



Agricultural Value Chains Resilience Support Project (PARFA)

**Addressing the XXI century climate change
challenges: improving resilience of agro-ecosystem
services for food security**



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Challenges to agricultural production and food security in Senegal: it is time for a transformational change!

How to face the future need for growth in agricultural production without compromising on the conservation of the environment?

Located in the Sub-Saharan Africa (SSA), the Republic of Senegal is composed of drylands regions particularly inclined to face the threat posed by environmental degradation. Moreover, Senegal's agriculture is characterized by a precarious and uncertain agro-pastoral and cereal mixed farming systems, combined with a poor rural community facing high level of food insecurity induced by the significant risks of droughts, high amount of post-harvest losses, water and land mismanagement, etc. The country is also facing a demographic growth rate of 2.8% with a majority of women (52%) and relatively young (71.2% under the age of 19), and 64% of the population who lives in rural areas relies on the limited resources of small-scale farms, particularly affected by climate variability. Climate change data and the Gross Domestic Product per inhabitant, which is not significantly evolving from year to year, favor the Government decision to improve the resilience of smallholders as well as the value and the quantity of the Senegalese agricultural production to improve population future food security condition. Therefore, in line with the governmental 'Plan Senegal Emergent' (PSE), the Republic of Senegal is ready to adopt new policies and

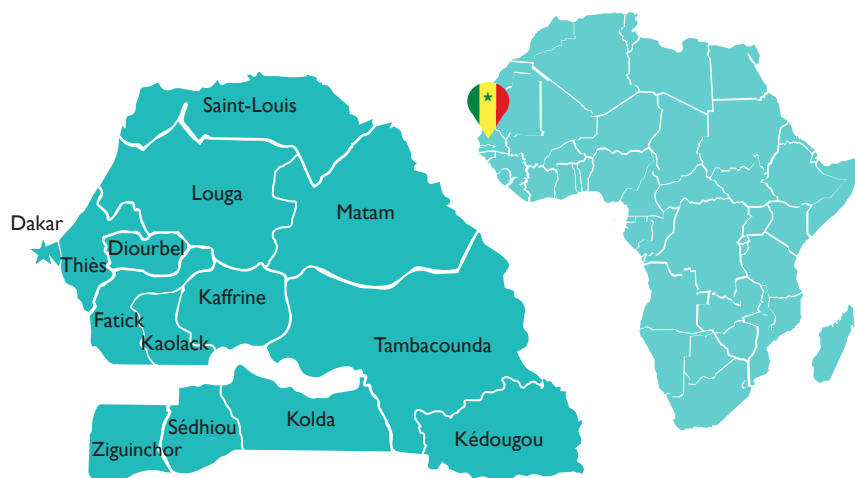
programmes to ensure the long-term sustainability and resilience of its smallholder farms production systems. Through the United Nations Industrial Development Organization (UNIDO) and the International Fund for Agricultural Development (IFAD), the country mobilized the Global Environment Facility GEF-6 funds (USD 7.2 million 2015-2021) to implement the Agricultural Value Chains Resilience Support Project (PARFA). The project focuses on improving agro-ecosystem services food security, and incomes of small-scale farmers, by creating remunerative employment for rural people - especially youth and women – in the most sustainable perspective, including land preservation, greening agricultural and transformation activities. Under the authority of the Ministry of Agriculture and Rural Equipment (M.A.E.R.) of the Republic of Senegal, PARFA is jointly implemented by UNIDO and IFAD, acting as GEF executing agencies within the framework of the GEF's Integrated Approach Pilot (IAP) for Food Security, its regional programme supporting Sub-Saharan countries.



CHALLENGES OF AGRICULTURAL PRODUCTION AND FOOD SECURITY IN SENEGAL

CLIMATE CHANGE

Senegal's biomes range from desert zone in the North to tropical savanna in the South. Usually characterized by a strict alternance of dry and rainy season, climate data analysts predict a decline in rainfall and an increase in temperature.



AGRICULTURAL SECTOR

As 55% of the active population directly depends of agriculture, mainly small family scale farms, the sector plays an important role in the national economy despite a 8% part of the GDP. Livestock farming is marked by traditional pastoral and agro-pastoral systems and cereal yields are low compared with other regions of the world.

WATER

Water resources consist on Atlantic Ocean and in surface of four rivers and their tributaries. Several basins form two ecosystems: the lower reaches of the Senegal River and the middle reaches of the Gambia River. As a result of climate change, increased salinization of the groundwater is to be expected.

LAND

Between 36% and 40% of the agricultural land is already degraded due to inappropriate agricultural practices, over exploitation of forests, strong human pressure, climate variability. Further climate change impacts such as increased salinization of arable lands, flooding of low-lying coastal areas, will result in an acceleration of the tanne (salt flat) formation process, thus reducing the availability of arable land.



‘Challenge’

The PARFA Project intends to adequately address the sustainable growth challenge. The strategic focus is on innovation and improving inclusion in existing agricultural value chains in order to safeguard the Senegalese productive bases and ecosystem services (land, water, forest, etc.), while enhancing sustainability and improving resilience to climate variability of the agricultural production systems.

Environmental degradations weigh upon the agricultural sector and threaten food security

Thoughtless intensification of the agricultural production endangers the crops of tomorrow and threatens the food security condition in a context of climate variability.

The environmental degradations affecting the quality and quantity of Senegalese agricultural production are multifactorial (climate variability, land degradation linked to population growth, ecosystems unprotected etc.) Despite its undeniable strengths, Senegal's agricultural sector faces consequently many issues regarding the proper management of its environment and natural resources in order to implement a sustainable agricultural intensification system in line with the increase of its population.

SENEGALESE AGRICULTURAL IMPACTS, CAUSES AND THREATS

NATURAL CAPITAL

The sustaining productivity of agricultural sector depends on this natural capital – land, soil, water, vegetation and genetic resources.

LAND PRESSURES

Production landscapes and agro-ecosystems are often unprotected and freely exploited, leading to their degradation and loss of productive functions as well as high amount of post-harvest losses.

CAPABILITY TO ADAPT

Agriculture intensification initiatives failed because it did not address the depletion of the natural capital and the loss of agro-biodiversity - leading to a resilience decrease and significantly impacting food and nutrition security.

CLIMATIC FACTORS OF ENVIRONMENTAL ISSUES

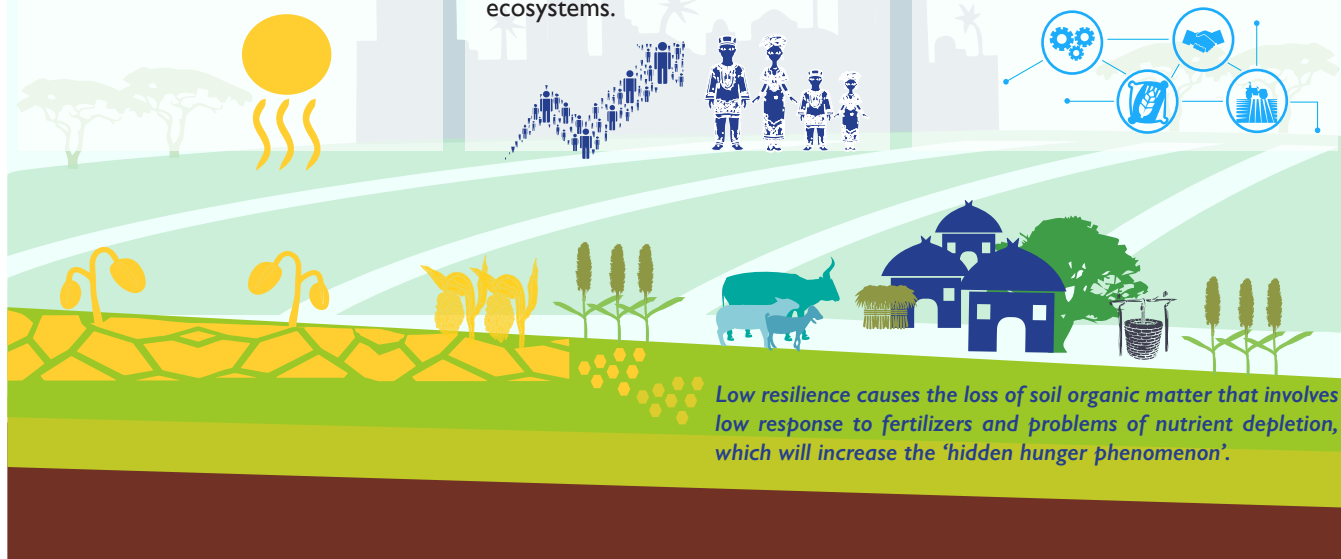
Climate variability is exacerbated by the production systems failure, leading to quantitative water shortages, soil salinity, and vegetation depletion. It also impacts key ecosystems such as mangroves, pastures, and forests.

SOCIAL FACTORS OF ENVIRONMENTAL ISSUES

Population growth increases the pressure on natural resources and ecosystem, leading to forest, pasture, and sea overexploitation. In conjunction with climate change, this phenomenon permanently degrades natural regeneration capacities of ecosystems.

LOW RESILIENCE OF AGRO-ECOSYSTEMS TO CLIMATIC & SOCIAL STRESSORS & SHOCKS

The stagnation of yields related to land degradation and weak technological innovations, and difficult access to markets, credit, quality inputs, agricultural equipment, food value chains.





What is an agro-ecosystem?

Agro-ecosystems, around which UNIDO and IFAD's actions will develop, are ecosystems managed for production of food, fibre and, or fuel, whose boundaries include the ecological and human resources required for production, including natural systems that support production, and the infrastructures, institutions and people across the supply chain.

Why the food security in SSA is challenging?

Demand for food will increase sharply in SSA. At the same time, with a chronic food deficit, low crop yields and poor soil quality, SSA countries' starting point in terms of food security is challenging. Moreover, the conventional model of high-input agriculture to intensify the agricultural production (mechanization, chemical fertilizers and pesticides, reliance on mono-cropping) is unsustainable and beyond the reach of most smallholder farmers.

PARFA & FOOD SECURITY

GEF 2020 vision and long-term strategy will impact on the global environment by strategically investing in solutions addressing drivers of global environmental degradation. In the IAP-Food Security in SSA an important driver is the rapid population growth and the need to reconcile this with sustainable intensification of agriculture.

Ensuring the production systems resilience to climate change

Developing traditional agro-products added-value at the rural level while improving income diversification, renewable energies use, and management, enhance resilience to climate change.

Within the framework of IFAD's programmes, the PARFA project is complementary with the Agricultural Value Chains Support Project – Extension (PAFA-E), contributing to the sustainable improvement of livelihoods of family farms of the groundnut basin in the Centre and North (Kaolack, Fatick, Kaffrine and Diourbel Regions) and in the Western Silvopastoral Region (Louga Region). Within the framework of UNIDO's programmes, the project is a component of the Country Partnership Programme (PCP) that UNIDO signed with the Government of Senegal and which includes the development of the private sector, the environment, and the green energies.

In line with the GEF's IAP-Food Security, UNIDO and IFAD's interventions are framed by the three components of the Ecosystem Services Approach:

Engage: Promotion of multistakeholder platforms integrating issues on environmental degradation and climate variability in their activities while strengthening institutional frameworks;

Act: Improvement of agricultural value chains based on the resilience approach and the upscaling of sustainable and resilient good practices;

Track: Mechanism for monitoring and assessing environmental impact and food security situation and project outcomes at the regional level.

By setting up the Engage-Act-Track technical components, IFAD and UNIDO aim at adding value to six targeted agricultural productions (millet, sorghum, cowpea, sesame, horticulture, and village aviculture). Therefore, the smallholders and rural communities are provided with tools and practices to improve the different steps of the production process that enable them, not only, to increase the value of their agricultural products, but also, to have adaptive responses to environmental degradation and climate variability.

Through IFAD's expertise for increasing yield and UNIDO's intervention for reducing post-harvest losses, increasing added-value through transformation, and improving market access, the PARFA project enhances integrated best practices and new tools and equipment (post-harvest reduction, renewable energy, hygiene, management of natural resources and marketing etc.) allowing smallholders and rural communities to adapt to harsh environmental conditions, access to markets, credit and consequently ensure and diversify their income, and drive economic growth in their communities.

PARFA ADDRESSES GLOBAL ENVIRONMENTAL IMPACTS



Carbon storage, emissions reduction, biodiversity conservation



Energy Management: renewable energy, waste processing, by-products



Water Management: resource conservation & restoration



Land Management: soil protection and restoration



Provision of technologies & infrastructures

'Ecosystem Services Approach'

The PARFA's ecosystem services approach is an integrated approach to resilience and environmental sustainability of the agricultural value chains. By focusing on creating synergies between provisioning services, such as food and fibre production, with regulating and supporting services, such as carbon sequestration, pollination and regulation of water and genetic diversity, sustainable management and resilience of ecosystems, the project makes a sustainable contribution to enhancing food security. This ecosystem service approach would also safeguard the long-term productive potential of critical food systems and generate Global Environmental Benefits (GEBs) related to reduction of emissions and carbon sequestration from improved land management, conservation and sustainable use of agricultural biodiversity.

What is UNIDO's approach to agro-value chains?

The value chain is a set of business, activities and relationships, engaged in placing an agricultural product or services on the market. Each value chain actor or function, such as production, processing and marketing, requires the development of effective tools and activities in order to provide other actors or functions with the most adequate service to add value to the agricultural product, develop human capital resources, and finally reach the targeted market. Each step requires technology transfer, product and entrepreneurship development, quality standards compliance implementation, skills upgrading, etc.

How does UNIDO's intervention along the agro-value chains respond to climate challenges?

The challenge now is to build resilience along the agro-value chains in order to adapt to environmental challenges. Value chains are based on an integrated approach when their development adopts the watershed approach, soil and water conservation (SWC), protection of key ecosystems and the promotion of renewable energy.

What are the comparative advantages of UNIDO's action?

By decreasing post-harvest losses, promoting energy efficiency and use of renewable energy across the six PARFA's agro-value chains in Senegal, UNIDO addresses unsustainable use of land, and water and dependency on non-renewable energy that weigh upon the quality and quantity of the agricultural products and the food security condition. The challenge is to support innovations in food production and spread tools and practices to reduce the impact of the environmental degradations on local agricultural and livestock production, and consequently improve the economic and ecological environment of the smallholders and rural communities.



UNIDO's modular approach to transformative changes

UNIDO leader role in promoting sustainability and resilience in food value chains enables to shift business as usual approaches in agribusiness value chains to an approach based on integrated and inclusive responsible agribusiness value chains.

Agriculture is the world's largest industry (nearly 40% of the planet's land surface and nearly 70% of global freshwater withdrawals) and a major contributor for water, land, biodiversity loss, greenhouse gas emissions and energy use. The interventions aiming to add value along the agricultural production process provide the opportunity to address dependencies on non-renewable natural resources and unsustainable agricultural practices.

Nexus Natural capital - Industrial operations

How to improve resilience to climate variability within existing agricultural value chains?

UNIDO's modular approach within ecosystem services component 'Engage': Through multistakeholder platforms, UNIDO strengthens the demand/transfer for sustainable technologies/renewable energy systems to safeguard the productive bases and existing ecosystem services, while decreasing post-harvest losses, promoting energy efficiency and renewable energy for production, processing and storage.

Nexus Environment - Agriculture

Why implementing sustainable use and conservation of agro-ecosystem in the context of agricultural intensification process?

UNIDO's modular approach within ecosystem services component 'Act': Through the promotion/use of sustainable technologies/renewable energy systems to ensure resilience of agro-ecosystems to climate variability, UNIDO addresses the necessity to guarantee a proper management of environment and natural resources in order to ensure food security condition for an ever-increasing population.



Nexus Knowledge management - Policy and Action

How to address the insufficient link between best integrated agro-ecological practices and policy decision-making?

UNIDO's modular approach within ecosystem services component 'Track': Through the knowledge management on best integrated agro-ecological practices (post-harvest losses reduction, valorization, hygiene of natural resources and marketing, integration of renewable energies for each product/value chain) as well as on food security and climate resilience, UNIDO aims to enhance an effective approach to monitoring and evaluating the impact on the environment and the project results, enabling the collection and dissemination of information intended to help actors involved in local, regional and national value chains.



UNIDO & TRANSFORMATIVE CHANGES

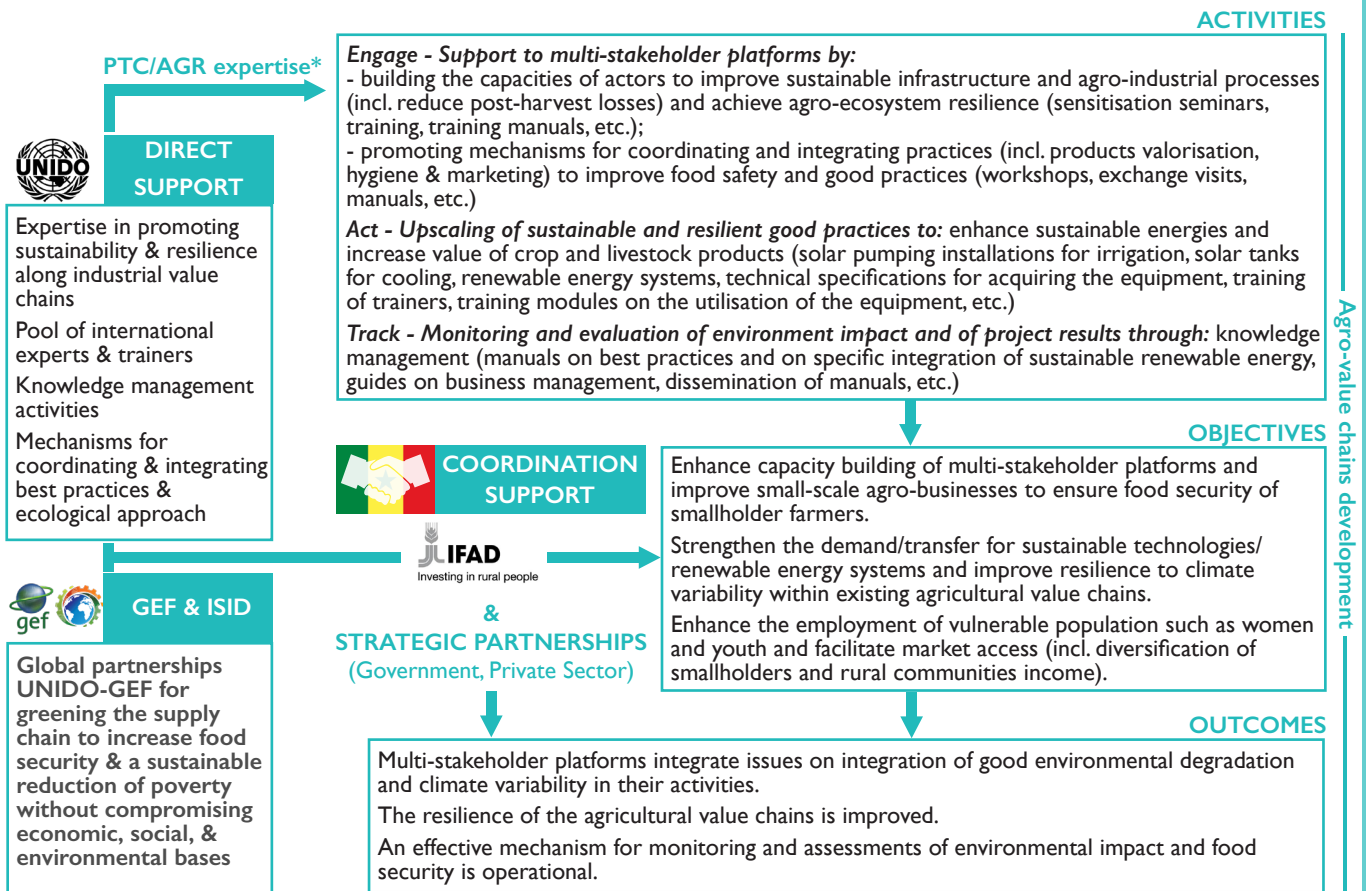
UNIDO's approach to transformative changes, as defined by the GEF, is determined by the intentional changes carried out in agro-value chains, as ideal pathways to elicit transformative changes in the four economic systems (food system, energy system, urban system and the production and consumption system). These transformative changes are rooted in UNIDO's Inclusive Sustainable Industrial Development (ISID) and apply the circular economy principles in which products are designed to be reused, remanufactured, up-cycled or recycled back into the production system.

UNIDO-GEF: an integrated approach to resilient small scale agriculture and food value chains

Interventions along the agro-value chains, such as within the PARFA project, enable sustainable use and conservation of agro-ecosystem through the implementation of agro-ecological practices.

UNIDO-GEF: DEVELOPMENT OF GREEN AGRICULTURAL VALUE CHAINS IN SENEGAL

PARFA Project Framework



*PTC/AGR expertise in agribusiness commodity-value chains, eco/agro-parks and experience in reducing post-harvest loss, improving market access, promoting energy efficiency and use of renewable energy across value chains.



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