STUDIES ON NATIONAL CLIMATE POLICIES LINKED TO A CAMPAIGN ON AGROECOLOGY FOR CLIMATE ACTION

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AFSA
ALLIANCE FOR FOOD SOVEREIGNTY IN AFRICA

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ACRONYMS AND ABBREVIATIONS

IPPC	International Plant Protection Convention
AFAT	Agriculture forestry and land use
AFITO	Association of Agricultural Input Suppliers of Togo
ANPAT	National Association of Poultry Professions of Togo
ATC	Togolese Consumers' Association
CAPAL	Commission des agréments professionnels, des autorisations et des licences (Commission for Professional Approvals, Authorisations and Licences)
UNFCCC	United Nations Framework Convention on Climate Change
CCS	Control and Monitoring Committee
CDN	Nationally determined contributions
ECOWAS	Economic Community of West African States
CFVC	National Committee on the Green Climate Fund
CH4	Methane
CILSS	Permanent Interstate Committee for Drought Control in the
CNCC	National Climate Change Committee
CNDD	National Commission on Sustainable Development
CNGP	National Pesticide Management Committee
CO2	Carbon Dioxide
CO2-e	Co2 equivalent (unit of measurement for direct GHG emissions taking into account the
COAHP	West African Pesticide Registration Committee
COS	Framework of strategic orientations
CPC	Central des producteurs de céréales du Togo
CSIGERN	Strategic Investment Framework for Environmental and Natural Resource Management
CT	Toxic vigilance Commission
CTOP	Togolese coordination of farmers' and agricultural producers' organisations
DDT	Dichlorodiphenyltrichloroethane
DPAT	Togo Agricultural Policy Document
CPO	Plant Protection Directorate
ESA	Higher School of Agronomy
FENOMAT	national federation of Togo market garden organisations
FNGPC	National Federation of Togo Cotton Producers' Groups
FUPROCAT	Fédération des unions de producteurs de café cacao du togo (Federation of Togo Cocoa Coffee Producers' Unions)
GES	Greenhouse gas emissions
Gg	Gigagram
IPCC	Intergovernmental Panel on Climate Change (IPCC)
GIFS	Integrated soil fertility management
Gt	Gigatonne
GVPCR	Grouping of private veterinarians in rural areas
ICAT	Institute for technical advice and support
ITRA	Togolese Institute of Agronomic Research
APRM	Ministry of Agriculture, Livestock and Fisheries

CDM	Clean Development Mechanism
MERF	Ministry of Environment and Forest Resources
N2O	Nitrous oxide
ODD	Sustainable development objective
NGO	Non-governmental organisation
CAP/ECOWAS	ECOWAS Common Agricultural Policy
PAN/LCD	National Action Programme to Combat Desertification (NAPCD)
PANA	National Action Plan for Adaptation to Climate Change
PAU	WAEMU agricultural policy
PCB	Polychlorinated biphenyls
CAADP	Detailed programme for the development of African agriculture
GDP	Gross Domestic Product
PNA	National Adaptation Plan
PNA	National Action Plan for Adaptation to Climate Change
NCCACP	National Climate Change Adaptation Plan
PNAE	National Environmental Action Plan
PNE	National environmental policy
PNGE	National Environmental Management Programme
PNGP	National Pesticide Management Policy
PNIASAN	National Agricultural Investment and Food and Nutritional Security Programme
PNIERN	National Investment Programme for the Environment and Natural Resources
NIPS	National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants
POP	Persistent organic pollutants
PRCGE	Capacity building programme for environmental management
PRIASAN	Regional Agricultural Investment and Food and Nutritional Security Programme
REDD+	Reducing GHG emissions from deforestation and land degradation
PRTR	Pollutant Release and Transfer Register
SAICM	Strategic Approach to International Chemicals Management
TCN	Second National Communication on Climate Change
UEMOA	West African Economic and Monetary Union
LULUCF	Land use, land use change and forestry

ABSTRACT

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Although agroecology is a concept that is already decades old, it is not yet fully integrated into the climate change strategies and policies that have been developed in developing countries over the past decade. The practice of agroecology is only partially widespread in the case of some traditional agriculture, and its widespread diffusion has not yet taken place. This absence of agroecology in developing countries' national climate strategies, programmes, sectoral policies or action plans is justified by the lack of support from official education and research institutions.

This analysis shows that Togolese agriculture has enormous potential in terms of arable land that extends over several agroecological zones that favour the production of a wide range of crop products. It is the driving force behind the country's economic and social development and occupies an important place in the National Development Plan (NDP).

Agricultural practices have evolved under the effect of increased demographic pressure, with the disappearance of fallow land, deforestation, the absence of crop residues returned to the soil and the cultivation of poor or degraded soils accentuating the phenomenon of soil erosion leading to a significant use of synthetic fertilisers and chemical pesticides. The agriculture sector is both vulnerable to climate change and an emitter of greenhouse gases. In Togo, the sector remains highly sensitive to the effects of climate change and its vulnerability is reinforced by the sensitivity of the biophysical and socio-economic factors on which its constituent parts are highly dependent. Climate change will mainly affect the production and productivity levels of food crop speculation, cash crop speculation, livestock breeding and fishing.

Policy documents on climate change and agriculture at the international and national levels have been analysed in this study. The majority of these documents focus on the agricultural sector. The climate change documents consider agriculture as the main sector vulnerable to climate change and identify some measures for soil fertility conservation and restoration that can strengthen agroecological practices.

However, these orientations are not necessarily taken into account in operational implementation plans to ensure the agroecological transition, and the analysis identified some opportunities in the implementation of these policies to integrate agroecology as an adaptation solution to climate change.

Agroecology faces a number of challenges that are food, health, societal, environmental, territorial and technical in nature. These challenges have been analysed and recommendations have been made to strengthen the integration of agroecology into public policies and climate processes. These include the identification of entry points for the integration of agroecology into policy processes and approaches to guide the integration of agroecology into national policies, legislation and frameworks and to facilitate agroecological transition.

INTRODUCTION

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Climate change is one of the environmental, social and economic challenges facing all countries today. It is a real threat to the survival of poor and most vulnerable countries in particular. While it contributes the least to the cause of global warming, accounting for less than 4% of global greenhouse gas (GHG) emissions, Africa remains the continent hardest hit by the phenomenon, warming 1.5 times faster than the global average. With about 70% of the population dependent on rain-fed agriculture, Africa lacks the safety net of rich, industrialised countries.

The agriculture sector is one of the largest contributors to global warming in Africa. Indeed, this sector of activity is one of the main sources of greenhouse gas (GHG) emissions. It is both a source of GHG emissions and one of the sectors most vulnerable to climate change. In 2015, the share of GHGs related to agricultural and forest land use was estimated at 24% by the report of the Intergovernmental Panel on Climate Change (IPCC, 2014). It should be noted that global warming will continue to seriously hamper the progress of poor countries towards development and prosperity if nothing is done to change the paradigm towards a low-carbon and more climate-resilient development model. This therefore recommends that the issue of climate change be further integrated into development policies, programmes, strategies and projects in all sectors of activity. As solutions to the current climate crisis, various actors recommend the use of adaptation by increasing industry-led agricultural initiatives, such as climate-smart agriculture, which supports the use of chemical inputs, fossil fuel-dependent mechanisation, the use of genetically modified organisms (GMOs) and hybrid seeds, with an emphasis on increasing production at all costs. However, this form of agriculture releases carbon stored in the soil while increasing the GHG load in the atmosphere, thus polluting water resources and is therefore considered a false solution. Nevertheless, others consider and recommend agroecology as one of the methods that contribute to solving this climate crisis. This study, which is being carried out as part of a continental campaign on agroecology for climate action led by the Alliance for Food Sovereignty in Africa (AFSA), aims to create an understanding of existing national climate change policies, plans, strategies, regulations and frameworks in a number of African countries in order to integrate agroecology as a strategy for adaptation to climate change.

The general objectives of the study are:

- Create an understanding of existing national policies, plans, strategies, regulations and frameworks on climate and climate-related issues;
- To make policy makers aware of the limitations of current agricultural techniques/ models in the face of climate change;
- Identify critical entry points for the integration of agroecology into identified policies, plans, programmes, strategies and regulations;
- Propose approaches to guide the integration of agroecology into identified national policies, legislation and frameworks.

The specific objectives are as follows:

- To make known the different techniques of agroecology;
- Demonstrate the importance of agroecology in mitigating greenhouse gas (GHG) emissions and adapting to climate change ;
- Engage policy-makers to integrate agroecology into existing national agricultural policies, plans, programmes, strategies and regulations;
- Integrate agroecology into national adaptation plans in the agriculture sector.

To achieve these objectives, the methodological approach adopted consisted of data collection and analysis of the policy environment in relation to the issue of climate change, in particular the programmatic documents developed in Togo on the environment and the fight against climate change and the policy documents in the agriculture sector. More specifically, this involves the analysis of data in policy documents such as national communications on climate change, the National Action Plan for Adaptation to Climate Change (NAPA), the National Plan for Adaptation to Climate Change (PNACC), nationally determined contributions (CDN), the strategy for Reducing Emissions from Deforestation and Forest Degradation (REDD+), Togo's Agricultural Policy Document, the National Agricultural Investment Programme and Food and Nutritional Security (PNIASAN), the National Development Plan (PND).

This report is structured around three chapters:

(i) Chapter 1 deals with the national context of agriculture and climate change;
(ii) Chapter 2 provides an overview of the political, legal and institutional framework for combating climate change, in relation to the agricultural sector and agroecology in particular;
(iii) Chapter 3 deals with agroecology as a key approach to climate change with recommendations for the integration of agroecology into public policies and processes for adapting agriculture to climate change.

CHAPTER 0.1

National Context of Agriculture and climate change

1.1. Demographic and economic context

1.1.1. Geographical location

Togo is located on the coast of the Gulf of Guinea in West Africa and covers an area of 56,600 km2 stretching 660 km from north to south between 6° and 11° north latitude and a maximum width of 150 km between 0° and 2° east longitude. It is bordered to the South by the Atlantic Ocean, to the North by Burkina Faso, to the East by Benin and to the West by Ghana. It is subdivided into five (05) administrative regions, 39 prefectures and 117 communes.

1.1.2. Demographics

Togo had an estimated population of 6,191,155 in 2010 (INSEED, 2011). It is predominantly female (51.4 per cent) and young people under 25 years of age represent 60 per cent of the total population. The annual growth rate is 2.84%. A major characteristic of the Togolese population is its relatively strong growth and its extreme youthfulness. In 29 years, it has grown from 2,719,567 inhabitants in November 1981 to 6,191,155 inhabitants in November 2010, corresponding to an average annual growth rate of 2.84%.

The potentially active population (15-64 years old) represents a proportion of 54%. Elderly people represent 4% of the total population. Those under 25 years of age represent 60% of the population and 42% are under 15 years of age. The population projection carried out in 2015 by INSEED, based on the 4th RGPH of 2010, indicates that the total Togolese population would increase to 6.8 million inhabitants in 2015, 40.1% of whom would live in urban areas, and to 7.6 million inhabitants, 43.5% of whom would live in urban areas by 2020 (INSEED, 2015).

1.1.3. Economic data

The primary sector dominates the Togolese economy. It accounted for 40.7% of GDP in 2015 and employed 75% of the working population, 44% of whom are men and 56% women. Togo has a remarkable agricultural potential in terms of arable land and extends over several agroecological zones, thus favouring the production of a wide range of products. However, only about 45% of the 3.4 million hectares of arable land are exploited. Food crops are the main components of the agricultural sector and include a wide variety of products, including cereals (maize, sorghum, millet, rice), tubers (cassava and yam) and legumes (cowpeas, groundnuts and soya). Cash crops are mainly cotton, coffee and cocoa. Togo's livestock potential is relatively large, especially in the northern part of the country. It is practised by almost 90% of farmers and is mainly made up of traditional livestock farming.

1.2. Situation of climate change in Togo

1.2.1. Extreme weather events

The most frequent extreme climatic events in Togo include floods, droughts, high temperatures, strong winds, seasonal shifts and poor rainfall distribution.

- Floods. Togo recorded 60 urban and rural floods between 1925 and 1992. The floods of 2007, 2008 and 2009 were particularly severe with disastrous social and economic consequences for the country in terms of loss of human life, massive destruction of road infrastructure, housing and fields. Formerly located primarily in the Maritime (Prefectures of: Gulf, Lakes, Zio) and Savannah (Prefecture of Kpendjal) Regions, these phenomena have become widespread throughout the country in recent years. In 2007, the official communiqué from the Government gives the following figures: 20 people dead, 58 injured and 34,000 displaced. In the same assessment, 22,129 huts were destroyed, as well as 101 bridges and culverts broken, smashed or washed away.

There were also 46 schools and colleges damaged or destroyed, and 3 dispensaries that could not be attended. In Oti, more than 1,500 hectares of food crops were destroyed. In 2008, the joint assessment report produced by the United Nations system revealed that the disaster is estimated to have affected between 30,000 and 40,000 people. The disaster claimed 6 lives and 4,000 households were more generally affected, i.e. around 20,000 people. In 2009, the number of deaths was 12, including 4 by drowning and 8 by the collapse of huts. Significant material and infrastructural damage was noted over the same period.

The year 2010 was marked by heavy flooding, with 82,767 people affected, 85 injured and 21 dead throughout the country. The material damage assessed concerns the number of flooded (3947), collapsed (7320), ruined (194) and abandoned (921) houses; the surface area of the devastated crop fields is 7744.24 hectares. This situation led the Head of State to declare a state of emergency in 2010 (Togolese Republic, 2010).

- Droughts. Togo has experienced three major droughts that caused severe famine between 1942-1943, 1976-1977, and 1982-1983 (Ministry of Environment and Forest Resources, 2010a). This phenomenon is mainly localized in the Savannah, Kara, Maritime and Eastern Plateaux regions. It is characterised by a gradual increase in ambient temperature, a decrease in rainfall, the number of rainy days and the potential rainfall/evapotranspiration ratio (P/ETP). The environmental impacts are mainly land degradation and loss of biodiversity. Recently, the lengthening of dry seasons has been noted.

- Very hot. They are mainly characterised by high temperatures. These temperatures in the months of February, March and April are very hot, can exceed 35°C (Ministry of the Environment and Forest Resources, 2015) and occur practically every year, reaching 40°C in places. They are frequent throughout the national territory and are more pronounced in the Maritime and Savannah regions.

- Violent winds. Togo's geographical location in the intertropical zone exposes it to the passage of cyclonic storms of average speed reaching the 115 km/h. The Plateaux, Centrale, Kara and Savannah regions are the most affected. The passage of these violent winds often leads to the uprooting of trees and the destruction of roofs of houses, classrooms and dispensaries (Ministry of the Environment and Forest Resources, 2013).

- Seasonal shift. Seasonal shifts have become a recurrent phenomenon in Togo over the last three decades. For example, in the southern regions, the main rainy season, instead of settling in mid-March as in the past, settles later, in early May, after the first rains in the second half of March followed by a period of lack of rain, of 3 to 4 weeks, in some years. In addition, the short rainy season in the Plateaux and Maritime Region is on the way to disappearing for good (Ministry of the Environment and Forest Resources (MERF, 2010).

- Poor rainfall distribution. Very detrimental to agricultural production, the poor distribution of rainfall is evident throughout the country. It results in the late or too early arrival of rains compared to the normal season, the appearance of pockets of drought, and excessively abundant and concentrated rainfall over short periods often leading to flooding. This phenomenon is characterised by a certain deficiency in the coverage of rainfall in time, space and quantity (MERF, 2010). It results in the loss of biodiversity, a

drop in agricultural yields, the retraining of workers, a drop in purchasing power and rural exodus.

1.2.2. Climatic trends observed in Togo

Togo's climate is generally experiencing global warming. Table 1 and Table 2 show respectively the phenomenon of warming and the evolution of rainfall in the different climatic zones of Togo. The averages contained in the tables below were obtained from data from the National Meteorological Department.

Table 1: Evolution of the warming phenomenon observed in the different climatic zones of Togo

Synoptic stations	Average T (°C) 1961-1985	Average T (°C) 1986-2018	T-difference (°C)
Lomé 06° 10' N - 01°15' E	26.8	28	1.2
Atakpamé 07°35' N - 01°07 E	25.8	27	1.2
Sokodé 08°59'N - 01° 07' E	26.2	27	0.8
Mango 10° 22' N - 00° 28' E	27.9	29	1.1

Source: Togolese Republic, 2019

Synoptic stations	Average rainfall (mm) 1961-1985	Average rainfall (mm) 1986-2018	Gap (mm)
Lomé 06° 10' N - 01°15' E	876.0	816.2	-59.8
Atakpamé 07°35' N - 01°07 E	1363.3	1347.9	-15.4
Sokodé 08°59'N - 01° 07' E	1380.7	1282.9	-97.8
Mango 10° 22' N - 00° 28' E	1085.1	1038.3	-46.8

Source: Togolese Republic, 2019

1.2.3. Future climate scenarios

Climate scenarios were developed in 2019 for the 2025, 2050, 2075 and 2100 horizons within the framework of Togo's Fourth National Communication and Second Updated Biennial Report on Climate Change using the SimCLIMV4 simulation tool. It is a computer model based on the guidelines of the Intergovernmental Panel on Climate Change (IPCC) for the climate projections of the fifth report (AR5).

The results of climate scenarios in Togo show that by 2025, average rainfall will remain in the range 894.7 to 1713.94 mm/year. Average temperatures will vary between 22.46 and 29.7°C and will increase, depending on the region, by 0.6 to 0.77°C compared to the 1995 rainfall level. The minimum and maximum temperatures will be in the ranges of 17.47 to 24.75°C and 27.40 to 36.37°C respectively.

In 2100, average rainfall will be between 895.21 and 1722.74 mm. Average temperatures will be between 24.16 and 31.65°C; minimum temperatures between 19.26 and 26.39°C and maximum temperatures between 28 and 38.28°C.

Generally speaking, the scenarios developed show that, compared to the reference situation (years 1995), strong variations in temperature will be recorded in the north of Togo in the prefectures of Tône, Tandjoaré, Kpendjal, and Cinkassé, while strong variations (increases) in rainfall will be recorded in the north of Bassar, Dankpen and Kéran. The scenarios developed, regardless of the assumptions, clearly show that climate change is a real concern for the country and that warming trends will increase in the short, medium and long term with consequences that would be very damaging if appropriate measures are not taken in time.

1.3. Agriculture sector and climate change

1.3.1. General overview of Togolese agriculture

Togo's agricultural potential is very remarkable in terms of arable land that extends over several agroecological zones that favour the production of a wide range of plant products. These include food crops (maize, sorghum, millet, rice), which account for about 70% of all Togolese agricultural production, tubers (sweet potato, cassava and yam), legumes (cowpea, groundnut and soya), cash crops (cotton, coffee, cocoa and palm nuts), vegetable crops (onion, tomato, watermelon, carrot, okra, guinea sorrel), and fruit crops (mango, papaya, cashew and orange).

The typology of farms in Togo is as follows (Ministry of Agriculture, Livestock and Hydraulics, 2015):

- 70.1% of agricultural households combine agriculture (crop production) with livestock farming;
- 2.2% of agricultural households do not own any plots and 11% own only one plot; 44.6% of households own between 2 and 4 plots; 30.1% of households own between 5 and 9 plots; 4.3% of female-headed households do not own any plots; 64.3% of female-headed households own 1 to 3 plots.
- The average size of farms in terms of physical area is 3.96 ha: 51.5% of farm households have less than 3 ha while only 12.7% of farm households have farms larger than 7 ha.
- 16.7% of agricultural households practice irrigation nationally.

Agriculture is the driving force behind Togo's economic and social development, given the number of jobs it generates. It accounts for 40% of GDP and employs nearly 75% of the working population, 44% of whom are men and 56% women. The cultivable surface area throughout the country is estimated at 3.6 million hectares, i.e. 60% of the total surface area, 41% of which is sown (1.4 million hectares). Togo's livestock potential is relatively large. It is practised by nearly 90% of farmers and is mainly made up of traditional livestock farming.

Indeed, between 2010 and 2019, several jobs have been created by this sector through the support of the different projects of the National Agricultural Investment Programme for Food Security (PNIASA) thus improving the income per producer from FCFA 217,149 to FCFA 336,300. More than 20 service enterprises and farmers' organisations (ESOPs) have been created, 170 commercial livestock farms have been promoted; 287 agricultural micro-projects have been financed with the distribution of 3679 small ruminant and 5300 poultry breeding stock breeders distributed. Also, support was provided in kits to 53,500 producers; the distribution of 1,200 pieces of equipment and the construction of 193 shops. 981 young people were trained and equipped in agricultural entrepreneurship and 115 young people in poultry farming.

Today, this sector still occupies an important place in the National Development Plan (NDP), which is the country's current national development strategy.

1.3.2. Brief overview of agroecological practices in the country

Agricultural practices have changed as a result of increased demographic pressure, with the disappearance of fallow land, deforestation, the absence of crop residues returned to the soil (harvesting, burning, grazing, and firewood) and the cultivation of poor or degraded soils. The combination of these practices leads to a decrease in soil cover and organic matter, accentuates the phenomenon of erosion to which the land is sensitive and leads to a decrease in yields. The reduction in available land per worker and the drop in yields have been compensated by an intensification of labour and inputs and by the search for external sources of income (migration, non-agricultural employment). The most widespread agricultural practices currently combine a significant use of synthetic fertilizers and chemical pesticides. Market gardening is developing more and more and makes massive use of mineral fertilisers and pesticides, often of dubious origin and quality, used without protection or respect for dosages.

Combining agroecological practices in sub-humid zones: the case of the Plateaux region in Togo

In the sub-humid region of Togo, farmers/farmers are combining different strategies to restore and maintain soil fertility. They traditionally manage soil fertility by including a fallow period in their farming system, but its duration is increasingly limited by the pressure of the growing population. In addition, improving plants are planted to improve soil fertility. For example, Cajanus Cajan, a leguminous shrub, is planted in fallow land and sometimes around plots. Apart from its fertilising properties, this plant has other advantages: its seeds are consumed by the local population and its stems provide firewood. At the same time, farmers favour agroforestry systems. Cash trees are interplanted (cashew, oil palm, teak) with crops. In addition, certain tree species are conserved (baobab, papaya, Shea, mango, etc.). They provide fruit to feed the local population, wood for energy and construction, shade for workers and the leaves of some of these trees are used as green manure (Neem, Leucaena).

In this region of Togo, farmers are therefore adopting strategies of diversification and plant-based soil fertility improvement to maintain their production capacity. By preserving tree species that provide food and fertilise the soil, these farmers contribute to the food security of local populations and to the conservation of fertile land in the long term. Such plant associations can also help to improve the resistance of systems to the development of weeds, pests and diseases.

1.3.3. State of vulnerability and impacts on the agricultural sector

1.3.3.1. Agricultural sector is both vulnerable and a greenhouse gas emitter

The impact of climate change on the agricultural sector in developing countries is particularly important because of the heavy dependence of agriculture in these countries on the environment. Indeed, African agriculture is mainly rain-fed, which makes it more vulnerable, and because economic conditions make it difficult to establish intensive farming patterns. Therefore, in the Nationally Determined Contributions (NDCs) presented by all the countries of the world when the Paris Agreement was adopted in 2015, all Sub-Saharan African countries included the agriculture sector among the options selected for adaptation to climate change.

The agriculture sector not only suffers the impacts of climate change; it is also one of the sectors with the highest greenhouse gas (GHG) emissions, responsible for about 12% of anthropogenic GHG emissions and 24% of emissions related to land use change are included (IPCC, 2014). But efforts are now being made to understand how agriculture and land use in the broad sense, including forestry, can be one of the solutions to climate change through the system of carbon sequestration in soil and vegetation, and through the possible reduction of agricultural emissions by changing a number of practices such as the massive use of synthetic fertilisers. However, a distinction must be made between increasing the stock of organic carbon in the soil and sequestration, the latter corresponding solely to a removal of carbon dioxide (CO2) from the atmosphere (Chenu et al, 2018).

It should be noted that today the concept of climate-smart agriculture attempts to take into account the fact that agriculture can be both an aggravating factor in climate change and at the same time a major contributor to climate change, and that it also suffers the consequences of climate change by requiring that all three of these criteria be met at the same time: (i) to be adapted to climate change (a function sometimes misunderstood as resilience, which is a broader concept that also includes risk reduction); (ii) to mitigate the effects of climate change; and (iii) to ensure food security according to the principles of sustainability. Recent studies have shown the complementarity between agroecology and climate-smart agriculture and, in particular that the latter would benefit from integrating agroecological concepts (Saj et al., 2017).

1.3.3.2. Vulnerability by sub-sector

Vulnerability studies conducted in 2015 as part of the Third National Communication on Climate Change (TCNCC) revealed that the agriculture, forestry and land use sector remains highly sensitive to the effects of climate change. The vulnerability of this sector is further enhanced by the sensitivity of biophysical and socio-economic factors to climate change on which its constituent parts are highly dependent.

- **Agriculture sub-sector**

For the agriculture sub-sector, climate change will mainly affect the production and productivity levels of food crop speculation, cash crop speculation, animal husbandry and fisheries.

Food crop production: The impact of the drop in rainfall and the rise in temperature at the soil level is the drying up of the soil, which will lead to a reduction in the vegetative cover for food crop speculation, particularly practised in savannah areas (cereals, legumes, tuberous plants and others). The resulting consequence is the exacerbation of the phenomenon of erosion by runoff, which leads to a drop in the productivity of annual, food crop or perennial speculation.

Cereals (maize and sorghum), specifically those that form the basis of the Togolese population's diet, are particularly vulnerable because of their high sensitivity to water stress, especially at the emergence and flowering stages. Climate change is leading to uncontrolled sowing periods, with producers no longer having the usual reference points, resulting in low germination and emergence rates. The water deficit, particularly on cereals during the flowering period, is affecting productivity and the production of food speculation, thus reducing the supply of foodstuffs, which will be accompanied by soaring prices and supply difficulties in urban areas. In addition, the simultaneous increase in temperature and rainfall height, as well as the concentration of the volume of rainfall over time, leads to the proliferation of plant and insect pests in flooded areas. Also, in these areas, specific fungi and bacteria will develop, which will attack the root system of the plants by rotting the roots, leading to the withering of the flooded speculations.

Cash crops: Cash crops, and more specifically coffee and cocoa, grown in forest areas, are also affected by the effects of ambient drought due to the reduction in the number of rainy days and the relative increase in temperature. This leads to an increase in the number of harmful insects such as mirids and stinking locusts, Zonocerus variegatus, and the appearance of certain diseases, the main ones being the necrotic decline of the coffee tree and swollen shoot.

Livestock: Sensitivities in the livestock sector to the effects of climate variability and change are manifested through : (i) the decrease in animal fodder, linked to the low productivity of pastures; (ii) the development of transhumance; (iii) the increase in the mortality and abortion rate in herds, due to the lack of water and pasture during periods of drought, leading to a change in the animals' reproductive cycle; (iv) the proliferation of metabolic diseases in livestock (cachexia, burns, skin wounds).

Studies carried out in this sector have revealed an invasion by harmful insects such as tsetse flies and ticks on the breeding centres, notably the Avétonou centre in the south-west of the country, the Adélé centre and the Namiélé centre in the savannah region. This insect invasion has been associated with changes in meteorological factors such as temperature warming and prolonged droughts, on the one hand, and the development of transhumance, on the other.

Djagba's dissertation (2011) and Bonfoh's thesis (2013) at the Agronomic Research Centre based at the Kolocopé Station also showed that not only is there a decrease in the Average Daily Gain for livestock during dry periods, losses are greater during periods of abundant water. This is due to the fact that the animals are kept in the pens for long periods of time and cannot be taken to pasture, and to the fact that the fodder is waterlogged with low protein content. Excessive rainfall has a negative impact on the productivity of ground cover and pasture for animals in depressed areas, and favours the recrudescence of certain diseases, notably fowl plague and trypanosomiasis in cattle, especially zebus. The floods in Togo in 2008, particularly in the southern regions, caused livestock losses and mortality.

Fisheries and aquaculture and fish production: According to the assessment report of the group of experts (IPCC, 2007), the rise in sea levels due to warmer temperatures will cause the development of harmful aquatic insects and invasive algae, making it difficult to manage fishing in estuaries and lagoons. The increase in the temperature of the warm marine surface water layer (between 25 and 29°C) may cause frequent migrations of certain species of fish at depth and a decrease in the volume of pelagic resources. These impacts are and will further affect, the decrease in fishermen's income, fish processing and marketing activity and may exacerbate malnutrition and poverty.

In the fisheries sub-sector, rising sea levels will lead to permanent saltwater intrusion into rivers, fish ponds and other water reservoirs, causing fish to migrate to other freshwater bodies, killing alvines and limiting reproduction. This phenomenon is observed in the Aného lagoon and in the mouth of the Mono, due to the high salinity of the fluvio-lagunar bodies. During exceptional floods, the opposite phenomenon occurs: fresh water occupies the entire plain, entering the sea and modifying the reproductive system of fish in brackish environments.

- **Forestry sub-sector**

In the forestry sub-sector, the effects of observed climate change are: (i) a strong tendency towards the degradation of plant cover, especially woody cover, resulting in a decrease in air humidity and a higher rate of desiccation of woody biomass, making it more vulnerable to the aggressiveness of external environmental conditions; (ii) acceleration of the desertification process and loss of biodiversity. The greatest risk according to the IPCC report is the threat of desertification.

It has been published that following the decrease in rainfall between the 1970s and 1990s in West Africa, the Sahelian, Sudanese and Guinean ecological zones underwent a shift of 25 to 35 km towards the southern regions in the second half of the 20th century (IPCC, 2001). This is the result of the loss of grassy savannahs, wooded savannahs of acacia species and significant disappearance of fauna and flora species. The report indicated that experiments on experimental air enrichment with CO2 have shown that forest species become acclimatised with higher levels of CO2.

- **Land use and land sub-sector**

The effects are related to the leaching and leaching processes of the soil.

- **The soil leaching process**

It is a process characteristic of mountain and hill areas. Heavy rains erode the slopes of exposed hills and mountains due to the disappearance of the vegetation cover, exposing the mother rocks. This process is almost irreversible and the covering of vegetation is almost impossible on bare rocks. This phenomenon is observed all along the Atakora mountain range where the vegetation has completely disappeared giving way to rocky soil. This explains the increase in the area of degraded land.

- **The process of concretisation or lateralisation**

This process can be observed in Togo to the east of the Plateaux region, the Precambrian peneplain or the Beninese Togolese plain. Under the combined effect of high temperatures and humidity, soils with an initial ferralitic composition will be transformed into soils with a ferrous composition forming lateritic shells towards the lower horizons where no development for economic purposes (agriculture and forestry) is possible. Today, these laterites outcrop in the prefectures of L'Est Mono and Moyen Mono and there is a great risk that their surface area will increase.

Furthermore, at the West African regional level, it is recognised that climate change has already caused the desert to advance 25-35 km towards southern West Africa. As a result, the area of arid and semi-arid zones in our regions will increase by 5-8%. In Togo, an estimated 163,400 ha of land was degraded in 2005, with projections of around 4 million hectares of managed ecosystems, including agricultural land, irrigated areas, pasture and forest plantations by 2050.

1.3.3.3. Assessment of socio-economic and environmental impacts

• Agriculture sub-sector

The socio-economic impacts inherent to the vulnerability of the agricultural sector are: (i) a reduction in the supply of plant, meat and fish products and in the supply of food to cities, which can lead to social tensions and even socio-political crises; (ii) the loss of income for producers, with the consequent increase in the incidence of rural poverty and greater impoverishment of the most vulnerable groups; (iii) the reduction of agricultural added value as the main source of national wealth creation (the agricultural sector accounts for almost 40% of GDP), the deterioration of the agricultural trade balance and the loss of competitiveness of the country; (iv) the intensification of the rural exodus, the accentuation of famine, the change in eating habits; (v) the development of social conflicts due to competition between animals and humans over the use of water points.

Environmental impacts are mainly reflected in land degradation, loss of biodiversity, and the invasion of insects harmful to crops, livestock and fish products. In addition, the increase in the concentration of CO 2 in the atmosphere will reach about 450 ppmv in 2050 and 520 ppmv in 2100 with the risks of changes in plant metabolism. This will lead to an increase in the biomass of C3 plants while C4 plants including maize, sorghum, millet and rice will react less. Weeds, most of which are C3 plants, will grow faster than cultivated plants, invade pastures and compete more severely with the main cereal crops, especially maize and sorghum, the staple food of the country, reducing their productivity by 5-15%.

• Forestry and land use sub-sector

The impacts on forestry and other land uses are as follows: projections show that all natural ecosystems, i.e. natural forests and wooded savannahs, would no longer exist by 2100. Indeed, the increase in the surface area of managed ecosystems up to 4 million hectares cannot be achieved without an incursion into forests and savannahs. In the future, Togo will have to face increasing needs for wood and other non-wood forest products. This jeopardises the country's 2011 policy statement which aims to extend the country's forest area to 30% of the total land area by 2050.

It should be noted that the disappearance of natural areas is not only due to land conversions as a result of human activities. These losses are caused by the process of desertification that threatens the whole of West Africa. On the socio-economic level, there will also be a decrease in the contribution of forestry to national GDP.

The other impacts related to the projections are as follows: (i) loss of forest land with no (or limited) possibility of recovering vegetation cover; (ii) wood shortages in all sectors (mainly wood energy, timber and service wood); (iii) increase in greenhouse gas emissions due to the disappearance of CO2 storage sinks; (iv) loss of biodiversity; (v) loss of wetlands with loss of fisheries production.

1.3.3.4. Impacts and risks in relation to the use of pesticides in the agriculture sector

The results of the survey conducted in 2017, showed that about 81% of producers use insecticides to protect their crops on areas ranging from 194,447 to more than 266,424 hectares. Several classes of insecticides including organophosphates, carbamates and synthetic pyrethinoids are imported and used. Overall, this represents 70% of imports, with tonnages increasing annually (between 2,281 and 3,278 tonnes) on the national territory. The areas with increased use of these pesticides are respectively the cotton-growing areas, in the forest areas for coffee and cocoa cultivation, and the rice growing areas. These pesticides are also used in market gardening (Accrobessy et al, 2017).

These quantities of imported pesticides are still not under the control of regulatory authorities, as more than 70% of import and distribution companies are not licensed and 80% of pesticides in circulation have not been registered. Dosages, although monitored by support and control staff, are not always respected by users and producers. However, some of these pesticides in their handling and use are likely to generate multiple environmental impacts (reduction of biodiversity, soil and water pollution, etc.) and represent a serious health problem for the populations concerned.

- **Impacts on the environment**

Among the major strategies for controlling crop pests such as insects, fungi, nematodes, weeds and unwanted grasses, the use of pesticides, most of which are chemical, is at the forefront and their uncontrolled use is not without consequences for environmental biodiversity.

As environmental impacts, the uncontrolled use of pesticides in agriculture generates ultra-resistant pathogens. Fungi, bacteria and viruses, under the effect of chemical stress, become increasingly resistant and virulent. Insects that are "harmful" to crops become stronger every year and grasses become resistant to herbicides. The problem linked to the phenomenon of pollination is partly due to the disappearance of certain species such as pollinating insects, raptors and other pest predators, and that of soil degradation (destruction of soil micro fauna and micro flora such as bacteria, fungi, algae, earthworms, among others, responsible for soil fertilisation), with the result that fragile forest species, among others, are gradually disappearing, all partly linked to the uncontrolled and abusive use of pesticides.

All in all, these toxic substances can directly destroy certain species, thus interrupting the cycles of matter (carbon, oxygen, nitrogen, etc.) and thus disrupting the various ecosystems It should also be noted that the effects of pesticides on the environment mainly include effects on non-target species, as they are sprayed or broadcasted on cultivated plots. Thus, more than 98% of insecticides sprayed on crops and 95% of herbicides reach a destination other than their targets (Madjouma et al, 2013).

- **Impacts on the air**

Pesticides, for the most part, contribute to air pollution and this pollution is influenced by temperature and relative humidity in terms of spread at the time of application. Pesticides

applied to crops can volatilise and be blown by winds to other areas, or to certain non-target species with the result that: (i) mortality of non-target species that perform important ecological functions: bees and other pollinators, natural enemies of certain pests (parasites, predators, pathogens); (ii) resistance in insect pest populations.

In addition, pesticides can bind to dust particles and travel far from their destination to other unexpected places. This increases the likelihood of these chemicals mixing with other chemicals. Some pesticides produce volatile organic compounds that pollute the atmosphere when they react with other chemicals. This reaction produces ground-level ozone, which in high concentrations can have harmful effects on vegetation and the environment (necrosis on leaves, limitation of photosynthesis with reduced plant growth and forest dieback).

• Impacts on water

Factors that influence the ability of a pesticide to pollute or contaminate water include its water solubility, distance from the application site to bodies of water, weather conditions, soil type, the presence of a growing crop, and the application method used. Water can cause pesticides to be dispersed into the environment through leaf washing, runoff and leaching. Runoff contributes to the pollution of surface water, while leaching contributes mainly to the pollution of deep water. Although surface water and groundwater are often considered separately, they are linked almost everywhere through the hydrological cycle. Depending on the hydraulic gradients, it is surface water that feeds aquifers or aquifers that recharge surface water (Léonard, 1990). Admittedly, whatever the levels of pesticides in surface or ground water, the consequences in terms of health and the environment (degradation of aquatic fauna and flora) remain.

• Impacts on the ground

The fate of pesticides in contaminated or polluted soil depends on the nature and chemical composition of the soil, and the risks to the environment are all the greater the more toxic they are. Used on surfaces and at high doses/frequencies, pesticides are persistent and mobile in the soil. Thus, they are either degraded by micro-organisms, or by hydrolysis, or absorbed by sediments or plant roots. A soil is made up of mineral and organic elements as well as living organisms and its micro flora is essential for maintaining its fertility, but the harmful effects of pesticides put it at risk. This is the case of earthworms, major actors and active agents in the structuring of soils and whose capital ecological role is to aerate and micro-drain this environment. Unfortunately, these products reach them through contaminated infiltration water in the soil and go as far as their total elimination and consequently the deprivation of their primordial role.

• Impacts on biodiversity

Released into the environment, pesticides will cause the target organisms against which they are used to be eliminated. However, most of these pesticides will also affect organisms other than those initially targeted, either directly (absorption, ingestion, respiration, etc.) or indirectly (via another contaminated organism, polluted water, etc.). The effects on biodiversity, particularly terrestrial and aquatic flora and fauna, are therefore undeniable. The species affected include those in the food chain (mammals, birds, etc.), insects (foragers

such as bees and butterflies), cold-blooded animals (reptiles and amphibians) and terrestrial or aquatic micro-organisms. As for flora, both natural and artificial, the abusive use of all kinds of herbicides leads to their destruction.

- **Impacts on human health**

Plant protection products intended to prevent and control pests and diseases in agricultural production or in vector control have initially proved to be harmful to humans and their environment. For example, in some mainly rural areas, these pesticides cause burns, human poisoning (nausea, vomiting, dizziness, coma, death) when the most basic safety measures or precautions are not taken. Pesticides can enter the body through inhalation of aerosols, dusts and vapours containing pesticides, orally by consuming food or water, and through direct skin contact. Pesticides seep into soil and groundwater, which can end up in drinking water, and pesticide sprays can drift and pollute the air. It is difficult to accurately quantify all the health harms of pesticides, but many of the dangers are already known.

Even with low exposure, pesticides can have serious consequences on the body, such as causing male infertility and cancer, but can also seriously affect the foetus. On the other hand, pesticides can cause spontaneous abortions or serious foetal malformations. Many cases of acute pesticide poisoning, sometimes fatal, have already been detected in agricultural settings, where exposure to pesticides is most frequent. The effects of pesticides on human health depend on the toxicity of the product and the duration and extent of exposure. The populations at risk in terms of exposure remain agricultural workers and their families. In terms of sensitivity to pesticides, children, pregnant or nursing women, the elderly, disabled or sick are more sensitive, with weak immune systems for all, especially for growing children.

1.3.4. Greenhouse gas emissions in the AFAT sector

The global food system (Box 1) is a major driver of biodiversity loss caused by climate change, land conversion, depletion of freshwater resources and pollution of aquatic and terrestrial ecosystems. The AFAT sector accounts for nearly a quarter (24%) of total global emissions (IPCC, 2014). In most countries, there is great potential to contribute to climate change mitigation and adaptation through changes in food systems (Roe et al, 2019). At the global level, actions on food production, including consideration of land-use change and agricultural emissions, could reduce global emissions by 7.2 Gt CO2-e per year.

In addition, the food system offers important opportunities for adaptation to climate change. Actions such as support for nature-based solutions, agroecological approaches including conservation agriculture, organic farming and others not only offer the potential to reduce emissions, but also contribute to climate change adaptation and food system resilience (CARE, 2017). These mitigation and adaptation options have co-benefits in the context of broader sustainability objectives such as the Sustainable Development Goals (SDOs) and the Convention on Biological Diversity (CBD). In Togo, estimates made in the framework of the elaboration of the TCNCC (MERF, 2015), reveal that in 2005 (base year), Togo emitted 17,743.42 Gg CO2-e of direct GHGs, of which 3,441 Gg CO2 the agriculture sector, i.e. 19.40% of total emissions, 11,495.02 CO 2-e for the forestry sector and other land use (LULUCF), i.e. 65.33% of total emissions.

1.3.4.1. Agriculture Sector

Taking into account the levels of contributions of the different sub-sectors i
key sources, defined as the cumulated emissions by source up to 95%, are as
agricultural soils (78.57%); (ii) enteric fermentation (15.78%); and (iii) manure management (2.6%). The non-key sources are the following in decreasing order of importance: (i) on-site burning of harvest residues; (ii) prescribed burning of savannah; and (iii) rice cultivation.

Figure 1 summarizes emissions by sub-sector.

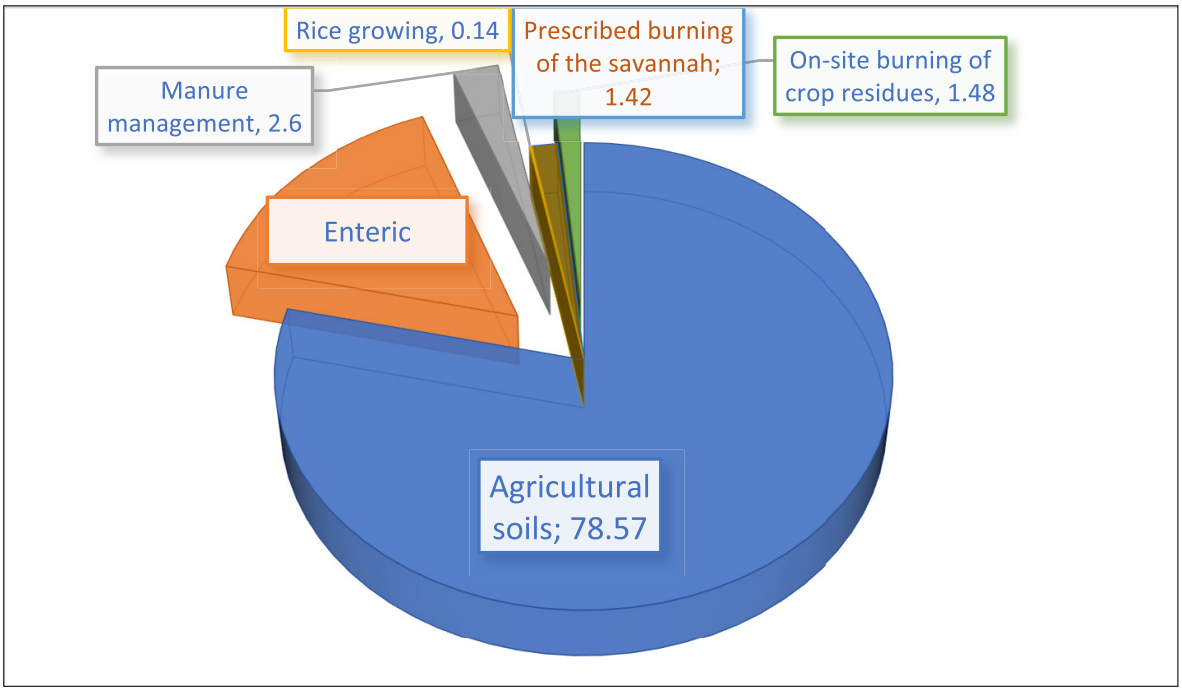

Figure 1: Illustration of the distribution of emissions in the Agriculture sector

Source: MERF, 2015

1.3.4.2. Land Use, Land Use Change and Forestry (LULUCF) Sector

In the LULUCF sector, the key sources identified are: (i) the loss of living biomass due to the conversion of forest land to cropland (50.93%); (ii) the removal of woody biomass from forest land (39.16%); and (iii) tillage on cropland (9.88%).

Non-key sources are (i) forest fires for CO2 and N2O emissions; (ii) mineral fertilization of soils on land converted to cropland for N2O emissions; (iii) grassland fires for CH4 and N2O emissions; and (iv) tillage on land converted to cropland for CO2 emissions.

CHAPTER 0.2

LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK ON CLIMATE CHANGE

LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK ON CLIMATE CHANGE

Environmental protection in Togo operates within a rapidly changing legal and political framework characterised by the development and implementation of national plans and programmes relating to environmental management and by the establishment of various institutions.

This chapter aims to provide a non-exhaustive list of multilateral environmental agreements, legislative and regulatory texts, but also strategic planning documents adopted by Togo on the environment in general and the fight against climate change in particular. The final objective of the study is to identify the opportunities to be seized in the implementation of this framework to integrate agroecology as a solution for adaptation to climate change.

2.1. Legal framework

2.1.1. At the international level

2.1.1.1. Climate Change Framework

The fight against climate change in Togo is part of a general framework set by the texts structuring environmental management. However, specific actions concerning the issue of climate change are mainly governed by the United Nations Framework Convention on Climate Change (UNFCCC), ratified by Togo on 8 March 1995, the Kyoto Protocol to this convention, ratified on 2 July 2004, and the Paris Agreement on Climate Change, ratified on 28 June 2017.

- United Nations Framework Convention on Climate Change and its Kyoto Protocol
  The main objective of the convention is to stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that prevents dangerous anthropogenic interference with the climate system.

As a Party to this Convention, Togo has taken a number of commitments that it must comply with by taking regulatory measures at the national level. Article 4 of the Convention defines the commitments. Paragraph 4.1(a-j) calls on all Parties, inter alia, to periodically compile a national inventory of GHG emissions, implement GHG mitigation and adaptation programmes.

The Kyoto Protocol, whose main objective is to strengthen the UNFCCC by imposing legally binding, quantified GHG emission limitation and reduction targets on developed country parties (Annex B countries), maintains the general commitments for all parties regarding emission inventories and mitigation.

- **Paris Climate Agreement**

The Paris Accord aims to strengthen the global response to the threat of climate change, in the context of sustainable development and the fight against poverty. In particular, it aims to keep the rise in global average temperature below 2°C above pre-industrial levels, by continuing actions to limit the rise in temperature to 1.5°C above pre-industrial levels. It also aims to strengthen countries' capacity to adapt to the adverse effects of climate change and to promote resilience to climate change and low-GHG-emitting development in a way that does not threaten food production.

The Paris Accord establishes in Article 7 a global goal for adaptation, which is to build adaptive capacity, increase resilience to climate change and reduce vulnerability to climate change. In line with this, each Party should develop programmes and implement measures to enhance the resilience of people and ecosystems to the impacts of climate change. Togo is a party to this agreement to which it has committed itself through its nationally determined contributions (NDC) to reduce its GHG emissions by 11.14% by 2030. Adaptation is considered as a priority and a gateway for the mitigation of GHG emissions in the implementation of the NDCs.

Also, given that the agriculture sector is a sector with a high potential for GHG emissions, Togo will therefore be able to integrate agroecology into the revision of the NDCs as an opportunity for mitigation and an adaptation measure for the agriculture sector in the face of climate change.

2.1.1.2. Framework for the management of agricultural pesticides

Within the framework of environmental protection, Togo is party to several multilateral environmental agreements. Some of these agreements are directly or indirectly related to the management of land, pesticides and agricultural inputs.

At the international level, these include:

- United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa ratified on 04 October 1995;
- Phytosanitary Convention for Africa signed on 20 December 1979;
- International Plant Protection Convention (IPPC) ratified on 6 January 1986;
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, signed on 9 September 1999 and ratified on 23 June 2004;
- Stockholm Convention on Persistent Organic Pollutants (POPs), signed on 23 May 2001 and ratified on 22 July 2004;
- Basel Convention on the Trans boundary Movements of Hazardous Wastes and their Disposal and its Protocol on Liability and Compensation for Accidents Resulting from Trans boundary Movements of Hazardous Wastes and their Disposal ratified on 02 July 2004;
- Strategic Approach to International Chemicals Management (SAICM) adopted in Dubai in February 2006;
- International Code of Conduct on Pesticide Management adopted in June 2013 by Resolution 3/2013, amending the International Code of Conduct on the Distribution and Use of Pesticides of 1 November 2002.

Adopted in Paris on 14 October 1994, the United Nations Convention to Combat Desertification (UNCCD) aims to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective action at all levels, in the framework of an integrated approach in order to contribute to the achievement of sustainable development in affected areas.

To achieve this objective, the Convention recommends that Parties implement long-term integrated strategies that focus on improving land productivity and on the rehabilitation, conservation and sustainable management of land and water resources, leading to improved living conditions.

This convention underlines the need for transversal and integrated approaches to combating desertification through development projects in order to take into account the multiple causes of the phenomenon. It defines "land degradation" as the decrease or loss of biological or economic productivity and complexity of non-irrigated cropland, irrigated cropland, rangeland, pasture, forest or woodland in arid, semi-arid and dry sub-humid areas as a result of land use or one or more phenomena, in particular phenomena due to human activity and settlement patterns, such as soil erosion caused by wind and/or water, the deterioration of the physical, chemical and biological or economic properties of soils and the long-term disappearance of natural vegetation.

The Stockholm Convention on Persistent Organic Pollutants aims to protect human health and the environment from Persistent Organic Pollutants (POPs) such as aldrin, dieldrin, chlordane, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene, Dichlorodiphenyltrichloroethane (DDT) and Polychlorinated Biphenyls (PCBs).

As for the Rotterdam Convention, it plays a decisive role in the management of pesticides insofar as it constitutes a countermeasure for Togo in that a number of its provisions limit the import of pesticides recognised as dangerous and prohibited by the international community.

At the community or regional level, the regulatory texts relating to the management of pesticides and to which Togo is a party are among others:

- Regulation No. C/REG.3/05/2008 of 18 May 2008 harmonising the rules governing the approval of pesticides in the ECOWAS space;
- Regulation n° 04/2009/CM/UEMOA of 27 March 2009 on the harmonisation of rules governing the approval, marketing and control of pesticides within WAEMU;
- Regulation of 2 June 2012 relating to the attributions, organisation and functioning of the West African Committee for the Approval of Pesticides (COAHP);
- Resolution No. 8/34/CM/99 of 16 December 1999 on the Common Regulations of the CILSS Member States on the Registration of Pesticides.

These regulatory texts deal with the management of pesticides, and more specifically their experimentation, approval, marketing, use or handling, transport and control within the framework of an integrated crop pest management approach in ECOWAS, UEMOA and CILSS member states. Generally speaking, the aim of these Community regulations is to protect people and the environment against the potential risks associated with the use of pesticides.

Togo's adherence to these phytosanitary regulations at the regional level is proof that the country is committed to ensuring better management of pests and pesticides.

2.1.2. At the national level

The legislative framework relating to the environment is built around texts of general and sectoral scope, at the apex of which is the Constitution of 14 October 1992, which enshrines the right to a healthy environment and the obligation of the State to ensure the protection of the environment (art. 41); the right to development (art. 12), the right to health (art. 34).

In relation to the issue of climate change and the agriculture sector in Togo, three pieces of legislation are relevant to this study. These are Law No. 2008-005 of 30 May 2008 on the Environment Framework Law, Law No. 2008-009 of 19 June 2008 on the Forestry Code and Law No. 96-007/PR of 3 July 1996 on plant protection.

• Law No. 2008-005 of 30 May 2008 on the Environment Framework Law

The general legal framework for environmental management in Togo is set by Law No. 2008-005 of 30 May 2008 on the Environment Framework Law. This law aims to preserve and sustainably manage the environment; guarantee, to all citizens, an ecologically sound and

balanced living environment; create the conditions for rational and sustainable management of natural resources for present and future generations; establish the fundamental principles for managing and preserving the environment against all forms of degradation in order to enhance the value of natural resources, fight against all kinds of pollution and nuisances; sustainably improve the living conditions of populations while respecting the balance with the surrounding environment.

It is dedicated to the conservation of the environment, the preservation of natural spaces, landscapes, animal and plant species, the maintenance or restoration of ecological balances and natural resources, risk prevention, the limitation of activities likely to degrade the environment and cause damage to people's health or their property and the protection of natural resources.

The specific case of climate change is dealt with by this law, which states in its article 134 that "the State shall combat desertification and climate change by ensuring the protection of forests, pastoral rangelands and pastures against any form of degradation, pollution or destruction resulting in particular from overexploitation, overgrazing, abusive clearing, fires, burning or the introduction of unsuitable species".

- **Law n°2008-009 of 19 June 2008 on the Forestry Code**

According to Article 1, the aim of the forestry code "is to define and harmonise the rules for managing forest resources in order to achieve a balance between ecosystems and the sustainability of the forest heritage".

The code specifies, with regard to the conservation and protection of sites, that the acts of conservation and protection of water, forests, soils and sites are any action to maintain or restore natural resources in situ, any action tending to preserve or limit activities likely to degrade them (Article 55). Article 64 prohibits and punishes fires and bushfires and subjects to a regulation set by decree in the Council of Ministers, crop fires, renewal of pasture and straw as well as early fires.

- **Law n° 96-007/PR of 3 July 1996 on plant protection**

Law n° 96-007/PR of 3 July 1996 on plant protection prohibits the import, manufacture, packaging or repackaging, storage, experimentation, use or placing on the market of any unauthorised or registered plant protection product. The aim of this law is to make the least toxic and least polluting pesticides available to producers on the country's markets.

Pursuant to Law n° 96-007/PR of 3 July 1996, regulatory texts are taken to regulate the pesticide sector in Togo. These regulatory texts relate to the creation, allocation and composition of the Committee for Phytopharmaceutical Products (CPP), whose main mission is, on the one hand, to study files and grant professional approvals for the importation and distribution of agricultural pesticides, and on the other hand, to study files and approve pesticides for agricultural use. More specifically, these are the regulatory texts relating to:

- professional approval for import, placing on the market, formulation,
- the repackaging of plant protection products and their use by service providers (Order n° 03/MAEP/SG/DA of 20 January 2000);

- the ban on the import and use of methyl bromide in Togo (Order No. 30/MAEP/SG/DA of 21 September 2004);
- the ban on the import and use of organ chlorines in Togo (Order No. 31/MAEP/SG/DA of 21 September 2004);
- setting the conditions for issuing authorisations, approvals and registration of pesticides in Togo (Order No. 106/15/MAEP/Cab/SG/DPV of 18 June 2015);
- the organisation and operation of the National Pesticide Management Committee (Interministerial Order n° 068/16/MAEH/MERF/MSPS, of 17 March 2016);
- The ban on the importation and use of certain plant protection products in Togo (Order n° 0078/18/ MAEP/Cab/SG/DPV of 17 May 2018).

2.2. Institutional framework

The institutional framework for managing the environment and the issue of climate change is characterised by a wide range of actors including public and private institutions, local authorities and civil society organisations. However, the Ministry of the Environment remains the central actor.

2.2.1. Institutional framework for environmental and climate change management

• Ministry of the Environment, Sustainable Development and Nature Protection

Created in 1987, the ministry in charge of the environment has the mission of elaborating and implementing the national policy on environment and climate change, in relation with the other sectoral ministries and other institutions concerned. As such, it monitors the results of the government's policy on environment and sustainable development and ensures that the international commitments on the environment to which Togo has subscribed are integrated into national legislation and regulations.

Environment Department

The Environment Directorate is responsible, among other things, for the implementation of the multilateral environmental agreements to which Togo is a party and for encouraging its adherence to other international instruments relating to environmental management. As such, it is the national coordinating agency for the implementation of the UNFCCC through its division in charge of the fight against climate change.

National Commission on Sustainable Development

The National Commission for Sustainable Development (CNDD) is the consultation body responsible for monitoring the integration of the environmental dimension into development policies and strategies. As such, it ensures that the international conventions on the environment ratified by Togo and the national sustainable development strategy are respected and implemented. It is composed of representatives of public and private institutions,

local authorities, civil society organisations and other legal entities. This commission is represented at the national and local levels.

Generally speaking, the framework for consultation and guidance on climate change is provided by the various committees. These include:

- National Climate Change Committee (NCCC) ;
- Clean Development Mechanism (CDM) Monitoring Committee ;
- Monitoring Committee for the Implementation of the Contributions Determined at National Level (MNC) ;
- Technical committee for the coordination of the process of integrating adaptation to climate change into planning and budgeting in Togo (Comité de suivi du processus PNA) ;
- National Committee on the Green Climate Fund (NCGF) ;
- Comité national de gestion du processus de la réduction des émissions de GES dues à la déforestation et à la dégradation des terres (REDD+) / National Committee for the Management of the Process of Reducing GHG Emissions from Deforestation and Land Degradation (REDD+) ;

2.2.2. Institutional framework for pesticide management

The pesticide management framework is made up of the Ministry in charge of the environment, the Ministry in charge of agriculture, the Ministry in charge of health and the Ministry in charge of trade and industry. These sectoral ministries are involved in pesticide management through the National Pesticide Management Committee (NPMC), which is a consultation and coordination body.

2.2.2.1. Consultation and coordination bodies

Bodies have been set up to facilitate coordination and concerted action in the field of environmental management in general and chemicals management in particular. These bodies are essentially:

- **National Pesticide Management Committee (NPMC)**

The National Pesticide Management Committee (CNGP) is created by inter-ministerial order n° 068/16/MAEH/MERF/MSPS of 17 March 2016. It is placed under the supervision of the ministry in charge of agriculture.

This committee's tasks include proposing principles and general guidelines for the regulation of pesticides; analysing and issuing opinions on health problems caused by pesticides; analysing and issuing opinions on problems of pollution and environmental degradation caused by pesticides.

It is structured and organised in three committees:

- Commission des agréments professionnels, des autorisations et des licences (CAPAL);

- Control and Monitoring Commission (CCS);
- Toxic vigilance Commission (CT).

Initiated on the recommendations of ECOWAS/UEMOA/CILSS, this committee is a formal framework for exchange, discussion, orientation and decision on issues related to pesticides, in their most rational and safe management in Togo. It brings together more than 35 actors (public, private, agricultural producers' organisations, civil society organisations, NGOs) involved in the pesticide sector.

The national pesticide management committee is made up of representatives from the ministries in charge of agriculture, environment, health and trade.

2.2.2.2. Producers' association and organisation

Several agricultural producers' organisations, non-governmental organisations and authorised distributors are involved in pest and pesticide management in terms of raising awareness and training producers and their members on the wise, rational and safe use of pesticides in their sector:

- the Fédération nationale des groupements de producteurs de coton du Togo (FNGPC), which is responsible for training its members on the judicious and safe use of pesticides on cotton;
- The Fédération des Unions de Producteurs de Café Cacao du Togo (FUPROCAT) trains its members on the judicious handling of pesticides on coffee and cocoa trees;
- the Centrale des producteurs de céréales du Togo (CPC) trains on cereal crops;
- the Togolese Coordination of Farmers' and Agricultural Producers' Organisations (CTOP);
- the National Federation of Market Garden Organisations of Togo (FENOMAT), provides training on market gardening;
- the National Association of Poultry Professions of Togo (ANPAT) trains on poultry;
- the Groupement des vétérinaires privés en clientèle rurale (GVPCR) trains rural livestock farmers and others on the professional use of veterinary pesticides;
- the Togolese Consumers' Association (ATC), raises public awareness of the harmful effects of the anarchic use of pesticides on agricultural products;
- The Association of Agricultural Input Suppliers of Togo (AFITO) trains their clients before any delivery on how to use pesticides rationally while avoiding health and environmental impacts.

2.3. Policy framework and level of integration of agroecology into policies

For several years, the Togolese government has been committed to implementing a proactive policy of sustainable development and the fight against global warming. This vision is part of a framework of national and sectoral strategic orientations. The national strategic orientations on which sectoral policies and programmes are based are part of the Strategy for Accelerated Growth for Employment Promotion (SCAPE) 2013-2017, which provides a

medium-term development framework based on the Millennium Development Goals (MDGs) covering the period from 2006 to 2015. Since 2018, these strategic orientations have been integrated into the National Development Plan (PND) initiated for the period 2018-2022 and based on the Sustainable Development Objectives (SDOs). This political will is expressed in the policy, planning and sectoral programme documents listed below:

- For the environment and climate change sector, these include : (i) National Environment Policy (PNE); (ii) National Environmental Action Plan (PNAE); (iii) National Action Programme to Combat Desertification (PAN/LCD); (iv) National Environmental Management Programme (PNGE); (v) National Investment Programme for the Environment and Natural Resources (PNIERN); (vi) National Plan for the Implementation of the Stockholm Convention on Persistent Organic Pollutants (PNM); (vii) National Pesticide Management Policy (PNGP); (viii) Capacity Building Programme for Environmental Management (PRCGE); (ix) National Action Plan for Adaptation to Climate Change (PANA); (x) National Plan for Adaptation to Climate Change (PNACC); (xi) National Strategy for Reducing Emissions from Deforestation and Forest Degradation (REDD+); (xii) Strategic Investment Framework for Environment and Natural Resources Management (CSIGERN).
- For the agriculture sector, it is a question of : (i) New ECOWAS Common Agricultural Policy (CAP/ECOWAS); (ii) ECOWAS Framework of Strategic Orientations (COS - 2025); (iii) UEMOA Agricultural Policy (PAU); (iv) Regional Agricultural Investment Programme and Food and Nutritional Security (PRIASAN 2016-2020); (v) Togo's agricultural policy; (vi) Togo's agricultural policy document (DPAT) 2015-2030; (vii) National investment programme for agriculture and food and nutritional security (PNIASAN 2016-2025).

2.3.1. Policy framework for the environment sector and climate change

2.3.1.1. Policies in the field of the environment in general

- Environmental policy

The policy framework for environmental management is defined by the National Environment Policy (PNE) adopted by the Government on 23 December 1998. Prepared within the framework of the process of elaboration of the National Action Plan for the Environment (PNAE), this document underlines the two main objectives assigned to this policy:

- promote rational management of natural resources and the environment in all areas of activity;
- Consolidating economic recovery measures designed to put development on an environmentally sustainable footing.

This policy has been given four main orientations: (i) taking environmental concerns into account in the national development plan, (ii) eliminating or reducing the negative impacts

on the environment of public or private development projects and programmes, (iii) strengthening national capacities for environmental and natural resource management, and (iv) improving the living conditions and environment of populations.

- National Environmental Action Plan (PNAE)

Adopted in July 2001, the National Action Plan for the Environment (PNAE) constitutes a strategic framework for the implementation of national environmental policy. This plan takes into account the environmental dimension in the planning and management of development programmes.

In its Strategic Direction 4, the NAPE calls for "promoting sound and sustainable management of natural resources and the environment". To this end, its objective 1 aims to "promote environmentally friendly sectoral policies". It therefore serves as a national policy framework for the promotion of rational management of natural resources and the environment in all areas, including the agricultural sector. The PNAE process will have made it possible to:

- To draw up a state of the environment and identify the constraints and advantages of environmental management. The PNAE provides a summary of the major environmental problems identified within this framework, their direct and indirect causes, as well as the impacts observed;
- to define and promote, in a participatory process involving all national actors and development partners, an overall strategic framework for integrating environment and development issues;
- To propose action strategies and practical modalities to ensure that the environment is taken into account in sectoral and national development plans, programmes and projects.
- National Action Programme to Combat Desertification (NAP/CD)

After ratifying the United Nations Convention to Combat Desertification (04 October 1995), the Togolese government adopted its National Action Programme to Combat Desertification (PAN/LCD) in March 2002. This programme aims to strengthen national natural resource management capacities for the promotion of sustainable development.

Sub-programme IV promotes sustainable management of land and natural resources through the promotion of wetland and protected area management, the protection of fragile ecosystems and the control of bush fires.

- National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (NIP)

The National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants (NIP) aims to eliminate certain POPs such as POPs pesticides. As part of the implementation of this plan, Togo conducted a feasibility study to set up a Pollutant Release and Transfer Register (PRTR). This is a coherent and integrated inventory of releases and transfers of pollutants, especially chemical pollutants, at the national level, intended to facilitate public participation in the environmental decision-making process and to contribute to the prevention and reduction of environmental pollution by toxic chemicals in order to protect human health.

- National Pesticide Management Policy

The national pesticide management policy includes strategic axes aimed at significantly reducing the use of pesticides in the agricultural sector. Axis 1 concerns the "establishment of programmes to reduce health and environmental risks"; Axis 2 aims to "promote integrated pest management and alternative methods"; Axis 5 aims to "strengthen networks for monitoring harmful organisms and the adverse effects of pesticide use".

As part of the implementation of this policy, some research projects on alternatives to chemical pesticides in agriculture and in vector control have been carried out by public structures and institutions such as the Directorate of Plant Protection (DPV), the Togolese Institute for Agricultural Research (ITRA), the Institute for Technical Advice and Support (ICAT), the Higher School of Agronomy (ESA-UL) among others, with the technical support of partners.

- National Investment Programme for the Environment and Natural Resources (PNIERN)

The National Investment Programme for the Environment and Natural Resources (PNIERN), adopted in August 2010, is proving to be a national reference framework for the operational implementation of the National Environmental Management Programme (PNGE). Its main objective is to sustainably reduce land degradation, natural resource depletion and environmental imbalances. It also aims to create the conditions to effectively adapt to climate change, improve the living environment of the populations with the involvement of all actors, from the local to the national level, in order to combat poverty and contribute to the improvement of food security and the economic growth of the country.

It has identified seven strategic priority investment areas, ranging from institutional, legal, financial and technical capacity building to the development of effective systems for the acquisition and management of knowledge relating to the Management of the Environment and Natural Resources (GERN), monitoring and evaluation (M&E) and information dissemination, as well as disaster management and risk prevention, and the improvement of the living environment in urban and rural areas.

- Strategic Investment Framework for Environment and Natural Resource Management (CSIGERN)

The Strategic Investment Framework for Environment and Natural Resource Management (CSIGERN) was developed in 2018. Strategic Axis 3 concerns the fight against climate change and the integrated management of the marine environment and the coastline. This strategic axis aims to reduce disaster risks, the vulnerability of populations and ecosystems to the adverse effects of climate change and to develop mitigation actions in key development sectors.

Designed to operationalize the strategic investment priorities of the NIP, the CSIGERN is based on the implementation of instruments aimed at encouraging public and private players to join forces with the government to enhance the environmental, economic and social potential.

- Climate change policy

After drawing up its initial National Communication on Climate Change in November 2001, which made it possible to identify potential sectors for GHG emissions and assess Togo's vulnerability to climate change and to define measures for mitigating GHG emissions and adapting to their impacts, Togo undertook a process of drawing up national climate change adaptation plans.

- National Action Plan for Adaptation to Climate Change (NAPA)

The main objective of the National Action Plan for Adaptation to Climate Change (NAPA), drawn up in September 2009, is to identify urgent and immediate adaptation needs and measures to reduce the vulnerability of populations and fragile ecosystems to the adverse effects of climate change. Specifically, the NAPA aims to ensure:

- the protection of human lives and livelihoods, resources, infrastructure and the environment;
- identifying the urgent and immediate needs of grassroots communities and implementing measures to adapt to the adverse impacts of climate change and variability;
- Integration of adaptation measures and objectives into sectoral policies and national planning.
- The National Climate Change Adaptation Plan (NCCAP)

The National Plan for Adaptation to Climate Change (PNACC), drawn up in 2016, aims to promote, in the medium and long term, the integration of adaptation to climate change into the country's development policies and strategies in order to reduce the vulnerability of development sectors and strengthen their resilience.

The vision of the PNACC is that by 2030, Togo's socio-economic development will be sustainable and the resilience of vulnerable populations will be strengthened, thanks to the implementation of climate change adaptation measures. This vision takes into account major issues and challenges such as: (i) food and nutritional security; (ii) the reduction of poverty and social inequalities; (iii) public health and the living environment; and (iv) the protection of the livelihoods of vulnerable groups.

In the agriculture sector considered as the first sector for adaptation, the NCCAPP plans to strengthen integrated soil fertility management (ISFM) through the dissemination of ISFM technologies to different crops to reduce and rationalise the use of mineral fertilisers, the dissemination of agroforestry practices, the use of organic animal manures, the use of cover legumes, the use of combinations with seed legumes and crop rotation, the use of composts with plant debris.

These actions are in line with agroecological principles and should serve as a tool for actors to better orient their actions to contribute both to the achievement of the objectives of the NCCAP and to the promotion of agroecology.

- Nationally determined contributions (NDCs)

Nationally Determined Contributions (NDCs) are at the heart of the Paris Agreement and the achievement of its long-term objectives. Following the example of several countries, Togo has developed and submitted its planned nationally determined contributions (NDCs) in 2015 in order to contribute to the achievement of the objectives set for the Paris Agreement. By ratifying the Agreement in 2017, the country has confirmed its agreement to the UNFCCC, which transforms the NDPC into a NDC without modification. Togo's activities focus mainly on increasing resilience to the effects of climate change. At the same time, the country is also striving to reduce GHG emissions and move towards a low-carbon and more climate resilient development.

Togo's NDCs identify agriculture as the second national priority sector (after energy) and propose mitigation options in the areas of livestock, rice cultivation, agricultural soils and savannah burning. In the rice sector, the emphasis is on supporting and accompanying the more appropriate use of organic matter in rice paddies. At the level of agricultural soils, it is planned to carry out a characterisation study of agricultural soils by agroecological zone, to set up a research and support programme on organic and synthetic soil improvers emitting less GHG, to study and promote optimal management of livestock waste and crop residues, to promote soil management practices aimed at improving carbon fixation in agricultural soils and agroforestry, and a specific support measure for the dissemination of good agroecological practices. These measures benefit the promotion of agroecology.

- Togo NDC Implementation Plan (2020-2024)

Togo prepared in 2019 a plan for the implementation of the NDCs for the period 2020-2024. This plan aims to manage growing emissions without compromising the required development and to enable Togo to play its role in global efforts to limit temperature rise to 2°C or preferably 1.5°C above pre-industrial levels. The action plan is based on five pillars: governance, adaptation, mitigation, financial, technological and aid needs, and the national measurement, reporting and verification (MRV) system.

The actions foreseen in the agriculture sectors are relevant for the promotion of agroecology, including the promotion of appropriate bio pesticides and biological control agents for integrated pest management and the development of post-harvest management with environmentally friendly technology packages.

2.3.2. Policy framework for the agricultural sector

2.3.2.1. At community or regional level

- Strategic Orientation Framework (COS-2025)

The ECOWAS Strategic Orientation Framework (COS-2025) takes into account certain current issues such as the fight against hunger and malnutrition, adaptation to climate change which affects agricultural performance, the occurrence of climate risks and consequently their impact on income and food security, strengthening the resilience to food and nutrition insecurity of vulnerable households and communities, promoting employment, vocational training and securing the status of agricultural producers and workers, women and youth, and mainstreaming gender in agricultural development policies and programmes.

- WAEMU Agricultural Policy (PAU)

The WAEMU Agricultural Policy (P.A.U.), which has been implemented at the community level since 2000, aims to make a sustainable contribution to meeting people's food needs, to the economic and social development of the Member States and to poverty reduction in rural areas. The three main areas of intervention of the PAU are: (i) the adaptation of production systems and the improvement of the production environment, (ii) the deepening of the common market in the agricultural sector and the management of shared resources, and finally (iii) the integration of national production into regional and world markets.

This policy adopted at Community level focuses on activities with a high impact on food security. In particular, the aim is to improve family farming in close collaboration with the National Agricultural Investment Programmes (NAIPs) and to prepare the sub-region to cope with climatic hazards and cereal deficits through concrete actions on the management of food security stocks.

- Comprehensive African Agriculture Development Programme (CAADP)

The Comprehensive Africa Agriculture Development Programme (CAADP) is the agricultural component of the New Partnership for Africa's Development NEPAD. It aims to ensure agriculture-led development in order to achieve and contribute to the achievement of the Sustainable Development Goals (SDGs).

Following the approval of CAADP, one of the specific objectives of which is to achieve an average annual growth rate of 6% by 2015, the States of the Regional Economic Communities adopted this programme as a vision for restoring agricultural growth, food security and rural development in Africa.

- Regional Agricultural Investment and Food and Nutritional Security Programme (PRIASAN 2016-2020)

The Regional Programme for Agricultural Investment and Food and Nutritional Security (PRIASAN 2016-2020) was adopted on 12 December 2016 in Abuja, Nigeria, within the framework of the meeting of the Specialised Ministerial Technical Committee on "Agriculture, Environment and Water Resources". This programme which is part of the implementation of the ECOWAS agricultural policy (ECOWAP) and the Strategic Orientation Framework for 2025 (COS-2025) contributes to ensuring in a sustainable manner the satisfaction of the food and nutritional needs of populations, economic and social development and poverty reduction in Member States.

Agroecology can be considered as an agricultural production system or a sustainable farming technique that contributes to achieving the objectives of this regional programme.

2.3.2.2. At the national level

- National Development Plan (PND) 2018-2022

The National Development Plan (PND) 2018-2022 adopted in August 2018, is structured around three main strategic axes: (i) Strategic Axis 1 aims to establish a logistics hub of excellence and a first-class business centre in the sub-region; (ii) Strategic Axis 2 aims to develop poles of agricultural processing, manufacturing and extractive industries; (iii) Strategic Axis 3 aims to consolidate social development and strengthen inclusion mechanisms. The section on agriculture as a basis for economic growth advocates sustainable agriculture that respects human health and the environment.

- Togo's agricultural policy

Togo's Agricultural Policy Document (DPAT) 2016-2030 has been drawn up to replace the Agricultural Policy Note implemented over the period 2007-2011 and to which the National Investment Programme for Agriculture and Food and Nutritional Security (PNIASAN) has been attached. This document constitutes the strategic reference framework for interventions in the agriculture sector for the period 2016-2030.

The policy aims to ensure "a modern, sustainable and high value-added agriculture at the service of national and regional food security, a strong, inclusive and competitive economy and the generation of decent and stable jobs by 2030". In order to establish the vision, five missions are assigned to the agricultural sector:

(i) to ensure sustainable food security;

(ii) to improve the income and living conditions of rural populations;

(iii) to contribute to improving the trade balance;

(iv) to accelerate job creation and reduce the arduousness of work; (v) to contribute to the development of the economy through sustained GDP growth. In its second strategic axis, the policy advocates the use of more appropriate techniques or technologies for the sustainable

management of land and other natural resources, such as organic farming an
Agroecology is in line with this agricultural policy document of Togo.

- National Agricultural Investment and Food and Nutritional Security Programme (PNIASAN, 2017-2026)

The National Programme for Agricultural Investment and Food and Nutritional Security (PNIASAN/2017-2026) was drawn up in December 2018. This programme aims at modern, sustainable and high value-added agriculture for national and regional food and nutritional security.

It takes into account the integration of vulnerability to climate change for the development of a sustainable agriculture with high environmental value integrating an ecological management of pests and pesticides.

CHAPTER 0.3

AGROECOLOGY AS A KEY APPROACH TO CLIMATE CHANGE

AGROECOLOGY AS A KEY APPROACH TO CLIMATE CHANGE

3.1 Definition of some key concepts and principles of agroecology

3.1.1 Definition of some key concepts

- **Adaptation**

Adaptation is defined by the Intergovernmental Panel on Climate Change (IPCC) as "the process of adjusting to the current or expected climate and its effects in order to moderate their impacts or exploit their opportunities" (IPCC 2007). As climate trends change, it is increasingly important to put in place adaptation measures to manage and reduce the risks of these changes to agriculture and to build resilience. This is the only effective option for societies to cope with the inevitable consequences of climate change that mitigation cannot limit (IPCC, 2014).

- **Resilience**

Resilience is defined by the IPCC as "the capacity of a system and its components to anticipate, absorb, cope with or recover from the effects of a hazard quickly and efficiently, including through the preservation, restoration or improvement of its basic structure and essential functions".

- **Agroecology**

Agroecology is subject to multiple definitions; it can refer to a scientific discipline at the crossroads of ecology and agronomy, agricultural practices or even a social movement in some countries. The term began to be used in the late 1920s, before really reappearing in the 1970s, when it was cited many times by academics in the context of research on sustainable agriculture, mainly in the United States and Latin America.

According to Altieri A. Miguel (1983), agroecology is "an approach to food production that attempts to ensure sustainable yields through the use of ecologically sound management techniques. The strategies are based on ecological concepts, so that the forms of

management result in optimal recycling of nutrients and organic matter, closed energy flows, a balance of pest populations and an increase in multiple use of the landscape".

Agroecology aims not only to transform agriculture but also to rethink entire food systems to make them more sustainable. Agroecology thus proposes a revision of production methods, using principles and concepts derived from ecology to meet a dual objective:

- optimise their productivity while strengthening their resilience in the face of new uncertainties imposed by climate change and the volatility of agricultural and food prices;
- Maximise the ecological services that can be provided by agro systems and limit negative impacts, in particular through reduced reliance and dependence on fossil resources.

To do this, agroecology uses a set of agricultural practices whose coherence is based on the use of ecological processes and the enhancement of (agro) biodiversity. They all have the characteristics of working with nature and not against it or independently, optimising the yield of photosynthesis on the cultivated area, improving soil capital by protecting it and increasing its organic matter content by returning as many carbon elements as possible to the soil and, finally, gradually reducing all recourse to inputs.

The practices considered for plant and animal production, all of which have the objective of reducing or even eliminating inputs (herbicides, insecticides, fertilisers, antibiotics) are as follows:

- Agroforestry, which resituates trees and hedges as precious allies of fertility and the protection of crops and animals;
- simplified tillage techniques ;
- permanent ground cover, sowing under cover and returning part of the biomass to the ground;
- long crop rotations and crop diversification, specifically including legumes;
- open-air breeding and the production system based on pasture, particularly linked to the presence of trees and hedges for animal comfort ;
- polyculture/livestock farming which favours the return of animal dejecta to the ground and the link to the soil.

Beyond the aspects related to agricultural production in the strict sense, agroecology covers a broader sense by considering the territorial dynamics and the social actors who are the bearers of the foundations of a sustainable, ecologically sound, economically viable and socially just agriculture .

Agroecology can thus be seen as a territorialised declination of ecology in agriculture, from the scale of the cultivated plot to that of the agrosystems, in a global, i.e. inclusive and systemic way.

3.1.2 Principles and objectives of agroecology

Agroecology is a form of agriculture that meets a number of principles and objectives.

The agroecology movement was born out of a two-fold observation:

- on the one hand, the observation of the crisis of agrarian systems that have not been able to find alternatives to the gradual disappearance of the old modes of fertility management based on long or shorter fallows with a certain level of agriculture-livestock integration,
- on the other hand, the observation of the limits and ecological damage of the practices of the green revolution.

Faced with this observation, agroecology responds to two fundamental principles for optimising agro-ecosystems by enhancing local resources with less dependence on external inputs:

- On the one hand, the principle of fully exploiting the potential of ecosystems, both in terms of capturing abundant external resources (carbon dioxide, nitrogen, solar energy, water, and subsoil minerals) and in terms of stimulating physical, chemical and biological processes and flows internal to the ecosystem (in particular the recycling of biomass). The application of this principle responds to objectives linked to agricultural production, both quantitative, qualitative (nutritional, sanitary, taste quality) and regularity, as well as to an objective of autonomy with regard to the use of inputs and energy external to the system. These objectives in turn contribute to food security and income generation objectives.
- On the other hand, the principle of protecting and improving, or even restoring agro-ecosystems (particularly soil fertility and water availability), which meets sustainability objectives - an objective which in turn contributes to food security and income generation in the long term -, providing various benefits for the environment (biodiversity, absence of contamination, etc.), and adapting to and mitigating climate change.

These principles clearly differentiate agroecology from the practices and systems that emerged from the Green Revolution. The Green Revolution, on the one hand, aims to artificialise and simplify the ecosystem as much as possible by making massive use of external resources and, on the other hand, it puts the issue of the effects and impacts of agricultural practices other than yield maximisation on the back burner.

However, agroecology does not necessarily rule out the use of certain practices from the Green Revolution, such as the use of mineral fertilisers to restore the fertility of deficient soils or as a complement to organic fertilisers as part of an agroecological transition of production systems. From this point of view, it is important not to confuse agroecology with organic farming. Organic agriculture is indeed an integral part of agroecology, but some agroecological systems do not fully meet the principles and specifications of organic farming. Conversely, many agroecological systems respond to objectives that go beyond these principles and specifications (energy saving, accelerated restoration of organic soil fertility, social dimensions of agroecology, etc.).

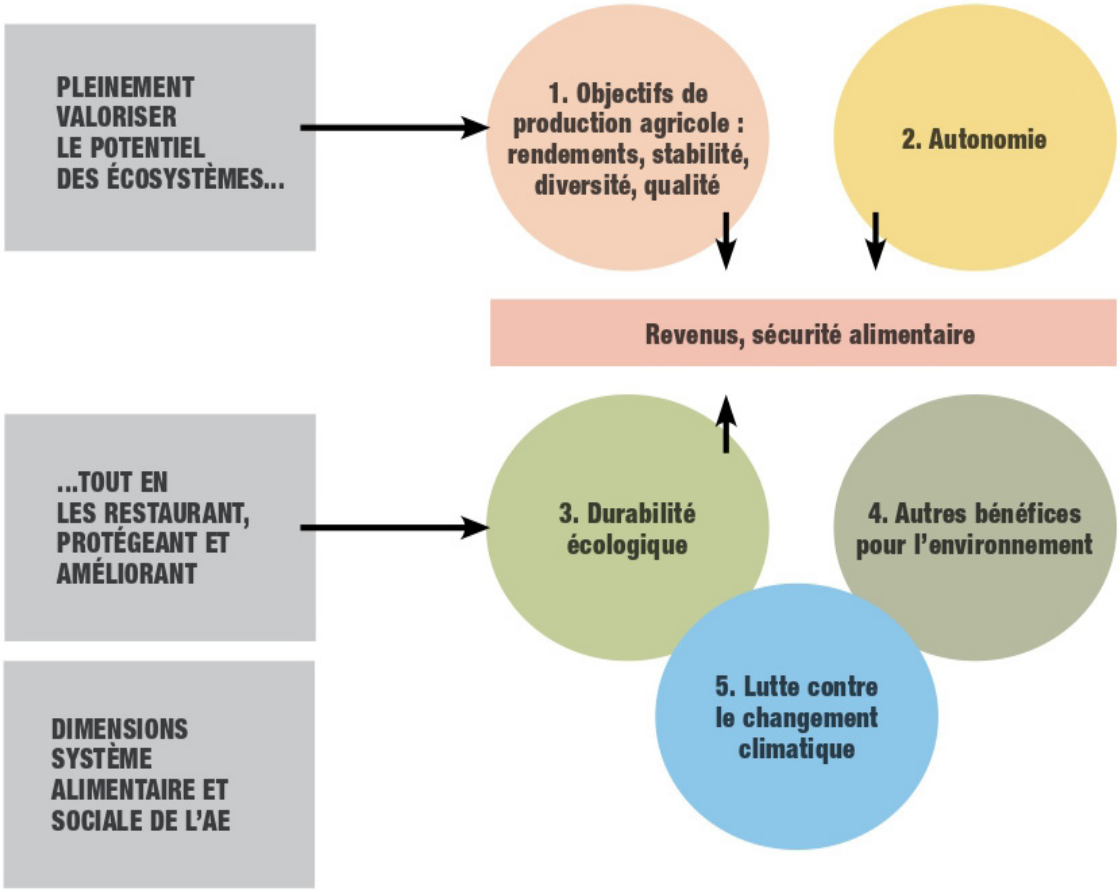

Figure 2: General principles and objectives of agroecology
Source: Laurent Levard and Bertrand Mathieu, 2018

While some of these agroecological objectives are objectives sought directly by the farmer, other objectives may respond to a more general point of view (communities, general interest of the country, humanity as a whole, with the objective of fighting climate change in particular). The agroecological approach is therefore multidimensional and can be applied at different scales: the plot, the farm and the territory, while keeping in mind a holistic vision.

Agroecology also covers other dimensions that were not addressed in the study: transformation of the entire food system, social and cultural dimensions (transmission of traditional knowledge, social movement, social project based on a global and sustainable management of natural resources, new relations between farmers and consumers, etc.).

3.2 Agroecological challenges

Agroecology faces a number of challenges that are food, health, societal, environmental, territorial and technical in nature.

3.2.1 Feeding challenge

The food challenge is about meeting food needs in terms of quantity and quality, an overarching objective that agriculture and the agri-food sector must help to achieve through :

- the production of quality food in adequate quantities for the entire population, enabling consumers to make their food choices at the territorial and national level;
- national food sovereignty ensured with respect for the food needs of all humankind and the fundamental right of access to healthy and balanced food.

This challenge is that of food security, a concept defined at the World Food Summit in Rome in 1996 as the situation in which "all people at all times have the physical, social and economic opportunity to obtain sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". It is based on 4 pillars:

- access (ability to produce one's own food or ability to buy one's own food);
- availability (sufficient quantities of food, whether from domestic production, stocks, imports or aid);
- the quality of food and diets, nutritional, health, but also social and cultural;
- stability (satisfaction over time of the 3 previous elements).

Food security, which can be expressed at the individual level, differs from the related concepts of food self-sufficiency, food sovereignty and the right to food, which are more political or legal concepts.

In Togo, food and nutrition insecurity remains a major challenge, especially in rural areas. Chronic malnutrition, acute malnutrition and underweight affect respectively 27.5%, 6.5% and 16% of children under five years of age, mainly in the Savanes, Kara and Plateaux regions (Ministry of Agriculture, Livestock and Hydraulics, 2017 - 2026). Chronic underweight or energy deficiency affects 6.9% of women of childbearing age. To this must also be added micronutrient deficiencies such as anaemia, vitamin A and iodine deficiency, one of the main causes of which remains the low consumption of micronutrient-rich foods. In 2013, 53% of children under the age of five suffered from vitamin A deficiency (Demographic and Health Survey -EDS, 2013-2014).

3.2.2 Health Challenge

This challenge, which concerns all the players in the production chain, has a two-fold dimension: to preserve the health of agricultural producers, employees in agriculture and the agri-food industry, and that of consumers. It therefore concerns :

- the protection of the health and safety at work of agricultural producers and employees by improving working conditions and in particular by reducing exposure to dangerous

substances (plant protection products, adjuvants, etc.);
- the provision of healthy food to ensure that everyone develops in good health. This food must provide the necessary nutrients and contain as few related molecules as possible (additives, chemical and synthetic preservatives, etc.). This also means preserving the quality of water, particularly for consumption.

In addition, agricultural producers and workers are exposed to the effects of the chemical inputs they use and handle. Studies have shown a link between this exposure and the occurrence of certain cancers.

These problems are also likely to affect the people living near the farms and, more broadly, the entire population, in particular through the degradation of water quality.

3.2.3 Societal challenge

Consumers are more informed and more sensitive to the conditions under which their food is produced: agri-food chains must take this development into account. This challenge therefore concerns :
– Farmers and food processors who have to produce ever healthier food in other ways;
– logistics to organise the processing and distribution of food products in a rational way.

The demand for sustainable, organic, fair or local food as well as for agriculture that respects people, the environment and animals is growing. Agroecology, which encompasses both more virtuous modes of production, seems to be able to respond to this societal challenge.

3.2.4 Environmental challenge

This challenge implies respect for a principle of sustainability: agriculture must not harm the natural environments of which it is an integral part, but, on the contrary, seek to enhance their positive interactions. Society must therefore not only be attentive to agriculture's action on the environment but, just as much, encourage it to strengthen these interactions, which means :
- restoring the natural agronomic functions of cultivated ecosystems;
- the fight against soil erosion and the preservation of soil fertility;
- reducing the consumption of water, chemical inputs, veterinary drugs and exogenous feedstuffs;
- the use of biological interactions, ecosystem services and the potential offered by natural resources (biodiversity, photosynthesis, etc.) while maintaining their capacity for renewal from a qualitative and quantitative point of view;
- the contribution to mitigation and adaptation to the effects of climate change and to the resilience of productive environments;
- the improvement of animal welfare.

The continuous search for productivity, a consequence of an increasingly precarious economic balance, has had significant effects on our environment: diffuse pollution of the soil, subsoil, groundwater and surface water, even the oceans, a reduction in pollinating insects, a decline in biodiversity, etc. The use of chemical inputs, the gradual abandonment of fallow land and crop rotation have proved to be technical dead ends, the negative effects of which can be seen a posteriori. These practices disrupt the capacity to regulate the water cycle and the climate system (soil water reserves, carbon sinks, etc.) and may also have had consequences in terms of landscape degradation and, more generally, living conditions in rural areas.

In addition, soil degradation (erosion and reduced fertility), pest resistance, the impacts of climate change... are all obstacles to improving the real productivity of agricultural systems.

3.2.5 Territorial challenge

This challenge requires maintaining close links between agriculture and the different territories, taking into account their specificities. Given its food vocation and its link to the land, agriculture must be considered as a major economic, social and environmental player. As such, it performs missions at the territorial level that deserve to be recalled and, if necessary, re-defined:

- the production of quality food that meets the expectations of the populations of the territories;
- the contribution to local economic dynamism by generating added value and maintaining a network of activities and therefore local jobs (abattoirs, food processing industries, crafts and local food trade, etc.);
- the enhancement of rural housing.

3.2.6 Technical challenge

The challenge is to ensure that agronomic practices and technical innovations are effectively designed and implemented to meet the needs of agriculture so that it can ensure the economic viability of farms and meet the expectations of consumers and society. This implies :

- research work consistent with the desired orientations for agriculture, particularly in terms of quantitative and/or qualitative productivity of production for the consumer and the preservation of natural environments and resources for the citizen;
- training in innovative good practices already implemented by some farmers, capitalisation and improved dissemination of these practices with a view to their generalisation;
- an emphasis on tools to reduce input and water consumption (e.g. in market gardening);
- taking into account the economic realities of family farms in order to offer facilities that correspond to their investment capacities;
- efforts to bring collective solutions to farmers.

In sum, the set of challenges thus listed covers a very wide and far-reaching range. The changes to be undertaken are important, but the cost of inaction would be even higher. In fact, while the costs associated with depollution can be assessed, the same cannot be said

for future costs associated with public health or biodiversity loss.

These challenges represent opportunities, not only for farmers, but also for stakeholders in the commodity chains and beyond, for consumers as a whole. Everyone, in their roles and choices, can work towards the success of a necessary global transition.

3.3 Recommendations to strengthen the integration of agroecology in public policies and climate processes

3.3.1 Relevance of agroecology for climate change adaptation

Agroecological practices have great potential, as they allow the adaptation of agricultural production to new climatic contexts, increasing the resilience of family farms. Indeed, they are in harmony with the local conditions of the agro-ecosystem in which they are implemented.

At the level of agricultural production, agroecology aims to meet various objectives simultaneously:

- obtaining diversified and quality agricultural and food products in sufficient quantities and economic income in a relatively stable (and therefore predictable) way over time, which implies a capacity for resilience to external shocks;
- the improvement and reproduction of the productive potential of the cultivated ecosystem;
- positive impacts on the environment, both locally and globally (soil and subsoil, water, atmosphere, biodiversity, state of flora and fauna, limited use of non-renewable resources, contribution to the fight against climate change).

To achieve this, agroecology is based in particular on the search for greater farm autonomy and the mobilisation of the potential and biodiversity of cultivated ecosystems, on the one hand to make the most of external natural resources (solar energy, atmospheric carbon and nitrogen, mineral elements in the subsoil, rainwater) and, on the other hand, to develop internal flows and interrelationships between the components of these ecosystems.

Agroecology is a key factor in the adaptation of family farming to climate change. Indeed :

- it increases the overall productivity of agricultural systems (production volumes and incomes) where fertility management systems were previously in crisis;
- water management in agroecological systems (capture, storage, loss limitation) reduces the impact of climate deficits;
- the diversity of activities and the buffer effect of the agroecological ecosystem (water reserves, but also temperature regulation and soil protection) makes it possible to mitigate the impact of climate variability on the overall production system ;
- the greater autonomy from the outside (production costs) mitigates the impact of a given drop in production on agricultural income;
- the genetic characteristics of the species used allow better adaptation to climate variability, compared to the species and varieties of the green revolution;
- the high plant and animal biodiversity of agroecological systems increases the overall

genetic adaptive capacity of the species used in the medium and long term.

In practice, most of the options for adaptation to climate change can be found in agroecological systems: water and soil management practices, crop rotations and intercropping, diversification of species and varieties, choice of varieties and species combining production potential and adaptability to variability in climatic, phytosanitary and sanitary conditions, integration of agriculture-livestock, agroforestry and reforestation, integrated pest management. These options make full use of biodiversity, intermediate consumption and synergies within the production system.

As a social movement, agroecology pursues multifunctional roles for agriculture, promotes social justice, supports identity and culture, and strengthens the economic viability of rural areas. These aspects of agroecology also contribute to better adaptation to climate change.

3.3.2 Agroecology as an adaptation measure with co-benefits mitigation

There are links between adaptation and mitigation practices. Many practices that facilitate agriculture's adaptation to climate change can also contribute to climate change mitigation, and vice versa. For example :

- certain cultivation and soil protection practices can increase the level of organic matter in the soil, its water retention capacity and its resistance to erosion. They thus contribute to increasing the resilience of systems in the face of climatic accidents (adaptation) while fixing carbon (mitigation);
- In addition to these same types of effects, agroforestry practices can increase soil mineral fertility and protection against heavy rains and high temperatures, further improving the resilience of the systems;
- the substitution of chemical fertilisers by leguminous crops, the use of green manure and better use of manure make it possible to limit nitrogen losses and increase the autonomy of the systems vis-à-vis external purchases, thus improving their resilience to climatic or economic shocks (adaptation), while reducing nitrous oxide and CO2 emissions linked to the manufacture and use of nitrogenous chemical fertilisers (mitigation). Concerted watershed management (afforestation, geographical distribution of activities) can also contribute to reducing the vulnerability of families and local populations while increasing carbon storage in the ecosystem.

However, certain practices aimed at adapting to climate change can increase greenhouse gas emissions. These include practices based on energy-intensive irrigation systems.

Similarly, practices aimed at mitigation can weaken adaptive capacities, such as reforestation and land-use plans that do not take into account the economic and social needs (food security, income) of local populations.

3.3.3 Entry points for integrating agroecology into policy processes

- **Get involved in the process of revising and implementing Togo's NDC**

Togo's NDC clearly refers to agroecology. Starting in 2023, and then every five years thereafter, countries that are Parties to the UNFCCC are invited to take stock of the implementation of the Paris Accord to assess collective progress in achieving the objectives of the Accord and to revise upwards their climate ambitions. Stakeholders should seize the opportunity of the review of the UNCCD, but also of the elaboration of its operational implementation plan to ensure that agroecology is really taken into account.

- **Seize the opportunity to update national policy documents to strengthen the integration of agroecology**

Togo draws up a national development strategy every five years, the current one being the NDP, which is due to end in 2022. For the agriculture sector, a national agricultural policy is drawn up for the period 2016-2030, to which the PNIASAN (2017-2026) is attached. All these processes constitute niches for the integration of agroecology and its effective inclusion in the operational plans for implementation.

- **Putting agroecology at the heart of the development of regional adaptation plans, the national adaptation plan for the agriculture sector and the revision of the NCCAPP**

The formulation process of the NCCAP document was conducted only at the central level due to budgetary constraints. Stakeholder engagement was limited to national actors and did not include all stakeholders, especially small farmers, fishermen, women and youth. The PNACC document does not highlight the specific adaptation needs of different communities at the grassroots level, in line with the agroecological specificities of the country. To remedy this, the Ministry in charge of the environment plans to develop regional adaptation plans to be followed by the revision of the PNACC at the national level. In addition, the health sector has already developed its sectoral adaptation plan and the same could be done for other vulnerable sectors, including agriculture. All of these are niches of opportunity for the effective inclusion of agroecology in these different processes.

3.3.4 Approaches to guide the integration of agroecology into national policies, legislation and frameworks

It is clear that the necessary changes cannot be achieved without a transition to ensure the dissemination and, in the long term, the generalisation of agroecological practices.

For such a change to be possible, all available levers must be activated to remove the aforementioned brakes. This requires coordinated initiatives to redirect research and training, the active participation of all the links in the upstream and downstream sectors, not forgetting the role of impetus and support to be played by public policies.

- **Mobilising local authorities to integrate agroecology into communal development plans (CDPs)**

Agroecology implies a better integration of agricultural activities in the territories, which notably involves strengthening synergies between farmers and other local actors. This is the way that will best enhance agriculture's capacity to contribute to rural development and local dynamism.

Since the municipal elections of June 2019, municipalities have had the possibility to propose rural development and agro-environmental measures through the elaboration of their municipal development plans (MDPs). They are thus in the front line in helping to develop agroecology, of which they should be the driving force. It is important that all the communes and the State, through the services of the Ministry of Agriculture, agree on the objectives and modalities of the transition in order to optimise the efficiency of their interactions.

Nevertheless, the link between agriculture and territories is not limited to the implementation and deployment of national agricultural policies at the local level. A first field of action consists of directing food purchases more strongly towards local producers in order to ensure those outlets and income.

It is also necessary to set up labels, established with all the stakeholders and guaranteeing the respect of the practices in question, in order to promote the marketing and valorisation of agroecological production. This would involve setting up a network of producers and processors committed to agroecology.

- **Ensuring the coherence of national and communal action in the service of agroecology**

The action of local authorities must be able to rely on that of the State services and its competent operators. The latter's intervention in favour of agroecology must be better coordinated.

They need to ensure the link and coherence between the national policy on agroecology (e.g. in the NDC and the PNACC) and its implementation at the local level. The agronomic expertise of local and regional authorities must therefore be strengthened to ensure that national agroecological objectives are applied and implemented in a coherent manner at the local level.

In the same way, Togo's regional chambers of agriculture must, as part of their mission to represent the interests of agricultural professionals to the State as well as to local authorities and economic partners, make a positive contribution to the definition of national policies and their local implementation. They can usefully relay to the public authorities the expectations of farmers wishing to change their practices and, at the same time, constitute an essential network for achieving coherent action at national level, despite the diversity of situations.

- **Adopt common regional rules to support agroecology**

The WAEMU Agricultural Policy (PAU) is one of the main community agricultural policies in West Africa, which, while highly integrated, encompasses very different national situations and interests. Togo alone cannot decide on its orientations. Nevertheless, it has to defend

the agroecological objective within the WAEMU. This requires it to work for the adoption of common rules that are not only compatible with the implementation of agroecological practices, but also, and above all, that promote them from an economic, social and environmental point of view. This means taking a stand in favour of a number of substantial reforms, both with regard to the functioning of markets and with regard to agricultural support. These are guidelines that will need to be taken forward in the negotiations on the forthcoming reforms of the PAU.

• Reorienting support for agroecology

The aim is to promote agroecological transition and production. Two orientations must be favoured in a global and coherent way:

o Support producers and agroecological production. To date, the bulk of support for agriculture has taken the form of undifferentiated aid distributed on the basis of the number of hectares on the farm, and the current system does not necessarily benefit the most environmentally friendly farms. Instead of the current logic of undifferentiated support per hectare, a mechanism that differentiates practices and is favourable to agroecological practices needs to be defined.

o Targeting support for the risks associated with the agroecological transition. The proposed paradigm shift is considerable and it is normal for farmers to be hesitant when making such a choice, even if the dynamics and the convincing results presented are likely to encourage them to do so. Nevertheless, mastering new practices and productions will take time. During this transitional period, the hazards could turn into additional economic risks. A significant proportion of subsidies to producers should be devoted to guaranteeing economic risk during the transition. To this end, a guarantee fund should be set up to cover the risks inherent in the agroecological innovation and experimentation that producers will undertake.

3.3.5 Approaches to facilitate agroecological transition

• Raising society's awareness to move towards "agroecological food".

One of the keys to the development of agroecological practices lies in the hands of consumers or citizens, as their food behaviour and purchasing choices may or may not favour such a development. It is therefore necessary to inform and raise awareness among them about the challenges of agroecology in terms of its multiple positive impacts: health, the environment, the vitality of the rural world and the economic sustainability of farms.

The aim is to highlight the triptych "agriculture/food/health", to explain it by recalling where food comes from and how it is produced, to make the link with the seasons, the fertility of the soil and the work of agricultural producers and human well-being.

The profession of farmer must be revalued and presented as the basis of food. We need to renew the now distorted link between those who work the land and their fellow citizens, whom they feed.

Agroecology can provide answers to consumers' questions about the nutritional content of their food and, more generally, the quality they expect from it.

- **Reorienting agroecological research priorities**

Agricultural policy making must be based on the priorities and results of agricultural research with the aim of strengthening the development and dissemination of production systems that are efficient from an economic, environmental, health and social point of view. Within this framework, it is first of all necessary that the public research institutes which have a key role in this field include agroecology as one of the main priorities in agricultural research and that sufficient human and financial resources are made available to them for this purpose.

- **Accompanying farmers in the agroecological transition**

The transition to agroecology takes time, and can only be done with appropriate support or training. Working together and relationships with neighbouring farms are key elements of successful transitions.

The regional chambers of agriculture, which have missions in terms of supporting farmers, have a role to play in this respect, for example by leading producer networks whose objective is to reduce the use of phytosanitary products. Beyond that, all the farmers' partners must be involved in the transition to accompany it. For example, the banks must also make the shift to agroecology. To do this, these financial organisations must be sensitised and trained in agroecology.

Finally, it is necessary to note that changes are never risk-free and it is ultimately up to farmers alone, in the field, to make choices. In this respect, farmers who volunteer to test new agroecological solutions on their farms must be supported in order to limit the risks that such an approach entails. Such mechanisms will have to take into account the "temporality" of the transition to agroecology and require funding.

- **Provide farmers with the necessary technical means**

In order to promote crop and livestock diversity (species, varieties and breeds), farmers must have access to the desired seeds and breeding stock. Genetic selection, both in the plant and animal sectors, has been driven by the needs expressed by industrialists and distributors in terms of yields and product characteristics. It is therefore necessary to provide producers with the technical means to move towards an agroecological transition.

- **Making agroecological products the new quality standard**

The issue of adding value to production is central to the success of agroecology, since it is directly linked to farmers' incomes. Schematically, this is the result of both production costs and selling prices. The implementation of agroecological practices should ultimately reduce these production costs. However, at least during a transition period, it may result in a reduction in yields. It is therefore legitimate that, since they offer additional guarantees for the consumer and the environment, agroecological production should be remunerated at its fair price.

All the recommendations are summarised in Table 3.

Table 3: Summary of recommendations for the integration of agroecology in public policies and processes for adapting agriculture to climate change

Average rainfall Synoptic stations	Average rainfall (mm) 1961-1985	Average rainfall (mm) 1986-2018
Gap (mm) (mm) 1986-2018 Gap (mm)	Gap (mm)	Gap (mm)
363.3	363.31	363.8
TARGET DOCUMENTS OR ACTORS	DOCUMENTS OR ACTORS	RECOMMENDATIONS
Seize the opportunity to update national policy documents to strengthen the integration of agroecology	Agriculture	Agriculture
Putting agroecology at the heart of the development of regional adaptation plans, the national adaptation plan for the agriculture sector and the revision of the NCCAPP	Putting agroecology at the heart of the development of regional adaptation plans, the national adaptation plan for the agriculture sector and the revision of the NCCAPP	Approaches to guide the integration of agroecology into national policies, communal development plans (CDPs) legislation and frameworks
Ensuring the coherence of national and communal action in the service of agroecology	PAU	PAU
Adopt common regional rules to support agroecology	Producers	Reorienting support for agroecology
Reorienting support for agroecology	Reorienting support for agroecology	Approaches to facilitate - Reorienting support for agroecology
Approaches to facilitate - Targeting support for the risks associated with agroecological transition	Consumers	Raising society's awareness towards "agroecological food".
Raising society's awareness towards "agroecological food".	Research	

CONCLUSION

Whether at the national or international level, in the face of the observed and projected effects of climate change, the issue of adaptation in agriculture has gained momentum over the past decade, as evidenced by its place in the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Accord and the African Agriculture Adaptation Initiative (AAA). It tends to be integrated into the national climate strategies and action plans of developing countries. Often with a time lag of a few years, agricultural policies have begun to integrate the objective of adaptation, particularly for family farming.

Agroecology provides both climate change adaptation and mitigation solutions. The dissemination of agricultural and livestock practices based on sustainable and agroecological agriculture helps to reduce the vulnerability of agricultural systems to climatic hazards and thus strengthen the resilience of small producers and agricultural systems to shocks and disasters.

The late consideration of agriculture in international climate negotiations and by the official bodies of the UNFCCC since COP23 in Bonn in November 2027 has changed the situation with regard to the importance of agriculture in climate action.

Given that agroecology has also been part of the main lines of certain development policies for some time (e.g. at the FAO at the symposium Agroecology for Food Security and Nutrition, FAO 2015), it is conceivable that the two themes, agroecology and climate change, could be mutually reinforcing.

What remains to be done is to ensure a 'scaling up' of these potentially intimate links between agroecology and climate change. There is a strong need to raise awareness among agricultural producers in both North and south that agroecology can be a response to the constraints of climate change. But how can we go beyond the successful experiences here and there and get this scientific message across to as many people as possible when it comes to national public policies? How can we raise awareness of these innovative techniques when the staff of technical support services for farmers are not themselves trained in agroecology but rather in conventional agriculture?

While it is now possible, thanks in particular to recent work on soil carbon, to envisage a role for agriculture in contributing to the solution to climate change, it is likely that climate change that does not include better consideration of agroecological principles will not allow agriculture to play this role.

This study on national climate policies carried out as part of a campaign on agroecology for climate action. The study provides an opportunity to take stock of the integration of agroecology in national climate policies or better, in the adaptation of the agriculture sector to climate change and to make recommendations for a better integration of agroecology in public policies to feed their advocacy work in the South with national governments, corporation agencies and international organisations.

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