyango, C. O., Bitek, A. O., Mwatondo, A., Muturi, M. K., Musee, N., Bigogo, G., Otiang, E., Ade, F., Lowther, S. A., Breiman, R. F., Neatherlin, J., Montgomery, J., & Widdowson, M. A. (2019). Successes and challenges of the One Health approach in Kenya over the last decade. *BMC Public Health, 19*(Suppl 3), 465.

Musara, J. P., Chimvuramahwe, J., Munyati, V., Chivheya, R., & Mwadzingeni, L. (2013). Why not commercial goat production? Exploring rural communities' preference for livestock enterprises. Case of Matsai communal area. *Zimbabwe. J. Agric. Res. Dev, 3*(3), 026-034.

Namonje-Kapembwa, T., Chiwawa, H., & Sitko, N. (2019). Value chain analysis of goats in Zambia: Challenges and opportunities of linking smallholders to markets.

Ndlovu, C., Rachel, M., Obert, W., & Abigirl, N. (2020). Breeding of goats: An indigenous approach to enhancing opportunities for smallholder farmers in Inyathi, Zimbabwe. *International Journal of Livestock Production, 11*(3), 91-101.

Neupane, H., Paudel, K. P., Adhikari, M., & He, Q. (2022). Impact of cooperative membership on production efficiency of smallholder goat farmers in Nepal. *Annals of Public and Cooperative Economics, 93*(2), 337-356.

Ng'asike, P. O. A., Stepputat, F., & Njoka, J. T. (2020). Livestock trade and devolution in the Somali-Kenya transboundary corridor. *Pastoralism, 10*(1), 27.

Nhapi, T. (2022). An exploration of the domains of the inequality trajectory in Zimbabwe. *Contemporary Social Science, 17*(2), 84-98.

Patón, D. 2021. Climatic and biological factors related with goat grazing management in the Arid Grassland of the Coquimbo Region (Northern

Chile). *Ecologies, 2*(4), 345-365.
Rubhara, T., & Mudhara, M. (2019). Commercialization and its determinants among smallholder farmers in Zimbabwe. A case of Shamva District, Mashonaland Central Province. *African Journal of Science, Technology, Innovation and Development, 11*(6), 711-718.
Seid, E. H. (2021). The AfCFTA Perspective.
Sibanda, B., Zivenge, E., Munyati, V. T., Musemwa, L., Mafuse, N., & Musara, J. P. (2022). Goat marketing decisions by smallholder farmers in Bikita District of Zimbabwe. Available at SSRN 4257515.
Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research, 104*, 333-339.
Sukume, C. (2016). Review of livestock sector production policies, strategies and institutional structures in Zimbabwe. USAID Strategic Economic Research And Analysis – Zimbabwe (SERA) Program. Harare: Nathan Associates Inc., USAID.
Svinurai, W., Mapanda, F., Sithole, D., Moyo, E. N., Ndidzano, K., Tsiga, A., & Zhakata, W. (2018). Enteric methane emissions and their response to agro-ecological and livestock production systems dynamics in Zimbabwe. *Science of The Total Environment, 616-617*, 710-719.
Tom, T. (2022). Agrarian futures matter: A1 farmers' investment in land and agriculture post-Zimbabwe's land reform. In Mukodzongi, G. (Ed.). *The future of Zimbabwe's agrarian sector.* Routledge.
VALUE (2019). Goat value chain scoping study report. Accessed 28.12.22. Available at: http://www.zagp.org.zw/home/resources/reports.
van Berkum, S. (2021). How trade can drive inclusive and sustainable food system outcomes in food deficit low-income countries. *Food Security, 13*(6), 1541-1554.
Wane, A., Cesaro, J. D., Duteurtre, G., Touré, I., Ndiaye, A., Alary, V., Juanes, X., Ickowicz, A., Ferrari, S., & Velasco, G. (2020). *The economics of pastoralism in Argentina, Chad and Mongolia: Market participation and multiple livelihood strategies in a shock-prone environment*. Food & Agriculture Org.
ZIMTRADE (2022). Education 5.0 and Exports, Innovation & Industrialization. A Presentation to the University of Zimbabwe.