Review of the challenges facing the seed sector in West Africa.

Abstract

As part of efforts to improve agricultural productivity through the promotion of a competitive seed industry, this study set out to analyse the challenges facing the seed sector in West Africa and to identify relevant indicators to be considered in future research in this sector. The methodology employed is based on a literature review and a SWOT analysis of the seed system through semi-structured interviews with the heads of seed services in the four target countries. The challenges identified for the sector in the study area are divided into three categories:

(i) institutional, regulatory, and policy challenges; (ii) organizational and governance challenges within the sector; and finally, (iii) technical challenges. The first category of challenges includes, in particular, the failure to adequately account for the informal seed system in policies, the ineffective enforcement of certain regulatory procedures, and the failure to operationalize a support fund for the seed sector. The second set of challenges relates to the low level of private sector involvement in the development of the seed sector, the poor organization of the seed marketing chain, and inadequate planning of seed chain activities. Finally, the third set of challenges highlights insufficient variety development, the weak infrastructural and technical capacity of public and private actors, and the low rate of use of certified seeds. These findings lay the groundwork for research focused on the relevant indicators to be considered in order to optimize the performance of the West African seed sector.

Keywords: Seeds, regulations, certification, constraints.

Introduction:

In West Africa, agriculture accounts for 29% of gross domestic product (GDP) and is the primary source of livelihood for more than 60% of the population (WBG, 2021).

Effective seed systems are essential for improving food and nutrition security, resilience, and the livelihoods of smallholder farmers in Africa (TASAI, 2024). Seed security can be ensured by focusing on four distinct elements: (i) seed availability, (ii) access to seeds, (iii) varietal suitability, and (iv) seed quality (FAO, 2016).

To ensure food security, improving the availability and accessibility of quality seeds to farmers is essential. Indeed, seeds are the primary and most critical factor of production, as they contribute at least 40% to crop yields in West and Central Africa (Djamen, 2016). The adoption of improved seed varieties can stimulate growth in agricultural production, reduce the risk of low yields, lead to increased production for household food consumption, improve farmers' incomes, and ensure food security in Sub-Saharan African countries (Dieng et al., 2025).

Recognizing the strategic importance of using high-quality seeds, several policies and initiatives at the national, regional, and continental levels have been developed and adopted to improve producers' access to certified seeds. Efforts to harmonize national regulations and facilitate the emergence of a regional seed market have been undertaken, such as Regulation C/REG.4/05/2008 on the harmonization of rules governing the quality control, certification, and marketing of plant seeds and seedlings within the ECOWAS region (Keyser, 2013). However, despite all these efforts, smallholder access to certified seeds remains a challenge.

The rate of certified seed use, particularly for food crops, remains low in West Africa, at around 12.5% in 2013 (Djamen, 2016). According to Africa Seeds (2021)in its 2022–2031 strategic plan, the informal seed sector is by far the main source of seeds in Africa, producing more than 90% of seeds, and even up to 100% for several traditional crops and vegetatively propagated crops in most regions. This reality reflects the existence of numerous challenges that still need to be addressed along the seed sector's value chain at the national level. Several studies and analyses have been conducted by authors and international organizations active in the seed sector, such as the Food and Agriculture Organization of the United Nations (FAO), Africa Seeds, the Alliance for a Green Revolution in Africa (AGRA), the Seed System Group (SSG), and The African Seed Access Index (TASAI) on the seed system in Africa, offering proposed areas of intervention (Africa Seeds, 2021).

This study is grounded in research focused on the challenges that must be addressed to improve the performance of the seed system in West Africa. Specifically, it focuses on an analysis of the current state of the seed sector in West Africa to: (i) identify relevant indicators to be considered in future research, (ii) analyze various evaluation results of the seed sector, and (iii) develop a typology of the main challenges facing the seed sector in West Africa

Materials and Methods:

The study's methodology is based on a review of the existing literature on the subject, supplemented by semi-structured interviews with the heads of seed services in the four target countries: Senegal, Benin, Sierra Leone, and Togo. Technical documents and scientific articles were consulted and analysed to identify the current challenges facing the seed sector in Africa in general and in West Africa in particular.

Similarly, the SWOT analysis conducted following the interviews aimed to identify the strengths, weaknesses, opportunities, and threats of the seed system in the countries targeted by the study. The main weaknesses identified in the seed sector were then categorized according to relevant indicators to outline the key challenges facing the seed sector.

Finally, the results of the literature review were cross-referenced with those of the semi-structured interviews to develop a typology of the sector's major challenges, followed by discussions based on the content of the 2023 Seed Sector Performance Index report (TASAI, 2024).

The 17 indicators defined in the previous study by "The African Seed Access Index (TASAI)" are listed as follows:

i)Quality of the variety release and registration process;

ii) Number of varieties releasedin the last three (03) years;

iii) Adequacy of the national agricultural research institutes' breeding programs;

iv) Status of the national program coordinating activities on Plant Genetic Resources for Food and Agriculture;

v) Adequacy of early generation seed;

vi) Availabilityofvarietalchoicetofarmers;

vii) Utilization of quality commercial seed by farmers;

viii) Adequacy of seed import process;

ix) Adequacy of agro-dealer networks;

x) Availability of seeds in small packages;

xi) Status of national seed policy instruments;

xii) Status of alignment of national seed policy instruments with harmonized regional seed regulations;

xiii)Status of adoption of national biosafety frameworks to guide plant breeding and seed production;

xiv) Status of the farmer-managed seed system;

xv) Adequacy of seed inspection services;

xvi) Adequacy of government efforts to combat counterfeit seeds;

xvii) Adequacy of the national seed trade association.

Of this list, indicators ii, iii, vi, vii, x, and xiv merit particular attention for the present study. The relevant documented information on these indicators is presented (Table 1).

To identify the challenges facing the seed sector in Africa, the analysis focused on the six indicators that received the lowest scores (below 4/10) following the 2023 assessment of the Seed Sector Performance Index (TASAI, 2024). The analysis also considered the scores obtained by a sample of four countries: namely Togo, Senegal, Benin, and Sierra Leonewhich constitute the study area covered by the research on the topic at hand. Finally, the frequency value associated with these challenge indicators in each of the four target countries was compared with that of South Africa, which ranked first following the evaluation of the Seed Sector Performance Index in 2023(TASAI, 2024).

The six TASAI indicators used in the analysis are defined and described as follows:

(i) Number of varieties released in the last three years: This indicator is a quantitative variable reflecting the total number of varieties registered or released in the three years 2020–2022 for the four priority crops selected in each country. The crops selected by country are: for Togo (maize, sorghum, rice, soybeans); Benin (maize, cassava, soybeans, rice); Senegal (peanuts, millet, rice, maize); and Sierra Leone (rice, peanuts, sorghum, maize).

(ii) Adequacy of the national agricultural research institutes' breeding programs: This indicator assesses three key aspects of the functioning of national agricultural research institutes (NARIs), namely: (a) adequacy of the number of breeders, (b) adequacy of funding for breeding programs, and (c) the quality of research infrastructure. This indicator assesses the extent to which public research institutes have sufficient human resources and infrastructure to support the development and commercialization of varieties in the target countries.

iii) Availability of varietal choice to farmers: This is a quantitative variable that reflects the number of varieties sold to farmers.

(iv) Utilization of quality commercial seed by farmers: This indicator measures the rate at which farmers use high-quality commercial seeds.

(v)Availability of seeds in small packages: The information conveyed by this indicator expresses the proportion of seeds sold in packages of 2 kg or less. This data corresponds to the total volume of seeds sold in small packages, expressed as a percentage of the total volume of seeds produced, for the four main crops selected.

(vi) Status of the farmermanaged seed system: This indicator measures the extent to which farmermanaged seed systems are incorporated into national seed policy instruments and institutional frameworks that foster an environment conducive to a competitive seed sector, encouraging private sector and community participation in the development of the seed sector.

Results:

Documented Challenges

An analysis of the seed sector in the study area of West Africa allowed the identified challenges to be categorized into three main groups based on their nature and the authors' assessment of the sector.

Institutional, Regulatory, and Policy Challenges

The analysis of the literature review highlights the mismatch between seed policies and strategies for developing an inclusive seed sector that encourages private investment (Djamen, 2016;Africa Seeds, 2021). In addressing this concern, Eveline et al. (2019)highlighted, following a forum between stakeholders from both formal and informal seed systems, (i) the need to revise catalogue registration and management procedures to include farmer-saved seeds, and (ii) the creation of community banks for farmer-saved seeds. Sperling et al. (2021)suggested integrated linkages between the formal and informal seed systems for the large-scale dissemination of improved varieties in Tanzania, highlighting the economic importance of the informal sector, whose sales amounted to US$4.35 million in 2019 among the informal traders surveyed. Analyzing the challenges of smallholder access to the agricultural innovations in West Africa, Butare et Zoundi (2005)emphasized that beyond the performance of agricultural innovation and the level of knowledge producers have about it, the institutional and political environment plays an equally decisive role in access to and use of research results. An assessment of the seed landscape in Senegal highlighted challenges related to (i) low private sector involvement, and (ii) the sub-optimal functioning of institutional, organizational, and financial mechanisms (Bloukounon et al., 2024). Following the ninth session of the Regional Committee on Seeds and Plants for West Africa and the Sahel, CORAF (2024)drew attention to political and institutional constraints, namely: (i) the failure to operationalize a Seed Sector Support Fund (FAS) in member states, (ii) the limited capacity of members of national seed committees (NSC) to fully fulfill their advisory role, and (iii) the slow progress made by certain countriesparticularly Portuguese-speaking countriesin implementing the harmonized seed regulations.

Organizational and Governance Challenges

Numerous studies have been conducted to identify and analyse organizational and governance challenges.

Regarding organizational challenges, studies have reported (i) the slow development of the private seed sector; (ii) low seed commercialization; and (iii) the lack of structure in seed supply and demand as organizational and governance challenges (Djamen, 2016;Africa Seeds, 2021;Achigan-Dakoet al., 2014). In this vein, Zucchini et al. (2020) reported, as part of an analysis of the formal rain-fed rice seed sector in Casamance, Senegal, a high level of dependence among the actors involved on interventions by the government and its technical and financial partners, as well as the lack of a framework for consultation and planning among the various actors in the seed chain.

Regarding the issue of seed market sustainability, Niangado (2010)noted that most farmers source their own seeds, meaning that exclusive seed trade by seed companies would not be viable. As part of an analysis of the rice value chain in Benin, Dossouhoui (2019)reported that the seed sector does not function as a true value chain serving key stakeholders, particularly paddy producers and processors, as well as consumers or end users of the grains. For their part, (Breen et al., 2024 ; Macrobert, 2009)highlighted the main obstacles to the adoption of improved seed varieties, including legumes, in Sub-Saharan Africa, namely (i) the lack of timely access to sufficient quantities of seeds through the official seed system, (ii) the high cost of seeds, and (iii) the lack of information on new varieties. In Africa, certain obstacles have been perceived as barriers to agricultural growth, such as access issues, high prices, and the poor quality of seeds used by producers (Keyser, 2013). Thus,Houssou (1999), in his assessment of the production, multiplication, and distribution systems for improved groundnut seeds in West and Central Africa, highlighted the same challenges and demonstrated the dominant role of the informal sector in supplying groundnut seeds to farmers. Furthermore, Ndoye et al. (2025)have helped focus attention on the dysfunction of the peanut seed collection, storage, and preservation system in Senegal and its impacts on seed lot quality.

As part of the establishment of a network of seed cooperatives, a study of the organization of the seed value chain in Senegal identified the key success factors: (i) a pilot researchanddevelopment initiative involving researchers, the farmers’ organization, and producers in the village of Paoskoto; (ii) the strengthening and diversification of partnerships among peanut stakeholders, particularly those in the seed sector; and (iii) the enhancement of technical capacities to achieve the professionalization of producers (Clavel and Gaye, 2018).

The operationalization of the Alliance for a Seed Industry in West Africa (ASIWA) by West and Central Africa Council for Agricultural Research and Development (WECARD) has helped focus attention on three (03) main challenges, namely: (i) gaps in the production and supply of quality seeds; (ii) a policy environment that is not conducive to the development of the seed chain; and (iii) underdeveloped seed markets (Diallo, 2015).

Technical Challenges

The technical challenges identified in the seed sector relate to: (i) insufficient variety development and commercialization, (ii) inadequate support for small-scale seed entrepreneurs, and (iii) weak infrastructure and technical capacity (Africa Seeds, 2021). To reverse this trend, Adigoun et al. (2022)emphasized the need to strengthen capacities and synergies among seed sector stakeholders through: (i) enhancing the commercial and marketing skills of seed producers through training and promoting the comparative advantages of improved seeds in increasing yields and(ii) connecting seed producers with maize producer organizations, coupled with information and communication technology (ICT)based agricultural extension services, which could stimulate the development of the maize seed sector and, in turn, the maize value chain.

Similarly, Ayenan (2018) in an analysis of strategies to improve the supply of soybean seeds in Benin, suggested that the focus should be on strengthening the capacity of research institutions, supporting private seed companies, and adopting a principle of declared seed quality.

The conclusions of the ninth session of the Regional Committee on Seeds and Plants for West Africa and the Sahel highlighted the following main constraints: (i) the low number of registered varieties in the countries, with the exception of Burkina Faso, Senegal, Mali, and Nigeria; (ii) the low level of communication between official control and certification services

(SOC); (iii) the limited capacity for quality control operations in most member states; (iv) the high risk of introducing pests and harmful organisms to plants and plant products into member states, linked to the weakness of the control and surveillance system; and (v) the low rate of use of certified seeds in member states (CORAF, 2024).

Overview of the main challenges facing the seed sector in Togo, Benin, Senegal, and Sierra Leone

This overview was prepared based on the methodological guidelines and key findings of the 2023 SSPI report.

Analysis of scores deemed poor (below 4/10) following the evaluation of the Seed Sector Performance Index (TASAI, 2024)identified six key indicators associated with the current challenges facing the seed sector in Africa: (i) Number of varieties released in the last three years,

(ii)Adequacy of the national agricultural research institutes' breeding programs (iii) Availability of varietal choice to farmers, (iv) utilization of quality commercial seed by farmers, (v) availability of small seed packages, and (vi) status of the farmer seed system.

The scores for the six indicators of major challenges in the seed sector in the four countries of the study area (Togo, Benin, Senegal, and Sierra Leone) are illustrated in Figures 1 to 5.

Analysis of radar charts 1, 2, 3, and 4, which illustrate the scores of the four countries targeted for the study, shows that the area of the polygon depends on the scores obtained by each country for each of the challenge indicators. The lower the scores, the smaller the area of the polygon. Thus, the four target countries share the same challenges, but there are specific characteristics at the country level, as evidenced by the variation in the areas depicted.

Indeed, the major challenges identified in these four countries show a high degree of similarity regarding indicators related to the number of registered varieties, the adequacy of the national agricultural research system, the status of farmer-saved seeds, and finally, the method of packaging seeds into small quantities. However, the challenge related to the use of certified seeds appears to be of greater concern in Benin and Sierra Leone than in Senegal and Togo. Unlike in Togo, Benin, and Sierra Leone, where the “number of commercialized varieties” indicator shows a significant gap (score <2), this same indicator is not a major concern in Senegal (score = 7.86).

The large area of the polygon obtained for South Africa confirms the country’s performance across the various targeted challenge indicators, as, in the SSPI reportin 2023, this country ranks first with a score of 8.62/10

Discussion:

An assessment of the performance of the seed sector in Africa for the year 2023 revealed that 19 of the 47 countries studiedlocated primarily in the sub-Saharan regionreceived an overall “fair” rating ranging from 4/10 to 6/10, and that these countries rank ahead of certain Central African nations, but behind countries in Southern and Eastern Africa.

In terms of the release of new varieties, for example, 13 of the 47 countriesincluding Liberia and Benindid not release any new varieties of priority crops during the 2020–2022 period, while South Africa released 296 during the same period (TASAI, 2024). These TASAI findings align with the conclusions of the ninth session of the Regional Committee on Seeds and Plants, which highlighted the weakness of the variety certification system in member states (CORAF, 2024).

In nearly half of the countries studied, the number of seed varieties available for commercialization in each countryconsidering the four (04) priority cropsis less than 20, with an overall mediocre average score of 3.83/10 (TASAI, 2024). The challenge of low certified seed utilization rates is confirmed by this same report evaluating the performance of the seed sector in Africa, which revealed that only 20% of the countries studied are able to meet 80% or more of their national seed needs. Most countries meet less than 50% of their seed needs, with a score of 3.65/10 for this indicator. These results illustrate the low level of efficiency in the supply and distribution system for improved seeds in Africa and align with the views of Adigoun et al. (2022), which highlighted the need to strengthen capacities and synergies among seed stakeholders by focusing on marketing, promoting seed use, and agricultural extension.

Furthermore, most countries have not sufficiently or at all integrated the farmer-based seed system into their seed policies, and Africa's average score for this indicator was poor, at 3.45/10. This result is fully consistent with the analysis conducted by (Africa Seeds, 2021;Sperling et al., 2021)who highlighted the issue of insufficient utilization of informal seed systems.

In terms of sector governance, according to the same SSPI report (TASAI, 2024), measures taken to combat seed counterfeiting in order to clean up the seed system remain only fair, with a score of 5.28/10. The lack of appropriate provisions to improve the functioning of the seed distribution chain does not guarantee the viability of seed markets, thus confirming the concerns raised in regarding the viability of seed companies threatened by farmers' practice of self-renewing seeds (Niangado, 2010).

According to(TASAI, 2024), there is an urgent need to increase investment in seed systems to support agricultural productivity through: improving the variety certification process; strengthening the technical, infrastructural, logistical, and material capacities of agricultural research; and revitalizing government seed inspection and certification systems and taking effective measures to combat unregistered seeds.

Furthermore, an analysis of the radar charts in relation to the challenge indicators suggests that Benin would rank highest in terms of the level of challenges facing the seed sector, followed by Sierra Leone, Senegal, and Togo.

These results confirm the need to continue analyzing the seed system in West Africa, particularly in the targeted countries, in order to deepen the assessment and propose more specific approaches to addressing these challenges.

Conclusion:

The analysis of current challenges of the seed sector in Benin, Togo, Senegal, and Sierra Leone, which is the subject of this study, has made it possible to categorize the major challenges facing the seed sector in West Africa according to institutional, regulatory, and policy dimensions; organizational and governance dimensions; and, finally, technical dimensions.

Indeed, the challenges facing the seed sector in West Africa are relatively similar, though with country-specific variations. Six indicators, namely: (i) number of registered varieties, (ii) adequacy of the national research and variety selection system, (iii) number of seed varieties marketed, (iv) use of certified seeds, (v) repackaging of seed packages to meet the needs of smallholder farmers, and (vi) status of the farmer-saved seed system, can help operationalize and determine strategies to address the identified challenges.

Greater attention to these indicators is required to measure future progress of the seed system in the member states.

The results of this study lay the groundwork for guidance and analysis regarding the relevant indicators of challenges that must be prioritized within the framework of a policy for evaluating the seed sector in Africa in general and in West Africa in particular.

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Table 1: Evaluation of seed system performance in selected African countries

Pays	Indicators						Average score calculated for the 6 indicators	Country scores for the 17 indicators of TASAI
	2	3	6	7	10	14		
	Number of varieties released	Adequacy of the national agricultural research institutes' breeding programs	Availability of varietal choice to farmers	Utilization of quality commercial seed by farmers	Availability of seeds in small packages	Status of the farmer-managed seed system		
Benin	**0,00**	**3,00**	**1,92**	**0,52**	**0,50**	**3,00**	**1.49**	**5.37**
Senegal	**2,43**	**2,50**	**7,86**	**8,16**	**0,00**	**0,00**	**3.46**	**5.31**
Sierra-Leone	**4,43**	**4,33**	**1,64**	**1,3**	**0,75**	**5,00**	**2.90**	**4.43**
Togo	**3,57**	**4,33**	**1,99**	**8,32**	**0,65**	**4,00**	**3.81**	**5.58**
South Africa	**10,00**	**9,00**	**10**	**10**	**0,00**	**5,00**	**7.33**	**8.62**
Average for Africa	**2,98**	**3,84**	**3,83**	**3,65**	**2,07**	**3,45**	**3.30**	**4.81**

Source: SSPI Report 2023 (TASAI)

Colorcodes:

Extremelypoor 0-<2	**Poor 2- <4**	**Fair 4- <6**	**Good 6- <8**	**Excellent 8-10**

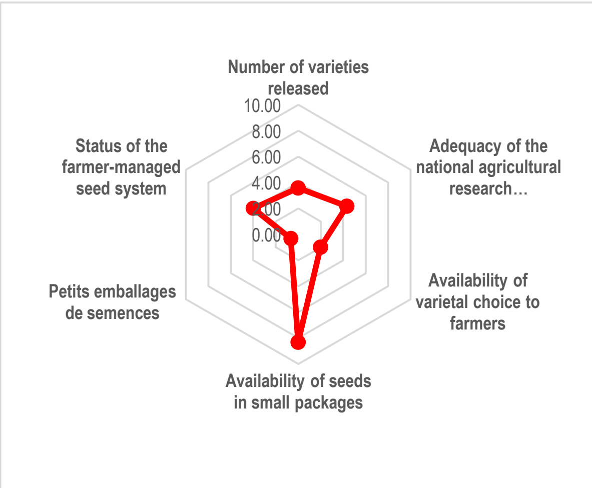

Figure 1 : Case of Togo

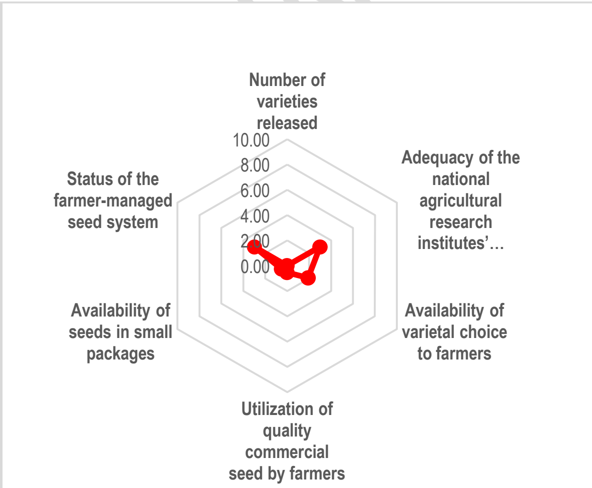

Figure 2 : Case of Benin

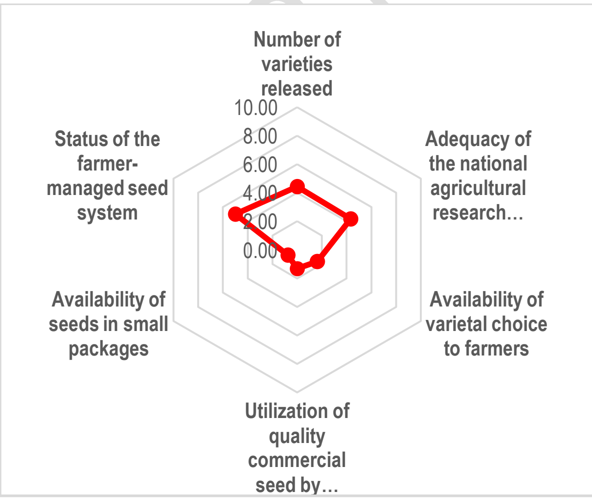

Figure 3 : Case of Sierra Leone

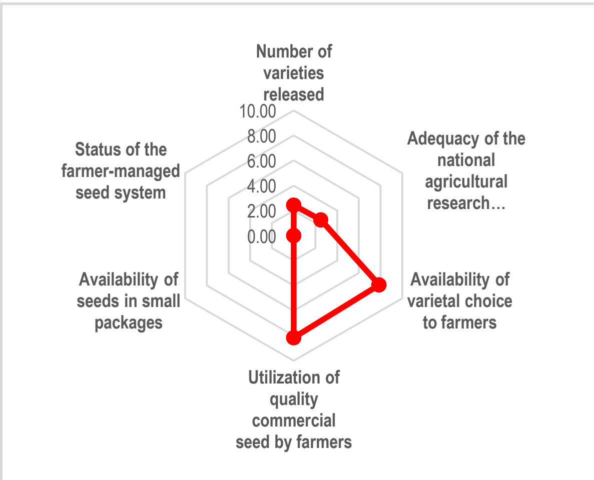

Figure 4 : Case of Senegal

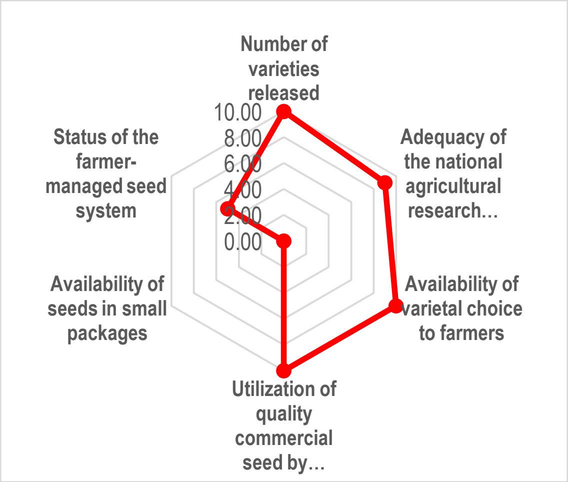

Figure 5 : Case of South Africa

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