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Skills Gap and Implications of Scrapping of Certificates and Diplomas in Universities on Agricultural Production in the SADC Region: A General Overview

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Abstract

Agricultural productivity in the Southern African Development Community (SADC) is currently undermined by a structural "inverted skills pyramid" resulting from "academicization"—the systematic phasing out of certificate and diploma programs in favour of university degrees. This review employs a Systematic Narrative Synthesis (SNS) of literature and institutional reports from 2021–2025 to evaluate the consequences of this shift across all 16 SADC member states. The findings reveal that while the region produces an oversupply of theoretically grounded degree holders, it faces a critical shortage of field-ready technicians capable of managing irrigation, mechanization, and the Fourth Industrial Revolution (4IR) technologies. In the absence of formal technical pathways, the "technical cadre" has been replaced by fragmented industry-led academies, donor-funded stop-gap programs, and an aging experiential workforce. Comparative analysis with dual-track models in Germany and Brazil suggests that SADC's current trajectory limits 4IR adoption and food security. The paper recommends an immediate restoration of autonomous technical colleges and the institutionalization of industry- Technical and Vocational Education and Training (TVET) co-governance to bridge the widening skills gap.

Keywords: Agricultural TVET; SADC; Academicization; Technical cadre; Agricultural productivity; Skills mismatch

Introduction

Agriculture is key to financial progress, food availability, and jobs in rural areas in the Southern African Development Community (SADC). It employs over 60% of the people in the countryside and contributes significantly to national gross domestic product (GDP), export earnings, and poverty reduction efforts (SADC Secretariat, 2023; Jayne et al., 2022). Farming productivity in the area depends not only on land, resources, and weather, but also on having trained people who can run production systems effectively (AfDB, 2023; Davis et al., 2021; Fan et al., 2023). These people include farm managers, extension workers, irrigation staff, livestock officers, mechanisation technicians, and food processing supervisors. Traditionally, this group was trained through certificates and diplomas offered by agricultural colleges, polytechnics, and technical institutes linked to universities. These programmes focused on practical learning, field work, and operational skills, enabling graduates to act as a link between agricultural scientists and farmers (Rivera & Qamar, 2023). However, over the last decade, many SADC countries have reformed their education systems to place greater emphasis on university degrees rather than vocational and technical qualifications. This shift, often described as academicization, has led to the closure or absorption of certificate and diploma programmes into bachelor's degree pathways (McGrath et al., 2022).

While these reforms are frequently justified as a way to improve academic quality and international alignment, evidence suggests they have weakened the practical skills base of the agricultural workforce (Powell et al., 2023). As a result, agricultural employers increasingly report difficulties in recruiting workers who can manage irrigation systems, supervise farm labour, maintain machinery, or apply climate-smart agriculture practices. At the same time, universities are producing growing numbers of agriculture graduates whose training is largely theoretical and who are often unwilling or unprepared to work in remote or physically demanding farming environments (Manda et al., 2021). This has created an imbalance often referred to as an "inverted skills pyramid," where there are many highly educated graduates but too few mid-level technical workers needed for efficient agricultural production.

This challenge is particularly serious given the SADC region's exposure to climate change, market instability, and recurring food insecurity. Climate-resilient farming systems, irrigation expansion, mechanisation, and value-chain development all depend on skilled technical workers who can implement innovations at scale (Barrett et al., 2022). Without such technical capacity, investments in agricultural research, improved seed varieties, and policy reforms are unlikely to result in meaningful productivity gains. Despite growing concern about agricultural skills shortages, there is still limited research examining how the removal of certificate and diploma programmes from universities has affected the agricultural labour market and production systems in the SADC region. Furthermore, while some member states have largely dismantled technical training pathways, others have retained them, providing opportunities for useful comparison (Filmer et al., 2021; Allais et al., 2022; Allais et al., 2024). This review therefore seeks to fill an important gap in the literature by examining who has taken over the technical workforce in the absence of formal certificate and diploma programmes, and what this shift means for agricultural production in the SADC region.

Methodology

This study utilized a Systematic Narrative Synthesis (SNS) to evaluate the impact of eliminating university certificates and diplomas on agricultural production in the SADC region. SNS was determined to be effective for studies concerning policy and specific industries because it integrated a diverse range of evidence, including journal articles, institutional reports from groups and donors, national skill assessments, and regional policy papers. The SNS approach was employed as it is particularly useful for gathering various types of evidence in contexts where regular meta-analysis is difficult due to missing data, situational variations, and methodological differences. Since the study covered many countries with inconsistent numerical data availability, the SNS framework permitted the organized combination of findings while ensuring clarity and analytical rigor. The research was designed to identify shifts in agricultural education, workforce composition, and production outcomes across all 16 SADC member states. Special emphasis was placed on comparing countries that retained technical certificates and diplomas with those that abolished or marginalized them. Efforts were made to establish direct relationships between educational policy decisions and factors such as operational efficiency, labor market trends, and agricultural performance. This approach aligned with established standards for using narrative synthesis in research regarding education, skill development, and agricultural systems.

Data Collection and Search Strategy

Between January and December 2025, we gathered data, focusing on studies released from 2021 to 2025. This helped ensure the data was about current agricultural policy, education changes, and job market situations (Booth et al., 2021; Munn et al., 2023). We used a clear search method across many research sites, following what works best for gathering evidence. We searched places like Google Scholar, ResearchGate, and databases from the FAO, World Bank, African Development Bank, and SADC Secretariat Archives. This mix of sources is useful for policy research.

Our main search phrases included:
"Agricultural TVET" AND "SADC"
"Agricultural skills gap" AND "Southern Africa"
"Academicization" AND "Agricultural education"
"Certificates and diplomas" AND "Agriculture" AND "Africa"
"Technical cadre" AND "Agricultural production"

We used wide search terms to find studies about crop production, livestock care, irrigation, machinery, support services, and food processing. This approach lines up with current ways of studying skills and systems in farming. We gave priority to articles from well-regarded journals like World Development and the Journal of Agricultural Education and Extension because they are important for discussing farming growth, education changes, and job trends. We also looked at reports from groups like the FAO, UNESCO, the World Bank, the African Development Bank, and national agriculture and education departments to get practical, official, and policy-related information (McGrath et al., 2022).

To be included, documents needed to meet at least one of these points:
Talk about job-related or technical farming education and training
Look at farming job markets, productivity, or worker quality
Study education changes that affect certificates, diplomas, or technical training
Give country-specific or regional facts about SADC countries

We didn't include studies published before 2021, those focused on non-farm jobs, or those not relevant to skill growth or worker performance. This is in line with current standards for reviewing evidence (Munn et al., 2023). We chose 15 key institutional and academic sources as our main data. This was backed by country-level data from all 16 SADC countries, taken from national policies and reviews, which fits with how regional comparisons are usually done.

Challenges in Data Acquisition

Gathering data revealed structural and process-related challenges in analysing regional skills development within the SADC. First, there is substantial variation in data availability and quality across member states. Countries such as South Africa, Tanzania, and Mauritius publish relatively comprehensive labour market and education statistics, whereas others—including Angola, Comoros, and the Democratic Republic of Congo—have limited publicly accessible data on agricultural training outputs and workforce composition (McGrath et al., 2022). This disparity reflects uneven national statistical capacity and differences in institutional reporting systems across the region. Second, much of the evidence on agricultural skills gaps is derived from grey literature, including donor-funded project evaluations, consultancy reports, and internal government assessments. While these sources provide valuable contextual insights, they frequently lack transparent methodologies, peer review, and standardised indicators, thereby reducing their reliability and constraining cross-country comparability. To address this limitation, institutional reports were systematically triangulated with peer-reviewed academic studies.

Third, the high prevalence of informal employment in agricultural labour markets across many SADC countries complicates efforts to accurately quantify the technical cadre. A significant proportion of technicians, supervisors, and extension workers acquire skills through informal apprenticeships, workplace learning, or experiential pathways, which are rarely captured in labour force surveys or education management information systems (Allais & Wedekind, 2023; Powell et al., 2024). As a result, this review prioritises qualitative patterns, institutional trajectories, and policy dynamics rather than attempting precise numerical estimation of skills shortages. Finally, the concept of academicization is not consistently defined or operationalised across national contexts. In some countries, diploma and certificate programmes were formally abolished, while in others they were retained in name but progressively deprived of funding, field-based components, or institutional autonomy. Given this conceptual ambiguity, the review adopts a functional definition of academicization, focusing on the erosion of field-oriented and practice-based technical training capacity rather than formal programme titles alone.

Thematic Analysis and Synthesis

After gathering data, thematic analysis was conducted to find common ideas and connections in the literature. A method based on comparative education was adopted, comprising labor economics, and agricultural systems research. Four main ideas came up in the studies: changes in agricultural education, especially the move from job-focused training to degree-focused programs; shifts in the workforce, with shortages in mid-level technicians and too many graduates; new ways of training people, like industry programs, NGO programs, and on-the-job learning; and the things these changes affected in agricultural production, like farm efficiency, use of machines, water management, and how well extension services worked (Allais & Wedekind, 2023; McGrath et al., 2023).

These outcomes highlighted in the aforementioned section were used to compare different countries. The basis for comparison were countries that still had certificate and diploma programs, to assess how workforce readiness and agricultural results were different (Powell et al., 2024). Thereafter, narrative synthesis was used to combine what was found qualitatively with numbers, i.e. employer surveys, skill mismatch data, and trends in agricultural production and labor. This helped with a better understanding of the impacts on the agriculture sector. During the review, the realistic results and effects of getting rid of technical training on agricultural production were established. This helped the study move past just describing what I saw and toward explaining things in a way that can help with policies, which is in line with what is considered good practice in skills and development research.

Findings

This section gives the main results of the review, organized by two analytical parts. The first part looks at how the inverted skills pyramid is showing up in farm production systems in the SADC area. The second part gives a bigger comparison of all 16 SADC countries, comparing countries that still have certificate and diploma routes with those that have gotten rid of or weakened them. These results show a clear link between the loss of technical education paths and poorer farm work in the field.

The Inverted Skills Pyramid

The inverted skills pyramid describes a job market where there are more university graduates with mostly theoretical knowledge than mid-level technicians. These technicians are important for agriculture to run without problems. In the past, farm production in the SADC area had a workforce with a few professionals with degrees, a large group of technicians with diplomas and certificates, and many farm workers. This setup allowed for good supervision, helped turn research into real-world farming practices, and supported quick decision-making on farms (Powell & McGrath, 2022). Those with diplomas and certificates were key as farm managers, extension officers, irrigation supervisors, livestock technicians, and machinery experts, making up the core of how farms worked.

But because education has focused more on degrees, the old pyramid shape has changed. In places that have pushed academic learning, the skills structure is upside down. There are now too many graduates but not enough technicians who are ready to work in the field. Studies of job markets and surveys of employers show that graduates know a lot about agronomy, farm economics, and environmental science in theory. Yet, they often lack the capacity to do things like plan crops, use machinery, check for pests, manage irrigation, or handle livestock (McGrath et al., 2023). Table 1 shows these patterns by comparing education styles, the state of technical staff, and farm results in some SADC countries from 2021 to 2025.

Table 1: Regional Comparison of Education Models and Agricultural Performance (2021–2025)

SADC Member State	Primary Education Model	Technical Cadre Status	Agricultural Productivity Trend
Tanzania	Dual-track	Strong / Retained	Rising / Resilient
South Africa	Dual-track	Declining but functional	High / Commercial focus
Eswatini	Academicized	Severe shortage (≈62% mismatch)	Stagnant / Declining
Zambia	Academicized	Oversupply of degree holders	Operational inefficiency
Angola	University-centric	Dependent on foreign experts	High production costs
Zimbabwe	Dual-track	Strong / Persistent	High field competence
Mozambique	Academicized	Weak practical capacity	Extension gaps

The distortion captured in Table 1 has tangible consequences for agricultural production systems. Farm enterprises in academicized contexts report higher operational error rates, reduced labour productivity, delayed technical decision-making, and increased reliance on external consultants or senior professionals to compensate for the absence of competent mid-level supervisors. In rain-fed and smallholder-dominated systems, shortages of technicians undermine the effectiveness of extension services, leading to weak adoption of improved seed varieties, fertiliser regimes, mechanisation, and climate-smart agricultural practices (Ragasa and Chapoto, 2021).

The inverted pyramid phenomenon is most pronounced in countries where certificate and diploma programmes were fully removed from universities or technical colleges, as seen in Eswatini, Zambia, and Mozambique. By contrast, countries that retained or partially protected diploma-level agricultural training—such as Tanzania and Zimbabwe—exhibit more balanced workforce structures and stronger operational continuity. This pattern underscores a critical finding of the review: the technical cadre cannot be readily substituted by degree-level graduates, regardless of curriculum content, because applied agricultural work depends fundamentally on practice-oriented training, prolonged field exposure, and task-specific competencies rather than academic knowledge alone (Van der Berg & Rankin, 2021).

Regional Case Studies: The 16 SADC Member States

Countries That Have Scrapped Certificates and Diplomas

This section looks at Southern African Development Community (SADC) countries where agriculture certificate and diploma programs have been cut, sidelined, or significantly weakened in the last ten years. This has caused big problems in the workforce and the skills people have. Using information from education policy reviews, job market research, and studies of the farming industry, this section studies how getting rid of mid-level technical training has changed how farms work, how extension services operate, and how productive they are. The countries in this group all have a similar thing in common: they're becoming more focused on academics.

This means they're growing their university agriculture programs but shrinking their practical vocational training. As a result, they keep having a shortage of technicians and supervisors who are ready to work in the field (Van der Berg & Rankin, 2021). This section gives brief profiles of each country and points out what happens when these policy changes are put into action. These things include relying more on foreign experts, higher production costs, weaker extension services, and less ability to come up with farming innovations that are suited to the local area. By comparing these countries, we can see how the way an education system is set up can change how well agriculture performs and how well workers' skills match the jobs available in different SADC countries.

Angola

Angola's agricultural education is very focused on universities, and there are hardly any formal programs for mid-level agricultural technicians. Because of this, big commercial farms and farming investment projects rely primarily

on technical experts from other countries or farm managers who are not from Angola. This makes production costs higher and limits Angola's ability to build its own skills, especially in managing irrigation and using machines for crop production (World Bank, 2022).

Botswana
Botswana has been including agricultural training in its university programs more and more, which means it has fewer stand-alone diploma programs. Employers say that graduates are not ready to supervise farms, especially farms that raise livestock or grow plants in dry areas. This has made farm management worse and increased the need for short training programs (OECD, 2023).

Comoros
Comoros doesn't have any formal vocational training schools for agriculture. It mainly depends on people passing on knowledge informally. Because there aren't enough technical people, the country can't produce enough food locally and has a hard time managing soil, dealing with pests, and preventing food from spoiling after it's harvested (FAO, 2022).

Democratic Republic of Congo (DRC)
In the DRC, agricultural training is split between universities and technical schools that don't have enough resources. There aren't enough diploma-level programs to meet the country's needs. This makes extension services weak, and farmers don't adopt better farming technologies, especially in far-off areas (AfDB, 2024).

Eswatini
Eswatini is a clear example of how focusing too much on academics can cause a mismatch between the skills people have and the jobs that are available. The country stopped offering agricultural diplomas at the university level, and at the same time, there was a 62% mismatch in skills for technical agricultural jobs (ESHEC, 2025). Commercial farms say they don't have enough irrigation supervisors, livestock technicians, and farm managers. This has caused productivity to go down and training costs to go up.

Lesotho
The vocational training schools for agriculture in Lesotho have become weaker, which means the country has to depend more on South Africa for technical training. This dependence on other countries makes it harder for Lesotho to have sustainable farming systems and reduces the number of local technical experts available (FAO, 2022).

Malawi
Malawi is producing more agriculture graduates, but it has fewer diploma-level training programs. This has created a shortage of extension officers and farm supervisors who are ready to work in the field. This has led to poor extension services and inconsistent use of better farming methods among small farmers (World Bank, 2022).

Mozambique
Mozambique has strongly shifted toward Bachelor of Science (BSc) agriculture programs. This has produced graduates with academic knowledge but not enough practical skills for community-based agriculture and irrigation projects. The skills mismatch is especially obvious in irrigation projects for small farmers (AfDB, 2024).

Namibia
Namibia has included agricultural training in its universities, which has reduced the number of skilled workers available for livestock production and rangeland management. These are very important sectors for the country's economy (OECD, 2022).

Zambia
Zambia's focus on academics has led to field staff being over-qualified. Graduates are often not willing to do farm work that requires physical effort. This has made both commercial and small farming systems less efficient (World Bank, 2022).

Countries that have retained certificates and diplomas
This section looks at Southern African Development Community (SADC) countries that still use certificate- and diploma-level agricultural training in specialized colleges or TVET schools. Research on skills and farm output shows that having mid-level tech training helps keep farms running, makes extension work better, and boosts tech use. Unlike systems that focus only on academic learning, these countries have a better mix of workers. Graduates are supported by technicians who can put science into everyday farming (McGrath et al., 2023).

Madagascar
Madagascar has a system of agricultural tech colleges that supply the sector with mid-level technicians. Even though these schools struggle with money and buildings, they are key to local farming, especially for rice, gardening, and small farms. Data shows that having trained people helps with crop care, handling crops after harvest, and working with farmers. This leads to stronger local production even with other problems (FAO, 2022).

Mauritius
Mauritius still has agricultural diploma programs that focus on real-world skills and industry needs. These programs are closely tied to commercial gardening, livestock, and food processing. This supports high output and quality, even though the country has little land. Skill studies show that diploma-trained technicians are important for accurate farming, biosecurity, and farm control, which makes the sector competitive (OECD, 2022).

Seychelles
Seychelles has specific TVET programs for farming and fishing. These programs aim to support food security and eco-friendly farming. They train people to manage small-scale farming, fishing, and conservation. The focus on practical training helps manage resources well and strengthens local food supplies, especially with climate and land limitations (FAO, 2023).

South Africa
South Africa has both universities and agricultural colleges for agricultural education. Though tech training has become less common, diploma programs still give important skills for commercial farming. This includes machine work, irrigation, and farm supervision. Government plans admit that agricultural TVET needs to improve to boost output, change the sector, and create jobs. This shows how important mid-level tech skills are (DALRRD, 2023).

Tanzania
Tanzania is a good example in the region for keeping and supporting diploma-level agricultural training. Agricultural colleges still train technicians who are important for extension work, irrigation, machine programs, and cooperative management. Many studies say that this tech skill leads to better work in the field, more tech use in farming, and stronger systems, especially for small farms (Ragasa and Chapoto, 2021).

Zimbabwe
Zimbabwe used to have a strong system of agricultural colleges that provided the sector's tech base. Even with economic problems, these schools still help with farm skills, extension, and sharing knowledge. Data suggests that keeping diploma and certificate programs has softened some of the issues tied to bigger problems, keeping key tech skills within the farm workforce (Allais and Wedekind, 2023).

Taken together, these countries reveal that keeping certificate and diploma programs leads to better skill sets and a stronger link between education and job needs in farming. The data supports the idea that mid-level tech training is a key part of agricultural production and should be a main focus in government education and growth plans (OECD, 2022).

Dual-Track vs. Academicization Models
Worldwide, programs for agricultural education usually use one of two methods: a two-path system that separates job-based learning from college degree programs, or a college-focused system that mostly puts agricultural instruction in universities. Data from Europe, Asia, and Africa south of the Sahara shows that countries that keep the two-path systems are better at keeping farm production steady, keeping a good mix of workers, and helping people use new ways to raise output, mostly in farming and food processing (Ragasa and Chapoto, 2021; McGrath et al., 2023). The two-path approach is based on the understanding that farming is hands-on, spread out, and affected by the climate. It needs many skilled workers who can do their jobs in rural, mechanical, and climate-sensitive situations. In this setup, certifications and diplomas are not seen as lesser qualifications but are clearly tied to specific job roles, career paths, and ways to recognize professionals. Studies show that this connection helps match people to jobs, supports good farm supervision, and makes support services better (Allais and Wedekind, 2023; McGrath et al., 2023). College degrees, instead, are usually aimed at research, making rules, business planning in agriculture, and improving technology, which helps rather than replaces job-based learning.

On the other hand, making agriculture mostly college-based weakens this division by making agriculture mainly a subject taught in universities. When classes focus more on theory, research methods, and general science, hands-on learning and practical skills are often ignored. Proof from around the world indicates that these systems produce too many graduates but not enough technicians. This creates a shortage of skills on farms, in support roles, and in the food supply chain. These shortages can stop people from using technology, lower how much workers can

produce, and make people depend more on informal training to make up for missing practical skills (Allais and Wedekind, 2023).

Alternative Technical Training Pathways

The decline of formal certificate and diploma programs in agricultural education within the SADC region has created a significant technical vacuum, shifting the responsibility for skill acquisition toward a fragmented "skills ecosystem" of informal and non-state training (Allais & Wedekind, 2023). This gap is currently being bridged by three primary stop-gap measures; agribusiness firms providing narrow proprietary training focused on specific technologies, NGOs and donor groups offering "projectified" short-term workshops tied to specific funding cycles and organic on-the-job learning through peer-to-peer exchange (McGrath et al., 2023). While these decentralized interventions help maintain agricultural output in the immediate term, they represent a "privatization of knowledge" that lacks the systemic cohesion, national accreditation, and skill portability offered by a formal, state-led technical education system—leaving the region's agricultural workforce without a sustainable foundation for long-term climate-smart adaptation.

Training by Companies and Corporate Academies

As formal agricultural diploma programs have shrunk, big agribusinesses and commercial farms in the SADC area are doing more skills training themselves. Company training units, farm-based schools, and structured apprenticeship programs have grown in countries like South Africa, Zambia, Zimbabwe, Mozambique, and Eswatini, especially in plantation farming, commercial horticulture, sugar farms, and big livestock operations (DALRRD South Africa, 2022). These programs use training based on skills needed for the company's specific production, quickly teaching supervisors, irrigation workers, machine operators, and production managers. Studies show these programs can make people ready for jobs with good practical skills and fast gains in output.

Despite these benefits, company-led training has limits that hold back its broader value to the sector. First, skills from corporate schools don't often transfer, as training is often owned and closely tied to certain crops, technology, or company rules. This limits job changes and pay raises (Powell et al., 2024). Second, these programs mainly serve workers of big commercial firms, leaving out small farmers and medium-sized producers who make up most of the agricultural workforce in most SADC nations. Third, training costs fall mostly on the private sector, raising production costs and widening the gap between well-funded agribusinesses and farming systems with fewer resources. From a policy view, this reliance on company training is like partly privatizing public skills training, which goes against national and regional agricultural plans that stress inclusive growth, equal skills, and rural change (SADC Secretariat, 2023; OECD, 2022).

Agricultural Training Programs by NGOs and Donors

Another major stand-in for formal technical education has been the growth of agricultural training run by NGOs and funded by donors. Groups like FAO, IFAD, GIZ, USAID, AGRA, and many local NGOs have put in place short courses, farmer field schools, and extension programs in the SADC region (AGRA, 2024). These efforts have been key in keeping up agricultural production, especially among small farmers, with training often on climate-friendly farming, conservation, livestock health, agribusiness management, and handling crops after harvest (World Bank, 2021; Ragasa et al., 2022). Despite their help, donor-led training programs have built-in flaws. Most are based on projects, have set time limits, and are tied to certain places, which cuts down on ongoing learning and long-term skills growth. Skills from these programs are rarely standardized, formally tested, or included in national skill sets. This makes them less valued by employers, banks, and professional groups (Allais and Wedekind, 2023; McGrath et al., 2023). Also, the courses are often made from the outside and may focus on what donors want more than what national agricultural needs or job markets require. Proof from Zambia, Malawi, and Mozambique suggests that while farmers trained by NGOs often see short-term gains, the lack of accepted technical papers limits growth, career moves, and lasting results. So, NGO and donor efforts act more as quick fixes than solid answers to the loss of formal agricultural technical education.

The Inherited and Experiential Labour Force

In SADC agriculture, experienced farm workers and supervisors often take the place of formally trained technicians. These individuals gain skills through years of practice, playing a key role in operations and supervision with 15–30 years in areas like estate agriculture and livestock production. Surveys show they are vital for keeping agricultural production going as formal training declines (Sulaiman et al., 2021; McGrath et al., 2023). They have valuable knowledge of crop cycles, soil, animal care, and local climates, often holding influence because of their expertise. Relying on this type of knowledge, while important, poses problems as agriculture advances. This knowledge is often unwritten, making it hard to pass on to younger workers. Many lack training in modern technologies like precision agriculture and digital management systems, which are important for increasing productivity. Without formal certificates, these workers face limited career opportunities and recognition. As agriculture integrates more with global markets, the limits of skills gained only through experience become clear in areas like sustainability and data use.

What this Means for Agricultural Production and Food Availability

The decline in formally trained agricultural technicians has major effects on agricultural production and food availability in the SADC region. Studies show that farms with trained technicians have higher yields, use resources better, and have less waste compared to those relying on informal training. A lack of standardized training weakens support services, reduces compliance with standards, and slows the adoption of better farming methods. These problems are worsened by the region's vulnerability to climate change and market changes. The decrease in certificate programs also affects the agricultural workforce. Research suggests that young people find agriculture less appealing due to a lack of career paths and recognized qualifications. This leads to fewer young people entering the field, labor shortages, and an aging workforce, which threatens the long-term health of the sector (Powell & McGrath, 2022; World Bank, 2023).

Limitations of Experiential Learning

Although industry training, non-profits, and hands-on learning have kept farm output from collapsing in SADC countries, these informal methods don't have the same advantages as formal technical education. These alternatives usually don't have standard recognition or the portability needed for skills to translate across different areas or farm sub-sectors. Studies point to how successful farm systems depend on a structured technical group to connect research and field work (Allais and Wedekind, 2023; Powell et al., 2024). Right now, the SADC region's lack of this formal help has made the workforce unstable and overly reliant on short-term fixes. This focus on just experience makes for an innovation gap, since practical knowledge usually lacks the scientific background required to handle advanced tech like precision irrigation and data-driven farm management (Allais and Wedekind, 2023; FAO, 2023). Formal training gives a standard skill level that keeps quality consistent, but field learning is often specific to one employer or crop. Without trained diploma holders acting as a bridge, innovation and farm work stay disconnected, which slows the use of climate-smart methods and hurts regional competition (Ragasa and Chapoto, 2021; World Bank, 2023). So, starting farm certificate and diploma programs again is key to boosting production, securing food, and encouraging strong rural growth in the region.

Discussion

This review suggests that eliminating or reducing certificate and diploma programs in agricultural education has had major, unforeseen negative consequences for farming across the SADC region. While expanding university education was often seen as progress that would bring things up to date, evidence shows that it has upset the balance of the agricultural workforce, weakened skills in the field, and held back productivity. Similar things have happened in other places where job-focused education has been less valued than academic routes, without enough attention to what the job market needs (Allais & Wedekind, 2023; McGrath et al., 2023). This section looks at these from four connected angles: workforce structure, productivity, institutional ability, and differences between regions.

Structural Workforce Imbalances

A main point from this review is the development of an upside-down skills pyramid. Now, there are more agricultural graduates than there are technical workers with diplomas. In the past, farming depended on a workforce where a few professional agronomists supervised many diploma-trained technicians, who then managed skilled farm workers. This made it easier to turn research into real-world practice and keep farms running smoothly. In places like Eswatini, Zambia, Malawi, Mozambique, and Botswana, getting rid of diplomas from universities and weakening agricultural colleges has squeezed this structure. Universities now create graduates with mainly classroom knowledge, who haven't had much chance to do fieldwork, manage farms, or handle machinery. Surveys from employers say that many graduates can't do important everyday jobs like planning irrigation, setting up machinery, checking for pests, and keeping an eye on livestock health (African Development Bank, 2024). This problem causes waste, as graduates are either not used well or need expensive extra training. On the other hand, countries like Tanzania, Zimbabwe, Madagascar, and Mauritius have kept or protected technical programs and have a better-balanced workforce. These places still produce farm supervisors and technicians who can do their jobs well from day one. The evidence suggests that the main problem facing SADC agriculture isn't a lack of education itself, but that the type of education doesn't match what's needed in real-world farming.

Impacts on Operational Productivity

The decline in technical training has directly hurt farming productivity, especially in areas that need a lot of labor and are affected by the weather. Studies show that farms with formally trained technicians get better harvests, use resources better, and follow quality and safety rules better than those relying on untrained labor (FAO, 2022; OECD, 2024). Systems that are full of untrained workers or graduates with classroom knowledge but little practical skill tend to have more mistakes, more waste, and weaker planning. These gaps in productivity are clear in areas like irrigation, mechanized farming, livestock health, and handling crops after harvest. In the past, technical staff were key in keeping irrigation systems running, managing machinery, enforcing safety measures, and making sure farming tasks were done on time. Without them, there are more equipment breakdowns, poor water use, and more losses after harvest, especially for medium-sized farmers who can't use corporate training programs (FAO, 2023;

Filmer et al., 2021). Countries that have kept diploma programs, like Tanzania and Zimbabwe, are doing better in these areas, which shows that technical education helps farming be more productive.

Institutional and Policy Implications

Beyond the effects on farms, ending certificates and diplomas has weakened the organizations that support agricultural improvement. Public services, usually staffed by diploma-trained workers, aren't working as well because they are hiring more graduates who don't always have good practical skills. This has made farmers trust these services less and weakened the ways knowledge is shared, especially among small farmers (Ragasa et al., 2022). Also, relying more on academic learning has shifted training costs from the government to private companies and aid groups. Agribusinesses have started investing in their own training, and NGOs have increased short training programs. While this has helped avoid a complete collapse, it breaks up skills development and reduces national coordination. This leads to private control of agricultural skills training, which hurts small farmers and poorer areas that don't have good access to private or aid-funded training (Allais and Wedekind, 2023; OECD, 2022). This shows a contradiction in policy: governments say agriculture is important for food and jobs, but they don't put enough money into the technical schools needed to support it.

Labor Market Trends and Youth Engagement

The heavy emphasis on scholastic agricultural instruction has induced labor market issues and diminished youth engagement. Degree programs often raise hopes for expert roles, yet farm jobs mostly call for applied skills and endurance. Research points out graduates shy away from manual labor or rural postings, causing high turnover, underemployment, and skill wastage (UNESCO, 2022; McGrath et al., 2023). Diploma programs once showed routes into agriculture for rural youth, offering solid job chances. Their removal complicated entry and weakened agriculture's role in social mobility. Nations keeping technical programs see more youth in farm jobs, showing how vocational training supports rural stability and equal opportunity. This prestige gap gets worse as courses focus on classroom learning, distancing students from real agribusiness (Powell and McGrath, 2022). When degrees are the sole route, it causes a brain drain as educated youth seek city jobs, leaving rural areas at the base of the inverted pyramid devoid of technical expertise (AfDB, 2024). Removing technical diplomas has created a labor shortage and signaled to youth that agriculture is only good at a management level, ignoring vital technical jobs in irrigation, machinery, and logistics that drive output (SADC Secretariat, 2023). Restoring these routes is vital in rebranding agriculture as a real and reachable career for the upcoming generation (OECD, 2024).

Strategic Alignment with SADC Frameworks

Evidence from Europe, Southeast Asia, and North America suggests that farm systems are more stable when academic studies combine with technical training. This creates a group of skilled workers who connect lab work with farm production (OECD, 2023; Powell et al., 2024). The Southern African Development Community (SADC) needs to invest in technical training to meet the goals of its Regional Integrated Strategic Development Plan (RISDP) 2020–2030. This training should give extension workers and farmers the skills to adapt to climate change and use precise irrigation (SADC, 2020). By focusing on this technical aspect, like other successful countries, SADC can make sure food security plans turn into real farm practices. This will help fix the region's skill gaps and raise overall farm output (FAO, 2024; World Bank, 2023).

Conclusion

This study looked at what happens when universities cut or reduce certificate and diploma programs in agriculture, focusing on who now does the work of applying agricultural knowledge. Looking at policy papers, skill assessments, school reports, and farm research, it's clear that losing technical training has weakened farming across Southern Africa. Southern Africa's farming used to rely on trained technicians with certificates and diplomas who worked as farm managers, extension workers, irrigation specialists, and livestock officers. They linked scientists, extension services, and farmers, making sure that research, policies, and new technologies were used in the fields. Moving towards more academic learning has upset this balance, leading to too many graduates but a lack of skilled technical people.

The data also suggests that when countries stopped offering certificates and diplomas, farming depended more on inconsistent and informal methods. Industry training, NGO programs, and on-the-job training have partly filled the gap. These methods lack standards, transferability, growth potential, and long-term support. As a result, farming gains are uneven, inefficiencies remain, and small farmers—who are key to food security in the SADC region—are majorly affected. On the other hand, SADC countries that have kept technical and vocational education in agriculture have stronger workforces, better extension services, and a better match between skills and needs. Evidence from Tanzania, Zimbabwe, Mauritius, and Madagascar shows that having technical qualifications improves farm productivity, technology adoption, and institutional stability. These examples show that technical education is not just a backup to university training; it's vital for agricultural growth. The SADC region is facing big challenges like climate change, population growth, food shortages, and youth joblessness. Cutting technical

agricultural education is a major policy mistake. Without fixing this, the region could end up with a weak farming sector that can't deliver lasting productivity, equal growth, or climate resilience.

Recommendations

To address declining agricultural output, SADC countries should quickly revitalize technical colleges that focus on hands-on certificate and diploma programs (UNESCO, 2022; FAO, 2023). A dual-track education system is needed in the region to separate the roles of institutions: universities should focus on advanced research, and technical schools should teach the practical skills needed for modern farming (OECD, 2023; World Bank, 2023). To keep the curriculum relevant, agribusiness leaders should have formal management positions in technical schools, ideally making up 40–50% of the governing boards (OECD, 2023; Allais & Wedekind, 2023). Regional bodies should use the SADC Qualifications Framework to standardize credentials and broaden Recognition of Prior Learning (RPL). This will aid worker mobility and confirm the skills of current workers (ILO, 2022; SADC Secretariat, 2023). By rebuilding public extension services with technically educated graduates, governments can assist small farmers in using climate-smart technologies (FAO, 2022; World Bank, 2023). Creating clear career paths in technical agriculture will improve the sector's image among young people, lowering joblessness and securing the region's food supply (UNESCO, 2022; AfDB, 2024).

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