Development of a local bioinput industry in the Fatick region.

Mapping of stakeholders involved in the production of biofertilizers

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REPORT

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1. Introduction

This study was conducted in the context of the growing challenges facing Senegalese agriculture, particularly in Fatick, marked by progressive soil degradation, declining organic matter, salinization in certain areas, and dependence on chemical inputs, whose costs and environmental impacts are major concerns for both producers and decision-makers. In response to these challenges, biofertilizers such as improved composts, biogas digestates, biostimulants, and other organic amendments appear to be strategic alternatives for improving agricultural productivity while preserving natural resources. However, despite the growing recognition of biofertilizers and organic amendments as sustainable alternatives to chemical inputs, their production and use remain limited due to technical, organizational, and financial constraints. The information available on existing initiatives, production capacities, and the diversity of biofertilizer types remains insufficient. It is therefore essential to better understand the institutional landscape and the technical knowledge available at the INP in order to guide the strategy for establishing a biofertilizer sector in Fatick.

This technical report presents the results of an initial activity carried out as part of the study on the establishment of the bio-input sector. The objective is to develop strategies for the development of a local bio-input production sector in order to improve soil fertility and promote sustainable and environmentally friendly agriculture. This report focuses in particular on biofertilizers. The activity consisted of a semi-structured interview with the Director of the INP (National Institute of Pedology) and informal discussions with other stakeholders, as well as the collection of secondary information to better understand the types of biofertilizers currently used in Senegal and the initiatives undertaken by various stakeholders in the field of their production. This mission was part of a broader diagnostic process aimed at guiding the design of future interventions in the Fatick region and the establishment of a bio-input sub-sector.

We should point out that while, in theory, a biofertilizer is primarily a product containing living microorganisms that improve the availability of nutrients for plants, it is very common in Senegal to associate biofertilizers with soil amendments or organic fertilizers. The analysis therefore takes into account compost or manure used in a more traditional way.

The study of biofertilizers is of major strategic interest from the perspective of landscape multifunctionality, insofar as these biological inputs act simultaneously on several economic, environmental, and social dimensions of rural areas. Environmentally, biofertilizers help improve nutrient use efficiency, enhance soil biological activity, and reduce dependence on synthetic mineral fertilizers, thereby limiting greenhouse gas emissions, water pollution, and soil degradation. Economically, they can reduce the cost of imported

inputs, strengthen the productive autonomy of farms, and promote the emergence of local bio-input production and distribution chains, generating jobs and added value for the region. Finally, on a social and institutional level, the development of biofertilizers can stimulate local innovation, strengthen producers' technical capacities, and support collective dynamics around sustainable resource management. Thus, the analysis of biofertilizers is not solely an agronomic issue, but is fully part of a multifunctional landscape approach where production, ecological regulation, employment, and territorial governance are closely linked.

2. Objectives and methodology

2.1 Objective

The objective was to gather the INP's institutional knowledge on the types of biofertilizers and the initiatives underway to support the development of biofertilizers at the national level and in Fatick. To this end, we sought to:

- Identify the main types of biofertilizers used or promoted in Senegal.

- Document the initiatives and actors involved in the production of biofertilizers.

- Understand the technical and logistical constraints associated with production.

2.2. Methodology

The activity was carried out through a semi-structured interview with the Director of the INP in Dakar. The interview guide included questions on soil types, fertility constraints, existing biofertilizer production practices, and institutional initiatives. The mission also included the collection of secondary information and informal exchanges with other stakeholders where possible.

In addition to this main interview, the mission included the collection of secondary information, including consultation of technical documents, project reports, existing data on soil fertility, and institutional references relating to bio-inputs and organic waste management . Telephone conversations were also held with other stakeholders where possible (researchers, technicians, local projects or initiatives) in order to triangulate certain information and identify areas for further exploration during the next phases of the assessment.

3. Results obtained

The combination of expert interviews and telephone conversations conducted on site provided an initial structured overview of the institutional and technical landscape related to biofertilizers in Senegal, particularly in Fatick, thus establishing a solid methodological basis for the subsequent stages of setting up the Biointrant sub-sector.

3.1 Types of biofertilizers identified

Several types of biofertilizers and organic amendments were identified, reflecting the diversity of practices and resources available in Senegal.

Compost remains the most widespread and accessible bio-input. It is generally produced from agricultural residues (straw, plant tops, peanut shells), organic household waste, and livestock manure. According to the practices observed, composting is carried out traditionally in windrows or pits, with varying maturation times. Compost is mainly used to improve soil organic matter, strengthen soil structure, increase water retention capacity, and stimulate biological activity.

Animal waste-based fertilizers are a second important category. They include raw or composted manure from cattle, sheep, goat, and poultry farms. Some operators also recycle specific by-products such as slaughterhouse waste (dried blood, crushed bones, horn residues), which are rich in nitrogen, phosphorus, and calcium. These inputs have high agronomic potential, but their use remains limited by logistical (collection, transport), sanitary (sanitization), and technical (formulation and dosage) constraints.

Digestate from biogas plants is an emerging biofertilizer that is particularly promising in areas where biodigesters are installed. This by-product of the methanization of organic waste (animal manure, plant residues) is rich in nutrients that can be directly assimilated by plants, particularly nitrogen in the form of ammonia. Its use makes it possible to combine renewable energy production and organic fertilization, thus contributing to a circular approach to resource management. However, the lack of clear standards on quality and application rates still limits its widespread use.

Organo-mineral fertilizers are another identified means of recovery. They combine local organic matter (compost, manure, processed plant residues) with complementary mineral inputs to improve the nutritional balance and availability of elements for crops. This type of product is particularly useful for addressing specific soil deficiencies while maintaining organic matter input. However, the formulation of these fertilizers requires technical supervision and laboratory analysis to ensure their effectiveness.

In addition, emerging practices have been reported, including the use of microbial inoculants and biostimulants derived from local biomass. Microbial inoculants aim to introduce beneficial microorganisms (nitrogen-fixing bacteria, mycorrhizal fungi, phosphorus-solubilizing microorganisms) into the soil or onto seeds to improve plant nutrition and soil health.

Biostimulants, on the other hand, include fermented plant extracts, plant manure, and microbial solutions (EM) designed to stimulate crop growth and strengthen their resistance to stress. These innovations are still relatively unstructured, often resulting from local initiatives or pilot projects, and require further scientific validation to regulate their production and use on a larger scale.

Overall, these different categories of biofertilizers illustrate the significant potential for valorizing local organic resources in Senegal. However, their effectiveness depends heavily on the quality of raw materials, processing methods, storage conditions, and field application methods, highlighting the need for technical support and a reference framework to structure the sector in a sustainable manner.

Table 1: Summary of biofertilizer products produced in the regions

Type of biofertilizer/soil amendment	Main raw materials	Agronomic functions	Level of distribution	Main constraints	Development potential
Compost	Agricultural residues (straw, leaves, husks), organic household waste, manure	Improvement of organic matter, soil structure, water retention, biological activity	Widespread, traditional practice	Variability in quality, long maturation time, lack of technical control	Strong, easily reproducible at community level
Animal waste-based fertilizers	Cattle, sheep, goat, and poultry manure; dried blood, crushed bones, horns	Provides nitrogen, phosphorus, calcium; improves chemical and biological fertility	Widespread but little processed	Logistical problems, insufficient sanitation, storage difficulties	High, especially with treatment and standardization units
Biogas digestate	Animal manure, methanized plant residues	Rapid supply of assimilable nitrogen, organic fertilization, improved microbial activity	Emerging, linked to areas equipped with biodigesters	No standards of use, difficult to transport (liquid), lack of knowledge about dosages	Very strong in a circular agriculture-energy approach
Organo-mineral fertilizers	Compost or manure + mineral supplements	Balanced supply of nutrients + organic matter	Low to moderate, pilot initiatives	Requires laboratory analysis, complex technical formulation	Important for addressing specific soil deficiencies
Microbial inoculants	Nitrogen-fixing bacteria, mycorrhizal fungi, solubilizing microorganisms	Improved plant nutrition, stimulation of soil life	Very low, especially in research/projects	Lack of laboratories, difficult quality control, low dissemination	Promising but requires scientific supervision
Biostimulants (liquid manure, fermented extracts, EM)	Local plants, fermented biomass, effective microorganisms	Growth stimulation, stress resistance, biological activation of the soil	Emerging, scattered local practices	Lack of scientific validation, absence of standards, imprecise dosing	Strong local potential with technical support

Source: Interview with INP, 2025

3.2 Key players and initiatives

The interview highlighted the existence of a diverse ecosystem of actors involved, at different levels, in the production, recovery, or promotion of biofertilizers in Senegal. These actors , include community structures, private companies, research institutions, and development projects, each with distinct technical capacities and objectives.

Among community actors, cooperatives and producer groups play an important role in the artisanal production of compost and the recovery of local organic waste. The CEPAD cooperative, for example, is involved in initiatives to transform organic waste into fertilizers, with a focus on local marketing. This type of actor contributes to the dissemination of agroecological practices at the community level, but faces constraints related to access to equipment, mastery of technical processes, and the regularity of raw material supplies.

On the private sector side, some initiatives to recover agro-industrial by-products have been reported. Activities related to SOCAS, in particular the recovery of animal residues (blood, bones, slaughterhouse waste) for the production of organic fertilizers, illustrate the potential for transforming industrial waste into agricultural inputs. These initiatives have strong potential in terms of product volume and nutritional value, but require significant investment in equipment, quality control, and logistics.

Research institutions play a central role in the biofertilizer ecosystem. Through its composting platforms and work on soil fertility, ISRA contributes to the experimentation and technical validation of different types of organic amendments. INP provides key expertise in soil characterization, amendment recommendations, and soil health monitoring. These institutions play a crucial role in the production of scientific knowledge, but their interaction with producers and local production units needs to be strengthened to ensure effective transfer of innovations.

Development projects and programs are another important pillar. Initiatives supported by ENABEL (Belgian cooperation), as well as other programs related to organic waste management, bioenergy, and agroecology, support the establishment of production units, the training of stakeholders, and the experimentation with new practices. These projects promote the emergence of local capacities, but their actions are often limited in time and space, which raises the question of how to sustain the gains after the end of funding.

Overall, these initiatives are distinguished by their scale of intervention, ranging from small-scale artisanal production to semi-industrial projects, and by their level of technical capacity, which varies greatly depending on access to equipment, laboratory analysis, technical skills, and distribution networks. This diversity of actors is an asset for the development of the biofertilizer sector, but it also highlights a lack of coordination, harmonization of practices, and a regulatory framework, all of which are essential for the sustainable structuring of biofertilizer production and marketing.

Table 2: Summary of current initiatives in biofertilizer production

Category of actor	Actor/Initiative	Role in the biofertilizer sector	Type of intervention	Identified location(s) of intervention
Cooperative / Community organization	**CEPAD**	Local production and marketing of organic fertilizers from organic waste	Artisanal production, waste recovery, local distribution	Fatick (and surrounding areas)
Agro-industrial company	**SOCAS (recycling of animal waste)**	Processing of animal by-products (blood, bones, horns) into organic fertilizers	Industrial waste recovery, larger-scale production	Slaughter and agro-industrial processing areas (mainly Dakar and supply areas)
Research institution	**ISRA**	Research, experimentation, and technical validation of composts and organic amendments	Composting platforms, agronomic trials, scientific support	Bambey, agricultural research stations
Research institution / soil expertise	**INP**	Soil analysis, soil amendment recommendations, expertise in soil fertility and health	Soil diagnosis, technical support, strategic guidance	Dakar (national), potential support for all regions
Development projects	**Programs supported by ENABEL**	Support for local production of biofertilizers, capacity building, structuring of units	Financing, training, technical support	Several regions depending on projects (including Fatick)
Technical platforms / research and development projects	**Composting platforms supported by projects**	Demonstration, training, experimentation with compost production techniques	Pilot production, demonstration, training	Bambey, Thiès, other pilot sites
Emerging local initiatives	**Groups/individual producers**	Artisanal production of compost, liquid manure, fermented extracts	Traditional practices and local innovations	Fatick, Kaolack, Casamance, various rural areas

Source: Interview with INP, 2025

3.3 Technical and organizational constraints

Analysis of discussions with the INP and the information gathered highlights a set of interdependent constraints that are hindering the structured development of the biofertilizer sector in Senegal.

- **Constraints related to raw materials**

Access to **sufficient quantities of high-quality organic raw materials** is a major constraint. Although agricultural residues and animal waste are available, their **scattered geographical distribution**,

competing uses (animal feed, domestic energy, bedding, etc.) and **variable composition** limit their mobilization. The lack of organized collection and pre-treatment systems leads to inconsistent input quality, directly affecting the agronomic performance of the biofertilizers produced.

— **Equipment and infrastructure constraints**

Most of the production units identified operate with **rudimentary equipment** (hand tools, no grinders, controlled aeration systems, concrete platforms, or covered storage areas). This situation reduces control over biological processes (temperature, humidity, oxygenation) and lengthens production times, while increasing nutrient losses. The lack of suitable infrastructure also limits the ability to produce regular volumes of consistent quality.

— **Lack of standardized technical protocols**

There are no **harmonized technical standards** for the production of different types of biofertilizers at the national or local level. Producers use empirical methods, with varying composting times, material mixtures, and maturation conditions. This lack of standardization makes it difficult to compare performance, reproduce processes, and market products that meet recognized standards.

— **Weaknesses in quality control**

Quality control is one of the weakest links in the sector. Very few units have access to laboratory analyses to determine the nutrient content, organic matter content, biological stability, or health safety of products. This situation limits the credibilit ity of biofertilizers among agricultural producers and hinders their integration into formal commercial channels.

— **Logistical constraints**

Logistical challenges mainly concern **the collection, transport, and storage of organic waste**. Raw materials are often bulky, wet, and of low economic density, which increases transport costs. The lack of organized collection points and structured supply chains reduces production efficiency and supply regularity.

— **Lack of information and market structure**

The biofertilizer market remains poorly structured. There is a **lack of information on actual demand**, producer preferences, acceptable prices, and competition with mineral fertilizers. Biofertilizer producers have little data to guide their production volumes or adapt their formulations to the specific needs of crops and soils.

— **Organizational and institutional constraints**

Finally, the sector suffers from a **lack of coordination between stakeholders**, weak producer structures, and the absence of a clear regulatory framework governing the production and marketing of biofertilizers. This situation limits the official recognition of products, access to financing, and the scaling up of local initiatives.

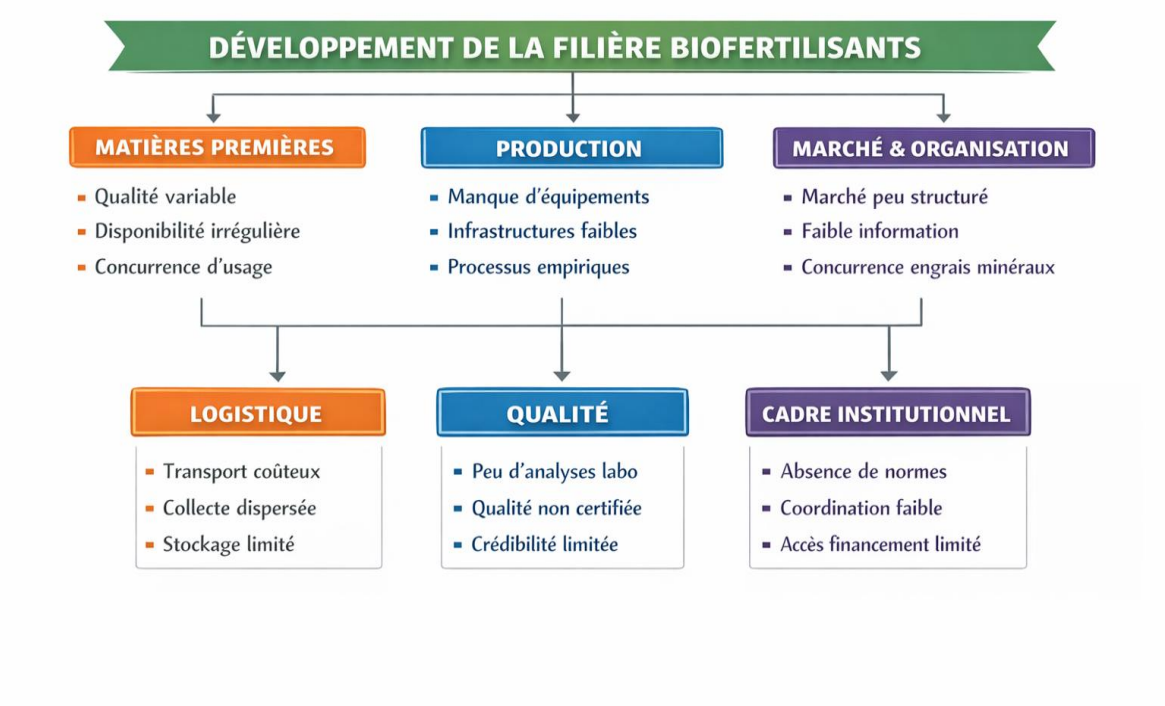

Figure 1: Main constraints in the biofertilizer sector

4. Discussion

The results of the interview with the INP and the analysis of the information gathered highlight a structural paradox in the biofertilizer sector in the Fatick region: significant technical, ecological, and economic potential coexists with structural weaknesses that hinder its large-scale development. The region has a significant supply of organic biomass from agricultural residues (peanuts, millet, vegetable crops), animal waste from livestock systems, and organic household waste. These resources provide a solid material basis for the development of a local biofertilizer industry, but the potential competition between uses must be analyzed. Most agricultural residues are consumed by animals, which poses a real trade-off problem.

The initiatives identified show that technical knowledge already exists in the region, particularly around traditional composting practices and the recovery of organic waste. Some community organizations and producer groups are experimenting with local forms of compost or organic fertilizer production, sometimes with the support of development projects. However, these experiments often remain limited to a very local

scale and do not always benefit from sufficient technical support to guarantee consistent product quality. The main challenge is therefore not the lack of practices, but the weak structure of their dissemination and the lack of support for their scaling up across the region, which inevitably also relates to the available volumes of raw materials.

The situation in Fatick also illustrates the high degree of fragmentation among initiatives. Development projects, technical institutions, decentralized services, and producer organizations often intervene in a piecemeal and uncoordinated manner. This lack of synergy limits the capitalization of experiences and hinders the development of a coherent regional dynamic around biofertilizers. Locally developed innovations thus struggle to move beyond the experimental stage and become widely adopted solutions for farms.

Added to this is the lack of harmonized technical standards adapted to the specific soil and climate conditions in Fatick, which are characterized by often sandy soils, low in organic matter and sometimes affected by salinity. The lack of laboratory analyses, precise dosage recommendations, and standardized production protocols limits producer confidence and makes it difficult to objectively evaluate the effectiveness of biofertilizers. This technical uncertainty hinders the emergence of a structured local market and the professionalization of production units.

Logistical constraints also play an important role in the Fatick context. Organic raw materials are scattered between farms, livestock areas, and villages, making their collection costly and poorly organized. The lack of collection platforms and suitable transport systems limits the regularity of supply to potential production units. Furthermore, the lack of information on local demand, specific crop requirements, and acceptable price levels complicates the economic planning of biofertilizer production activities.

5. Outlook for 2026

In 2026, the prospects for the development of the biofertilizer sector in the Fatick region will revolve around a systematic census of existing initiatives in order to identify all production units, whether community-based, private, or project-supported. This work will make it possible to classify initiatives according to the types of biofertilizers produced—compost, animal waste-based fertilizers, digestate, organo-mineral fertilizers, or biostimulants—and to analyze each unit's production capacity, level of equipment, organization, and room for improvement. This step is essential to better understand the local supply available and to direct technical support towards the production models best suited to the agroecological conditions in Fatick.

At the same time, this information will be linked to the potential agronomic uses of biofertilizers in the region. Composts and organic amendments will be particularly relevant for restoring organic matter to sandy and depleted soils, improving water retention, and supporting rain-fed crops such as millet, peanuts, and corn. Fertilizers derived from animal waste and organo-mineral fertilizers will be able to meet more targeted nutrient needs in vegetable and tree-growing systems, while biogas digestate will provide a rapid source of nitrogen for short-cycle crops. Biostimulants and microbial inoculants, meanwhile, can help strengthen crop resilience to climatic stresses and improve the biological activity of degraded or salinity-affected soils.

Finally, combined analysis of supply and use will make it possible to assess the level of territorial coverage of production units and identify areas where bioinput needs remain unmet. By estimating potential demand based on cultivated areas, soil types, and dominant cropping systems, it will be possible to determine the number of additional units needed and their specialization according to product type. This integrated approach will facilitate coherent regional planning, aimed at aligning local biofertilizer production capacities with the actual agronomic needs of farms in Fatick, while supporting a gradual transition to more sustainable agricultural practices.

8. Conclusion

The analysis conducted was a first step in the preliminary diagnosis of the establishment of the biofertilizer sector, providing essential insights into the current state of biofertilizer production and use in Senegal, and more specifically into the challenges applicable to the Fatick region. The information gathered provided a better understanding of the types of biofertilizers available, existing initiatives, and the technical, organizational, and institutional constraints that hinder the structured development of the sector.

The results highlight a significant diversity in the supply of biofertilizers and a plurality of initiatives aimed at increasing production at the local and regional levels. This dynamic reflects a growing interest among stakeholders in the valorization of organic resources and the development of alternatives to chemical fertilizers. However, the analysis carried out at this stage does not yet cover the actual supply and demand for bio-inputs, nor how the needs of agricultural producers are expressed and structured. The next stages of the project will therefore aim to further study the structure of the sector, examine the multifunctionality of the raw materials used in the manufacture of biofertilizers (competing agricultural, energy, food, or domestic uses), and to analyze in greater detail the agronomic needs actually covered by bio-inputs according to the crops, soil types, and production systems in the region.

This study of biofertilizers confirms their major strategic interest from a landscape multifunctionality perspective, insofar as these biological inputs simultaneously affect several economic, environmental, and social dimensions of rural areas. Thus, the analysis of biofertilizers is not solely an agronomic issue, but is fully part of a multifunctional landscape approach where production, ecological regulation, employment, and territorial governance are closely linked, which is entirely in line with the objective of the MFL project conducted in the area.

APPENDIX 1. Questionnaire used for interviews

A. Soil context

- What are the main soil types in the Fatick region?
- What fertility constraints influence the production of **biofertilizers** (organic poverty, salinity, etc.)?
- Which areas have the greatest need for organic amendments in the region?

B. Biofertilizer production

- What types of bio-inputs are produced locally in the area?
- What technical practices are observed in the area (composting, fermentation, extraction, etc.)
- What are the approximate volumes and production capacities?
- What are the limiting factors (quality of raw materials, equipment, skills)?

C. Constraints and needs

- What are the main difficulties encountered by producers
- What training, equipment, or standards needs have been identified?
- What technical improvements could strengthen local production?

D. Initiatives and opportunities

- What other projects or programs are working on **biofertilizer** production or organic matter management
- Which local organizations are the most active or promising
- What opportunities for partnership or technical reinforcement does the INP identify (question only for the INP)

E. Recommendations

- Which areas or stakeholders should we visit as a priority?
- What avenues for collaboration could be considered for the future?

Others …


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