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RESEARCH ARTICLE

REVIEW OF THE CHALLENGES FACING THE SEED SECTOR IN WEST AFRICA

Daouda Salami[1], Saliou Bello[2], Etienne Adango[3], Nieyidouba Lamien[4] and Agnassim Banito[5]

1. Direction De La Production Agricole (DPA), Ministere De l'Agriculture, De La Peche, Des Ressources Animales Et De La Souverainete Alimentaire (MAPRASA) Du Togo.
2. Centre Regional De Specialisation Sur Le Mais (CRS-Mais), Institut National Des Recherches Agricoles Du Benin (INRAB).
3. Direction De La Production Vegetale (DPV), Ministere De l'Agriculture De l'Elevage Et De La Peche (MAEP) Du Benin.
4. Conseil Ouest Et Centre Africain Pour La Recherche Et Le Developpement Agricoles (CORAF),Senegal.
5. Ecole Superieure d'Agronomie, Universite De Lome (ESA/UL).

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Abstract

As part the strategies to improve the agricultural productivity through the promotion of seed industry to be competitive, the present study aimed to analyze the challenges facing the seed sector in West Africa and identify relevant indicators useful for further research activities in this sector. Therefore, the methodology employed was based on a literature review and a SWOT analysis of the seed system through semi-structured interviews with the main seed services in the four countries selected for the research, namely Sierra-Leone, Senegal, Benin and Togo. The analysis identified a set of tree categories of challenges: (i) institutional, regulatory, and policy challenges; (ii) organizational and governance challenges within the sector; and finally, (iii) technical challenges. The first category of challenges included, the failure to adequately account for the informal seed system in policies, the ineffective enforcement of certain regulatory procedures, and the failure in the operationalization of the support fund for the seed sector. The second category of challenges was related to the low level of the private sector involved in the development of the seed sector, the weak organization of the seed marketing chain, and inadequate planning of seed chain activities. The third set of challenges was related to the insuff icient variety development, the weak infrastructural and technical capacities of the public and the private actors, and the low rate of the use of certified seeds. These results constitute an important database on the indicators to be considered in the further researches for the optimizat ion of the seed sector performance in West Africa.

Corresponding Author:-Daouda Salami
Address:-Direction de la Production Agricole (DPA), Ministere de l'Agriculture, de la Peche, des Ressources Animales et de la Souverainete Alimentaire (MAPRASA) du Togo.

Introduction:-

In West Africa, agriculture accounts for 29% of the GDP and is the main means of subsistence 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 the following essential criteria: seed availability, seeds accessibility, variety relevance, and seed quality (FAO, 2016).

The seeds are the primary and most critical factor of production, as they contribute at least for 40% in the crop yields in West and Central Africa (Djamen, 2016). The adoption of improved seed varieties can increase the agricultural production and the household food consumption, reduce the risk of low yields, improve farmers' incomes, and ensure food security in Sub-Saharan African countries (Dieng et al., 2025). Aware of the importance the strategy of using high-quality seeds, several policies and initiatives at the national, regional, and continental levels were developed and adopted to improve producers' access to certified seeds. Efforts to harmonize national regulations and facilitate the emergence of a regional seed market were 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 across the ECOWAS region (Keyser, 2013). However, despite these efforts, smallholder access to certified seeds remains a challenge, with a rate 12.5% for food crops in West Africa in 2013 (Djamen, 2016). According to AfricaSeeds (2021), the informal seed sector was by far the main source of seeds production in Africa with more than 90% of seeds and even up to 100% seeds for several traditional crops and vegetatively in most regions.

This reflects the existence of numerous challenges to be addressed regarding the seed value chain at the national level. Several studies and analyses on the seed system in Africa have been conducted by researchers and international organizations working in the seed sector, such as the Food and Agriculture Organization of the United Nations (FAO), AfricaSeeds, the Alliance for a Green Revolution in Africa (AGRA), the Seed System Group (SSG), and The African Seed Access Index (TASAI) (AfricaSeeds, 2021).This study focussed on the challenges that must be addressed to improve the performance of the seed system in West Africa. Thus, the analysis of the current status of the seed sector in this region was performed 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.

Materials and Methods:-

To achieve these goals, a comprehensive review was conducted and supplemented by semi-structured interviews which involved four main seed departments from Sierra-Leone, Senegal, Benin, and Togo. These department were selected on the basis of their experience in the seed sector.For this, recent technical documents and scientific papers were reviewed and analyzed for identification of challenges in the seed sector in Africa and especially in West Africa, while the SWOT analysis carried out following the interviews to categorize the data collected by sector and to find out the strengths, weaknesses, opportunities, and threats facing the seed sector in the study area. To develop a typology of the major challengesof the seed sector, the results of the literature review were cross-referenced with those of the semi-structured interviews, followed by discussions based on the Seed Sector Performance Index reported by TASAI (2024).

Thus, 17 indicators defined by TASAI were used: (i) Quality of the variety release and registration process; (ii) Number of varieties released in 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) Availability of varietal choice to farmers; (vii) Utilization of quality commercial seed by farmers; (viii) Adequacy of seed import process;(ix) Adequacy of agrodealers 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 seed system;(xv) Adequacy of seed inspection services; (xvi) Adequacy of government efforts to combat counterfeit seeds and (xvii) Adequacy of the national seed trade association.

However, the indicators ii, iii, vi, vii, x, and xiv required a particular attention in this study (Table 1) following this scores of the Seed Sector Performance Index (TASAI, 2024) .

These 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: peanuts, millet, rice, and maize for Senegal, rice, peanuts, sorghum, and maize for Sierra Leone, maize, cassava, soybeans, and rice for Benin, maize, sorghum, rice, and soybeans for Togo; (ii) Adequacy of the national agricultural research institutes (NARIs) breeding programs; This indicator assesses three key aspects of the operation of this institution, namely, (a) adequacy of the number of breeders, (b) adequacy of funding for breeding programs, and (c) the quality of research infrastructures. This indicator assesses the extent and highlights the public research institutes with sufficient human resources and infrastructures to support the development and commercialization of varieties in the countries; (iii) Availability of varieties with choice options for 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 of use high-quality commercial seeds used by the farmers; (v) Availability of seeds in small packages: the proportion of seeds sold in packages of 2 kg or less from the total volume of seeds produced for the four crops selected; (vi) Status of the farmer seed system: This indicator measures the extent to which farmer 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.

The analysis also considered the scores obtained by a sample from the four countries of the study area, namely Togo, Senegal, Benin, and Sierra Leone. The frequency value associated with these challenge indicators in each of the four target countries was compared with that of South Africa, which was the best according to the Seed Sector Performance Index in 2023 (TASAI, 2024).

Results:-

Result of the SWOT analysis for the seed sector in the study area

The summary of results of the SWOT analysis according to domains is presented in tables 2, 3, and 4.

Challenges in the seed sector

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 to develop an inclusive seed sector that could encourage private investment(Djamen, 2016; AfricaSeeds, 2021). In the forum between stakeholders from both formal and informal seed systems, Eveline et al. (2019) highlighted (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, this revealed the economic importance of the informal sector, with amounted of US$4.35 million in 2019.

Analyzing the challenges of smallholder access to agricultural innovations in West Africa, Butare and Zoundi (2005) emphasized that beyond the performance of agricultural innovation and the level of producers knowledge about, the institutional and political environment plays an equally decisive role in the access to and the use of research results. An assessment of the seed landscape in Senegal underlined challenges related to (i) low private sector involvement and (ii) the suboptimal functioning of institutional, organizational, and financial mechanisms (Bloukounon et al., 2024). In the framework 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 in member states, (ii) the limited capacity of members of national seed committees (NSC) to fulfil their advisory role to the full, and (iii) the slow progress made by certain countries, particularly Portuguese speaking countries, in implementing the harmonized seed regulations.

Organizational and Governance Challenges

Several studies have been conducted to analyze and identify the organizational and governance challenges in the seed sector. For the organizational challenges, studies 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 (Djamen, 2016; Africa Seeds, 2021; Achigan-Dakoet al., 2014). As part of an analysis of the formal rain-fed rice seed sector in Casamance in Senegal, Zucchini et al. (2020) reported 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) revealed that most of the farmers renewed their own seeds, meaning the lack of effective or viable seed companies. As part of an analysis of the rice value chain in Benin, Dossouhoui (2019) reported that the seed sector did not function as a real value chain serving key stakeholders, particularly paddy producers and processors, as well as consumers or end users of the grains. According to Breen et al., (2024) ; Macrobert, (2009) the main constrains to the adoption of improved seed varieties, including legumes, in Sub-Saharan Africa, were (i) the lack of access to sufficient quantities of seeds through the official seed system on time , (ii) the high cost of seeds, and (iii) the lack of information on new varieties. In Africa, certain constrains have been pointed out as barriers to agricultural growth, such as access issues, the high prices, and the poor quality of seeds used by producers (Keyser, 2013). Dysfunction of the peanut seed collection, storage, and preservation system in Senegal and its impacts on seed lot quality was reported Ndoye et al. (2025).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 research and development initiative involving researchers, the farmers' organization, and producers in the village of Paoskoto; (ii) the strengthening and diversification of partnerships among peanut stakeholders 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 the 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

Technical challenges were identified in the seed sector relate to (i) insufficient variety development and commercialization, (ii) inadequate support for small-scale seed business companies, and (iii) weak infrastructure and technical capacity (AfricaSeeds, 2021). To reverse this trend, Adigoun et al. (2022) emphasized the need to strengthen capacities and synergies among seed sector stakeholders through the enhancement of the commercial and marketing skills of seed producers by training and promoting the comparative advantages of improved seeds to increase yields, and the connexion of seed producers to maize producer organizations, with the information and communication technology (ICT) based agricultural extension services. This will stimulate the development of the maize seed sector and the maize value chain.As strategies to improve the supply of soybean seeds in Benin, Ayenan (2018), suggested the capacity building of research institutions, the support of the private seed companies, and adoption of 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 revealed as main constraints in the seed sector in the member countries: (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; (iv) the high risk of introducing pests and harmful organisms to plants products, linked to the weakness of the control and surveillance system; and (v) the low rate of use of certified seeds (CORAF, 2024).

Overview of the main challenges facing the seed sector

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

The Analysis following the evaluation of the Seed Sector Performance Index (TASAI, 2024) revealed poor scores (below 4/10) for the six key indicators associated with the current challenges facing the seed sector in Africa. Thus, all these indicators (number of varieties, adequacy of the national agricultural research institutes' breeding programs, varieties availability, use of quality see, availability of small seed packages, and the status of the farmer seed system) were unfavorable to the development of the seed sector in the six countries of the study area.

The scores for the six indicators of major challenges in the seed sector in the four countries in contrast with South Africa are illustrated in Figures 1 to 5. The results of the analysis of radar charts 1, 2, 3, and 4, showed positive correlation between the polygon and the scores for each of the challenge indicators in each country. The lower the scores, the smaller the area of the polygon, revealing the same challenges in the four countries. However, specific characteristics at the country level were noted, as evidenced by the variation in the areas depicted.The major identified challenges in the four countries showed 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 the packaging of seeds into small quantities. However, the use of the certified seeds appeared as a major concern in Benin and Sierra Leone than in Senegal and Togo. The commercialized varieties in Togo, Benin, and Sierra Leone with the score <2, were lower than in Senegal with a score = 7.86.The large area of the polygon obtained for South Africa revealed the performance of the country across the various targeted challenge indicators, as in the SSPI report in 2023, this country ranked first with a score of 8.62.

Discussion:-

The SWOT analysis carried out following the semi-structured interviews showed that the weaknesses of the seed systems in the study area are diversified and concern all the links in the sector, namely, the political and regulatory environment, variety research, seed production, distribution, and use of seeds.

The diversity of the seed system's weaknesses revealed that the seed warrants a systemic or holistic approach in order to propose sustainable solutions to the sector's challenges. Thus, the performance of the seed system in the study area still needs to be strengthened by addressing the key indicators of the identifiedchallenges. In terms of the release of new varieties, for example, 13 of the 47 countries, including Liberia and Benin, did 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 findings are supported the conclusions of the Regional Committee on Seeds and Plants which highlighted the weakness of the variety release system in member countries (CORAF, 2024).

The challenge of the low rate of certified seed utilization rates is confirm 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 Afrique and align with the views of Adigoun et al. (2022), which highlignted the need to strengthen capacities and synergies among seed stakeholders by focusing on marketing, promoting seed use, and agricultural extension.

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 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 system and taking effective measures to combat unregistered seeds.Furthermore an analysis of the radar charts in relation tothe challenge indicators suggests that Benin would rank highest in terms of the level of challenges facing the seed sector, followed by Sierra Leone. In contrast, Senegal and Togo present almost similar levels of challenges. 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 the 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

Country	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 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:

Extremelypoor0-<2	Poor 2-<4	Fair 4-<6	Good 6-<8	Excellent 8-10

*: Continental average determined from the scores of the 47 countries covered by the TASAI study.

Table 2: Institutional and regulatory framework for the seed sector

Strengths,	Weaknesses
- National seed regulations revised and brought into line with the harmonised regulatory framework of ECOWAS; - Gradual creation of a policy environment conducive to the development of the seed sector through the updating of national seed policies and strategies; - Establishment and operation of the national seeds and plants committees (CNSP); - Official catalogue of species and varieties available in each country; - Teams of sworn inspectors available for quality control; - Operationalization of national seed testing and certification laboratories, including the DISEM laboratory in Senegal, which was accredited by ISTA; - Adhesion of the Senegalese seed system to the OECD certification scheme;	- Insufficient resources (material, technical, human and financial) allocated to the control services for their proper functioning; - Low level of implementation of certain regulatory provisions (professional licence, seed inspection fees, etc.); - Lack of operationalization of the Seed Sector Support Fund in most states; - Insufficient staff and weak technical capacity of seed inspectors and analysts; - Weak operationalization of mechanisms for controlling the import and export of plant seeds and penalizing fraud; - Low level of operation of the national committees for seeds and the variety registration committees; - Low frequency of updating the official catalogue of species and varieties

Opportunities	Threats
- Support for projects, Parteners and NGO in terms of equipment, technical capacity for the quality control and certification system, and promotion of the use of improved seeds, - Commitments by certain countries, including Togo, to join the OECD seed certificationsystem and to obtain ISTA accreditation for their laboratories	- Effects of climate change; - Competition between imported seeds and domestic production and countries being highly dependent on vegetable seeds from abroad; - Presence of fraud in the seeds selling

Table 3: Plant breeding, seed production and conditioning

Strengths	Weaknesses
-Multidisciplinary research team actively working on the plant breeding and improvement of varieties in some countries; - Availability of resilient varieties for certain speculations; - Existence of national associations of certified seed producers in the targeted countries; - Existence of certain seed processing and sorting stations; - Availability of seed packaging standards by species in certain countries; - Emergence of small, and medium-sized seed companies approved by national seed services.	- limited capacity for plant breeding and the multiplication of foundation seeds due to insufficient human, financial, and material resources for breeding programs; - limited capacity in gene banks for the management of plant genetic resources - Low level of professionalization of seed producers and distributors; - Poor planning of seed production activities, - Low level of mechanization in production and post-harvest operations; - Suitable packaging lines and storage infrastructure for seed that is in short supply; - Lack of a reliable system of information and documentation on seeds; - Low level of water control in the national plant seed production system;
Opportunities	**Threats**
- Operational projects and NGOs providing technical and financial support; - Government grants for the purchase of production, processing, and storage equipment, etc.; - Existence of significant potential for arable land not yet valued; - High potential domestic demand for certified seeds; - Favorable soil and climate conditions	- Adverse effects of climate change and variability on production; - Genetic erosion of certain strains of local food crops; - State intervention through seed subsidies, which sometimes limits the action of the private seed sector; - land tenure insecurity in most countries

Table 4: Seed distribution and use

Strengths	Weaknesses
-Existence of a legal framework and national seed quality control services; - Very high potential seed needs in the countries due to the large farmland; - Gradual strengthening of the availability of quality seeds in countries with the emergence of new companies; - Existence of seeds selling stores;	- Slowness in the dissemination of new registered varieties; - Low level of organization and decentralization of the circuits for collecting and distributing plant seeds; - Lack of a marketing strategy for seed distribution by private companies; - Price of certified seeds deemed too high by producers in some countries; - Lack of traceability of seeds (packages not properly sealed or sometimes without labels); - Low utilization rate of certified seeds
Opportunities	**Threats**

- Existence of projects and NGOs active in supporting the seed sector; - Favourable environment for companies to specialize in distribution and marketing; - The ECOWAS seed market opened thanks to the principle of free movement.	- The proliferation of poor-quality seeds on the market; - Government intervention in the form of seed subsidies sometimes limits the action of the private seed sector.

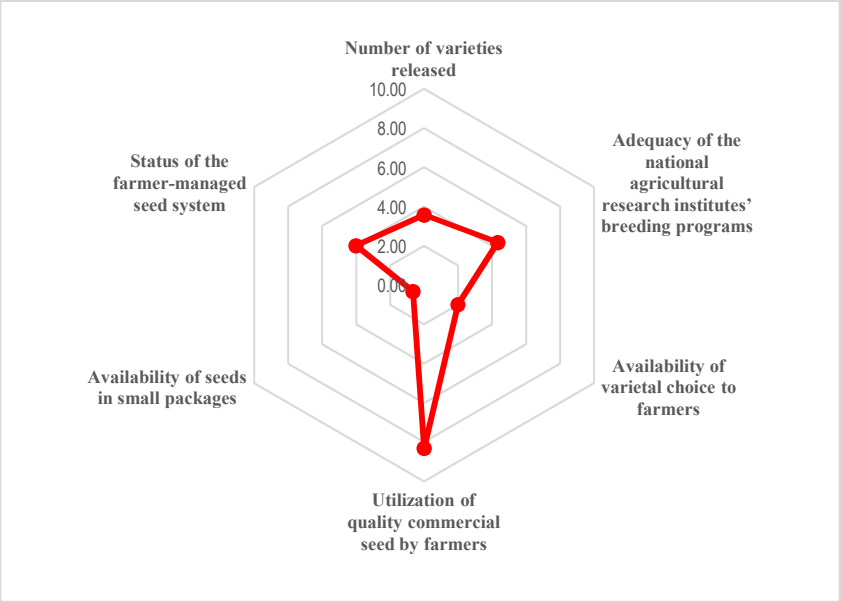

Figure 1 : Case of Togo

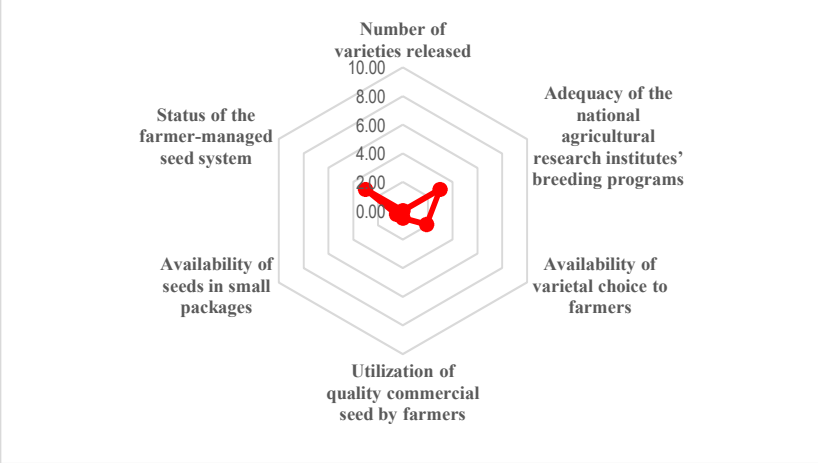

Figure 2 : Case of Benin

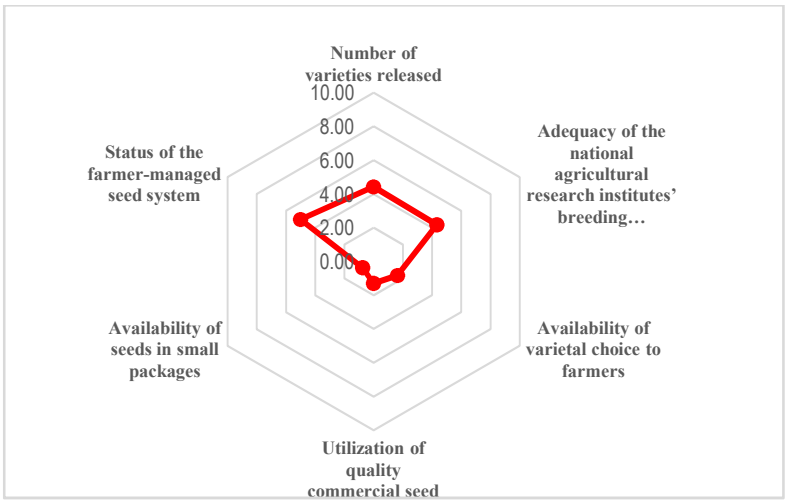

Figure 3 : Case of Sierra Leone

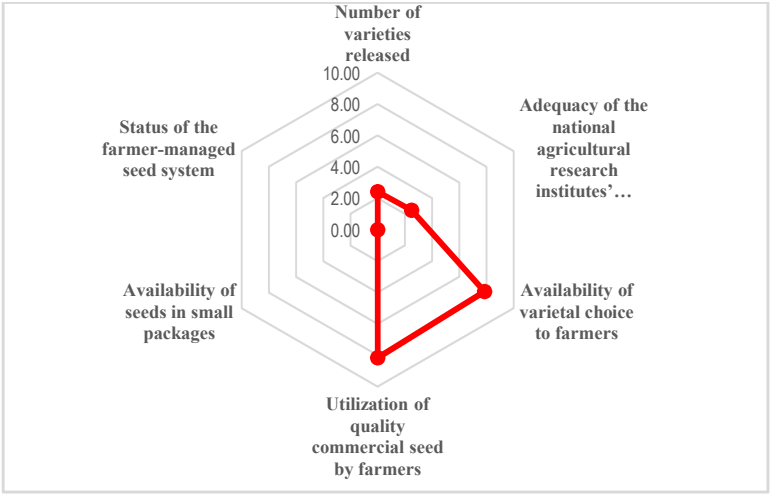

Figure 4 : Case of Senegal

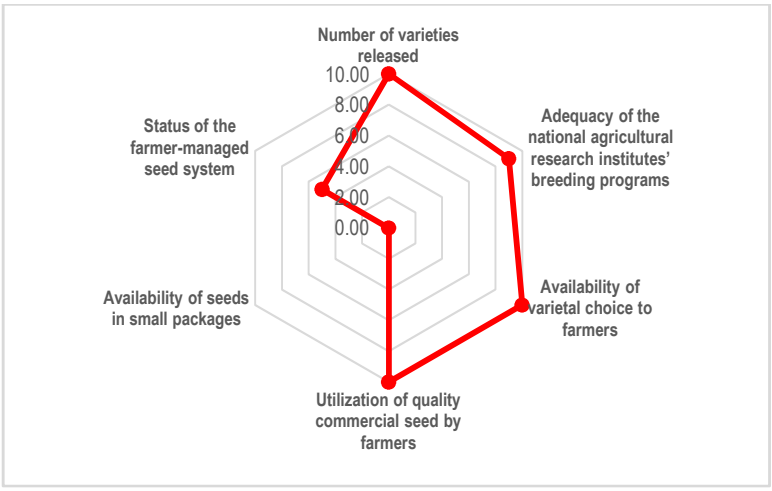

Figure 5 : Case of South Africa

References:-

1. WBG(2021). West Africa Food SystemResilience Program, Project appraisal document (PAD) - P172769, 241p + Annexes. https://www.gafspfund.org/sites/default/files/inline-files/Burkina-Faso-Mali-Niger-Togo-Chad-Ghana-Sierra-Leone-West-Africa-Food-System-Resilience-Program_0.pdf (accessed on le 26 july2025).
2. TASAI(2024), Seed System Performance Index, Status Report 2023 for Africa, 234 p. https://agra.org/wp-content/uploads/2024/09/SSPI_report_2023_web.pdf
3. FAO(2016).Etude sur la securite semenciere, Guide du praticien, Rome, 72 p. https://openknowledge.fao.org/items/92933b1e-4a45-4761-bc23-3813e71dcc6e
4. Djamen, P. (2016). Developper le secteur semencier pour augmenter la productivite agricole en Afrique de l'Ouest et du Centre : Leviers et principes d'action,10 p. https://doi.org/10.13140/RG.2.2.13616.05121
5. Dieng,F., Diallo,M. F., Lo A. M. and AidaraM. M. (2025). Utilisation des Varietes de Semences Ameliorees et Efficacite Technique des Riziculteurs au Senegal, Revue Française Gestion, 6, 194-218.https://www.revuefreg.fr/index.php/home/article/view/2110
6. Keyser, J.C. (2013). Ouvrir les marches au commerce des semences en Afrique, (2013) 33 p.https://openknowledge.worldbank.org/server/api/core/bitstreams/373e2576-d2b3-582d-851d-350e355b035c/content
7. Africa Seeds (2021). Strategie d'AfricaSeeds 2022-2031, Pour un developpement inclusif du secteur semencier en soutien à la transformation de l'agriculture en Afrique, Abidjan, (2021), 52 p +Annexes.https://www.africa-seeds.org/wp-content/uploads/2018/02 https://www.africaseeds.org/wpcontent/uploads/2023/01/AfricaSeedsNewStrategy_FR.pdf(consulte le 03 mai 2025)
8. Eveline, S.C.M., Ludovic, T., Constantin, C., Amos, K., Lucrece, N., Laurent, O., Souleymane, O. and Aline, Z. (2019). Forum sur le fonctionnement et l'evolution du secteur semencier au Burkina Faso, 45 p. https://agritrop.cirad.fr/595544/1 /Rapport%20atelier%20Ouaga4.pdf
9. Sperling, L., Birachi, E., Kalemera, S., Mutua, M., Templer, N., Mukankusi, C., Radegunda, K., William, M., Gallagher, P., Kadege, E. and Rubyogo, J.C. (2021). The Informal Seed Business: Focus on Yellow Bean in Tanzania Sustainability, 13, 8897. https://doi.org/10.3390/su13168897
10. Butare, I. and Zoundi, J.S. (2005). Eclairer la prise de decision politique en Afrique subsaharienne: nouvelle donne pour la recherche agricole et environnementale, Deuxieme edition, Butare et Zondi, Dakar, 96 p. https://www.researchgate.net/publication /277202307
11. Bloukounon Goubalan, A.Y., Affognon,H., Sagne,F.,Diop,N. N. and Guei G.R. (2024), Analyse du paysage du secteur semencier au Senegal, FAO, Dakar, 21p. https://doi.org/10.4060/ cd1912fr FAO.
12. CORAF(2025). Rapport annuel, Dakar, Senegal, 64 p. https://www.coraf.org/
13. Achigan-Dako,E.G.,Houdegbe,A.C.,Glele,M.andNono-Womdim,R.(2014). Analyse du systeme de production et de distribution des semences de mais (Zea mays L.) au Sud- Benin. Biotechnol. Agron. Soc. Environ. 18 (2014) 49–60. https://www. researchgate.net/ publication/270048747
14. Zucchini,E., Manzelli,M., Tarchiani,V. andVecchia,A.D. (2024). La filiere etatique des semences de riz pluvial en Casamance (Senegal) : fonctionnement, contraintes et perspectives de developpement. Eur. Sci. J. ESJ, 16. https://doi.org/10.19044/esj.2020.v16n5p20
15. Niangado,O. (2010). Varietal development and seed system in west Africa: Challenges and opportunities, 8 p. https://www.researchgate.net/publication/309293830
16. DossouhouiF. V. (2019). Developpement d'un secteur semencier integre aux chaînes de valeur du riz local au Benin. These de doctorat (PhD). Universite de Liege, Gembloux Agro-Bio Tech,Belgique, 206 p.
17. Breen, C., Ndlovu, N., McKeown, P.C. and Spillane, C. (2024).Legume seed system performance in sub-Saharan Africa: barriers, opportunities, and scaling options. A review. Agron. Sustain. Dev. 44, 20. https://doi.org/10.1007/s13593-024-00956-6
18. MacrobertJ. (2009), Seed Business Management in Africa, International Maize and Wheat Improvement Center, Harare, Zimbawe, 256 p. https://ethiopianseedassociation.wordpress.com/wp-content/uploads/2022/04/seed-business-management-in-africa.pdf
19. Ndoye,M., Bamba, B. and Diop, S., (2025). Analyse du systeme de collecte, de conditionnementet de stockage des semences d'arachide (Arachishypogeae L.) au Senegal, Afrique SCIENCE, 27(6) (2025) 42 - 53
20. Clavel, D. and Gaye, M. (2018). L'emergence de nouvelles cooperatives semencieres au Senegal-Analyse de l'impact de la recherche-developpement sur l'arachide de 1999 à 2016. Cah. Agric. 27, 15008. https://doi.org/10.1051/cagri/2017062
21. Diallo,Y. (2015). Alliance for seed industry in West of Africa (ASIWA) presentation, CORAF/WECARD,29slides.https://fr.slideshare.net/slideshow/asiwa-presentation/52504962

22. Adigoun, R.F.R., Houdegbe, A.C., Fassinou Hotegni, N.V., Segnon, A.C., N'Danikou, S., Adje, C.A.O., Adadja, R.P.M. and Achigan-Dako, E.G. (2022). Enabling effective maize seed system in low-income countries of West Africa: Insights from Benin. Front. Sustain. Food Syst. 6, 1045629. https://doi.org/10.3389/fsufs.2022.1045629
23. Ayenan, M.A.T., Sewade,P.L., and Agboton, M.S.(2018). Approvisionnement en semences de soja au Benin : Quelle strategie faut-il mettre en place ? Bibliotheque nationale du Benin, 4 p.https://www.researchgate.net/publication/324681120.