WHICH PUBLIC POLICIES TO PROMOTE ADAPTATION OF FAMILY FARMING TO CLIMATE CHANGES?

C2A REPORT – OCTOBER 2017

AGRICULTURE · FOOD

Coordination SUD
Solidarité Urgence Développement

Coordination SUD (Solidarity - Emergency - Development)
Coordination SUD is the national coordination body for French international solidarity NGOs. Founded in 1994, it brings together almost 170 NGOs conducting humanitarian actions through emergency operations, development aid, environmental protection, defence of human rights among disadvantaged populations and actions in the area of education on international solidarity and advocacy.

Coordination SUD's Agriculture and food commission (C2A):
C2A brings together member NGOs working for the realization of the right to food and strengthened support for family farming in policies that have an impact on world food security. It is made up of the following NGOs: ActionAid France, Action against Hunger, AEFJN, AGTER, Artisans du Monde, AVSF, CARI, CCFD-Terre Solidaire, CFSI, CRID, Gret, IECD, Inter Aide, Inter-réseaux, Iram, ISF AgriSTA, MADERA, Oxfam France, Plate-Forme pour le Commerce Equitable, Secours Catholique-Caritas France, SOL and UNMFREO.

C2A represents Coordination SUD in its contacts with institutions working in the areas of agriculture and food, such as the French Interministerial group on food security (GISA) and the Civil Society Mechanism (CSM) for the Committee on World Food Security (CFS).

Contact for the Agriculture and food commission:
Sébastien Chailleux, ActionAid France
Email : s.chailleux@peuples-solidaires.org
Website : www.coordinationsud.org

The study was conducted by Laurent Levard (Gret) and coordinated by a steering committee made up of Aurélie Ceinos (CARE France), Damien Lagandré (Gret), Bertrand Mathieu (AVSF), Didier Pillot (Montpellier SupAgro), Omar Tankari (independent consultant) and Jean Vettraino (Secours Catholique-Caritas France)

Translated from French by Jenny Gilbert

This document was produced with support from AFD. The points of view expressed in this document in no case represent the official points of view of AFD.

Cover copyright: Mansi Thapliyal / ActionAid

C2A REPORT – OCTOBER 2017

WHICH PUBLIC POLICIES TO PROMOTE ADAPTATION OF FAMILY FARMING TO CLIMATE CHANGES?

SOMMAIRE

1. page 9

ADAPTATION OF FAMILY FARMING TO CLIMATE CHANGES AND CONDITIONS OF ADAPTATION

I. THE IMPACTS OF CLIMATE CHANGES FOR FAMILY FARMING 10

II. FARMERS' AND POPULATIONS' ADAPTATION STRATEGIES AND OPTIONS 13

III. CONDITIONS FOR IMPLEMENTING ADAPTATION STRATEGIES AND OPTIONS 19

2. page 23

EMPHASIS ON THE ADAPTATION OF FAMILY FARMING TO CLIMATE CHANGES IN NATIONAL PUBLIC POLICIES

I. CONTEXT 24

II. STRONG PRESENCE OF AGRICULTURAL ADAPTATION IN CLIMATE POLICIES 29

III. INCREASING CONSIDERATION OF ADAPTATION TO CLIMATE CHANGES IN AGRICULTURAL AND FOOD SECURITY POLICIES 32

IV. DIFFICULT INTEGRATION BETWEEN AGRICULTURAL AND CLIMATE POLICIES 34

V. POSSIBLE ADAPTATION-MITIGATION SYNERGIES ARE OFTEN RECOGNISED BUT STILL GENERATE FEW REAL MIXED APPROACHES 35

VI. CAPACITIES FOR EXPERTISE AND A LINK WITH RESEARCH THAT ARE STILL INSUFFICIENT 36

VII. PROMOTED PRACTICES FOR ADAPTATION TO CLIMATE CHANGES: TO WHICH TYPE OF AGRICULTURE ARE THEY RELATED? 37

VIII. A VARIETY OF POLITICAL ISTRUMENTS AND STRATEGIES 38

IX. CLIMATE STRATEGIES AND POLICIES THAT ARE OFTEN NOT IMPLEMENTED... 41

3. page 45

RECOMMENDATIONS FOR PUBLIC POLICIES

I. THE NECESSITY FOR CONSISTENCY, COORDINATION AND INTEGRATION BETWEEN CLIMATE POLICIES, AGRICULTURAL DEVELOPMENT AND FOOD AND NUTRITIONAL SECURITY 44

II. GUARANTEEING COMPLEMENTARITY AND CONSISTENCY WITHIN CLIMATE AND AGRICULTURAL POLICIES 47

III. GUARANTEEING THE RIGHTS AND PARTICIPATION OF LOCAL POPULATIONS 48

IV. INCLUDING A GENDER PERSPECTIVE IN ADAPTATION POLICIES 49

V. DEFINING PRIORITY ADAPTATION OPTIONS FOR FAMILY FARMS 50

VI. COMBINING VARIOUS PUBLIC INSTRUMENTS 54

VII. INVOLVING RESEARCH AT VARIOUS LEVELS 59

VIII. THE ROLE OF INTERNATIONAL COOPERATION 61

4. page 63
CONCLUSION

page 67 · BIBLIOGRAPHY

page 71 · APPENDIX: CASE STUDIES

1. Costa Rica 72
2. Niger 74
3. Viet Nam 80

INTRODUCTION

Family farming generally plays a central role in developing countries, in terms of demographics, economic and social development, preservation of ecosystems and natural resources, and overall balance of society. It provides a job and an income for a significant portion - sometimes the majority – of the population. Countries' food security is very often based essentially on family farming. In a context of demographic growth and increasing food requirements, strengthening food security is a major challenge for the development and future balance of societies.

Family farming is often weakened by adverse agro-climatic conditions, a reduction in the size of farms, an ecological crisis of the ecosystems cultivated, an uneven spread of resources, difficulty in accessing capital and finance, unfavourable conditions for market insertion and lack of protection vis-à-vis agribusiness. It is within the farming population that levels of income are lowest and levels of poverty and food insecurity are highest. This population is very often vulnerable to various types of risks (climatic, economic, health). It is sometimes threatened by land-grabbing processes, and is constantly faced with continuous land fragmentation of the surface areas farmed. In many countries, funding devoted to agricultural policies in favour of family farming has decreased over recent decades.

In addition to this, family farming in developing countries is one of the sectors that is most directly affected and threatened by climate changes. This increases the need for favourable policies including strengthening of existing measures and the implementation of new measures responding specifically to the objective of adaptation to climate changes.

Whether at national or international level, given the observed and projected effects of climate change, the issue of adaptation, especially agricultural adaptation, has become increasingly significant over the last decade, as witnessed by its place in the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC), and the initiative for the Adaptation of African Agriculture (AAA). It is being included in national strategies and climatic action plans in developing countries. Often with a time lag of several years, agricultural policies have started to include the adaptation objective, especially for family farming.

It is in this context that the member organisations of Coordination SUD's Agriculture and food commission (C2A), the national platform for French international solidarity NGOs involved in particular in monitoring climatic negotiations, decided to devote, as part of their studies, their 2016-2017 report to the issue of public policies and adaptation of family farming to climate changes. Public policies will play a decisive role in the future to facilitate direct implementation of adaptation strategies and options by family farms and by populations. They can also contribute to adaptation via complementary measures directly or indirectly involving public authorities (public infrastructures, mechanisms for collective solidarity, etc.) The objective, via the preliminary study, the seminar for discussion on provisional results and the report itself, is to:

- review the inclusion of adaptation of family farming to climate changes in national climate policies and developing countries' agricultural policies, results obtained and difficulties encountered. It should be mentioned that one of the study's limitations is the lack of hindsight and of tools to monitor and evaluate the impacts of implementing policies on adaptation to climate changes and, more specifically, the impacts of including the objective of adaptation to climate changes in agricultural policies. A fortiori there are no real comparative studies of agricultural policies including the adaptation objective and the impacts of the latter ;

- draw up recommendations with a view to better inclusion of these issues in public policies, in order to inform their work on advocacy and that of their partners in developing countries vis-à-vis national governments, cooperation agencies and international organisations. More generally, it is about helping all these stakeholders to better include the issue of adaptation of family farming in public policies.

The report was written based on a review of literature and interviews with specialists on the issue. Three countries were focused on, Costa Rica, Niger and Vietnam, representing contrasting situations in terms of impacts of climate changes and of public policies implemented. A provisional version was presented and discussed during a seminar organised by Coordination SUD in Nogent-sur-Marne, on the outskirts of Paris, France, on 9 December 2016. Discussions within Coordination SUD's Agriculture and food commission, the seminar on 9 December and the written comments from Alexandre Meybeck from the FAO, made it possible to complete and improve the first version of the report. The list of speakers at the seminar, whom we sincerely thank for their participation, and of the various specialists who were kind enough to answer our questions, is presented in an appendix to this report.

The report is divided into three parts:

- the first part covers the adaptation of family farming to climate changes and conditions of adaptation;
- the second part deals with the focus given to adaptation of family farming in public policies;
- the third part provides a certain number of recommendations with a view to better inclusion of this issue in public policies.

A presentation of the three country case studies is provided in the appendices.

1.
Mark Purdon, *The comparative turn in climate change adaptation and food security governance research,* Working paper n°92, CGIAR Research program on climate change, agriculture and food security (CCAFS), 2014

1.

ADAPTATION OF FAMILY FARMING TO CLIMATE CHANGES AND CONDITIONS OF ADAPTATION

I. THE IMPACTS OF CLIMATE CHANGES FOR FAMILY FARMING

1. The impacts of climate changes: what are we talking about?
2. The direct and indirect effects of climate changes on agriculture

II. FARMERS' AND POPULATIONS' ADAPTATION STRATEGIES AND OPTIONS

1. Context
2. Farmers' and populations' adaptation strategies and options
3. Links between practices for adaptation and practices for mitigation

III. CONDITIONS FOR IMPLEMENTING ADAPTATION STRATEGIES AND OPTIONS

1. Initial climatic situation, predictability and magnitude of changes
2. "Good health" of family farms
3. Economic and social conditions facilitating adaptation
4. Conditions for access to information, knowledge and know-how facilitating adaptation
5. Capacities for organisation with a view to adaptation

copyright: Srikanth Kolari / ActionAid

1 THE IMPACTS OF CLIMATE CHANGES FOR FAMILY FARMING

1. The impacts of climate changes: what are we talking about?

Current and projected climate changes

The United Nations Framework Convention on Climate Change (UNFCCC) defines climate changes as variation in the state of the climate, which can be detected (for example via statistical tests) via changes in the average and/or variability of its properties and which persists over a long period, generally over decades or longer. The UNFCCC distinguishes between climate changes attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and the natural variability of the climate observed during comparable periods[2].

To discuss the impacts of climate changes on family farming, it is necessary first and foremost to distinguish between current climate changes and climate changes projected for the medium and long term. The latter are generally much greater than the former, and pose specific questions related to the necessity to anticipate them and prepare for them.

Measured and perceived climate change

In terms of current climate changes, it is important to distinguish between climate changes that are measured and climate changes that are perceived by farmers. Perceived climate changes can be less than changes measured, either because for the moment ecosystems are capable of compensating for these changes, or because climate changes do not actually generate new constraints for the farmer. However, when climate changes, even minimal, lead to significant impacts because of high vulnerability of the ecosystem or the household economy (decrease in yields and in income for families in situations of extreme poverty), perceived climate changes can be a lot greater than measured climate changes.

Climate changes rather than a climate change

From a farmer's point of view, climate changes manifest themselves differently and with more or less intensity according to the major regions. But variations can also be significant between areas on a smaller geographic scale. It would be more exact to speak about climate changes in the plural rather than climate change in the singular[3].

Climate changes and related phenomena

Strictly speaking, climate changes refer to changes affecting climatic parameters (temperatures, rainfall, wind). But climate changes also modify other phenomena that can impact on agriculture (flooding, depletion of freshwater resources, parasites and disease, rise in sea level). They can be characterised as manifestations of climate changes.

The components of climate changes

When we speak about climate changes, it is necessary to distinguish between three components[4] that can lead to the need for different types of adaptations:

- evolution of average conditions. The evolution of average climatic conditions can generate a change in the availability of water (average level of rivers and streams and groundwater tables), characteristics of flora, fauna and of micro-organism populations. In addition to this, in coastal regions there is the gradual rise in sea level related to more global phenomena (melting glaciers, heating and expansion of oceans);
- increase in the arbitrary nature of climatic parameters. We know that levels of rainfall, the start and end of rainy seasons and temperatures can vary from one year to the next. So they have a more or less arbitrary nature. Climate changes can increase this arbitrary nature, which leads to greater unpredictability for farmers. In addition to this increase in temporal variability, there can be an increase in spatial variability (for example, greater occurrence of localised pockets of drought during years that have sufficient rainfall globally);
- lastly, the increase in the frequency and intensity of extreme accidents and events: droughts, abundant and/or violent rainfall and cyclones, extreme and or prolonged

2. United Nations Framework Convention on Climate Change (UNFCCC), *National adaptation plans – Technical guidelines for the national adaptation plan process,* LDC Expert Group, December 2012

3. We mainly use the plural in this document.

4. Marie-Josèphe Dugué (with support from Hélène Delille and Sylvain Malgrange), *Caractérisation des stratégies d'adaptation au changement climatique en agriculture paysanne,* AVSF, May 2012

periods of heat or cold.

Heightening of pre-existing climatic risks and new phenomena

Climate changes very often heighten pre-existing climatic risks (variability of the climate, occurrence of extreme events), faced with which farmers have already implemented – or try to implement - endogenous adaptation strategies. This is the case for example with irregularity of rainfall in Sahelian regions.

However, phenomena with as yet unknown magnitude may exist, as may totally new phenomena. The evolution of average climatic conditions (for example change in seasonal cycles) may correspond to new phenomena, even if the scale of the average evolution observed to date very often remains lower than the pre-existing interannual variability.

2. The direct and indirect effects of climate changes on agriculture

Climate changes - via the three types of components (average conditions, arbitrary nature, climatic accidents) – and their manifestations may generate:

- direct effects on the results of agricultural activity (decrease in plant yields, lower availability and lower quality of fodder, herds that are less productive due to this decrease and water stresses or related to excessive temperatures) and value chains (decrease in supplies and increased irregularity, effects on the quality of products) and on productive capital (loss of land due to rise in sea level, destruction of infrastructures, plantations, animals and soil) of farms and other stakeholders in value chains;
- indirect effects on the results of agricultural activity (income) and on productive capital (number and physical state of animals, soil, trees), because of a change in conditions of production (decrease in surface water or groundwater reserves, loss in forest cover, loss of biodiversity, development of new parasites and expansion of their of dissemination areas, degradation of soil fertility). Soil fertility can be decreased due to lower production of biomass caused by drought or excessive temperatures, overgrazing related to lower production of biomass, erosion, introduction of coarse-textured elements, and salinisation in coastal or delta areas. In addition, lower ground coverage facilitates desertification and degradation of soil by water and wind erosion, and therefore degradation of soil fertility.

In turn, decreases in production, income and capital can lead to other types of indirect effects that generate greater precariousness and vulnerability for families:

- decrease in the capacity of families to maintain food stocks and savings (cattle, money, etc.) that can be mobilised in the case of an accident (climate shock, market accident, illness of a family member, etc.);
- degradation of food and nutritional security.

In addition, the change in conditions of production and the increase in precariousness of families can lead to tensions and conflicts around management of resources (land, water) that are depleting and, more generally, to a decline in traditional collective strategies and solidarity[5-6].

For farmers, the evolution of average climate conditions, especially in the medium and long term, can generate a mismatch between their production system and new conditions. It poses the question of the necessary evolution of the production system.

The increase in climatic risks

The increase in the arbitrary nature of climatic parameters and in the extreme frequency of events also increases risks for farmers.

According to the UNFCCC, the risk includes the possible and uncertain consequences of an event on something of value. The risk is often represented as the probability of an occurrence of dangerous events or trends that amplify the consequences of such phenomena when they happen. The risk arises from interactions between vulnerability, exposure and hazards[7].

Vulnerability represents the propensity or predisposition to suffer damage. Vulnerability encompasses a wide variety of concepts or elements, in particular the notions of sensitivity or fragility, and the incapacity to face situations and adapt[8]. We will use a broad interpretation of the definition of adaptation, including in it the fact of facing the consequences of climate changes[9], i.e. the capacity of a system to compensate for

5.
Ibid.

6.
Adeline Derkimba and Marion Finet, *Pour une transition agroécologique dans les territoires soumis à désertification - Proposition d'une démarche d'accompagnement,* Groupe de travail Désertification, December 2015

7.
United Nations Framework Convention on Climate Change (UNFCCC), *National adaptation plans – Technical guidelines for the national adaptation plan process*, LDC Expert Group, December 2012

the negative effects of a shock, and to reorganise, which in global terms corresponds to a reduction of vulnerability and an increase in resilience (capacity to return to normal operation after a disruption).

Vulnerability can de differentiated within each family (especially according to gender and age), and between individuals and families within society (especially according to social class, gender, ethnicity or the fact of having a handicap or not).

Exposure represents the presence of people, livelihoods, species or ecosystems, functions, environmental resources or services, infrastructure elements or economic, social or cultural commodities, in a place or a context likely to suffer damage[10].

It is worth noting that an even broader definition of vulnerability includes exposure. Coordination SUD will use this broader definition of vulnerability in this document.

The term hazard refers to the probability of an occurrence of dangerous events or trends. For Olivier Gilard, the hazard depends essentially on "natural" factors that human intervention can contribute to modifying by developments its makes or by the impact of certain practices[11]. Conversely, the concept of vulnerability is essentially a socio-economic factor[12]. The increase in risks poses the question of strategies to minimize risks, via the reduction of hazards or of vulnerability, including via compensation mechanisms[13].

Do not isolate climate changes from other types of risks and evolutions

Dealing with the impacts of climate changes cannot be isolated from other issues:

- As mentioned above, climate changes tend to accentuate the variability of climatic conditions, but, regardless of these, farmers are already faced with a certain variability of climate and the risks it entails;
- Family farmers are also faced with other types of risks, which can be related to insect attacks on crops grown or animals, access to natural resources and land, markets or the health of family members. Management of risks by farmers therefore comprises a variety of risks;
- The climate is changing, but so are other factors: characteristics and potential of the ecosystem cultivated, agricultural markets, job opportunities, conditions of access to productive resources, demographics, etc. Family farming must adapt to a variety of changes. Climate changes are just one of these, even if they can play a crucial role.

Risk management among a variety of objectives

So, family farmers aim to manage existing risks, whether they are related to climate changes or not. But this is not their only objective: they also aim to increase their average income, guarantee average food availability, preserve or improve their productive ecosystem, invest in their farm and in the future of their families, and sometimes to reduce the harsh nature of their work. Management choices of farming households are the result of a compromise between a variety of objectives, with reduction of risks being just one of these, even if it can be central when climatic hazards are significant and the family is particularly vulnerable.

Similarly, in terms of the community as a whole and of the general interest, there is a variety of economic, social and environmental objectives that must be taken into account. The capacity of agriculture to adapt to climate changes, and especially to the risks they generate, is an objective among others, even if, yet again, it can be central if the agriculture is highly vulnerable to climatic hazards. Thierry Brunelle considers, for example, that "*equity of economic growth outweighs [climate changes] in the reduction of hunger*"[14] .

8. *Ibid.*

9. Mark Purdon, *The comparative turn in climate change adaptation and food security governance research,* Working paper n°92, CGIAR Research program on climate change, agriculture and food security (CCAFS), 2014

10. United Nations Framework Convention on Climate Change (UNFCCC), *National adaptation plans – Technical guidelines for the national adaptation plan process,* LDC Expert Group, December 2012

11. Olivier Gilard, *Aléa, vulnérabilité et risque,* Changement climatique et agricultures du monde, éditions Quae, 2015

12. *Ibid.*

13. The border between hazard and vulnerability may depend on the point of view taken. For example, an irrigation system can be considered as both a means to reduce the hazard of drought – in the sense of a deficit of water to meet the needs of plant populations – and as a means to reduce the production system's vulnerability to drought, in the sense of rainfall deficit.

14. Caritas Climat Blog, "*Le monde à +2°C peut vraiment être un enfer*" ("The world at +2°C can really be hell"), Interview with Thierry Brunelle, 7 September 2016

2 FARMERS' AND POPULATIONS' ADAPTATION STRATEGIES AND OPTIONS

1. Context

The IPCC defines adaptation as the approach taken to adjust to the current or expected climate, and to its consequences. In human systems, this implies mitigating or avoiding harmful effects and exploiting beneficial effects[15]. It therefore includes actions intended to:

- lessen the consequences of climate changes on certain parameters that are external to human systems (hazard of flooding or drying up of rivers and streams, etc.);
- reduce the vulnerability of these systems to climate changes and to their consequences.

Before discussing adaptation options strictly speaking, it should be stressed that reduction of the overall vulnerability of farming families can be the most effective means to decrease risks related to climate changes. Reducing vulnerability to other risks (market risks, health risks, etc.) can be a means to reduce vulnerability to climate changes in so far as it reduces the risk of simultaneous occurrence of several shocks. Generally speaking, the precariousness of family farming – and therefore the social inequalities that tend to accentuate it – increases its vulnerability in the face of various types of risks, including those related to climate changes. This vulnerability reduces the capacity of family farms to make investments in protection from climatic accidents, to maintain their livelihood in the event of crops being destroyed and to mobilise resources to reconstitute the capital destroyed. On the contrary, less precariousness in family farming strengthens its resilience to various risks. At the collective level, all solidarity mechanisms, whether community-based or depending on public authorities, also contribute to reducing the vulnerability of family farming and to increasing its resilience.

Family farms implement the various strategies and options for adaptation to climate changes, whether these come from their own experience and know-how, or whether they are promoted "externally" by public institutions or other development bodies, within policies, programmes or projects. The strategies and options implemented by farmers are very often confused with those that they are used to implementing to deal with the variability of the climate and related risks. Similarly, the strategies and options promoted externally are themselves very often similar to those responding to the existing climate variability[16].

However, given the existence of phenomena that are new or whose magnitude is as yet unknown, new strategies and options can also be promoted and implemented.
Although the majority of strategies and options for adaptation to climate changes are implemented at farm level, some can also be implemented collectively, in producers' organisations, localities and regional and local authorities. In this case they require forms of collective organisation. In fact, certain strategies and options can only be implemented at collective level, in particular for certain work on infrastructures, regional and local development plans, watershed development plans, seed banks and solidarity mechanisms ensuring a form of individual insurance against risk. Some collective strategies and options can also be implemented directly by regional and local authorities or by the State. This type of intervention will be covered in the section relating to public policies.

Generally speaking, adaptation strategies and practices implemented at farm level aim more to reduce its vulnerability to climate change than to reduce the hazard, i.e. the risk of a consequence of these changes occurring (flooding, insect attacks, etc.). However, family farms can also implement strategies and practices to develop the territory or make investments with a view to reducing certain hazards, in particular the occurrence of flooding and development of erosive torrents (afforestation, hydraulic works) or drought (dams, irrigation infrastructures). These strategies and practices can be implemented at farm level, but the pertinent level is generally that of the local and regional territory.

15. GIEC, *Changements climatiques 2014 - Incidences, adaptation et vulnérabilité - Résumé à l'intention des décideurs,* Contribution du Groupe de travail II au 5ème rapport d'évaluation du GIEC, 2014

16. Mark Purdon, *The comparative turn in climate change adaptation and food security governance research,* Working paper n°92, CGIAR Research program on climate change, agriculture and food security (CCAFS), 2014

2. Farmers' and populations' adaptation strategies and options

Local farmers' and populations' strategies and options for adaptation to climate changes can be divided into several types[17] :

Types of adaptation strategies and options	Objectives	Adaptation strategies and options
Protection infrastructures	Protection from high waters and flooding	Dam, diversion and evacuation of excess water, etc.
Water management[18]	Recover available water, store it and use it while minimizing losses	Management of rain water, sand dams, micro-basins and basins, stone barriers, Zai holes, half-moons, recovery of rain water for protection of animals and plants, stabilisation of water supply, etc., irrigation and irrigation techniques enabling losses to be minimized
Soil management	Protect soil from water and wind erosion, improve soil and climate conditions (humidity, temperature) and structures that are favourable for soil life, increase organic and mineral fertility, improve capacity for infiltration and retention of water	Zero-tillage and reduced tillage technique, green fertilisers, mulching, manure spreading and compost, terracing, etc.
Adaptation of crop management practices	Increase or preserve yields, or minimize (or spread) risks (combination of various activities, increase in genetic diversity of plant species and animal breeds, optimum value from varied ecosystems), often with compromises between these two types of objectives	Crop rotation and combined crops, diversification, genetic characteristics of plant material (species and varieties with high production potential, greater resilience to some extreme events or some parasites and disease, more suitable to a variety of climatic conditions or to the evolution of average climatic conditions), sowing and tilling techniques, use of pesticides or fertilising elements purchased externally or produced on site (green fertilisers and intercropping, manure and compost, agroforestry, organic pesticides), modification of growing cycles and crop calendars, diversification of plot locations[19]
Agroforestry and reforestation	Enrich soils with organic matter and mineral elements, create a favourable micro-climate (limitation of temperatures, protection of soil and crops from heavy rains and wind, retention of humidity), increase diversity of productions, increase fodder production, reduce pressure on other fodder (including crop residues), ensure a wood stock that can be mobilised if necessary	Plant trees in cultivated plots, shelterbelts and windbreaks, plant trees and hedgerows, assisted natural regeneration (ANR), reforestation

17. Classification based partly on: Louis Bockel and Laura Vian, *Towards Sustainable Impact Monitoring of Green Agriculture and Forestry Investments by NDBs: Adapting MRV Methodology,* AFD-FAO-IRD, 2016

18. Water management practices also contribute significantly to soil management in itself. This is why all of these practices are sometimes qualified as techniques for soil and water conservation and for soil defense and restoration (SWC/SDR).

19. Several of these practices also contribute to better soil management. It should be noted that several of these strategies are often combined within systems inspired by the principles of agroecology.

Types of adaptation strategies and options	Objectives	Adaptation strategies and options
Adaptation of livestock, grazing and fodder management practices	Seek compromises between increasing average yields and reduction of risks, preserving animals' health and optimising fodder production by improving and diversifying species and regulating pressure put on grazing	Preventive animal healthcare, animal healthcare, modification of breeding cycles, of species used and of genetic characteristics of animals, grazing calendar management with temporary closing of part of the grazing area, introduction of new fodder species, regeneration of natural grazing areas, assisted natural regeneration, reforestation, storage of fodder, substitution of fodder and production of concentrate feeds
Increase autonomy vis-à-vis the exterior	Reduce external costs, and therefore limit the impact of a drop in production volume on income. Concerns plant production just as much as animal production	Replace external foods and inputs with inputs, foods and mechanisms from within the ecosystem cultivated; replace external means of production with work by family members
Seed banks	Increase the availability of seeds with high production potential and other specific characteristics related to farmers production objectives, conserve existing genetic diversity, enrich it with external inputs and make it available for family farming, thereby facilitating genetic diversification within each farm and preservation of a variety of possible adaptation options in the face of future climate changes	Seed banks
Constitution of reserves that can be mobilised (self-insurance)	Deal with short-term drops in food, fodder or income production, finance reconstitution of capital destroyed following a climatic accident	Livestock, plantations, standing or stored fodder reserves, food stocks (including food stocked thanks to previous processing), monetary savings
Diversification of activities as a complement to or outside of agriculture	Minimize losses or optimise value of agricultural production. Ensure part of income comes from outside agricultural production	Storing, processing and implementation of new marketing circuits; search for activities and income that are complementary to the agricultural activity, including via temporary or long-term migrations
Collective solidarity mechanisms	Compensate for seasonal drops in income or contribute to rebuilding capital following a climatic accident	Food stocks, solidarity funds, loans, aid in the form of work

Types of adaptation strategies and options	Objectives	Adaptation strategies and options
Process of joint territorial planning including adaptation objectives	Reduce hazards related to climate and to the vulnerability of populations, taking into account climate changes observed, as well as climate change predictions, water resources and other parameters (in particular demography), inform and influence policies implemented by local and national public institutions, to gear them towards the interest of populations[20].	Identification and implementation of collective actions for regional and local development

20. Care International, *Adaptation Planning with Communities – Practitioner Brief 1*, 2015

AGROECOLOGY AND ADAPTATION TO CLIMATE CHANGE

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

- obtain diverse quality food and agricultural products, in sufficient quantities, as well as an economic income, in a relatively stable (and therefore predictable) manner over time, which necessitates a capacity for resilience to external shocks;
- improvement and reproduction of productive potentialities of the ecosystem cultivated,
- positive impacts on the environment, at local and global level (soil and subsoil, water, atmosphere, biodiversity, state of fauna and flora, limited use of non-renewable resources, contribution to the fight against climate changes).

To do this, agroecology is based in particular on striving for greater autonomy of farms and on the mobilisation of potentialities and biodiversity in the ecosystems cultivated, on the one hand to draw maximum value from external natural resources (solar energy, carbon and atmospheric nitrogen, mineral elements in the subsoil, rain water), and on the other hand, to develop internal flows and interrelations between the components of these ecosystems[21].

Agroecology contributes in a decisive manner to the adaptation of family farming to climate changes:

- it strengthens the overall productivity of agricultural systems (production volumes and income) in cases where fertility management systems were previously in crises;
- water management in agroecological systems (collection, storage, minimization of losses) reduces the impact of climatic deficits;
- diversity of activities and the buffering effect of the agroecological ecosystem (water reserves, as well as regulation of temperature and soil protection) makes it possible to mitigate the impact of climatic variability on the overall output of the production system;
- greater autonomy vis-à-vis the exterior (production costs) mitigates the impact of a possible decrease in production on agricultural income;
- the genetic characteristics of the species used enable better adaptation to climatic variability, in comparison to the species and varieties of the green revolution;
- the high level of plant and animal biodiversity in agroecological systems increases the overall capacity for genetic adaptation of the species used over the medium and long term.

So, in practise, the majority of options for adaptation to climate changes are found in agroecological systems: water and soil management practices, crop rotations and combined crops, diversification of species and varieties, choice of varieties and species combining a certain production potential and adaptability to the variability of climatic, phytosanitary and sanitary conditions, crop/livestock integration, agroforestry and reforestation, integrated pest management. These options draw optimum value from biodiversity, intermediary consumption and synergies within the production system.

In addition, as underlined by the FAO, "*as a social movement, it pursues multifunctional roles for agriculture, promotes social justice, nurtures identity and culture, and strengthens the economic viability of rural areas*"[22]. These aspects of agroecology also contribute to better adaptation to climate change.

21.
See in particular Coordination SUD, *Agroecology:A Response to the Agricultural and Food Challenges of the 21st Century,* 2013, Christian Castellanet, Laurent Levard, Didier Pillot and Aurélie Vogel, Agroecology: Evaluation of 15 Years of AFD Support, AFD, 2014, and Justine Scholle (coordination), Agroecological and agroforestry practices in tropical wet zones, Technical guide, Éditions du Gret, 2017

22.
FAO, *Family Farming Knowledge Platform*: http://www.fao.org/family-farming/en

3. Links between practices for adaptation and practices for mitigation[23]

Numerous practices facilitating the adaptation of family farming and populations to climate changes can also contribute to mitigating climate changes, and vice-versa. In this regard, Bruno Locatelli *et al.* speak about synergy between mitigation and adaptation, which exceeds mere co-benefits[24]. This is particularly the case with agroecological practices.

So:

- some crop and soil protection practices make it possible to increase the rate of organic matter in soils, their capacity to retain water, and their resistance to erosion. In this way they contribute to increasing the resilience of systems faced with climatic accidents (adaptation) while sequestering carbon (mitigation);
- agroforestry practices make it possible, in addition to these same types of effect, to increase the mineral fertility of soils and their protection from heavy rains and high temperatures, improving the resilience of systems even further;
- replacing chemical fertilisers with leguminous plants, use of green fertilisers and optimum use of manure make it possible to minimize nitrogen losses and increase the autonomy of systems vis-à-vis external purchases, thereby improving their resilience to climatic or economic shocks (adaptation), while at the same time decreasing emissions of nitrous oxide and CO2 related to the production and use of nitrous chemical fertilisers (mitigation).

Joint territorial planning for watersheds (afforestation, geographic spread of activities) can also contribute to reducing the vulnerability of local populations and families while increasing storage of carbon in the ecosystem.

Some practices aimed at adaptation to climate changes can however increase greenhouse gas emissions. In particular practices based on irrigation systems that consume a high level of energy.

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

Copyright: ActionAid

23. See also the links between adaptation to and mitigation of climate change in Monica Di Gregorio, Bruno Locatelli, Charlotte Pavageau and Emilia Pramova, *Integrating climate change mitigation and adaptation in agriculture and forestry: opportunities and trade-offs, WIREs Clim Change,* 2015, Louis Bockel, *How to mainstream climate change adaptation and mitigation into agriculture policies,* FAO Policy Learning Programme, 2009 and Simon Anderson, Sabine Gundel, and Monique Vanni, The impacts of climate change for food security in Africa: a synthesis of policy issues for Europe, International Institute for Environment and Development (IIED), 2010

24. *Ibid.*

3 CONDITIONS FOR IMPLEMENTING ADAPTATION STRATEGIES AND OPTIONS

The capacity of family farming and local populations to implement adaptation strategies and options depends on a number of conditions. Identification of these conditions is necessary to better identify public policies likely to influence them and therefore to facilitate adaptation to climate changes. Apart from the initial climatic situation and the magnitude of climate changes, the majority of conditions can be influenced by public policies: general "good health" of family farms, economic and social conditions of agricultural production, access to information, knowledge and know-how, and capacities for organisation[25].

1. Initial climatic situation, predictability and magnitude of changes

Family farms' capacities to adapt to climate changes depend first and foremost on the initial climatic situation (conditions of rainfall or extreme temperatures, hazardous nature) and on the predictability, magnitude and speed of change[26]. The situation varies greatly according to regions, arid regions on the one hand and coastal and delta regions on the other, both appear particularly vulnerable. Farmers' adaptation to climate change tends to be more complex in these regions.

2. "Good health" of family farms

As previously mentioned, the capacity of family farms to adapt to climate changes depends largely on their general economic situation, their level of overall vulnerability and therefore their socio-economic environment and the policies implemented:

- Vulnerability to climatic shocks is lower when the average agricultural income of the farm is higher, and in particular when it is far higher than the simple reproduction threshold[27];
- Farms in good economic health generally have reserves that can be mobilised (livestock, trees, food reserves, monetary savings) to compensate for a drop in production and income or to replace an element of working capital that may have been destroyed;
- Some adaptations require investments and therefore the existence of sufficient economic surplus. They can also be labour-intensive. The most precarious family farms do not necessarily have the means to mobilise the necessary family labour force. In general, family labour force is allocated as a priority to productive activities generating food or income in the short term. At the same time, they cannot pay for hired labourers[28];
- Family farms in situations of economic crisis often have to make decisions that allow them to survive in the short term, but that decrease their adaptation capacity over the medium and long term (decapitalisation, deforestation, crop-growing on slopes increasing the risks of erosion, etc.).

So, all the conditions facilitating the economic development of family farming also contribute to improving its capacity to adapt to climate change: conditions for access to land and natural resources, to other productive resources (material, inputs, finance), conditions for access to markets, conditions for access to information and knowledge, existence of collective solidarity mechanisms or individual insurance.

3. Economic and social conditions facilitating adaptation

Several measures to facilitate adaptation require investments (infrastructures for irrigation, drainage and water collection and storage; terracing and other systems to combat erosion; tree planting; purchase of animals; etc.). Access to credit in appropriate conditions (repayment periods over the medium and long term, reduced interest rates) or subsidies for investments are often a necessary condition for making such investments. Apart from payment of elements of capital, inputs and services (construction of infrastructures, rental of carts for transporting stones necessary to build terraces, etc.), some investments may be labour intensive, particularly for collective works. It is difficult to mobilise this labour force without external financial contributions, especially when it can potentially be mobilised for other income-generating activities.

25. Approach proposed by Chinwe Ifejika Speranza, who distinguishes between the "*buffering capacity*", the "*self-organisation capacity*" and the "*learning capacity*": Chinwe Ifejika Speranza, *Resilient adaptation to climate change in African agriculture*, Studies n°54, German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE), 2010

26. Marie-Josèphe Dugué (with support from Hélène Delille and Sylvain Malgrange), *Caractérisation des stratégies d'adaptation au changement climatique en agriculture paysanne,* AVSF, May 2012

27. The simple reproduction threshold of a farm is the level of income that enables only the essential needs of the family to be met and replacement of working capital used, without degradation of the ecosystem cultivated. It does not therefore make it possible to generate an economic surplus available to improve the family's social living conditions, to invest in the farm, to improve ecological conditions of production or to deal with a shock if necessary.

28. Christian Castellanet, Laurent Levard, Didier Pillot and Aurélie Vogel, *Agroecology: Evaluation of 15 Years of AFD Support,* AFD, 2014

Conditions for access to land and natural resources – especially water for agricultural use and genetic diversity – limit the implementation of some practices and restrict investments. It is important to ensure that the rules for year-round access to land are compatible with strategies for reforestation, regeneration of natural vegetation and soil cover (live or dead). In many regions, common grazing rights after the main crop has been harvested limit the development of agroecological practices. Green fertilisers, catch crops or crop residues left in the soil to enrich it or protect it from erosion risk being consumed by animals[29]. In livestock grazing regions, common rules that are adapted and accepted by the various stakeholders are necessary for good management of grazing areas and regeneration of tree vegetation. Access to genetic diversity of plant and animal material is another condition for diversification and risk management[30]. The latter runs counter to processes of genetic uniformity and of patenting of living organisms.

Making investments in the ecosystem in the form of trees and work on soil and water management is only possible if the families that make them are guaranteed they will benefit from them. So it can only be envisaged if there is genuine long-term security in terms of access to land. In the Sahel countries, recognition of farmers' ownership of the trees they have planted on land they do not own is a central issue for reforestation[31]. Legal and cultural changes may be necessary to ensure social acceptability of certain practices[32]. In a number of countries, such as Morocco, securing rights of access requires solving situations of legal uncertainty related to the absence of appropriate mechanisms to deal with inheritance rights[33].

4. Conditions for access to information, knowledge and know-how facilitating adaptation

In the short term (the agricultural cycle) and very short term (the days and weeks ahead), providing information to farmers on climatic risks or risks generated by climatic conditions can help them to change management of the production system (dates of sowing, plant species and varieties used, constitution of fodder reserves, etc.) and to protect farms, and more generally territories, in the face of extreme climatic events.

Knowledge of forecasts relating to future evolution of climatic and hydrological parameters to enable family farms to anticipate future climate and, if necessary, to plan structural changes (evolution of species and varieties, infrastructures necessary for water management, creation of new value chains, etc.).

Lastly, although adaptation to climate change requires a range of knowledge and know-how that already exists at local level, not all farmers possess the same levels of knowledge and technical know-how. In addition, faced with new phenomena relating to climate changes and their consequences, farmers are often disadvantaged. Access to new knowledge and new know-how making it possible to test and implement technical innovations is therefore a central issue for the adaptation of family farming to climate change. This knowledge and know-how can come from other farmers in the territory, farmers located in other regions, scientific research or agricultural consulting bodies. Cooperation between research, development bodies and farmers themselves is a recurrent challenge in many countries.

5. Capacities for organisation with a view to adaptation

Many adaptation strategies and options require family farms and local communities to have a capacity for organisation. This is naturally the case for collective initiatives, as well as for the definition and implementation of territorial planning, for example the plans for assisted natural regeneration in the Sahel[34]. It is also the case for the identification, construction and management of collective infrastructures, setting up seed banks, implementation of collective solidarity mechanisms to deal with accidents, and representation and defence of their requirements vis-à-vis local or national political authorities and other external parties. But collective organisation, especially within farmers'organisations, is also necessary to develop individual adaptation strategies and options, in particular to promote sharing of knowledge and know-how, and to access markets, specific services or financial resources.

29. *Ibid.*

30. Marie-Josèphe Dugué (with support from Hélène Delille and Sylvain Malgrange), *Caractérisation des stratégies d'adaptation au changement climatique en agriculture paysanne,* AVSF, May 2012

31. Permanent Inter-State Committee for Drought Control in the Sahel (CILSS) and Centre for International Cooperation/ University of Amsterdam, *The silent transformation of environment and production systems in the Sahel, Impacts of public and private investments in natural resources management,* 2009

32. Marie-Josèphe Dugué (with support from Hélène Delille and Sylvain Malgrange), *Caractérisation des stratégies d'adaptation au changement climatique en agriculture paysanne,* AVSF, May 2012

33. Christian Castellanet, Laurent Levard, Didier Pillot and Aurélie Vogel, *Agroecology: Evaluation of 15 Years of AFD Support,* AFD, 2014

34. Permanent Inter-State Committee for Drought Control in the Sahel (CILSS) and Centre for International Cooperation/ University of Amsterdam, *The silent transformation of environment and production systems in the Sahel, Impacts of public and private investments in natural resources management,* 2009

2.

EMPHASIS ON THE ADAPTATION OF FAMILY FARMING TO CLIMATE CHANGES IN NATIONAL PUBLIC POLICIES

I. CONTEXT

II. STRONG PRESENCE OF AGRICULTURAL ADAPTATION IN CLIMATE POLICIES

III. INCREASING CONSIDERATION OF ADAPTATION TO CLIMATE CHANGES IN AGRICULTURAL AND FOOD SECURITY POLICIES

IV. DIFFICULT INTEGRATION BETWEEN AGRICULTURAL AND CLIMATE POLICIES

V. POSSIBLE ADAPTATION-MITIGATION SYNERGIES ARE OFTEN RECOGNISED BUT STILL GENERATE FEW REAL MIXED APPROACHES

VI. CAPACITIES FOR EXPERTISE AND A LINK WITH RESEARCH THAT ARE STILL INSUFFICIENT

VII. PROMOTED PRACTICES FOR ADAPTATION TO CLIMATE CHANGES: TO WHICH TYPE OF AGRICULTURE ARE THEY RELATED?

VIII. A VARIETY OF POLITICAL ISTRUMENTS AND STRATEGIES

IX. CLIMATE STRATEGIES AND POLICIES THAT ARE OFTEN NOT IMPLEMENTED...

Copyright: Florian Lang / ActionAid

1 CONTEXT

Strategies and policies specific to climate changes have been developed over the last ten years in many countries. Over the same period, sectoral policies, especially agricultural policies, also include these objectives.

Analysis of emphasis on adaptation of family farming to climate changes in national public policies involves examining the inclusion of:
- adaptation in climate strategies and policies;
- agriculture in the adaptation component of climate strategies and policies;
- adaptation to climate changes in agricultural policies and other policies (sectoral and cross-sectoral) that affect agriculture;
- family farming in these various policies (climatic, sectoral).

More globally, it involves examining the consistency between the objectives of family farming's adaptation to climate changes and the other objectives of public policies, especially those related to economic and social development, food and nutritional security, the environment and mitigation of climate changes.

Over the last ten years, faced with an increased manifestation of climate changes and with their negative impacts, public policies in developing countries have increasingly included the adaptation objective. This inclusion dynamic is partly related to the evolution of the balance of power between stakeholders within each country. It is also the result of changes in the economic, social, ecological, cultural, national and international institutional environment, including international or bilateral agreements in which States are involved and which generate new opportunities and commitments[35]. Public policies decided and implemented at national level are strongly influenced by initiatives taken by multilateral bodies or by certain donors, whether at international or continental level. So mitigation was often prioritised in climate policies at certain periods (in the 1990s and at the beginning of the 2000s) because international funding prioritised these types of actions. In more recent years, we observed an increase in focus on adaptation, both in the international agenda and national agendas, for example in Costa Rica, Niger and Vietnam. Generally speaking, actions implemented are often very dependent on external funding aimed at implementing specific projects, for example in Niger, which raises the question of the sustainability of these actions[36].

Concerning the African continent for example, the Comprehensive Africa Agriculture Development Programme (CAADP), led by the African Union and integrated into the New Partnership for Africa's Development (NEPAD) in 2003, established the framework and general principles to be applied to agricultural development in Sub-Saharan Africa. It is transposed at regional (large African regions) and national (regional and national pacts) levels. Management of land and water, which is very important for adaptation to climate change, is one of the pillars of the CAADP. Similarly, NEPAD's environmental initiative gives priority to climate change, which is one of its ten areas of intervention. One of the specific objectives of the political framework defined by the African Union for pastoralism in Africa is to define practical approaches to manage risks and thereby reduce the vulnerability of pastoral communities to climatic events (especially drought and flooding) and to conflicts. It particularly recommends implementing a steering committee for pastoral policy in each country[37]. In West Africa, in 2010, ECOWAS adopted a sub-regional action programme to reduce vulnerability to climate change in West Africa, which aims to implement joint adaptation options at regional level.

Policies concerning adaptation to climate change are sometimes also implemented at infranational level by local and regional public authorities, particularly in decentralisation contexts. But sometimes their grasp of climatic issues is weak, due to lack of training and experience or because of budgetary limitations. In Vietnam, although regional and local authorities are regularly invited to implement national orientations in terms of climate change, effective implementation at local level is sometimes still limited.

35. Ben Bradshaw, Chris R. Bryant, A. Holly Dolan, Mark W. Skinner and Barry Smit, *Adaptation to climate change in agriculture: evaluation of options,* Occasional papers in geography, Department of Geography, University of Guelph, n° 26, 2001

36. Chinwe Ifejika Speranza, *Resilient adaptation to climate change in African agriculture,* Studies n° 54, German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE), 2010

37. Aliou Diouf, Abdulai Jalloh and Edward R. Rhodes, *Review of research and policies for climate change adaptation in the agriculture sector in West Africa,* Working paper, Future Agricultures, May 2014

Weakness of national policies and modes of intervention used by international cooperation can strengthen the role of regional and local public authorities. In Niger, the various projects supported by international cooperation generally attribute great importance to the definition and implementation of actions at local level. However, this approach is not generalised within national policies. There are also numerous examples of international cooperation interventions at local level defined and implemented outside of public authorities that contribute to weakening local and regional public authorities.

On the contrary, in countries such as Costa Rica and Vietnam, which have a strong central State, agricultural policies and policies related to climate change are first and foremost national policies. More generally, as underlined by Mark Purdon[38], policies at national level are persistently significant. The national State, via its institutional presence, shapes the implementation of policies at subnational and local levels. Similarly, despite the process of globalisation, the State generally continues to play a major role in shaping economic conditions within countries' borders.

The various economic and social stakeholders (producers' organisations, NGOs, etc.) are often involved in the definition of national strategies, but the opinions and suggestions of these stakeholders are not necessarily found in the final documents drawn up by public authorities and international cooperation stakeholders, which is the case in Niger for example.

As in other areas, approaches intended to be participative at local level may exist, but often, the agents in charge of organising such processes are not necessarily trained for this and these processes seem more like a means to have populations accept solutions that are already more or less defined (the case in Niger). In addition, as previously mentioned, numerous initiatives supported by international cooperation are conducted by elected representatives and corresponding institutions.

THE CASE OF COSTA RICA[39]

In Costa Rica, the agricultural sector contributes to 9 % of national GDP and 14 % when agrifood businesses are added[40]. Agricultural production is intended to meet the population's food requirements (corn, beans, rice, livestock, fruit and vegetables, etc.) and for exports (mainly bananas, pineapples and coffee), with a significant agrifood trade surplus. Agriculture in Costa Rica is largely made up of family farming – particularly for food crops and coffee - but large-scale production, often by multinational companies, dominates productions intended for export such as bananas and pineapples.

Climate changes should lead to an increase in the average yearly temperature and in its variability, and to a growing number of extreme rainfall situations. These changes should have significant effects on agriculture, with an overall balance sheet that is clearly negative, even if some areas could increase in productive potential.

Costa Rica is a pioneer in terms of inclusion of climate changes in national policies, as well as in terms of a mixed approach to the issues of mitigation and adaptation. It plays an active role in the UNFCCC and in the Conference of the Parties. The issue of climate changes was first included in Costa Rica's forestry policy in the 1990s, with a focus on mitigation. It is in this context that Costa Rica was a precursor in terms of inclusion of payments for environmental services (1997) in public policies. Current reflections are aimed at expanding the approach, including a landscape approach, making the link with adaptation and achieving greater inter-sectorality.

Inclusion of the issue of climate changes in agricultural policies strictly speaking happened later than in the forestry sector. It began in the middle of the 2000s, and more clearly from 2010 on. In 2003, the agricultural sector had been included in the environmental payments scheme. This policy continues today. 10

38.
Mark Purdon, *The comparative turn in climate change adaptation and food security governance research,* Working paper n° 92, CGIAR Research program on climate change, agriculture and food security (CCAFS), 2014

39.
The complete presentation of the study is included in the appendices.

40.
Ministerio de Agricultura y Ganadería (MAG), *Política de Estado para el Sector Agroalimentario y el Desarrollo Rural Costarricense 2010-2021*, 2010

% to 30 % of the additional cost of practices concerned is covered by the State, with funding generated by a hydrocarbon tax.
The 2015-2018 policy for the agricultural sector and the development of rural territories illustrates the growing importance of the issue of climate in agricultural policies. The policy makes a clear reference to the national climate change strategy drawn up in 2010, which demonstrates better coordination between general climate strategy and agricultural policy than during the previous period. Mitigation and adaptation are in part dealt with separately, but some actions contribute simultaneously to both objectives. In terms of adaptation, the focus is on planning and zoning of agricultural territory, selected plant breeding, water management (collection and storage), irrigation and drainage, and the creation of protected environments. Actions to promote green economic activities include actions contributing to both mitigation and adaptation: support for organic agriculture, payment for environmental services (which benefits organic agriculture in particular), taxation and production of bioenergy via productive activities that are not in competition with food production. Lastly, actions for management of climatic risks, which benefit the majority of the budget for the climatic component of agricultural policy. These actions also contribute to adaptation. They consist in particular of measures aiming to support investments and rehabilitation of capital within farms affected by climatic accidents, as well as actions to strengthen weather stations and manage preventive risks.
In Costa Rica, climatic and agricultural policies are national policies. Consultation with producers' organisations and civil society is organised mainly at national level.

THE CASE OF NIGER[41]

Niger is one of the poorest countries in the world. Agriculture, livestock breeding and exploitation of fisheries resources make up approximately 40 % of GDP, 22 % of exports and 84 % of employment. 75 % of the population live in Sahelo-Sudanian and Sahelian regions, and the remaining quarter live in Sahelo-Saharan and Saharan regions. The country's climate is characterised by high variability of rainfall. According to the IPCC, it is one of the countries that is most vulnerable to climate changes (increase in temperatures; decrease in average rainfall, with, for the future, contradictory and contrasting scenarios according to regions; increase of extreme phenomena, and particularly drought).
Diverse national policies and strategies have been drawn up over the past fifteen years concerning climate changes, demonstrating growing consideration of the issues related to it, with priority being given to adaptation after a period (late 1990s and early 2000s) when more focus had been placed on mitigation because of the international context. Given the importance of agriculture in the country, and because the latter seems extremely vulnerable to climate changes, it is the central sector in policies, strategies and initiatives relating to adaptation. In general, orientations on adaptation are implemented within various projects funded by international cooperation.
The various policies, strategies and initiatives feature orientations, objectives and types of activities that are often similar, but without clear coordination between them, highlighting duplication of efforts. This also reveals competition between public institutions, political instability, lack of continuity of staff in public administrations and opportunism in terms of funding opportunities provided by such and such international cooperation body. In addition, the various policies, strategies and initiatives usually become operational within projects, the origin of which is more related to funding opportunities and international cooperation initiatives than autonomous planning to implement these policies and strategies. In a manner of speaking, these projects are linked to policies, strategies and initiatives "retrospectively". So rather than a real national policy related to climate changes, there is a multiplication of projects,

41. The complete presentation of the study is included in the appendices.

even if they do refer to background documents. In this context, numerous actions envisaged in national policies are not implemented in practice, due to lack of funding. To date, actions planned as part of the INDC, for example, have not yet been implemented.
With regards agricultural policies, they very clearly include objectives for adaptation to climate change and strengthening the resilience of agriculture. Yet again, they are mainly implemented within projects. They feature no explicit reference to family farming, but the latter makes up the majority of the country's agriculture.
There is also a serious gap between policy documents and the effective implementation of actions, with the latter depending on funding opportunities in the form of projects.
Actions aimed at adaptation often also contribute to mitigation but there is no real national strategy aimed at including mitigation and adaptation objectives.
Various national programmes include objectives for agricultural adaptation to climate changes, particularly the "3N" initiative – For sustainable food security and agricultural development, "Nigeriens Nourishing Nigeriens", which is the country's global strategy in terms of agriculture and food security. More recently, as part of the 3N initiative and with support from the World Bank, an Action plan for management of agricultural risks in Niger (PAGRA) was drawn up for 2014-2023. The plan's two main components focus on the one hand on the capacity of crop and livestock farm systems to deal with risks and, on the other hand, anticipation, adaptation and response in emergency situations for communities, local authorities and the State.

LE CAS VIET NAM[42]

In Vietnam, over 70% of the working population works in agriculture. The country has become not just globally self-sufficient in terms of food, it also exports rice, which is the main crop and staple food. Vietnam, where agriculture is largely concentrated in coastal and delta regions, should be one of the countries most affected by climate changes, with the rise in sea level and an increase in temperatures, higher levels of rainfall during the rainy season and decrease in rainfall during the dry season. The main risks are risks of storms, flooding and salinisation of land in the Mekong delta region, as well as soil degradation and erosion, and drought in some mountainous regions.
The Vietnamese government started to fully include the issue of climate changes in its policies in 2008, with a view to real coordination between the global climate strategy and sectoral policies, with each ministry being responsible for integrating global orientations and making them operational. This is particularly the case for the Ministry of Agriculture and rural development.
However, the implementation of the climate policy was hampered by lack of indepth knowledge on the issue, local teams' lack of financial resources, difficult access to climatic data and to reliable, sufficient satellite images, as well as by problems related to poor interinstitutional coordination. Social aspects (populations' adaptation to climate change) are given less attention than biophysical aspects (rise in sea level scenarios) and infrastructures (construction of dams in particular).
It was in 2011 that climate changes became a top-ranking political priority. Agriculture is at the heart of the national climate strategy. However, in the National Green Growth Strategy for 2013-2020, agriculture is mainly dealt with in terms of contribution to mitigation of climate change.
The agricultural policy relating to adaptation corresponds to a specific deployment of the national climate strategy for the agricultural and rural development sector. As part of this action plan, a study was conducted in 2010 with a view to analysing the impacts of climate change on agriculture and making recommendations on adaptation options and policies. The action plan is broken

42.
The complete presentation of the study is included in the appendices.

down into five-year action plans. The current five-year plan aims in particular to define guidelines for including climate changes in programmes, projects and activities in the sector, to encourage investments in adaptation to and mitigation of climate change via public-private partnerships, to evaluate the various actions implemented for better selection of the most effective measures, to develop awareness-raising actions and strengthen early warning systems. In terms of options, the issues of mitigation and adaptation are dealt with in a distinct manner, without explicit identification of options that would contribute jointly to both objectives, or of possible contradictions. Yet some options for mitigation and for adaptation overlap. On the other hand, some options seem potentially contradictory.

In terms of adaptation, priority options include agroecological practices, even if the concept is not used: combined agriculture-breeding-fish farming, agroforestry, crop diversification, Eco-system-based Adaptation (EbA), Vietnamese Good Agricultural Practices VietGAP and management of grazing land. The focus is also placed on plant varieties that are suitable to salinity, drought and flooding, as well as on the selection of animals that are suited to climate changes. Whether for plant or animal productions, focus is placed on both adaptation and obtaining high yield potentials, with reference to the Climate Smart Agriculture concept. Some adaptation options are designed at community level.

Focus is placed in particular on scientific research, especially for the development of agricultural practices aimed at both high productivity and better adaptation to climate change. Strengthening of agricultural extension and animal epidemic services are also prioritised, as are actions in terms of training and communication on climate changes. A pilot agricultural insurance programme was also implemented for the period between 2011 and 2013.

2 STRONG PRESENCE OF AGRICULTURAL ADAPTATION IN CLIMATE POLICIES

A number of countries have defined plans, strategies or national policies specifically covering climate change, and particularly adaptation. In 2001, National Adaptation Programmes of Action (NAPA) were planned by the UNFCCC. They are designed to help Least Developed Countries (LDCs) "*to identify priority activities that respond to their urgent and immediate needs to adapt to climate change*". In 2012, 50 LDCs had drawn up a NAPA[43]. Drawing up a NAPA opens up access to international funding for adaptation that transits in particular through the Global Environment Facility. This funding is aimed at the implementation of specific projects. NAPAs were designed to respond to emergencies, but without mechanisms allowing them to be taken fully into account in other policies, which leads back to the question of integration between climate and sectoral policies.

This is not the case with the National Adaptation Plans (NAPs). These were implemented in 2010 by the UNFCCC to provide "*a means of identifying medium- and long-term adaptation needs*". The objective is to help LDCs *"to reduce their vulnerability to the impacts of climate change, by building adaptive capacity and resilience, and by facilitating the integration of climate change adaptation into development planning*", and particularly into sectoral policies . There is a link with the NAPAs, as the NAPs are supposed to "*to build on the rich experiences of the LDCs in addressing adaptation through the NAPAs*"[45].

Outside the framework of the UNFCCC, numerous countries have also drawn up regional and national climate strategies. In West Africa, this is the case of Nigeria, Ghana and Ivory Coast.
More recently, almost all the Member States of the UNFCCC drew up a document entitled Intended National Determined Contribution (INDC), presenting its objectives and the measures envisaged in terms of mitigation and adaptation to climate changes. These documents are relatively short, as they are not intended to detail the measures envisaged.

Generally speaking, the NAPAs and specific plans related to climate changes mention agriculture, food security and water resource management as priority issues for adaptation . 96 % of NAPAs mention agriculture as one of the key issues for adaptation, 87 % mention water resource management and 78 % mention natural resource management, which is partly related to agricultural issues. The same applies to climate information systems mentioned in 62 % of NAPAs[47].

Analysis of projects funded as part of NAPAs reveals consistency between projects' priorities and the importance attributed to these various issues in NAPAs. Agriculture in itself is the top priority in 32 % of projects. Climatic information systems are the top priority in 17 % of projects, natural resource management is the top priority in 14 % of projects and water resource management is the top priority in 12 % of projects[48].

43.
United Nations Framework Convention on Climate Change (UNFCC), *National adaptation plans - Technical guidelines for the national adaptation plan process,* LDC Expert Group, December 2012

44.
Ibid.

45.
Ibid.

46.
Simon Anderson, Sabine Gundel and Monique Vanni, *The impacts of climate change for food security in Africa: a synthesis of policy issues for Europe,* International Institute for Environment and Development (IIED), 2010

47.
Global Environment Facility (GEF) / Independent Evaluation Office (IEO), *Adaptation to Climate Change – The Least Developed Countries Fund: Review of the Implementation of NAPAs,* 2014

48.
Ibid.

KEY ISSUES FOR ADAPTATION IN NAPAS AND NAPA PROJECTS

Key issues	% of NAPAs	Top priority: % of NAPA projects
Agriculture	96 %	32 %
Water resource management	87 %	12 %
Natural resource management: fragile ecosystems (including ecosystems in uplands), reforestation, land management, land degradation	78 %	14 %
Climate information systems	62 %	17 %
Human health	59 %	0 %
Management of coastal regions	48 %	15 %
Others, for example the energy sector	43 %	0 %
Development of infrastructures	35 %	2 %
Risk and disaster management	26 %	8 %

Source : GEF / IEO, 2014.

In an analysis of 160 INDCs submitted to the UNFCCC[49], several researchers highlighted that "*Despite the historical challenges to including agriculture in the official climate change negotiations, the submitted INDCs underline countries' priority to determine and address agricultural adaptation and mitigation at the national level*"[50]. The FAO, which also conducted a comparative study of the INDCs, specifies that, among the 188 countries that had submitted a national contribution at 31 March 2016 (161 INDCs, with the EU's INDC representing 28 countries), 94 % included the agriculture sector in their mitigation or adaptation plans. Concerning adaptation, 94 % of States included a specific section, i.e. 130 countries, mainly developing countries.

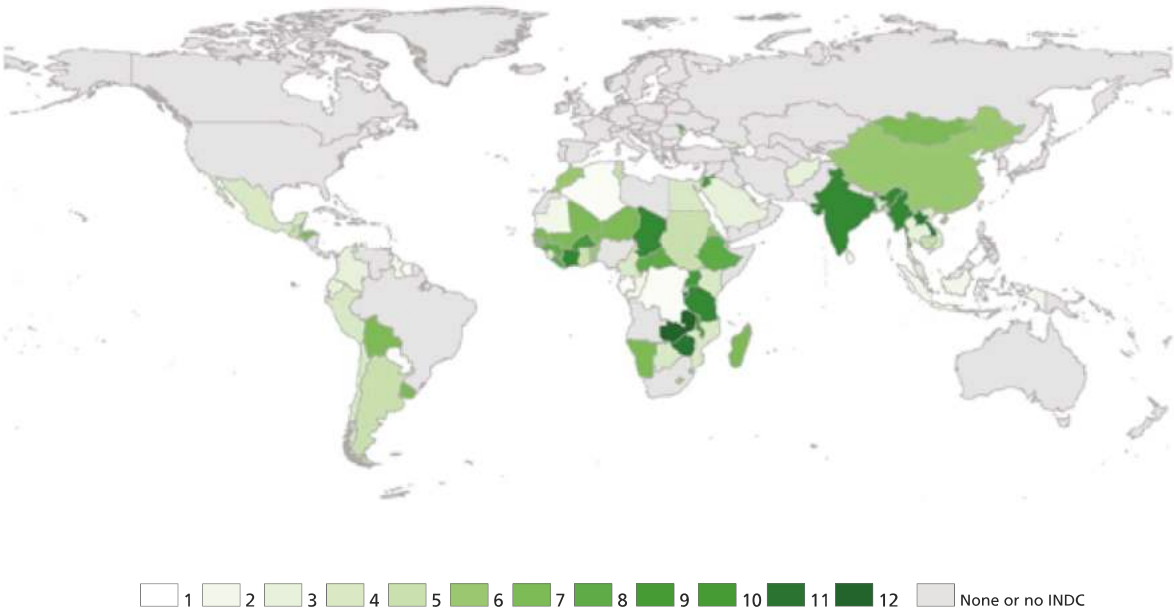
Among the countries having included an adaptation section in their INDC, 95 % included agriculture and livestock breeding in it, 83 % included forestry and 46 % fisheries and aquaculture. Agriculture is therefore a priority sector in terms of adaptation to climate changes for developing countries, with issues related to economic and social development and to the environment. Most of these countries highlight the vulnerability of agriculture faced with climate changes. The majority – and in particular 80 % of least developed countries - consider extreme events (flooding, drought) as the biggest challenge generated by climate change. For a lot of countries (37 % of LDCs), management of risks and climatic disasters is included in the measures envisaged[51].

49. Thilde B. Bruun, Bruce M. Campbell, Lucy E. Gregersen, Sophia Huyer, Victoria Kuntze, Simone T.N. Madsen, Mads B. Oldvig, Meryl Richards, Ioannis Vasileiou, *How countries plan to address agricultural adaptation and mitigation – An analysis of Intended Nationally Determined Contributions,* Info Note, Research Program on Climate Change, Agriculture and Food Secrurity, CGIAR, 2015

50. *Ibid.*

51. FAO, *Climate change and food security: risks and responses,* 2016

NUMBER OF AGRICULTURAL ADAPTATION MEASURES MENTIONED IN THE INDCS[52]



Of the 102 countries that include adaptation for agriculture in their INDCs, 94 provide details on implementation, mentioning for example at least one adaptation measure. The main measures mentioned are presented in the table below[53].

Main adaptation measures	Number of countries
Livestock management	54
Crop management	51
Fisheries and aquaculture management	48
Irrigation management	46
Water management	45
Transfer of knowledge	35
Diversification of agriculture	32
Water and soil management	31
Climate smart agriculture	29
Early warning systems	28
Agroforestry	22
Agroecology	20
Indigenous knowledge	19
Financial mechanisms (for example, crop insurance)	18
Total number of countries having included agricultural adaptation	102
Total number of countries having included at least one measure	94

52.
Thilde B. Bruun, Bruce M. Campbell, Lucy E. Gregersen, Sophia Huyer, Victoria Kuntze, Simone T.N. Madsen, Mads B. Oldvig, Meryl Richards, Ioannis Vasileiou, *How countries plan to address agricultural adaptation and mitigation – An analysis of Intended Nationally Determined Contributions,* Info Note, Research Program on Climate Change, Agriculture and Food Security, CGIAR, 2015

53.
Ibid.

70 countries mention the need to strengthen capacities in their INDCs and 50 include the need for transfers of technology.

It should be noted that reference to the issues of food security is made in 98 contributions. However it appears that equity and human rights are not the subject of high levels of attention in climate policies, whether at global or national level[54]. These issues have however been given greater focus over the last two years.

3 INCREASING CONSIDERATION OF ADAPTATION TO CLIMATE CHANGES IN AGRICULTURAL AND FOOD SECURITY POLICIES

There are a variety of initiatives and policy documents concerning agriculture:

- On the one hand more global plans and strategies including the agricultural sector, in particular national development strategies, national food security strategies and *Poverty Reduction Strategy Papers* (PRSPs) required by the International Monetary Fund and the World Bank as part of the Heavily Indebted Poor Countries Initiative (HIPC);
- On the other hand, strategies and policies more specifically concerning the agricultural sector. For example, the countries of the African Union committed to drawing up programmes for national deployment of the CAADP (Comprehensive Africa Agriculture Development Plan) and investment plans generated by it and aimed at creating a framework for expenditure for agriculture over the medium term with a view to improving agricultural planning.

A number of States were slow to include climate objectives in agricultural policies. The FAO mentions that policy documents generally focus on increasing food production and productivity – sometimes considered as the best way to adapt to climate changes – but do not take their foreseeable impacts on agriculture into account , whereas the latter can affect future food production and productivity. Similarly, Edward Rhodes et al. highlight the fact that, although policies and plans for development of agriculture directly or indirectly recognise the necessity to react to climate changes, productivity objectives are not related to projections of the impacts they could inflict on agriculture. They quote the example of Ghana, where the agricultural policy, aligned with the CAADP and the ECOWAS regional agricultural policy (ECOWAP), includes areas that will be concerned by the impacts of climate changes (food security, preparation for emergencies, sustainable management of land and the environment), but does not highlight climate changes themselves and their consequences. As for the part dedicated to sustainable management of land and the environment, it does not specifically cover them . In fact, although public authorities are demonstrating a certain level of awareness in terms of the risk represented by climate changes and their impacts on agriculture, they often do not draw the necessary conclusions in terms of adaptation strategies.

However, although agricultural policies are not primarily aimed at adaptation, but rather at increase in productivity, resilience to climatic accidents and food security, the actions implemented sometimes contribute to better adaptation. This is the case for example in Niger, where food security is a central objective of successive governments and where actions implemented in this regard (irrigation, land management, management of grazing systems, water management, early warning systems, emergency food stocks) contribute to adaptation to climate changes. In the semiarid region of Nigeria, the support provided in recent years by government for development of irrigation, and more recently smallscale irrigation, made it possible to increase agricultural production and reduce production risks in the Northern States, which are drier. Although these actions were not implemented as part of a programme for adaptation to climate changes, in practice, they contribute to farmers' adaptation to current climatic risks .

In recent years, although inclusion of climate objectives in agricultural policies is generally done later than the definition of national climate strategies, it is nevertheless beco-

54. *Ibid.*

55. FAO, *Food Security and Climate Change, "Climate-Smart" Agriculture – Policies, Practices and Financing for Food Security, Adaptation and Mitigation,* 2010

56. Thilde B. Bruun, Bruce M. Campbell, Lucy E. Gregersen, Sophia Huyer, Victoria Kuntze, Simone T.N. Madsen, Mads B. Oldvig, Meryl Richards, Ioannis Vasileiou, *How countries plan to address agricultural adaptation and mitigation – An analysis of Intended Nationally Determined Contributions,* Info Note, Research Program on Climate Change, Agriculture and Food Secrurity, CGIAR, 2015

ming widespread. It is facilitated by the fact that, based on the analysis of the INDCs, 30 % of countries mention the cobenefits of actions focusing on climate in economic, social and environmental terms, particularly for rural development and health, poverty reduction, job creation and preservation of ecosystems and biodiversity .
There are examples of questionable trade-offs, where certain adaptation policies meeting the requirements of a sector are detrimental to the adaptation of the agricultural sector. This is the case with the construction of dams in watersheds that can lead to a decrease in fisheries resources in flood risk areas. The drying up of Lake Chad and its fisheries resources is an example of this.

Inclusion of the adaptation to climate changes objective does not necessarily lead to new aspects in terms of promoted adaptation options and policy instruments. This is the case for example in Niger, which is starting to include adaptation as an objective, without really changing policies and funding priorities, because, as mentioned, policies implemented with regards other objectives also contribute to adaptation.
Mark Purdon points out that the low level of consideration for climate changes expected in the future and of their possible impacts, particularly in terms of hydrology, does not facilitate the implementation of new measures that would exceed the measures necessary for adaptation to climatic variability currently being observed. He specifies that this can lead to poor adaptation . In some cases, consideration of probable long term climatic changes should lead to the envisagement of sectoral restructuring, restructuring that cannot be justified if only evolutions already observed are taken into account.

However, in a country such as Vietnam, the rise in sea level and the risks related to flooding illustrate that climate changes also lead to the envisagement of new solutions, or at least solutions of a completely different magnitude than traditional risk prevention actions.

Crédit : ActionAid

57.
Ibid.

58.
FAO, *Climate change and food security: risks and responses,* 2016

59.
Mark Purdon, *The comparative turn in climate change adaptation and food security governance research,* Working paper n°92, CGIAR Research program on climate change, agriculture and food security (CCAFS), 2014

4 DIFFICULT INTEGRATION BETWEEN AGRICULTURAL AND CLIMATE POLICIES

Integration between agricultural and climate policies raises two questions:
Is there a convergence between content relative to agricultural adaptation to climate changes included on the one hand in climate strategies and policies and on the other hand in agricultural strategies and policies? In cases where national adaptation strategies do not lead directly to climate policies in the strict sense, are objectives and strategies actually included in operational terms in development policies or agricultural policies?

Consistency and coordination between climatic and agricultural policies largely depend on the institutional system of governance implemented and the will and capacity of the State to guarantee overall consistency. Good coordination is more likely:

- on the one hand, when sectoral institutions are closely involved in the definition of the overall climate policy. On the contrary, if the institutions in charge of defining the climate policy work partly "in a vacuum", without fully including sectoral institutions, it is more likely that this climate policy will be relatively disconnected from the realities of the sectors and from the sectors' visions and other priorities. In addition, sectoral institutions feel less committed to subsequently implement general orientations by including them in their own policies;

- on the other hand, when the State's internal power relationships generate a situation where sectoral institutions effectively implement climatic orientations. When the institution in charge of climate changes does not itself have hierarchical superiority in terms of sectoral institutions, as was the case in Niger, coordination tends to be more complex. There is often competition between public institutions in the quest for legitimacy of power and access to national or international funding. International cooperation bodies, institutions and agencies often accentuate lack of consistency, lack of coordination and competition between public institutions, by simply designing and funding specific projects or programmes relating to a particular public institution. In addition, national public institutions are often subjected to the influence of specific interests. In the case of agriculture, the latter often advocate more for the construction of large infrastructures, support for large-scale agriculture and agricultural practices of the green revolution, than for the development of family farming, the reduction of its vulnerability and transition to a more ecological agriculture.

Coordination is more complex when the institution in charge of defining the climate strategy is not really supported by the head of the executive power to guarantee real inclusion of the climate in sectoral policies, or when this institution seeks to directly implement actions which would normally be covered by sectoral policies.

This is not the case when the head of the executive demonstrates real political will to require such inclusion from sectoral ministers. In Costa Rica, over the past five years, there has been real political will on the part of ministerial teams to include the issue of climate in agricultural policy. Similarly, in Vietnam, the national climate strategy provides that each ministry is responsible for fully including overall orientations and making them operational. The attachment of the institution in charge of climate policies to the Presidency or to the Prime Minister can facilitate such processes. Similarly, increasing the budget of each sector related to the inclusion of climate objectives can be a deciding factor.

5 POSSIBLE ADAPTATION-MITIGATION SYNERGIES ARE OFTEN RECOGNISED BUT STILL GENERATE FEW REAL MIXED APPROACHES

Although synergies between adaptation and mitigation in agriculture are referred to in one third of INDCs, climate policies have generally covered these strategies separately[60], without real definition of an overall strategy integrating both dimensions. The fact that the instruments of the UNFCCC separate adaptation and mitigation did not facilitate better integration. This is the case for example in Niger and in Vietnam. In this country, specific options are identified for one or the other, without real identification of possible synergies or contradictions. On the contrary, Costa Rica quickly sought to integrate mitigation and adaptation issues, by identifying possible synergies and policies to support practices simultaneously meeting both objectives. The example of this country demonstrates that it is possible to use these instruments initially designed for mitigation to also support adaptation. Stephen Leonard *et al*. underline the fact that the absence of an international agreement has long been an obstacle for highlighting potential synergies between adaptation and mitigation. It is only recently that certain countries took into consideration the possible benefits of the REDD+ schemes for adaptation, particularly via REDD+ approaches not based on the carbon market. The Paris Agreement made it possible to increase the level of consideration given to these synergies, with article 5 encouraging joint mitigation-adaptation approaches for sustainable management of forests, "while reaffirming the importance of incentivizing, as appropriate, non-carbon benefits associated with such approaches" (5.2). Links were also established in the Warsaw Framework for REDD+, as well as by the Green Fund[61].

For their part, international organisations, having promoted funding in favour of specific mitigation or adaptation approaches, now tend rather to promote mixed approaches, i.e. approaches claiming to pursue both mitigation and adaptation objectives. For example, all interventions promoted by IFAD include objectives and evaluation criteria focusing on both mitigation and adaptation[62]. The concept of *Climate Smart Agriculture* launched by the FAO also features a mixed approach. The 4 per 1000 Initiative, launched by France at COP 21, also integrates both dimensions[63]. The AAA Initiative also includes both adaptation and mitigation.

Generally speaking, these various international initiatives are characterised:

- on the one hand by limiting the issue of mitigation to soil carbon sequestration, neglecting other aspects, particularly reduction of greenhouse gas emissions by agricultural activity. This is the case in particular of the *Global Alliance for Climate Smart Agriculture*, which was created in the hope of developing an agricultural soil carbon market and which is in fact greatly criticised by civil society organisations, and particularly by Coordination SUD and its members in France. It is in fact an alliance created on the margins of the United Nations, with strong presence of multinational agrifood companies, focusing on an extremely vague concept. This allows these companies to promote their vision of industrialised, large-scale agriculture to serve their own economic interests, opposed to civil society's positions in favour of family farming and agroecology;
- on the other hand, by a hierarchical relationship between sequestration and adaptation (concept of co-benefit), in alternating directions according to organisations. IFAD, initiatives promoted by developing countries and NGOs give priority to adaptation, whereas funding bodies depending on rich countries or where the latter play a dominant role tend to give priority to carbon sequestration;
- lastly, growing interest for the use of climate funding – which for the moment is primarily funding for adaptation – to support agricultural development.

60. Monica Di Gregorio Bruno Locatelli, Charlotte Pavageau and Emilia Pramova, *Integrating climate change mitigation and adaptation in agriculture and forestry: opportunities and trade-offs*, WIREs Clim Change, 2015

61. Himlal Baral, Stephen Leonard, Bruno Locatelli, Christopher Martius, Daniel Murdiyarso and Margaretha Quina, A match made in Paris – *Adaptation-mitigation synergies in the land sector,* CIFOR infobrief n°137, May 2016

62. Interview with Louis Bockel

63. Coordination SUD, *The 1 per 1000 Initiative: caution!,* October 2015

6 CAPACITIES FOR EXPERTISE AND A LINK WITH RESEARCH THAT ARE STILL INSUFFICIENT

In several of the least developed countries, the inclusion of climate objectives in agricultural policies is often faced with insufficient capacity for analysis and expertise on the subject. This is not the case in emerging countries, which have made strengthening of these capacities a priority, as for example in Vietnam.

The formulation of strategies and policies for agricultural adaptation to climate changes has often been insufficiently based on the results of research.

There are several reasons for this situation:

- forecasts relating to climate changes and their impacts are often inaccurate, because they cover an excessively large geographic scale that does not take sufficient account of local specificities. At the same time, degrees of uncertainty regarding these evolutions are very significant. This is particularly the case with long term evolutions (several decades), whereas impacts by this horizon could be a lot more substantial than current impacts or even than medium term impacts (10/15 years)[64];

- despite the fact that research has enabled significant progress in understanding how cultivated ecosystems function and watersoil-plant relationships, there is often still a dearth of research on the various issues, whether in terms of hydrological forecasts, evaluation of the vulnerability of family farms, impacts of climate changes on secondary crops, adaptation options or conditions for their implementation. In terms of hydrological forecasts, research work has been done based on the various hypotheses of the IPCC, but the latter correspond to very significant uncertainty ranges. With regards adaptation options, various work has been produced by NGOs or producers' organisations based on experiences in the field that should be better capitalised. The lack of research work also concerns the evaluation of agricultural policies, and particularly policies aimed at adaptation or responding to mixed mitigation-adaptation approaches, for which hindsight is minimal, apart from the fact that they do not always have adequate monitoring-evaluation mechanisms;

- sometimes researchers make insufficient efforts to translate the results of their research work into useful operational recommendations for deciders, and the latter sometimes make insufficient efforts to include research in policy definition and evaluation processes.

However, we can observe contrasting situations. In Niger, the definition in 2010 of the Strategic Programme for Climate Resilience (SPCR) was preceded by an indepth review of the inventory of knowledge on climate changes in the country, with the participation of research institutions. The programme also displays an ambition to develop appropriate climatic models, even if these actions have not yet really started. During preparation of the INDC, focusing on land management, a comparative analysis of the various adaptation options was conducted. This type of analysis was not however conducted in national policy documents covering adaptation more generally.
In Vietnam, strengthening of research is a priority in policies on climate change, in order to better anticipate changes, evaluate impacts, identify best options, generate technical solutions and assess the actions implemented.

64. Interview with Louis Bockel

7 PROMOTED PRACTICES FOR ADAPTATION TO CLIMATE CHANGES: TO WHICH TYPE OF AGRICULTURE ARE THEY RELATED?

Inclusion of objectives relating to climate changes in agricultural policies is often an opportunity to promote a certain vision of agriculture in the name of climate changes. Has this inclusion made it possible to strengthen options based on agroecology or those based on the green revolution? It appears that contrasting situations exist. In reality, this inclusion is not independent of pre-existing visions of agricultural development or of the balance of power between the various types of economic stakeholders and social forces. This is especially true for adaptation as few references exist in terms of systematic evaluation of the various types of practices and approaches aimed at increasing resilience to climate changes.

Inclusion of climate objectives has often provided an extra argument to promoters of agroecology and policies in favour of it. We mentioned that the implementation of agroecology principles contributes to strengthening the resilience of production systems to climate shocks. In fact, by increasing carbon stocks in the soil (organic fertilisation, erosion control, etc.) and in vegetation (tree cover), agroecological practices contribute to increasing carbon storage, while substitution of synthetic fertilisers by organic fertilisers contributes to reducing nitrous oxide emissions, a powerful greenhouse gas emission. In many countries, in Central America for example, inclusion of climate objectives made it possible to strengthen the position of promoters of agroecology within public institutions themselves. Emmanuel Torquebiau points out that, compared to a previous period where agroforestry and agroecology were already being promoted, but mainly to increase the resilience of agriculture to various types of shocks (including climate shocks), it is the increasingly preponderant issue of mitigation which made it possible to strengthen interest in agroecological practices[65]. In Costa Rica, Niger and Vietnam, many practices promoted as adaptation options relate to agroecological principles.

The promotion of agroecology is often accompanied by the promotion of small-scale family farming, not just because the latter is particularly vulnerable to climate change, but also because it appears to be the most apt to implement agroecological practices. The latter are, on the whole, more intensive in terms of labour, which, in family farming, is an abundant resource, the use of which generates no extra production costs. Agroecological practices also strengthen the autonomy of farms vis-à-vis the exterior (purchase of equipment, of inputs, of services), an autonomy often sought by family farming in order to minimize various types of risks.
However, climate changes often provide an extra argument for those promoting the practice of the agriculture generated by the green revolution, aimed at increasing agricultural productivity and production or simply the search for simple "turnkey" solutions, or because of a partial vision of factors influencing food and nutritional security. The reasoning is that, faced with the threats created by climate change, it is better to aim for maximum production by specialising in the crop or crops most suited to the conditions and by fully applying the technologies of the green revolution (varieties with high genetic potential, intensive use of chemical inputs). At international level, we see this as part of the *Global Alliance for Climate Smart Agriculture* (GACSA).

In Vietnam, the promotion of adaptation options responding to the principles of agroecology is accompanied by that of practices using biotechnology and other cutting-edge technologies often with a view to mitigation.

In fact, the promotion of green revolution solutions is often paired with that of agriculture which employs waged labour, because of its supposed superiority to family farming in terms of making investments and implementing practices increasing productivity and food production. In Vietnam, the call for investors as part of public-private partnerships and the development of large livestock farms are designed as options for mitigation.

65. Interview with Emmanuel Torquebiau

8 A VARIETY OF POLITICAL INSTRUMENTS AND STRATEGIES

The inclusion of adaptation objectives in agricultural policies can lead to the confirmation or strengthening of certain measures that also meet other objectives. It can also lead to the integration of new measures. Generally speaking, political measures responding to the objective of adaptation to climate changes mainly aim to:

- on the one hand, reduce climate hazards and climate-related events. In particular irrigation systems (as in Niger) and infrastructures to protect from flooding (dams in Vietnam);
- on the other hand, promote specific agricultural and livestock farming techniques. The focus is frequently put on varietal changes. This is the case in Niger, where varieties of cereals produced by local populations are promoted and feature potential for resilience to drought and shorter growth cycles. It is also the case in Vietnam, where the selection of varieties that are resilient to drought, flooding and salinisation, while also featuring high productive potential, is a priority in adaptation policies. In Costa Rica, agroecological practices are prioritised;
- regenerate natural capital (reforestation, works aimed at restoring agricultural land, regeneration of grazing land). Making this type of investments can also, as in Niger, enable the creation of employment and income opportunities for the most vulnerable populations;
- provide information on climate risks (early warning systems) and climatic projections over the long term. This is the case in Niger, Costa Rica and even more so in Vietnam, where it is a short-term priority. In terms of using climatic projections, let us mention the case of Indonesia, where the West Java department of agricultural extension promoted "climate field schools", inspired by the experience of field schools aimed in particular at helping farmers to use the climate forecasts of the agricultural cycle to bring their practices in line with integrated farming[66].

Policies often primarily focus on the promotion of new adaptation practices for farmers. However, some countries also give priority to exploitation of traditional knowledge and know-how. In Ghana, the national strategy for adaptation to climate changes provides for the necessity to "*document existing indigenous knowledge and best practices*».[67]

Less frequently, inclusion of adaptation objectives has also led to measures aimed at:

1. improving economic and social conditions for adaptation.

In terms of land policy, Edward R. Rhodes et al. mention that "*For Niger, the granting to users of the right to own and benefit from trees on their farms, through the Rural Code, contributed to the greening of the Sahel*"[68].

The Permanent Inter-State Committee for Drought Control in the Sahel (CILSS and the Centre for International Cooperation/University of Amsterdam specify that "*since 1985, farmers in Niger's Maradi and Zinder regions have already created their version of a Great Green Wall at low investment cost, without any recurrent costs for government and its financial partners*". In Mali, again, before there was any talk of adaptation to climate changes, the new land legislation in 1994 recognising farmers' ownership of trees in their fields made it possible to refuse access to woodcutters, facilitating regeneration of natural vegetation[69].

2. payments for environmental services

Concerning funding by the local authority of practices implemented by farmers, several national experiences of payments for environmental services are justified by the contribution of these practices to mitigation of climate changes. However, these practices can also contribute to improving ecosystems and therefore contribute to adaptation to climate changes. This is the case with the project to promote agropastoral systems implemented in Colombia, Costa Rica and Nicaragua with the participation of the FAO, the Tropical Agricultural Research and Higher Education Center (CATIE) and other partners, which contributed to soil and soil fertility restoration[70]. In Costa Rica, it is also the case for agroecological practices in coffee growing.

66. FAO, *Food Security and Climate Change, "Climate-Smart" Agriculture – Policies, Practices and Financing for Food Security, Adaptation and Mitigation,* 2010

67. Aliou Diouf, Abdulai Jalloh and Edward R. Rhodes, *Review of research and policies for climate change adaptation in the agriculture sector in West Africa,* Working paper, Future Agricultures, May 2014

68. *Ibid.*

69. Permanent Inter-State Committee for Drought Control in the Sahel (CILSS) and Centre for International Cooperation / University of Amsterdam, *The silent transformation of environment and production systems in the Sahel, Impacts of public and private investments in natural resource management,* 2009

70. FAO, *Food Security and Climate Change, "Climate-Smart" Agriculture – Policies, Practices and Financing for Food Security, Adaptation and Mitigation,* 2010

Copyright: ActionAid

3. improving capacities for organisation with a view to adaptation

Some countries included actions to strengthen communities' capacities for organisation in their policies, with a view to facilitating adaptation (community-based evaluation and management of risks in particular). Vietnam recently included such an objective in its strategy for adaptation to climate changes in the agriculture and rural development sector (*Community Based Adaptation*)

4. implementing collective solidarity or insurance systems

Several countries have implemented solidarity and social protection policies making it possible to make monetary transfers or payments in kind (food, inputs) to the most vulnerable categories of the population. Although, strictly speaking, they are not necessarily designed as policies for adaptation to climate changes, they also contribute to them. In Ethiopia, one such policy has been permanently implemented and several million people are benefitting from it. It contributes to increasing the resilience of populations, including in the case of a climatic accident[71]. Various experiments have been conducted with monetary transfers or payments in the form of food, sometimes subject to carrying out community work, in the case of an acute crisis following a climatic accident. In Costa Rica, part of the budget devoted to adaptation to climate changes is used to compensate farmers for their losses.

Similarly, various experiments were conducted in several countries on individual climatic insurance systems based on a climatic index, which were promoted by the World Bank. In India, "*29 million Indian farmers – a quarter of all the country's food producers – signed up for index-based insurance schemes which indemnified them against crop losses caused by adverse weather*"[72]. In Vietnam, pilot insurance projects have as yet generated mixed results.

Some countries implement strategic seed reserves with a view to compensating for poor harvests in the case of climatic accidents. Chinwe Ijefika Speranza observes that this is one of the only policies conducted without external funding on initiatives by countries themselves, which reflects the differences in the assessments, on the one hand by international bodies and cooperation organisations and, on the other hand, by governments in developing countries, of the pertinence of such systems[73]. However, in Niger, a country that is particularly vulnerable to climatic accidents, constitution of food reserves, which are both an instrument to regulate markets and to deal with food crises, is supported by international cooperation.

71. *Ibid.*

72. Charlie Pye-Smith, *Promoting climate-smart agriculture in ACP countries,* CTA Policy brief, n° 9, December 2012

73. Chinwe Ifejika Speranza, *Resilient adaptation to climate change in African agriculture,* Studies n° 54, German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE), 2010

9 CLIMATE STRATEGIES AND POLICIES THAT ARE OFTEN NOT IMPLEMENTED...

National climate strategies are often full of intentions with limited operational implementation. Climate strategies and policies are generally drawn up by institutions that do not have their own operational structures. Furthermore, strategies and policies are often drawn up by external consultants, as was the case for many INDCs. Yet, the implementation of a national climate strategy depends on its effective ownership by ministries and institutions, and particularly those in charge of sectoral policies, more specifically the ministry of Agriculture and the public institutions depending on it. We mentioned the frequent difficulties of coordination between bodies, which often lead to a low level of effective implementation of climate strategies and policies. This limitation is in fact not specific to climate strategies, it can be found in other cross-sectoral strategies (environment, nutrition, etc.).

The National Adaptation Plans (PAN) process implemented by the UNFCCC aims to facilitate developing countries' inclusion of adaptation to climate changes in policies, in particular processes and strategies for planning of development in the various sectors[74].

The implementation of national climate strategies can also be hindered by difficulties in accessing financial resources to fund the actions they are supposed to generate. It is often more difficult for policies aimed at adaptation to receive support from international cooperation than those aimed at mitigation. Often, as we can see in the majority of INDCs in developing countries, their operational implementation depends on subsequently obtaining funding for specific projects funded by international cooperation (the case in Niger). The difficulties must however not be considered in relative terms, because insufficient funding is often the result of political choices (other priorities) or poor use of public funding.

As we mentioned in the introduction, today we lack hindsight and tools to monitor and evaluate the impacts of the implementation of policies on adaptation to climate changes and, more specifically, those on including the climate change adaptation objective in agricultural policies. *A fortiori* there are no real comparative studies on agricultural policies including the objective of adaptation to climate changes and their impacts[75].

74.
United Nations Framework Convention on Climate Change (UNFCCC), *National adaptation plans – Technical guidelines for the national adaptation plan process,* LDC Expert group, December 2012

75.
Mark Purdon, *The comparative turn in climate change adaptation and food security governance research,* Working paper n°92, CGIAR Research program on climate change, agriculture and food security (CCAFS), 2014

3.

RECOMMENDATIONS FOR PUBLIC POLICIES

I. THE NECESSITY FOR CONSISTENCY, COORDINATION AND INTEGRATION BETWEEN CLIMATE POLICIES, AGRICULTURAL DEVELOPMENT AND FOOD AND NUTRITIONAL SECURITY

II. GUARANTEEING COMPLEMENTARITY AND CONSISTENCY WITHIN CLIMATE AND AGRICULTURAL POLICIES

III. GUARANTEEING THE RIGHTS AND PARTICIPATION OF LOCAL POPULATIONS

IV. INCLUDING A GENDER PERSPECTIVE IN ADAPTATION POLICIES

V. DEFINING PRIORITY ADAPTATION OPTIONS FOR FAMILY FARMS

VI. COMBINING VARIOUS PUBLIC INSTRUMENTS

VII. INVOLVING RESEARCH AT VARIOUS LEVELS

VIII. THE ROLE OF INTERNATIONAL COOPERATION

Copyright: Teresa Anderson / ActionAid

1 THE NECESSITY FOR CONSISTENCY, COORDINATION AND INTEGRATION BETWEEN CLIMATE POLICIES, AGRICULTURAL DEVELOPMENT, AND FOOD AND NUTRITIONAL SECURITY

Agricultural policies respond to a variety of economic and social objectives (economic growth, food and nutritional security, etc.). Facilitating adaptation of family farming to climate changes is an additional specific objective.

Achieving this objective partly requires political measures already responding to other objectives, and particularly strengthening the capacity of family farms – especially the most vulnerable groups – to deal with climate variability, various types of hazards (environmental, economic, health-related) and changes in their environment. There should therefore be substantial consistency between the adaptation objective and the objective of strengthening family farms and their resilience. Globally speaking, the sound economic health of family farms and their resilience (especially the capacity to minimize risks and manage losses) to cope with various hazards contributes to strengthening their capacity for adaptating to climate changes. Options which generally tend to improve income and capitalisation for family farms and to reduce their overall vulnerability are the best options for adaptation to climate changes, including forthcoming climate changes. James W. Hansen et al. thus consider that "improving rural livelihoods now through aggressive propoor development may be the most promising avenue for adapting to future climate change"[76].

Some family farms in apparent good health may in fact be threatened in the longer term by agricultural practices that degrade the ecosystem cultivated. They can also generate negative outputs that increase the vulnerability of other populations, which is frequent in systems generated by the green revolution or based on massive deforestation. Not all options for strengthening family farming contribute to the specific objective of adaptation to climate changes, and those that do contribute do so to varying degrees. One of the criteria for evaluating these options should therefore be the degree to which they contribute to adaptation to climate changes.

The objective of strengthening capacities for adaptation to climate changes can lead to strengthening specific measures related to resilience in agricultural policies. But it can also require specific measures responding to the multiplication of climatic risks and uncertainties regarding climate or climatic parameter trends, by including both changes already observed and those ahead.

Agricultural and food security policies must therefore include objectives related to family farms' adaptation more comprehensively than is currently the case.

With regards mitigation, adaptation is a primary climatic objective for agriculture in developing countries. At a global level, mitigation efforts in the area of agriculture primarily requires questioning of production and consumption models in the wealthiest countries, models generated by these countries (industrial agriculture, losses and wastage, overconsumption of animal products, etc.), which are major contributors to global warming. However, family farms in developing countries can also contribute to reducing greenhouse gas emissions, especially when they implement systems based on the green revolution or on destruction of forestry resources. Including the mitigation objective can be all the more justified because, as pointed out, there are often co-benefits and synergies between practices aimed at adaptation and those aimed at mitigation. So, from a societal point of view, the contribution of family farming to mitigation, and more generally to the production of other positive environmental outputs, could justify specific remunerations. It could also facilitate access to certain international funding mechanisms in the future.

76. Walter Baethgen, Pietro Ceccato, James W. Hansen, Robinson Kinuthia Ngugi et Dan Osgood, *Innovations in Climate Risk Management: Protecting and Building Rural Livelihoods in a Variable and Changing Climate,* Journal of Semi-Arid Tropical Agricultural Research, 2007

Joint integration of adaptation and mitigation objectives could be mutually beneficial for each objective, and could also strengthen family farming in itself, therefore its contributions to the economic and social development of the country as a whole. However, mitigation and adaptation can also be contradictory. Bruno Locatelli *et al.* point out that "*Policy integration also requires the removal of internal contradictions among climate change policies: these contradictions are clear in some analyzed cases where integrated approaches led to lose–lose rather than winwin situations*"[77].
Bruno Locatelli *et al.* suggest defining an integrated climate policy "*as the incorporation of adaptation and mitigation objectives into policymaking of sectoral policies (e.g., agriculture), the aggregation of adaptation and mitigation outcomes into policy evaluation, and the minimization of contradictions between adaptation, mitigation and sectoral policy objectives.*"[78]. These authors also stress that "To ensure climate policy integration, we need to move from the traditional 'endofpipe' approach to a preventative approach that considers both adaptation and mitigation from the stage of policy formulation and includes consideration of specific institutional structures and procedures that can facilitate such integration »[79].

So, all objectives relating to climate changes should be included in agricultural and food security policies, rather than defining policies specific to climate changes:

- Choosing specific climate policies implies drawing up new policies, whereas States already have difficulty implementing existing policies, it implies generating risks of duplication, competition or inconsistency with these policies. In addition, adaptation measures are specific to each sector and it is difficult to envisage that an institution specialised in climate changes has the capacities, technical skills and authority to directly intervene in the various sectors;
- on the contrary, including climate objectives in existing policies makes it possible to draw on existing capacities, technical skills and links with stakeholders in the field. It also contributes to placing greater focus in interventions on concrete adaptation or mitigation measures rather than on climate monitoring, models and forecasts[80];
- inclusion of climate objectives in existing policies rather than the promotion of policies designed exclusively in terms of climate objectives makes it possible to avoid implementation of measures that could lead to negative impacts for economic and social development, for family farms' access to land and natural resources and for food security. This is partly why Coordination SUD is calling for projects or initiatives recognised as part of the 4 per 1000 Initiative on agricultural soils be evaluated upstream using a variety of criteria[81].

It is important therefore that agricultural policies can be based on overall diagnoses of agrarian situations, including the climate dimension, in order to, as Emmanuel Torquebiau et al. point out: "*ensure that diagnosis and action go hand in hand, making a break from the practice of transferring wholesale solutions designed and evaluated according to certain criteria that do not necessarily reflect all of the issues to be addressed.*"[82]. Such diagnoses must be completed with a forward-planning dimension, which must not be limited to forecasts in terms of climate hazards but also focus on the vulnerability of populations and territories.

Inclusion of climate objectives in existing policies - especially agricultural and food security policies – does not however exclude the upstream definition of a national climate strategy and action plan. These provide the means to define a real national vision on climate changes (desired situation within a certain time frame), an overall roadmap to achieve this and of the respective role of each sectoral or cross-sectoral policy (energy, infrastructure, education, etc.). In this way they contribute to driving and ensuring monitoring of inclusion of climate objectives in sectoral and cross-sectoral policies and to facilitating complementarity and consistency between the various actions implemented as part of these policies. Similarly, the creation of a specific authority and institution dedicated to climate changes can contribute to planning, monitoring and overall evaluation of the inclusion of climate objectives in various policies, to their effective coordination, promotion or provision of specific services (particularly climatic and hydrological information). In addition, this institution can be the point of contact with the UNFCCC

77. Monica Di Gregorio Bruno Locatelli, Charlotte Pavageau and Emilia Pramova, *Integrating climate change mitigation and adaptation in agriculture and forestry: opportunities and trade-offs,* WIREs Clim Change, 2015

78. *Ibid.*

79. *Ibid.*

80. Louis Bockel and Barry Smit, *Climate Change and Agricultural Policies - How to mainstream climate change adaptation and mitigation into agricultural policies,* FAO, 2009

81. Coordination SUD, *The 1 per 1000 Initiative: caution!*, October 2015

82. Dominique Berry, Patrick Caron, Jean-Yves Grosclaude and Emmanuel Torquebiau, *New Research Perspectives to Address Climate Challenges Facing Agriculture Worldwide,* Climate Change and Agriculture Worldwide, éditions Quae, 2015

and funding mechanisms[83]. It can also contribute to reconciling funding for climate and development policies. This reconciliation is one of the main challenges for inclusion of adaptation in agricultural policies[84].

The definition of such a strategy and of such action plans must involve sectoral institutions, and their implementation must clearly establish the allocation of responsibilities among institutions. The head of the executive must be able to guarantee effective implementation of orientations by the institutions concerned. Relative sustainability of the institutional architecture, the policy implemented and the public service employees responsible for the latter is particularly important, as the process of adaptation to climate changes can only take place over the medium and long term.

It is also necessary to ensure complementarity and synergies between national strategies and action plans related to the three respective Conventionss on biodiversity, combatting desertification and the fight against climate changes. As Chinwe Ifejika Speranza points out, the pertinence of drawing up and implementing a single environmental action plan and strategy from the outset, integrating the three objectives, could avoid wasting time and resources on seeking and subsequently dealing with possible synergies and contradictions[85].

Copyright: Turjoy Chowdhury / ActionAid

83. Louis Bockel and Barry Smit, *Climate Change and Agricultural Policies - How to mainstream climate change adaptation and mitigation into agricultural policies,* FAO, 2009

84. Interview with Emmanuel Torquebiau

85. Chinwe Ifejika Speranza, *Resilient adaptation to climate change in African agriculture,* Studies n° 54, German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE), 2010

2 GUARANTEEING COMPLEMENTARITY AND CONSISTENCY WITHIN CLIMATE AND AGRICULTURAL POLICIES

It is all the more necessary to guarantee complementarity and consistency between the various interventions related to climate changes because certain measures can only be effective if they are accompanied or preceded by other measures. The effectiveness of early warning measures is a key element to trigger other adequate adaptation measures or policies, for example the mobilisation of strategic seed reserves[86].

Furthermore, it is necessary to have complementarity and consistency between measures related to climate changes and other agricultural policy measures. Many measures, particularly grants, do not take account of climate objectives and can facilitate forms of agriculture that are contrary to desirable developments, such as systems that are less vulnerable and generate less greenhouse gas emissions. This is particularly the case with policies regarding grants for chemical inputs that do not facilitate practices to adopt agroecological systems, whereas other measures can support these types of systems. More generally speaking, it is necessary to avoid the frequent inconsistency between widespread promotion of green revolution solutions, where productivist objectives are put forward with the claim they will increase the country's ability to emerge, and the recurrent precariousness of family farms, which is heightened by climate risks, in the countries of the Sahel for example. More realistic agricultural policies should first and foremost aim to consolidate the resilience of family farms, in particular to cope with climate changes, rather than claiming to make them the champions of the green revolution.

It is often necessary, therefore, to ensure better overall coherency of the agricultural policy and complementarity between the various types of measures. As pointed out by Louis Bockel, many measures including climate objectives, among which payments for environmental services, could be funded via reallocation of certain existing funding[87].

Similarly, it is important to ensure complementarity and consistency between the agricultural policy, more global policies integrating the agricultural sector (policies concerning economic development, food security, poverty reduction, rural development), and cross-sectoral policies involving or impacting on agriculture (policies concerning water management, the environment, management of climate disasters, energy, infrastructures, health, education, gender equality, etc.). Generally speaking, although efforts for consistency are often made at policy definition level, the main consistency issue today is primarily an issue of implementation. Complementarity and consistency of interventions must also be ensured at local and regional level.

This brings us to the question of the role of local and regional authorities in policies contributing to adaptation to climate changes. The most pertinent adaptation strategies and options vary according to the territories in question and must be defined in close proximity and with the participation of local populations. Local and regional authorities must therefore play a central role in terms of including climate objectives in public policies, especially agricultural policies, with participation from local populations for the definition and monitoring of these policies, including involvement from informal institutions. Consequently, apart from defining overall orientations for adaptation and directly implementing certain actions, national policies must, to a large extent, serve to promote and facilitate local policies contributing to adaptation via an appropriate legal framework, technical and methodological support, as well as financial support, with close collaboration from populations.

Cooperation between States is also necessary for collecting, analysing and sharing climatic and hydrological information, and for management of watersheds or cross-border territories used for grazing[88].

86. *Ibid.*

87. Interview with Louis Bockel

88. Aliou Diouf, Abdulai Jalloh and Edward R. Rhodes, *Review of research and policies for climate change adaptation in the agriculture sector in West Africa*, Working paper, Future Agricultures, May 2014

International cooperation organisations, institutions and agencies also have a responsibility in terms of complementarity and consistency of climate and agricultural policies. Their forms of intervention must not facilitate sectoral or specific approaches that are fragmented from a national policy and lead to competition between Ministries and other public institutions.

3 GUARANTEEING THE RIGHTS AND PARTICIPATION OF LOCAL POPULATIONS

Populations' participation in planning and implementation of local adaptation strategies and policies guarantees that their fundamental rights are respected. It also makes it possible for these strategies and policies to be really appropriate to needs, and to highlight local knowledge of ecosystems and know-how in terms of managing these ecosystems. In addition, it enables real ownership of strategies and policies by these same populations. This also strengthens the sustainability of adaptation strategies.

Community-based adaptation aims to support local populations to understand the changes they are facing and take appropriate measures based on this understanding. The CARE association, for example, promoted processes for "Community-based Adaptation Action Planning" (CAAP), which could provide inspiration for public policies (see boxed text).

It is important that these processes be integrated in local policies and contribute to strengthening the participation of populations in their definition. They require taking account of climate changes in already complex development processes, by including new information, ways of thinking and approaches, and by working on this with various stakeholders[89].

Populations' adaptation plans at village level and local development plans that are defined and implemented at local government level, can be strengthened mutually:

- integration in local development plans of populations' priorities in terms of adaptation makes it possible for populations to have better access to resources, to provide them with the resources they need for their own plans, in other words to facilitate support from public institutions for populations' adaptation plans at village level;
- the process of drawing up adaptation plans at village level provides knowledge that can facilitate integration of issues related to adaptation to climate changes and priorities identified by local population, in local development plans. When populations draw up their own plans, it increases their capacities and their recognition by local governments, and therefore facilitates better integration of their priorities in the process of preparing local development plans. In this regard, it is important that local governments be trained to consult with populations and that they have a duty to explain to these populations what has been retained and what has not been retained from their proposals, as well as the reasons for these choices. It is also important that local governments be able to identify and take full account of the situation and needs of the most vulnerable groups. At local level there may be significant social differences and less capacity among the most vulnerable groups to express themselves and articulate their points of view and priorities.

To do this, it is important that local governments' representatives (elected bodies and representatives of ministries and public institutions, especially the ministry of Agriculture) participate in processes for planning adaptation actions at village level. This contributes to strengthening their capacities in terms of adaptation to climate changes, and also strengthens the links and accountability of public institutions vis-à-vis populations[90].

89. Care International, Adaptation planning with communities – Practitioner brief 1, 2015

90. *Ibid.*

CARE'S EXPERIENCE IN TERMS OF COMMUNITY-BASED ADAPTATION

Promoting community-based adaptation is a difficult exercise in so far as it requires practitioners to add a climate perspective to already complex development processes, introducing new information, reflections and approaches, and working with a variety of stakeholders.
Planning is a crucial element of community-based adaptation (CBA) because successful adaptation depends on the capacity to manage climate impacts, risks and uncertainties, which requires informed, forward-looking decision-making. The basic process of Community-based adaptation action planning (CAAP) requires analysis of information, identification of actions and stakeholders concerned, prioritisation and operationalization. These are the key aptitudes underlying adaptation capacity, enabling people to learn and use their knowledge and experience to manage the risks and uncertainty related to a changing climate. With these aptitudes, people are able to process climate information, analyse their situation and the root causes of vulnerability, plan for the future and make choices in terms of their living conditions and risk reduction strategies. Local institutions also need to possess these aptitudes to make their activities and plans resilient to climate changes and to support community-based adaptation[91].

At national level, it is also necessary to plan mechanisms for consultation and exchange enabling national policies to draw fully from lessons learnt from experiences at local level and to focus on the needs and points of view of the stakeholders involved in these experiences, in terms of policy definition, implementation and evaluation.

4 INCLUDING A GENDER PERSPECTIVE IN ADAPTATION POLICIES

In a report published in 2012, the UNFCCC LDC expert group argued for the necessity to include a gender perspective in the definition and implementation of national adaptation plans and made a certain number of recommendations[92]. It seems to us that the observations and recommendations made must be included more globally in all policies responding to an objective regarding adaptation of family farming to climate change.

The expert group recalls that: "*In many countries, women face historical disadvantages, which include limited access to decision-making and economic assets. The dynamics of gender can thus lead to a situation in which women are more vulnerable to the adverse impacts of climate change. Women's disproportionate dependence on natural resources and their pre-dominant roles in the community and in the household can make them particularly vulnerable when the resources on which they depend are adversely impacted, become scarcer or are harder to access due to climate change.*"

The group subsequently points out that "*integrating a gender perspective into the NAP process can help to ensure that there is equal participation of men and women in the decision-making processes, as well as in the implementation of adaptation activities. Furthermore, it can help to ensure that the NAP process and the activities it entails will not exacerbate gender inequalities. It can lead to better adaptation, and more resilient communities.Women can act as key active agents of adaptation in societies. Their often deep understanding of their immediate environment, their experience in managing natural resources (water, forests, biodiversity and soil) and their involvement in climate-sensitive work such as farming, forestry and fisheries should be harnessed.*" Various studies have shown that projects produce better results when gender issues and dynamics are integrated in their planning and implementation.

91. *Ibid.*

92. United Nations Framework Convention on Climate Change (UNFCCC), *National adaptation plans - technical guidelines for the national adaptation plan process*, LDC Expert Group, December 2012

Including the gender dimension in processes for defining and implementing adaptation policies can be achieved through various activities. Among these, the UNFCCC experts mention:

- "*Assessing what information is available regarding particularly vulnerable groups including women, and further researching on this topic in the country ;*"
- "*Harnessing the potential of women as agents of change within their communities, and investing in this potential as part of the NAP process;*"
- "*Tailoring and implementing the NAP activities based on an understanding of gender dynamics and the potentially disproportionate impacts of climate change on women*";
- "*Ensuring the participation of the most vulnerable groups, including women, in the NAP process. This includes integrating the perspectives of women and drawing on their unique adaptation knowledge and local coping strategies when formulating the NAP;*"
- "*Undertaking outreach to ensure that different stakeholders understand the gender dynamics of climate change;*"
- "*Using sex-disaggregated data in vulnerability and adaptation assessments ;*"
- "*Monitoring and reporting on the integration of gender considerations into the NAP process ;*"
- "*Evaluating the integration of gender considerations into adaptation and making improvements if necessary.*"

5 DEFINING PRIORITY ADAPTATION OPTIONS FOR FAMILY FARMS

Inclusion of the objective of family farms' adaptation to climate changes in public policies requires defining, on the one hand, priority adaptation options, and on the other hand, the most appropriate political instruments to promote and implement these options. Here we discuss the issue of definition of priority adaptation options.

Evaluation of the various options in light of the various criteria must partly draw on specific studies featuring indepth analysis of agrarian systems and farms. However, in order to be pertinent, evaluation of adaptation options must be largely conducted by local populations and their representatives within participative processes. This requires the definition of appropriate methodologies enabling populations to identify, take ownership of and evaluate the possible effects of the options envisaged.

1. Criteria for definition of priorities regarding adaptation options

In order to define priorities in terms of adaptation options, it is necessary for public authorities to evaluate and compare the various options based on pertinent criteria[93]. This evaluation must integrate criteria corresponding to family farms' and local populations' points of view, as well as pertinent criteria in terms of the general interest of society as a whole. Louis Bockel points out that adaptation is very difficult to measure and it is advisable to implement methods combining quantitative and qualitative approaches[94]. The main criteria to be retained should be:

- the technical feasibility of the adaptation option for family farms and local populations;
- the impact of the option in terms of family farms' autonomy. It is important not to create new technological or financial dependencies that would strengthen the vulnerability of farms over the medium term;
- the effectiveness of the adaptation option in terms of reducing the hazard or the vulnerability of family farms
- economic efficiency. The possible improvement of average agricultural income generated by the adaptation option must be evaluated, which requires taking into account the decrease in indirect costs related to climate accidents (interests on loans, replacement of capital destroyed, etc.) and specific costs related to the adaptation option.

93. Ben Bradshaw, Chris R. Bryant, A. Holly Dolan, Mark W. Skinner et Barry Smit, *Adaptation to climate change in agriculture: evaluation of options,* Occasional papers in geography, Department of Geography, University of Guelph, n°26, 2001

From a general interest point of view, the extra added value generated by the adaptation option must be taken into account;

- the extent to which the adaptation option removes obstacles, i.e. its capacity to facilitate the implementation of other options or decisions;
- flexibility of the adaptation option, i.e. its capacity to reduce vulnerability when faced with a variety of possible climatic conditions, all the more so as there is usually a high level of uncertainty as to future climate evolutions and their possible implications;
- differentiated impacts according to gender and age, in terms of workload, autonomy, allocation of decisions and income, and to what extent does the option contribute to greater equality between men and women;
- institutional compatibility, i.e. consistency of the option with existing laws, regulations and institutional structures;
- the technical and institutional feasibility of the political measures necessary to promote and support the option. It depends in particular on the technical, human, organisational and financial capacities of public institutions;
- acceptability and possibility of ownership at both the individual level and the social and cultural level. At individual level, acceptability depends, on the whole, on the criteria mentioned above, but also on the option's compatibility with the various objectives of farms and with their constraints (security of access to land, working calendar, cash flow, conditions of access to credit, inputs and markets, etc.) and with local and traditional practices and know-how. The existence of opportunity costs must be taken into account. For example, if the adaptation option requires a lot of work, it can be more opportune for the farming family to use the available workforce in other incomegenerating activities. On a social level, acceptability depends in particular on the rules governing the use of land and natural resources[95];
- the capacity to generate co-benefits independently of adaptation to climate changes. It is pointed out that "*the majority of adaptation options are not just adaptations [to climate changes], they are also practices and methods that have repercussions on other aspects of agricultural production and are affected by conditions other than climate. Farmers(…) and governmental agencies rarely assess production choices based solely on climate changes and adaptation options must [consequently] be undertaken in light of broader decision-making processes[96]. At individual level, the issue of co-benefits is closely related to that of acceptability: it is necessary to estimate to what extent the option contributes to the farm's other objectives, particularly to the family's food and nutritional security. At the collective level, it is necessary to estimate to what extent the adaptation options are likely to generate co-benefits for the local community, on a more substantial scale (hydrological basins, etc.), or that respond to a more global general interest (society, humanity). Co-benefits can be economic (see efficiency in terms of society), social (particularly food and nutritional security, sanitary quality of food, employment, other fundamental economic and social rights, fight against social inequalities and inequalities between men and women) or ecological (biodiversity, water management, fight against flooding, torrents and erosion, quality of water, mitigation [of climate changes])*"[97].
- potential for replicability and dissemination. This requires aptitudes among individuals and populations to adopt and adapt approaches and techniques, including their own knowledge and experiences, and to disseminate these using endogenous circuits and mechanisms for the transfer of knowledge and practices.

Based on the various criteria, priority adaptation options will not be the same for different social groups. Family farming is in fact highly diverse. Therefore it is important to take account of this diversity and envisage possible differentiated policies according to social groups. It is important to attribute particular importance to adaptation options that are pertinent for the most vulnerable social groups and to define policies that are appropriate for these social groups.

2. Prioritising combined adaptation-mitigation approaches

Including adaptation to and mitigation of climate changes in agricultural policies is advisable. But the question is whether adaptation and mitigation objectives should be included jointly or separately in sectoral policies. This question gives rise to debate (see

94.
Interview with Louis Bockel

95.
Christian Castellanet, Laurent Levard, Didier Pillot and Aurélie Vogel, *Agroecology: evaluation of 15 years of AFD support,* AFD, 2014

96.
Ben Bradshaw, Chris R. Bryant, A. Holly Dolan, Mark W. Skinner and Barry Smit, *Adaptation to climate change in agriculture: evaluation of options,* Occasional papers in geography, Department of Geography, University of Guelph, n°26, 2001

97.
Ibid.

boxed text below). Given these elements of debate, and the example of Costa Rica, for Coordination SUD, combined approaches (joint inclusion) can make it possible to create real synergies and recognise the positive role of family farms in ecosystems (positive outputs), especially in terms of mitigation of climate change, but also in terms of development and food and nutritional security. In this way they can facilitate the remuneration of small farmers with regard to this contribution, for example in the form of payments for environmental services (PES)[98]. As previously mentioned, adaptation options must be designed not just for plots, but also for territories as a whole, for example with mitigation being prioritised for certain areas and adaptation for others, even if it is necessary above all to give priority to agroecological practices enabling the two objectives to be dealt with in the same areas (*land sharing*, as opposed to the concept of *land sparing*).

THE DEBATE ON THE SUBJECT OF COMBINED APPROACHES

Bruno Locatelli *et al.* point out that certain arguments advocate in favour of separate inclusion: the fact that spatial and temporal adaptation and mitigation scales can be different, difficulties for aggregation of costs and benefits for each objective, the fact that certain sectors are primarily concerned by one or other of the two objectives (for example, mitigation for industry and transport, and adaptation for health and coastal areas)[99]. Referring to development projects, Stephen Leonard *et al.* consider that the approach based on adaptation-mitigation synergies can give rise to projects that are difficult to implement and administrate, and can generate insufficient results in terms of both adaptation and mitigation. Project developers could be tempted to sell projects aimed mainly at mitigation as "adaptation" projects and vice versa. Limitations in terms of skills and capacities therefore advocate keeping the two aspects separate. They add that there is a risk that, due to integration, funds for adaptation could in practice be redirected to mitigation, whereas funds for adaptation are already insufficient[100]. However, concerning the agriculture sector, we mentioned that there are possible synergies between adaptation and mitigation, which argues for simultaneous integration of these two objectives in agricultural policies, which must make it possible to increase effectiveness and efficiency[101-102] .

Stephen Leonard *et al.*, recommend thinking in terms of synergies rather than in terms of co-benefits. They mention for example that, by including adaptation in forestry projects, it is possible to facilitate acceptance of the project by local populations, so that consequently actions are more sustainable[103].

They point out however that policies based on combined approaches must take into consideration the fact that projects can be more complex and costly, and it is important to fully understand the possible contradictions between adaptation and mitigation[104].

Duguma *et al.* consider that four conditions need to be in place to create effective synergies: existing laws, policies and strategies that are unified at national level; planning of financial resources and measures to promote these synergies; implementation of institutional systems aimed specifically at issues relating to climate changes and the launch of plans, programmes and initiatives in the country[105].

98. Mechanisms for payments for environmental services must be well designed through participative approaches fully involving local populations. It is necessary to ensure their effectiveness, their fairness and their coordination with other national and local policies. In order to be real instruments for investment in ecosystems, they must include the various costs from the design phase (including strengthening of capacities, training, long term support to structure value chains, etc.). See Camille Lejean, *Ensuring that Payments for environmental services contribute to fair development,* Develoment policies and practices, Gret, October 2012 and Sylvain Angerand, Christian Castellanet, Alain Karsenty and Aurélie Vogel, *Paying for the environment. Can the REDD+ mechanism and the Payments for Environmental Services (PES) tackle the underlying causes of deforestation?,* Summary note, Cirad-Gret-Les Amis de la Terre, 2013

99. Monica Di Gregorio Bruno Locatelli, Charlotte Pavageau and Emilia Pramova, *Integrating climate change mitigation and adaptation in agriculture and forestry: opportunities and trade-offs,* WIREs Clim Change, 2015

100. Himlal Baral, Stephen Leonard, Bruno Locatelli, Christopher Martius, Daniel Murdiyarso et Margaretha Quina, *A match made in Paris – Adaptation-mitigation synergies in the land sector,* CIFOR infobrief n°137, May 2016

101. Monica Di Gregorio Bruno Locatelli, Charlotte Pavageau and Emilia Pramova, *Integrating climate change mitigation and adaptation in agriculture and forestry: opportunities and trade-offs,* WIREs Clim Change, 2015

102. Lalisa A. Duguma, Peter A. Minang, Meine Van Noordwijk and Susan W. Wambugu , *A systematic analysis of enabling conditions for synergy between climate change mitigation and adaptation measures in developing countries,* Environmental Science & Policy 42, 2014

103. Himlal Baral, Stephen Leonard, Bruno Locatelli, Christopher Martius, Daniel Murdiyarso and Margaretha Quina, *A match made in Paris – Adaptation-mitigation synergies in the land sector,* CIFOR infobrief n°137, May 2016

104. *Ibid.*

105. Lalisa A. Duguma, Peter A. Minang, Meine Van Noordwijk and Susan W. Wambugu , *A systematic analysis of enabling conditions for synergy between climate change mitigation and adaptation measures in developing countries,* Environmental Science & Policy 42, 2014

3. Adaptation options to be prioritised

The first part of this document presented various individual or collective options for adaptation to climate changes. To a great extent, the choice of options must be made by family farms and local populations, according to their specific needs and characteristics. They must receive support for this (favourable economic environment, access to specific know-how and information, support for their organisation). In particular, public authorities must implement structural measures, joint regional and local development plans and specific investments. Governments can influence farmers' and local populations' choices. By taking account of the realities of the country and its agriculture, they must define priorities to meet the general interest of the population and future generations (economic and social development, food and nutritional security, preservation of the natural heritage and environmental quality, reduction of flooding risks), also by taking account of joint commitments by the international community, in particular with a view to the fight against climate changes and respect of human rights. In light of this it has been pointed out that it is important that public authorities be able to evaluate the various possible adaptation options based on pertinent criteria in order to identify priorities and design appropriate policies for supporting family farms and local populations. It is important to plan a variety of complementary adaptation options that ensure a certain flexibility of adaptation in a context where it is often difficult to forecast with certainty the various effects of climate change.

In this context, it is up to public authorities, working jointly with local authorities and civil society organisations, to define the distribution of funding allocated to reducing hazards (large-scale irrigation systems) and of that allocated to reducing the vulnerability of populations and strengthening their capacity to adapt to these hazards. Very often, as pointed out by Olivier Gilard, it is "*preferable to gear public funding towards management of vulnerabilities*" rather than "*invest in costly investments to reduce the hazard*"[106].

The need for public policies to retain adaptation options in line with the agroecology approach must be underlined. Fully exploiting the potential of ecosystems, which is the premise of agroecology, combined with comprehensive integration of objectives for maintaining and improving the ecosystem cultivated, contribute to increasing production, greater regularity of production and income, a high level of autonomy vis-à-vis external resources, and multiple positive impacts for the environment. Agroecology is also a key means to strengthen small-scale and family farming, as well as food and nutritional security. On condition that it benefits from favourable production conditions and a positive economic environment, family farming tends to generate more added value per unit area, more employment and more income for the population than agribusiness, mainly because of greater labour intensity and the implementation of more complex production systems with more intensive use of ecosystems' potential and more moderate use of external inputs. Generally speaking, small-scale and family farming also tends to be a lot more attentive to preserving the ecosystem, because the latter is its basic source of current and future livelihood .

In this context, it is necessary to highlight the advantages of combined approaches based on the promotion of options responding to both adaptation and mitigation objectives, given that there are synergies between them. These options, which are usually in line with the principles of agroecology, often contribute to generating other positive outputs for the population (employment, food and nutritional security, biodiversity, protection of soil and water sources, fight against flooding, landscapes, etc.).

106.
Olivier Gilard, *Hazards, vulnerability and risk,* Climate Change and Agriculture Worldwide, éditions Quae, 2015

6 COMBINING VARIOUS PUBLIC INSTRUMENTS

1. Policies aimed at the overall strengthening of family farms

We have mentioned that family farms' capacity to adapt to climate changes depends largely on their general economic situation and their low level of overall vulnerability. So, all policies aimed at strengthening family farms are in themselves policies that are favourable for adaptation. Without entering, in this report, into an exhaustive review of these policies, we can identify three main areas of support[108]:

- fair access to land and natural resources. Supporting the development of family farms means removing the increasing competition they are meeting with other uses in access to natural resources, especially land and water, via protection from land-grabbing, reform of land policies and better management of natural resources. In this regard, the implementation of *Voluntary guidelines for responsible governance of land regimes applicable to land, fisheries and forestry* in the context of national food security, is an essential element;

- stable, remunerative prices. In developing countries, agricultural work is generally underpaid to a large extent compared to other sectors. Measures aiming to ensure remunerative, stable prices make it possible to improve farmers' standard of living and encourage them to make investments over the medium and long term. The consequent increases in productivity also make it possible to reduce production costs, for the benefit of consumers. Support provided to farmers in terms of marketing of family farms' products and price formation must therefore be prioritised (commercial policies, buffer stocks, provision of support to value chains);

- investment in family farms, whether with a view to funding family farms themselves or public tangible or intangible investments (research, training, etc.).

2. Policies aimed at reducing climate-related hazards and climate-related evolutions

At a global level, the main strategy for reducing climate-related hazards and climate-related evolutions is the fight against global warming, which requires participation from all countries within the multilateral framework of the UNFCCC (even if the majority of reduction efforts must be made by the wealthiest countries, which are responsible for the majority of green-house gas emissions).

At national and local level, public policies can contribute to reducing hazards resulting from or exacerbated by climate changes (frequency and intensity of flooding, torrents and temporary drops in water availability) – in this case they are integrated in strategies for managing climate disaster risks – or to compensating for climate-related structural evolutions (rise in sea level, salinisation of deltas, depletion of water resources). These policies often involve substantial investments: dams, dykes, reforestation, water harvesting and distribution via irrigation systems. Their pertinence must be carefully examined with regard to their cost, their impacts, available budgets and other needs in terms of adaptation based on reduction of populations' vulnerabilities.

Reducing hazards can also be achieved via a regional and local development policy decided and implemented at the most pertinent geographic levels, with the participation of local authorities and populations. It is important in particular to identify watersheds where woodlands must be conserved or restored, constructible zones, excess water evacuation zones and systems, and water requirements in light of future evolutions in the population, in uses and in supply sources.

3. Policies aimed at improving social and economic conditions of adaptation for farms and local populations

We mentioned that several adaptation options require investments intended to reduce vulnerability to climate changes, which can only be profitable over the long term (protec-

107. Coordination SUD, *Agroecology: a response to the agricultural and food challenges of the 21st century,* 2013

108. For a more exhaustive review of these policies see Coordination SUD, *Which public policies for family farming in developing countries?,* 2010

tive dykes, plantations, etc.). Policies to support these investments are therefore essential, via grants in the form of transition funds, as suggested by Charlie Pye-Smith[109]. Grants can also be indirect via enhancement of the investment credit, making it possible to decrease interest rates to viable levels for farmers. However, as there is a long pay-back period for this type of investment, it is generally preferable to prioritise direct grants.

Although grants can be targeted for certain types of investments, it is important to provide farming households with a sufficiently flexible range of options so that they themselves can choose the options they consider most suitable. The grants offered must also concern collective investments identified through participative processes for drawing up regional and local plans for development and for reducing vulnerabilities. The implementation of grants is particularly appropriate in so far as the investments in question make it possible to respond to general interest objectives, such as protection of natural resources and watersheds or overall food security.

The implementation of regulations and standards governing the practices of farmers (plantation or terracing of certain zones that are sensitive to erosion, use of water resources, management of crops and grazing land, etc.) can also be a complementary instrument to accelerate and ensure the implementation of development plans contributing to the reduction of overall vulnerability in certain territories. It is important that local authorities and populations participate in their definition, which should be accompanied by reflection on conditions for their implementation, in particular funding of investments, time frames, technical support and possible offsets for farmers, particularly if they lead to losses of income. It is necessary to ensure that these rules are economically viable and socially acceptable for populations.

It is also important that public authorities facilitate farmers' access to diversified genetic material enabling diversification of systems and the use of species and varieties that can resist climate shocks: support for conservation mechanisms, exchange and distribution of genetic material, legislation that promotes preservation of genetic diversity.

Very often, practices facilitating adaptation to climate changes - especially agroecological practices – generate positive outputs for society. By drawing inspiration from some experiences of this type of policy (Central America and Colombia in particular), support for these practices could be integrated in agricultural policies in the form of specific payments (payments for environmental services) or by making some grants subject to the implementation of certain types of practices, in particular agroecological practices.

Putting commercial policies back on the agenda with a view to ensuring remunerative prices for family farms is all the more justified as climate changes will tend to further increase inequalities in terms of agricultural productivity between countries with temperate climates and countries located in intertropical regions, with the latter being the worst affected by climate changes.

The implementation of appropriate land policies and natural resource management policies is also a key condition to ensure farmers benefit from the practices and investments they make with a view to improving the ecosystem cultivated (crop calendars, green fertilisers, leaving crop residues in situ, regeneration of natural vegetation, plantation of trees, soil and water management practices). As pointed out by CILSS – Permanent Interstate Committee for Drought Control in the Sahel, and the Centre for International Cooperation / University of Amsterdam, drawing from the experience in Niger, acknowledging in forestry legislation that if "*farmers have an exclusive right to the trees in their fields, governments could incentivize millions of farmers to invest in trees*"[110].

It is also important that local authorities and populations fully participate in the definition and implementation of such policies at local level in order to ensure joint management of these resources, which leads back to the issue of organisational capacities.

4. Policies aimed at improving access to information, knowledge and know-how facilitating adaptation

As pointed out by NGO CARE: "*Climate information is a critical input to adaptation processes, including longer-term climate projections and shorter-term information such as seasonal forecasts, early warnings for climate extremes, short-range weather forecasts and local rainfall records. In some contexts, access to this information is difficult, due to lack of availability, poor communication systems or political barriers to access for local stakeholders.* "[111]. Strengthening of weather reading and forecast systems, dissemination of avai-

109.
Charlie Pye-Smith, *Promoting climate-smart agriculture in ACP countries,* CTA Policy brief, n°9, December 2012

110.
Permanent Interstate Committee for Drought Control in the Sahel (CILSS) and the Centre for International Cooperation / University of Amsterdam, *The Silent Transformation of Environment and Production Systems in the Sahel, Impacts of Public and Private Investments in Natural Resource Management*, 2009

111.
Care International, *Adaptation Planning with Communities – Practitioner brief n° 1,* 2015

lable information (radio, mobile phones) and implementation of early warning systems are useful measures to enable farmers, local populations and public authorities to anticipate possible climatic accidents and their consequences (drought, flooding, heavy rains, parasite infection) and, possibly, as far as farmers are concerned, to adapt crop management (especially choice of sowing dates) and breeding practices accordingly. It is important that the information disseminated can be easily interpreted by all family farms, including the poorest, which is often not the case today.

It is also important to develop systems to forecast climate evolutions over the long term on a more precise geographic scale than is currently the case, as well as forecasts related to impacts on water supply (surface and groundwater) and on climate risks. It must be possible for political deciders and local populations to subsequently interpret and use this information in participative processes. More generally, the issue of research policy is also central.

Furthermore, the challenges posed by climate changes heighten the need for support and advisory systems for farmers that are related to research. It is necessary to support farmers to diagnose the impacts of climate changes and take future forecasts into account, to identify possible adaptation options, and to test and evaluate these. These systems must therefore place strong focus on experiments by farmers themselves and sharing of experiences between farmers, both at local level (farmers from the same community) and at a larger geographic level in order to fully exploit successful experiences implemented in certain territories.

The implementation of support and advisory policies suited to the realities of family farming and based on support for experimentation by small farmers and exchanges between farmers often requires a significant change in initial and vocational training systems for agricultural technicians and agronomists. Professionals working for this type of policy must have solid, multi-disciplinary training, a good understanding of agroecology mechanisms, know-how specific to a support and evaluation approach and attitudes enabling them to recognise and fully exploit local know-how. It is particularly important that training and advisory systems are not influenced by the interests of companies related to the marketing of conventional agriculture "technical solutions" (seeds, chemical pesticides and fertilisers).

Support and advisory systems can also be largely based on volunteer or paid farmer-technicians, who must also be able to benefit from appropriate training systems.

5. Policies aimed at improving organisational capacities with a view to adaptation

A good number of adaptation options require collective actions by organised farmers' groups (cooperatives or other) and local populations. Policies must therefore include actions to strengthen organisation of farmers and populations to plan activities (diagnoses, identification and prioritisation of actions to be taken and of pertinent stakeholders), their implementation and their evaluation, particularly in terms of adaptation to climate changes (risk management, territorial planning, setting up seed banks, creation of cereal stocks, etc.). It is therefore necessary to support farmers' organisations to fully integrate issues relating to adaptation in their activities and to strengthen their capacities to negotiate with public authorities. Based on experiences in Niger, CILSS and the Centre for International Cooperation / University of Amsterdam point out for example that the protection and management of ANR require "*village-based organisation and good social cohesion in the village*", that there are no real problems in terms of know-how, but above all "*a need for support to manage internal conflicts*"[112]. This type of support can be provided by local and regional authorities and by funding of services to strengthen farming organisations' and local populations' capacities. Various guides and toolkits produced by international organisations or NGOs could be more widely used[113].

The strengthening of local and regional authorities' capacities to plan and implement local policies and support populations' adaptation plans should be another priority in national public policies[114], especially for the managment of shared resources (grazing lands, forests, water resources, etc.). This strengthening can be achieved by the legal consolidation of their power to organise the joint management of resources, appropriate funding systems and training and support actions based on appropriate training resources, for example the training resource kit produced by GERES - Group for the En-

112. Permanent Inter-State Committee on Drought Control in the Sahel (CILSS) et Centre for International Cooperation / University of Amsterdam, *The Silent Transformation of Environment and Production Systems in the Sahel, Impacts of Public and Private Investments in Natural Resource Management,* 2009

113. Aliou Diouf, Abdulai Jalloh and Edward R. Rhodes, *Review of research and policies for climate adaptation in the agriculture sector in West Africa,* Working paper, Future Agricultures, May 2014

114. Care International, *Adaptation Planning with Communities – Practitioner brief n° 1,* 2015

vironment, Renewable Energy and Solidarity, intended for local and regional agents in Senegal wishing to be supported for the implementation of a climate plan, which includes a kit of pedagogical factsheets, an atlas and a poster[115].

6. Policies for collective solidarity and promotion of individual insurance

The implementation of collective solidarity policies is a key element to strengthen populations' resilience: social protection, social policies and policies for compensation for losses in case of climatic or other accidents, sometimes referred to as safety nets. Management of climate risks must be integrated in a more global approach encompassing the various types of risks (health-related and market risks in particular). In terms of climate risks, it is important that public authorities, with support from the international community, implement actions to support populations in the case of a major climate crisis. Such mechanisms require good use of scientific information to evaluate risks and populations' vulnerability, a capacity to anticipate risks (when feasible), react rapidly, and store and mobilise emergency food reserves. The creation of food stocks can be an important instrument in the most vulnerable countries. It is often important that stocks and their management be sufficiently decentralised in order to ensure fast effective mobilisation when necessary.

In terms of individual insurance mechanisms, their suitability to the reality of agriculture in developing countries and to States' capacities must be evaluated in all cases. There is a debate as to their pertinence (see boxed text). In general, rather than promoting insurance systems, Coordination SUD considers that it is preferable for States to invest in various actions to strengthen family farms and reduce their vulnerability, as well as in solidarity mechanisms in the case of a climatic accident.

THE DEBATE ON INDIVIDUAL INSURANCE MECHANISMS

Index-based individual insurance (triggered based on the value of climatic indexes) avoids certain adverse effects, as farmers benefitting from insurance need to manage their crops just as well as other farmers, because the insurance being triggered is not related to the state of individual crops[116]. As pointed out by Charlie Pye-Smith, based in particular on the experience in India, these mechanisms can "*help farmers to cope with droughts, floods and other climatic threats*", which contributes to increasing their confidence[117], and therefore encourages them to invest.

However, launching index-based insurance is costly: it requires significant resources and technical expertise in order to conduct initial research and development, develop the capacities of local insurers, raise awareness of potential clients, market the product, and in some cases, access to data[118]. In addition, minimal triggering frequency is necessary for a farmer to accept paying a climate insurance premium, a frequency generally requiring a high premium for family farms. In India, the government covers two thirds of the costs of the index-based insurance mechanism[119].

7. Risk management policies

Risk management (prevention, management of accidents and of their consequences) is a component in climate change adaptation policies. However, it has not been treated as such because it requires various instruments already mentioned in the different sub-parties above, in particular instruments to reduce climate hazards and climate-related evolutions, to improve economic and social conditions of farms' and local populations' adaptation, to facilitate access to information, to strengthen the organisational capacities of populations and local and regional authorities, or collective solidarity policies.

115. GERES, *ClimTerr Toolkit - Adaptation to climate change in the sylvi-pastoral Ferlo region:* http://www.geres.eu/fr/ressources/publications/item/309-mallette-climterr-adaptation-aux-changements-climatiques

116. Charlie Pye-Smith, *Farming's climate smart future,* CTA Policy brief, n° 9, December 2012

117. *Ibid.*

118. Isolina Boto, Filippo Brasesco and Biasca Ronalee, *Climate change agriculture and food security: proven approaches and new investments,* Briefing n° 29, CTA, 2012

119. Charlie Pye-Smith, *Farming's climate smart future,* CTA Policy brief, n° 9, December 2012

7 INVOLVING RESEARCH AT VARIOUS LEVELS

In order to better integrate the conclusions of research in agricultural policies, especially for the choice, monitoring and evaluation of priority adaptation options and policies themselves, it is important that research institutions participate in the processes of defining, monitoring and evaluating policies. This participation also contributes to better orientation of research according to the needs of the country and to better dissemination of research results so that they can be easily interpreted by political deciders and other stakeholders. For its results to be pertinent and for populations to take ownership of them, it is crucial that research be based on participative action-research systems.
Research can contribute to:

- improving forecasts in terms of climate evolutions and climate-related phenomena;
- diagnosing agrarian situations and greater understanding of vulnerability of populations and territories;
- evaluating adaptation options and policies intended to improve adaptation capacities of populations and territories;
- identifying, designing, evaluating and proposing innovations for adaptation.

In so far as possible, local populations must in all cases be involved in research programmes.

1. Improving forecasts in terms of climate evolutions and climate-related phenomena

The need to strengthen short-range weather forecasts (seasonal) and to foresee their consequences with a view to implementing early warning systems has been mentioned. This research must be accompanied by the identification of pertinent indexes for triggering such early warning mechanisms or possible insurance systems: rainfall indexes for crops and "greenery" indexes for rangelands, with use of teledetection, for systems used by breeders and pastoralists[120].
Furthermore, there is a lack of coherent and consistent information on the expected effects of climate changes over the medium and long term in the various regions[121]. Research can contribute to developing systems for forecasting climate evolutions over the medium and long term at local level, of hydrological impacts and climate risks. This type of research must be complemented by forecasts in terms of impacts on ecosystems cultivated, populations, animals and yields. As pointed out by Emmanuel Torquebiau et al.: "*little is known about how to forecast the occurrence of a given stress and, most importantly, about whether different stresses, combined, can produce new effects*", as, for example, "*the association between increased concentrations of carbon dioxide, causing higher temperatures, and increasingly haphazard water availability*". The same authors add that "*no one knows what a wet equatorial zone (with rainfall all year) will be like in a warmer climate, since no such case now exists anywhere*". Specialised studies in climatology are therefore necessary "*to further analyse the impact of change anbd provide data for modelling efforts*"[122].

2. Diagnosing agrarian situations and evaluating the vulnerability of populations and territories

As pointed out by Emmanuel Torquebiau, it is, to a large extent, in the area of human sciences that the contribution of research is expected[123], especially for the diagnosis of agrarian situations and the vulnerability of populations, as well as for the evaluation of adaptation options and policies.

Research can contribute to the production of diagnoses of agrarian situations, complemented by a forward-planning dimension, including not just the issue of climate hazards, but also an evaluation of populations' current and future vulnerability, as well as of their resilience. To do this, it can use forecasts relating to climate and climate-related phenomena (water resources, etc.), as well as other types of information, such as forthcoming demographic evolutions. Consideration of these elements must contribute to territorial planning, making it possible to cope with average evolutions and to manage risks. For example, they can lead to instruments making it possible to conduct a reliable prediagnosis in the

120. Aliou Diouf, Abdulai Jalloh and Edward R. Rhodes, *Review of research and policies for climate adaptation in the agriculture sector in West Africa,* Working paper, Future Agricultures, May 2014

121. FAO, *Food Security and Climate Change, "Climate-Smart" Agriculture – Policies, Practices and Financing for Food Security, Adaptation and Mitigation,* 2010

122. Dominique Berry, Patrick Caron, Jean-Yves Grosclaude and Emmanuel Torquebiau, *New research perspectives to address climate challenges facing agriculture worldwide,* Climate change and agriculture worldwide, éditions Quae, 2015

123. Interview with Emmanuel Torquebiau

process of defining integrated territorial plans, such as the *Atlas "Vulnerability of the Ferlo region to climate change"* produced by GERES[124].
These elements can also contribute to designing safety net or insurance systems[125].

3. Evaluating adaptation options and policies intended to improve adaptation capacities

As previously mentioned, it is important, within the process of policy definition, to be able to evaluate adaptation options based on the various criteria responding to farmers' interests and to the general interest. Research can play an important role to propose indicators and conduct such evaluations, as a complement to and in relation to participative processes involving local populations. Research can also contribute real time monitoring and evaluation enabling adjustments and *ex post* adaptation options to be implemented by farmers and local populations, again partly via support to these stakeholders so that they can participate in evaluation. Participation of research in the evaluation of practices implemented by farmers can in part be achieved within participative action-research processes.
As previously mentioned, evaluation of the various options in terms of adaptation to climate change can be conducted as part of a more global evaluation of practices from farmers' and local populations' points of view, and in terms of the general interest. In particular, research has a role to play to provide public authorities and other development stakeholders with much more systematic evaluations and comparisons, than currently, of the various types of agricultural practices and production systems in terms of the general interest, integrating economic, social and environmental criteria (including mitigation of climate changes).
Research also has a role to play in the evaluation of policies themselves, again taking account of their various objectives, including that of facilitating adaptation to climate changes.

4. Identifying, designing, evaluating and proposing innovations for adaptation

Research can also contribute to identifying practices implemented by certain farmers in certain regions and to evaluating conditions of implementation in other contexts. It can also design specific innovations in order to respond to the particular challenges related to climate changes, evaluate them and propose them to political deciders and farmers. In the area of research, it is also important not to focus solely on specific objectives related to climate change adaptation and to take broader account of the various general interest objectives and farmers' decision-making criteria.
Research can be based on participative action-research systems, which make it possible to better identify farmers' needs, to recognise their capacities for innovation, including collective and/or institutional innovations, and to test innovations in reallife conditions, which avoids the frequent setbacks of "technical solutions", which are efficient controlled settings (experimental stations), but scarcely or not at all implemented by farmers, as not suited to all of their objectives or to the complexity of their actual production conditions. Coordination SUD shares the opinion of Emmanuel Torquebiau *et al.*, for whom: "*given the complexity of the processes and the uncertainty surrounding them, it may be considered that a conventional diagnosis plus prescription approach is inadequate and that for appropriate innovations and changes to take place, any research undertaken should aim to produce both knowledge and inventions, taking care at the same time to elucidate the changes underway and to get involved in learning systems*"[126]. This can be achieved in particular by including participative action-research processes in the research approach and fully exploiting traditional know-how.
To back up these systems, it is advisable to set up networks to exchange practices and experiences, in particular focusing on the search for agroecological solutions[127].
To complement participative action-research processes, researchers can also conduct indepth research making it possible to understand the underlying causes of certain results obtained[128], or to search for solutions to specific problems.

Several subjects for which research work is expected must be mentioned:

- the impacts of climate changes on yields from agricultural activities and livestock farming, and the stability of these yields, including impacts of future changes, via appropriate modelling integrating climate evolution forecasts (rainfall, temperatures, level of carbon dioxide in the atmosphere)[129];

124.
GERES, *ClimTerr Toolkit - Adaptation to climate change in the sylvi-pastoral Ferlo region*

125.
FAO, *Food Security and Climate Change, "Climate-Smart" Agriculture – Policies, Practices and Financing for Food Security, Adaptation and Mitigation,* 2010

126.
Dominique Berry, Patrick Caron, Jean-Yves Grosclaude and Emmanuel Torquebiau, *New research perspectives to address climate challenges facing agriculture worldwide,* Climate change and agriculture worldwide, éditions Quae, 2015

127.
Coordination SUD, *Agroecology: A response to the Agricultural and Food Challenges of the 21st Century,* 2013

128.
Aliou Diouf, Abdulai Jalloh and Edward R. Rhodes, *Review of research and policies for climate change adaptation in the agriculture sector in West Africa,* Working paper, Future Agricultures, May 2014

129.
Dominique Berry, Patrick Caron, Jean-Yves Grosclaude et Emmanuel Torquebiau, *De nouvelles perspectives de recherche au regard des enjeux climatiques concernant les agricultures du Sud,* Changement climatique et agricultures du monde, éditions Quae, 2015

- the impacts of climate changes on the prevalence and spread of pests and diseases, as well as on pollinators and other auxiliary insects, and more largely on ecosystems;
- genetic improvement of plants and animals, including criteria of resistance to biotic and abiotic stresses. It is important to propose varieties that consume less water and are drought-resistant;
- improvement of management of grazing land and other fodder resources;
- improvement of agricultural water management, including in rainfed agriculture systems;
- management of animal waste and manure;
- recovery of land degraded by salt water;
- co-benefits, synergies and trade-offs between practices aimed at adaptation to and mitigation of climate changes;
- links between short-term adaptation options and long-term adaptation, in particular to what extent do short-term adaptation options facilitate or hinder long-term adaptation to climate changes? On this subject, Edward Rhodes et al. point out the importance of ensuring that "*management and policy implemented in the next 10 to 30 years does not compromise the capacity to adapt to potentially more substantial impacts in the more distant future*"[130].

8 THE ROLE OF INTERNATIONAL COOPERATION

Full inclusion of family farms' adaptation to climate changes in agricultural policies and other public policies that impact on agriculture raises the question of funding and the role of international cooperation. Current funding ensured for the years ahead is far from sufficient to meet requirements. The Paris agreement includes a commitment from the international community to provide annual funding of one hundred billion euros, with a balance between funds for mitigation and funds for adaptation. Real requirements could reach 300 to 400 billion euros by the year 2030. Today, effective commitments are far below this. In addition, only 16 % of funding is intended for adaptation, and 20 % by 2020. Regarding Agence française de développement (French Development Agency) funding for climate, only 19 % is intended for adaptation.

Although the issue of funding amounts is important, that of the way in which this funding is used is just as important. It is particularly important that the policies of the various institutions and cooperation agencies, whether multilateral, regional or bilateral, evolve with a view to real insertion of the actions they promote or support within coherent public policies. These institutions and agencies must contribute to strengthening this coherency rather than, as is often the case, generating competition between national institutions and promoting programmes that are not integrated.

130.
Ibid

4.

CONCLUSION

Copyright: Gonzalo Guajardo / ActionAid

Given the central role of family farming in the economic, social, ecological and political equilibrium of the majority of developing countries, its capacity to adapt to current and future climate changes is a key issue.
The first part of this report recalled the diversity of objectives targeted and of constraints farmers have to cope with. Adaptation to climate changes is a supplementary objective that farmers must integrate coherently with their other objectives. Procedures for family farms and local populations to integrate the adaptation objective are numerous and often complementary. Putting these procedures in place depends largely on the social and economic environment of these farms and on public policies implemented.

In the second part, focus was placed on the increasing importance of climate issues, particularly adaptation, in national political agendas over the last ten years, as well as on the difficulties encountered in terms of consistency between agricultural and climate policies and their effective integration. This consistency and coordination depends largely on existing institutional systems and on the more or less substantial determination and capacity of States to ensure this integration. Among the difficulties encountered, States' capacities for expert studies and links with research are often still insufficient. As for the possible synergies between adaptation and mitigation, these are often recognised, but as yet seldom lead to real combined approaches. Furthermore, although climate strategies and policies, or those with a climate dimension, are numerous, they are sometimes not effectively or only minimally implemented. The inclusion of climate issues in the political agenda, which mobilises various types of measures, makes it possible in certain cases to strengthen approaches based on agroecology, family farming and small-scale farming. But it can also be a pretext to recycle options related to the green revolution model, to support forms of large-scale capitalist agriculture and agribusiness.
This analysis led, in the third part, to the proposal of a certain number of recommendations with a view to better inclusion of the objective of family farms' adaptation to climate changes in public policies.

Firstly, improvement of family farms' capacities for adaptation to climate changes require:
- on the one hand, strengthening of these family farms and their overall resilience through policies contributing to: fair and secure access to land and natural resources, access to markets and stable remunerative prices, or to funding for their investments;
- on the other hand, support for transitioning to agroecological systems, which are the most capable of increasing their productivity and their overall resilience while generating various positive outputs for all societies: food security, generation of income and employment, fight against climate changes, biodiversity, preservation of natural resources, ecological balances, healthy environment.

Furthermore, it is important to:

1. Include climate objectives in agricultural and food security policies, rather than designing specific policies on climate changes.

It is necessary to avoid risks of duplication, competition and inconsistencies between the agricultural and food security policy on the one hand, and what would be a specific climate policy. This inclusion must also make it possible to draw on the existing technical capacities and skills of the country's institutions. It also avoids the pitfall of excessive focus on climate issues to the detriment of other economic, social and ecological issues facing agriculture;

2. Analyser les mesures politiques en faveur de l'agriculture familiale à l'aune de leur degré de contribution à l'adaptation aux changements climatiques sur le long terme

En effet, toutes les mesures en faveur de l'agriculture familiale ne contribuent pas nécessairement à l'adaptation ;

3. Define, upstream of including climate objectives in existing policies, a national climate strategy and action plan.

The latter provide an opportunity to define a national vision, an overall roadmap and the respective roles of each institution and sectoral or cross-sectoral policy. The existence of a specific reference institution focusing on climate issues is a key element for defining and

monitoring such a national climate strategy. This institution must ensure full involvement of sectoral institutions, guarantee effective coordination of the various sectoral and cross-sectoral policies, and align interventions funded by international cooperation;

4. Integrate the national climate strategy in a more global strategy ensuring complementarity and synergies between the actions conducted as part of the three Rio Conventions (biodiversity, fight against desertification, climate changes).

5. Ensure complementarity and consistency between the various measures related to climate changes, and between these measures, other agricultural policy measures and the various sectoral or cross-sectoral policies.

6. Strengthen local and regional authorities and decentralised State services
so that they can fully integrate climate objectives, ensure complementarity and consistency, and coherency between interventions of the various stakeholders involved in the territories concerned.

7. Involve local populations, local stakeholders and farmers' organisations in the definition and implementation of policies on adaptation to climate changes, both at local and national level.
This is a pre-condition for the effectiveness and sustainability of adaptation strategies.

8. Take gender into account in adaptation policies.
It is necessary to guarantee equality of participation in the definition and implementation of adaptation options, in the reduction of gender inequalities, through the central role of activities conducted by women, and in achieving greater effectiveness of adaptation policies

9. Prioritise support for certain adaptation options for populations, based on an evaluation of these options integrating various criteria:
technical feasibility of adaptation options, impact in terms of farms' autonomy, effectiveness, removal of obstacles (capacity to facilitate the implementation of other options), economic efficiency, flexibility, differentiated impacts according to gender, institutional compatibility and feasibility, acceptability and capacity to take ownership for individuals and society, capacity to generate co-benefits independently of adaptation to climate changes, potential for replicability and dissemination.

10. Prioritise adaptation of family farms over their contribution to mitigation.
However, it is necessary to pay particular attention to adaptation options that also contribute to the objectives of mitigation of climate changes. Combined adaptation-mitigation approaches are likely to enable real synergies between these two elements and facilitate recognition of the positive role of family farming for ecosystems.

11. Combine various public policy instruments:
- all policies making it possible to globally support family farming;
- policies aimed at reducing climate hazards and hazards relating to climate evolution, in particular via specific investments and territorial development plans;
- policies aimed at improving economic and social adaptation conditions for farms and populations: investment grants, regulations and standards (the definition of which must involve the population and ensure their acceptability and viability), remunerations for positive outputs (environmental services), appropriate commercial policies, land and natural resource management policies - especially with a view to ensuring that farmers can actually benefit from the effects of investments facilitating adaptation, and joint sustainable management of shared resources -, institutional and financial support for collective organisation dynamics;
- policies aimed at improving access to information, knowledge and know-how that facilitate adaptation: weather forecasts and early warning systems, medium- and short-range forecasts regarding climate evolutions and water resources – including a variety of scenarios at national level resulting from uncertainties as to future evolutions - , initial and vocational training systems, support and advisory systems;

- collective solidarity policies, including compensations via safety nets, covering reconstitution of capital destroyed and food stocks. Coordination SUD has certain reservations regarding individual insurance systems.

12. Full involvement of research.

This involvement must make it possible to:

- Improve forecasts regarding climate evolutions and climate-related phenomena;
- Diagnose agrarian situations and evaluate the vulnerability of populations and territories;
- Evaluate adaptation options and policies intended to improve adaptation capacities;
- Identify or design innovations for adaptation. It is important that research draws on participative action-research systems making it possible to better identify the needs of farmers, recognise their innovation capacities and test the latter in real-life conditions.

13. Fund the implementation of public policies that fully include the issue of adaptation to climate changes within coherent national approaches.

The international community's contribution must be far greater than it currently stands. It is also necessary for interventions by institutions and cooperation agencies to evolve with a view to being fully aligned with such national coherent approaches.

BIBLIOGRAPHY

BIBLIOGRAPHY ON THE THREE COUNTRIES STUDIED

1. Costa Rica

Claudia Bouroncle, Pablo Imbach, Peter Läderach, Beatriz Rodriguez, Claudia Medellin, Emily Fung, Ruth Martinez-Rodriguez, and Camila Donatti, *La agricultura de Costa Rica y el cambio climático: Dónde están las prioridades para la adaptación ?*, CGIAR / CCAFS, 2015

Louis Durey, *L'évolution de l'utilisation de la notion de services environnementaux au sein des politiques agricoles et de lutte contre les changements climatiques au Costa Rica,* Serena, 2010

Gobierno de Costa Rica, *Plan Nacional de Desarrollo 2015-2018 "Alberto Canas Escalante"*, 2014

Jean-François Le Coq, Suyen Alonso, Fernando Sáenz-Segura et Denis Pesche, *Mitigation of Climate Change and Agricultural/Environmental policies: the Costa Rican paradox,* communication, 117th seminar of the European Association of Agricultural Economists, 2010

Jean-François Le Coq, Denis Pesche, Thomas Legrand, Géraldine Froger and Fernando Sáenz-Segura, *La mise en politique des services environnementaux : la genèse du Programme de paiements pour services environnementaux au Costa Rica,* VertigO – la revue électronique des sciences de l'environnement, December 2012

Jean-François Le Coq and Abigaïl Fallot, *Las políticas de cambio climático en Costa Rica*, CIRAD and UNA/CINPE, 2015

Ministerio de Ambiente y Energia, *Costa Rica's Intended Nationally Determined Contribution,* 2015

Ministerio de Ambiente, Energia y Telecomunicaciones, *Plan de Acción de la Estrategia Nacional de Cambio Climático (ENCC)*, 2009

Ministerio de Agricultura y Ganadería, *Política de Estado para el Sector Agroalimentario y el Desarrollo Rural Costarricense 2010-2021,* 2010

Ministerio de Agricultura y Ganadería, *Plan de acción para el cambio climático y la gestión agroambiental 2011-2014,* 2011

Ministerio de Agricultura y Ganadería, *Plan sectorial de agricultura familiar 2011-2014,* 2012

Ministerio de Agricultura y Ganadería, *Políticas para el Sector Agropecuario y el Desarrollo de los Territorios Rurales 2015-2018,* 2015

Ministerio de Agricultura y Ganadería, *Plan sectorial de Desarrollo Agropecuario y Rural 2015-2018,* 2015

Ministerio de Agricultura y Ganadería, *Estrategia 2015-2034 y plan de acción para la ganadería bajo en Carbono en Costa Rica,* Síntesis informativa, 2015

Ministerio de Agricultura y Ganadería, *Informe de Gestión del Sector Agropecuario y el Desarrollo de los Territorios Rurales Mayo 2015-Abril 2016,* 2016

2. Niger

Issoufou Baoua, Mahamadou Ai, Abdourahamane Balla, Toudou Adam, *Systèmes locaux d'alerte précoce et de réponse aux urgences : motivation et partenariat exigeant,* Journal of Applied Biosciences, 2015

Keene Brooks, *Analysis of the NAPA Development in Niger,* draft, 2008

CARE International in Niger, *Analyse institutionnelle, Programme de Gestion Equitable des Ressources Naturelles et de Renforcement de la Société Civile (PROGRES) et Programme d'Apprentissage sur l'Adaptation aux changements climatiques (ALP),* 2011

High-Commissioner for the 3N initiative and the World Bank, *Plan d'action pour la gestion des risques agricoles au Niger (PAGRA) 2014-2023,* 2013

World Bank, *Evaluation des risques du secteur agricole au Niger : De la réaction aux crises à la gestion des risques à long terme,* 2013

Ministry of territorial planning and community development, *Document annexe au Guide national d'élaboration des PDC pour l'intégration de la dimension changements climatiques (IDCC) dans la planification communale,* 2012

Republic of Niger, *Programme Stratégique du Niger pour la Résilience Climatique (PSRC)*, 2010

Republic of Niger, *Initiative « 3N » pour la sécurité alimentaire et le développement agricole durables « Les Nigériens nourrissent les Nigériens » - Synthèse du cadre stratégique et coût indicatif des programmes pour la période 2012-2015,* 2012

Republic of Niger, *Politique nationale en matière de changements climatiques, avant-projet,* 2012

Republic of Niger, *Rapport d'évaluation à mi-parcours du projet PANA Résilience,* 2012

Republic of Niger – Office of the Prime Minister, *Rapport sur l'actualisation de l'évaluation de la vulnérabilité et de l'adaptation aux changements climatiques dans le secteur de l'agriculture réalisée dans le cadre de l'élaboration de la seconde communication nationale sur les changements climatiques,* 2013

Republic of Niger, *Contribution Prévue Déterminée au niveau National (INDC) du Niger,* 2015

3. Viet Nam

Asian Management and Development Institute, *Viet Nam and The Pressure Group Consultancy, UK, Climate Change and Disaster Management Policy in Viet Nam, assessment document,* 2011

Communist Party of Vietnam, *Responding to climate change; protection of natural resources and environment, Executive Summary of the Proposal submitted to the 7th Conference of the XI Congress of the Party Central Committee,* 2013

Institute for Agricultural Environment, *Analyzing impacts of climate change in agriculture in Viet Nam, proposing adaptation measures and policies to cope with the impacts,* 2010

Ministry of Agriculture and Rural Development, *Action Plan Framework for Adaptation and Mitigation of Climate Change in the Agriculture and Rural Development Sector Period 2008-2020,* 2008

Ministry of Agriculture and Rural Development, *Approval of The Action Plan in response to Climate Change (CC) in agriculture and rural development period 2016-2020 with visions to 2050,* 2016

Ministry of Natural Resources and Environment, *Action Plan to response to climate change of the Ministry of natural resources and environment in the period 2011-2015,* 2010

Ministry of Planning and Investment, *National Action Plan on Green Growth in the Period 2012-2020,* 2012

The Prime Minister of the Socialist Republic of Vietnam, *Decision on approval of the Target Program to respond to climate change,* 2008

The Prime Minister of the Socialist Republic of Vietnam, *Decision on approval of the National Climate Change Strategy,* 2011

The Socialist Republic of Vietnam, *Intended Nationally Determined Contribution of Viet Nam,* 2015

CONTRIBUTORS TO THE STUDY

1. Speakers at the seminar on 9 December 2016

- Marius Dia, coordinator with the National rural consultation council (CNCR, farmers' organisation), Senegal
- Jean-Luc François, Agence française de développement (AFD)
- Ludovic Larbodière, ministry of Agriculture, Food and Forestry
- Jean-François Le Coq, Cirad researcher in Latin America, specialising in agricultural and agro-environmental policies and climate changes (*)
- Marine Lugen, researcher at the Center for studies on sustainable development (CEDD), Université Libre de Bruxelles, Brussels, Belgium
- Alexandre Meybeck, Senior advisor for agriculture, environment and climate change to the Deputy director-general of the Agriculture and consumer protection department of the FAO
- Malyne Neang, lecturer-researcher, director of the Ecoland Research Center, Cambodia Royal University of Agriculture (Cambodia)
- Didier Pillot, agronomist, MSC agriculture and climate coordinator, Montpellier SupAgro, France
- Bernard Pinaud, C2A coordinator with the Coordination SUD Management board, France
- Sébastien Subsol, head of the Food security, nutrition and sustainable development unit, ministry of Foreign Affairs and International Development (MAEDI), France
- Omar Tankari,consultant and civil society member, specialist on climate change issues in the countries of the Sahel, Niger (*)
- Emmanuel Torquebiau,, reasearcher with Cirad, specialist in agroforestry, climate changes programme manager with Cirad, France (*)

(*) : Were also interviewed as part of this study

2. Other people interviewed

- Pierre-Marie Aubert and Sébastien Treyer, Iddri, France
- Louis Bockel, FAO
- Yen Nguyen Thi Yen, CARE (Vietnam)
- Pham Thi Dung, MARD (Vietnam)

Copyright: Rémi Henderycksen / Gret

APPENDIX: CASE STUDIES

1. COSTA RICA

In Costa Rica, the agricultural sector contributes to 9 % of national GDP and 14 % when agri-food businesses are added[131]. Agricultural production is intended to meet the population's food requirements (corn, beans, rice, livestock, fruit and vegetables, etc.) and for exports (mainly bananas, pineapples and coffee), with a significant agrifood trade surplus. Agriculture in Costa Rica is largely made up of family farming – particularly for food crops and coffee - but large-scale production, often by multinational companies, dominates productions intended for export such as bananas and pineapples.

Climate changes should lead to an increase in the average yearly temperature and in its variability, and to a growing number of extreme rainfall situations. These changes should have significant effects on agriculture, with an overall balance sheet that is clearly negative, even if some areas could increase in productive potential.

1. Policies and strategies relating to climate changes

Costa Rica is a pioneer in terms of inclusion of climate changes in national policies, as well as in terms of a mixed approach to the issues of mitigation and adaptation. It plays an active role in the UNFCCC and in the Conference of the Parties. The issue of climate changes was first included in Costa Rica's forestry policy in the 1990s, with a focus on mitigation. It is in this context that Costa Rica was a precursor in terms of inclusion of payments for environmental services (1997) in public policies. Current reflections are aimed at expanding the approach, including a landscape approach, making the link with adaptation and achieving greater intersectorality.

The National strategy on climate changes, which was prepared under the responsibility of the ministry of the environment, was launched in 2010, as was the action plan for its operational implementation, including adaptation and mitigation, which includes a carbon neutrality objective for the country by 2021. This strategy is in turn broken down into sectoral objectives. Sectoral policies are supposed to feature the sectoral objectives and actions planned in the national strategy. Agriculture is mentioned both as one of the three priority sectors for mitigation and one of the two priority sectors (together with water resources) for adaptation. The action plan includes actions aimed at:

- generation and dissemination of techniques that reduce the vulnerability of farms. These techniques are largely agroecological techniques. Indepth reflection was under-taken to classify techniques, on the one hand according to their positive impacts solely for the farmer or both for him/her and the community, and on the other hand, according to whether these impacts are short term or medium and long term.

So, for example, the following are classified as being beneficial and having a positive environmental impact:

- for the farmer in the short term, improved grazing land or drip irrigation;
- in the medium and long term, organic and green fertilisers or land cover;
- or the community in the short and medium term, agroforestry and sylvi-pastoral systems;
- for the community in the long term, integrated crop management, shelterbelt hedgerows, tree plantations, or soil management practices with a view to protecting from erosion.

- the increase in capital (in the sense of physical, human, financial and social capital) available to the most vulnerable farmers, through both involvement in social life, better access to information on the consequences of climate changes and how to cope with them, and access to credit.

2. Agricultural policies and climate changes

Inclusion of the issue of climate changes in agricultural policies, strictly speaking, happened later than in the forestry sector. It began in the middle of the 2000s, and more clearly from 2010 on. In 2003, the agricultural sector had been included in the environmental payments scheme. In 2007, the Programme for recognition of environmental benefits was implemented, with financial support for beneficial practices. The entrance point is mitigation, in particular with the implementation of specific Nationally Appropriate Mitigation Measures (NAMAs) for the coffee and livestock sectors, implemented as part of the overall carbon

131. Ministerio de Agricultura y Ganadería (MAG), *Política de Estado para el Sector Agroalimentario y el Desarrollo Rural Costarricense 2010-2021*, 2010

neutrality strategy, but also with the inclusion of an adaptation objective, especially for coffee. The use of agroforestry is also encouraged. It benefits from payments for environmental systems with regards carbon sequestration and is also considered as an adaptation practice based on ecosystems. This policy is ongoing today. 10 % to 30 % of the additional cost of practices concerned is covered by the State, with funding sourced from a carbon tax.

The 2010-2021 State policy for the agribusiness sector and rural development provides the overall framework of the agricultural policy for the current period. Climate changes (mitigation and adaptation) are included in it: this is one of the four strategic areas of one of the strategy's three pillars (with pillars relating to innovation and technical development), but with no reference to the national climate change strategy previously mentioned, reflecting a problem in terms of institutional coordination. Apart from risk prevention actions, this policy led to the definition of a National agricultural plan for adaptation to climate changes and agro-environmental management (2011). The climate change adaptation strategy includes actions for restoration of degraded land, preservation of natural and cultivated ecosystems and particularly their biodiversity.

In addition, the 2011-2014 four-year sectoral plan for the agricultural sector was also complemented by a 2011-2014 Sectoral plan for family farming including, apart from actions already planned by the former, other specific actions depending on obtaining extra funding. It includes a cross-sectoral approach concerning adaptation to climate changes and aiming in particular to support organic agriculture, integrated crop management and sylvipastoral systems. The new government, in place since 2014, did not follow up on this initiative for a specific plan for family farming. But, although this concept is not highlighted, the government is focusing on food security and sovereignty, the development of value chains for the domestic market and agroecological practices, therefore consequently, for family farming.

More recently, the 2014-2018 National development plan was drawn up. In the chapter on agriculture, the issues of adaptation and mitigation are covered. The Plan acknowledges that, until now, "*work on adaptation to climate change (…) has barely started*".

The 2015/2018 Policy for the agricultural sector and the development of rural territories, produced by the new administration, makes adaptation to and mitigation of climate changes one of its five areas, alongside the areas of "food security and sovereignty", "opportunities for agricultural youth and rural territories", "local and regional rural development and strengthening of the agri-export sector". This new policy illustrates an increase in focus on the climate issue in agricultural policies, especially if we compare it to the far more modest role that had been given to climate changes in the 2010 policy. However, this increase clearly dates back to the previous administration, under the initiative of the vice-minister of Agriculture, Tania Lopez, and with support from the minister of Agriculture, Gloria Abraham. The policy in fact makes a clear reference to the national climate change strategy, drawn up in 2010, which illustrates better coordination between the general climate strategy and the agricultural policy than during the previous period. Mitigation and adaptation are in part dealt with separately, but certain actions contribute simultaneously to both objectives.

The operational implementation of the 2015-2018 Policy for the agricultural sector and the development of rural territories and the agricultural component of the National development plan is conducted as part of the 2015-2018 Sectoral plan for agricultural and rural development. The issue of climate changes is included in the form of a specific pillar. This "adaptation to and mitigation of climate changes" pillar benefits from 4.3 % of the budget allocated to the plan, compared to 74 % for the "food and nutritional security and sovereignty" pillar (of which 53 % of the total budget for actions to support marketing on the domestic market), 19 % for the "local and regional rural development" pillar (mainly support for value chains), 2.3 % to the "strengthening of the agri-export sector" pillar and 0.4 % to the "opportunities for agricultural and rural youth".

Within the "adaptation to and mitigation of climate changes" pillar, the actions envisaged are classified as:

- actions for the adaptation of productive processes to climate changes (30 % of the pillar's dedicated budget), with focus on the development and zoning of agricultural territory, varietal selection, water management (collection and storage), irrigation and drainage, and the creation of protected environments;
- actions relating to mitigation (1 %), including actions to promote NAMA measures that also contribute to adaptation (sustainable and organic agriculture, climate information, monitoring of impacts of climate changes);
- actions to promote green economic activities (10 %), including actions contributing to both mitigation and adaptation: support for organic agriculture (certification, marketing, construction of multi-stakeholder alliances), payment for environmental services (recognition of environmental services, in particular for organic agriculture), taxation, production of bio-energy from productive activities that do not compete with food production) and risk management actions;
- actions to manage climate risks, which benefit from the majority of the pillar's budget (59 %) and that also contribute to adaptation. In particular measures aimed at supporting investments and regeneration of capital in farms affected by climate accidents. Also included are actions to strengthen weather stations and preventive management of risks (early warning systems, monitoring of vulnerable areas, institutional protocols, training of farmers).

In Costa Rica, climatic and agricultural policies are national policies. Consultation with producers' organisations and civil society is organised mainly at national level.

2. NIGER

Niger is one of the poorest countries in the world. Agriculture, livestock breeding and exploitation of fisheries resources make up approximately 40 % of GDP, 22 % of exports and 84 % of employment. 75 % of the population live in Sahelo-Sudanian and Sahelian regions, and the remaining quarter live in Sahelo-Saharan and Saharan regions. The country's climate is characterised by high variability of rainfall. According to the IPCC, it is one of the countries that is most vulnerable to climate changes (increase in temperatures; decrease in average rainfall, with, for the future, contradictory and contrasting scenarios according to regions; increase of extreme phenomena, and particularly drought).

1. Global strategies

The Strategy for accelerated development and poverty reduction (SDRP) and the Strategy for rural development (SDR) are two of the country's major strategies. Initially, they did not specifically refer to climate change, even if the SDRP referred to the need to "fight against desertification and reverse the trend of depletion of environmental resources" (reforestation, recovery of land and development of forests). Similarly, although the SDR, the main instrument for implementing the SDRP in rural areas, features few activities directly related to climate issues, it does, through various programmes, implicitly include sustainable actions for adaptation to climate changes and variability. The implementation of the agenda of the Comprehensive Africa Agriculture Development Programme (CAADP) and the ECOWAS Common Agricultural Policy (Ecowap) is part of the SDR. The 2013-2018 SDRP includes climate changes more clearly.

2. Policies and strategies relating to climate changes

Diverse national policies and strategies have been drawn up over the past fifteen years concerning climate changes, demonstrating growing consideration of the issues related to it, with priority being given to adaptation after a period (late 1990s and early 2000s) when more focus had been placed on mitigation because of the international context. Given the importance of agriculture in the country, and because the latter seems extremely vulnerable to climate changes, it is the central sector in policies, strategies and initiatives relating to adaptation. In general, orientations on adaptation are implemented within various projects funded by international cooperation.

The various policies, strategies and initiatives feature orientations, objectives and types of activities that are often similar, but without clear coordination between them, highlighting duplication of efforts. This also reveals competition between public institutions, political instability, lack of continuity of staff in public administrations and opportunism in terms of funding opportunities provided by such and such international cooperation body. In addition, the various policies, strategies and initiatives usually become operational within projects, the origin of which is more related to funding opportunities and international cooperation initiatives than autonomous planning to implement these policies and strategies. In a manner of speaking, these projects are linked to policies, strategies and initiatives "retrospectively". So rather than a real national policy related to climate changes, there is a multiplication of projects, even if they do refer to background documents. In this context, numerous actions envisaged in national policies are not implemented in practice, due to lack of funding. To date, actions planned as part of the INDC, for example, have not yet been implemented.

The National Council on Environment for Sustainable Development (CNEDD) is the main institution in charge of ensuring the coordination and monitoring of the national environment and sustainable development policy. The CNEDD is original in that it brings together, within a single forum, State stakeholders and structures (1/3 of its members) and civil society organisations (2/3 of its members). The National technical commission on climate changes and variability is attached to it.

The CNEDD is the focal point vis-à-vis the UNFCCC. The CNEDD should therefore play an important role in the implementation of the climate policy. However, conflicts of competence between the CNEDD and the sectoral ministries create a significant impediment. Its very broad mission creates competition with other ministries, including the ministry of the Environment. The CNEDD was in charge of defining priority orientations and general objectives and the ministries were in charge of designing detailed programmes. But the synergy between the two did not operate; the governmental institutions proved to be ill equipped to integrate climate issues, and very unstable. Since 2011, the CNEDD's institutional position has been clarified, with a mandate for the design and strategic coordination of actions relating to the environment and climate changes. The technical ministries' roles have been refocused on implementation of interventions and their monitoring in collaboration with the CNEDD.

Launched in 1995, the National Plan on Environment for Sustainable Development (PNEDD) is made up of six priority programmes, including the Programme on climate changes and variability, with a view to collecting information for and supporting Niger's contributions to the UNFCCC.

In 2003, a Climate Change and Variability Strategy and Action Plan (SNPA-CVC) was drawn up, mainly featuring mitigation objectives (collection of information for the UNFCCC), although, since then, the issue of adaptation has gradually come to the fore. It is in this context that, in 2006, following COP 7 in Marrakech, that the National Adaptation Programme of Action (NAPA) on climate changes and variability was drawn up, which is focused on agriculture. As part of the NAPA, various projects are implemented with the support of international cooperation. The NAPA focuses on three key areas: strengthening the resilience of production systems and communities, strengthening of institutional capacity, and capitalisation of experiences.

In 2010, Niger's Pilot Programme for Climate Resilience (PPCR) was implemented. It was drawn up following a participative process at national level and coordinated by the Ministry of Economy and Finance and not by the CNEDD, demonstrating competition between public institutions. The official mission of the PPCR is to support both the CNEDD with its mission to coordinate and implement the national strategy on climate changes and variability, and the sectoral ministries to conduct the programme's activities in the field. There was strong resistance to limit it to this role. The PPCR aims to "*improve the resilience of populations and of production systems to climate change, in order to increase national food security*". The definition of the PPCR was preceded by an indepth assessment of the state of knowledge on climate changes in the country, with the partici-

pation of research institutions. The programme also aims to develop appropriate climate models, although, to date, these actions have not actually started.

Agriculture is at the heart of the programme and can be found in each of its five pillars:

- the first pillar aims for better integration of climate resilience inpoverty-reduction strategies and development planning (especially the 2013-2018 SDRP and the SDR), improvement of climate forecasts and early warning systems for climate crises, and strengthening of national capacities in terms of climate;
- the second pillar focuses on investments, particularly in terms of irrigation systems suited to climate changes, sustainable land and water management (water collection, soil conservation techniques, agroforestry, crop rotation) and improvement of varieties cultivated (drought resistance and yield potential). With regards experience and with a view to capitalising on experiences, insurance, warrantage and social protection (safety nets) mechanisms are also integrated.

In operational terms, the PPCR is implemented as part of a pilot climate resilience programme, with the activities being integrated in investment projects:

- project for the development of information and agricultural forward planning (PDIPC);
- project for the mobilisation and optimum exploitation of water resources (Promovare);
- project for community-based actions for climate resilience (PACRC), which includes sustainable management of land, social protection, insurance and pooling of agricultural production (pillar 2), and the development of climate resilience tools (pillar 1). It is mainly this project that is currently effectively implemented.

In 2012, the National Climate Change Policy (NCCP) was drawn up. The various orientations of the policy are:

- improvement of knowledge, promotion of development-research, production and dissemination of information on climate changes;
- strengthening and development of populations' adaptation capacities and of the resilience of ecological, economic and social systems;
- mitigation;
- inclusion of the issue of climate changes in national, regional and local planning instruments;
- strengthening of stakeholders' capacities.

It includes a monitoring-evaluation system. The NCCP aims to be a framework of reference for all actions in terms of climate changes. With regards the SNPA-CVC strategy, it aims to achieve rebalancing for the benefit of adaptation. The CNEDD ensures coordination of the system for implementing the NCCP.

Niger's Independent Nationally Determined Contribution (INDC) includes a mitigation component and an adaptation component. The agriculture, livestock farming and forestry sectors are part of the priorities, alongside water resources, fisheries, fauna, health and strengthening of stakeholders' capacities at all levels.

The Strategic Framework – sustainable land management (2014 CS-GDT) is the document of reference for the INDC. The INDC insists on the fact that its content must not replace, duplicate or weaken existing national response processes, particularly the NAP and, for the land sector, the 2015-2030 CS-GDT. But in fact, the INDC focuses on actions related to land management, without fully integrating all the other actions planned by other national initiatives concerning adaptation to climate changes.

We find here another example of competition between institutions, the ministry of the Environment having been put in charge of drawing up the INDC, and also in charge of the strategic framework for land management. Inclusion of climate changes in local planning (Communal Development Plan) is mentioned. When drawing up the INDC, an indepth analysis of the various adaptation options was conducted.

Focus is placed on climate smart agriculture techniques to cope with climate changes as measures contributing to both adaptation (the national priority) and mitigation (especial-

ly with a view to facilitating support from international cooperation). Implementation of the programmes generated by the INDC is coordinated by the Mesudd, currently the structure in charge of the INDC, in collaboration with the Executive Secretariat of the CNEDD, the focal point of the convention. However, an institutional analysis was to be conducted to envisage other possible options.

The adaptation measures of the INDC are mainly aimed at agriculture and livestock farming (obtaining of straw and fodder). The objective is to restore agricultural land (24 % of estimated costs), assisted natural regeneration (2.6 %), dune stabilisation (17 %), plantation of hedge-rows (3.7 %), plantation of gum trees to obtain gum and leaves (24 %), plantation of Moringa oleifera (2.9 %) and herbaceous sowing (2.4 %). The other measures concern forestry, which has a link to agricultural activities: development of natural forests to produce wood for construction (17 %) and private forestry (6 %).

The various projects generally attribute great importance to the definition and implementation of actions at local level, with participation from the authorities and local populations, but without making this approach really widespread within national policies. With regards participation of civil society at national level, it was more or less substantial, depending on the various cases. Civil society is a stakeholder in the National Council on Environment for Sustainable Development (CNEDD). The definition of the PSRC involved civil society organisations from the outset, but their role tended to decrease as progress was made on the process of drawing up the final document by State stakeholders and international cooperation.

A decentralisation process was also undertaken between 1999 and 2004. It provides Niger with the institutional basis to deal with the issue of resilience to climate changes at local level. With regards the framework document for local development plans (PDL, 2011), it does not refer to climate changes.

3. Agricultural policies

With regards agricultural policies, they very clearly include objectives for adaptation to climate change and strengthening the resilience of agriculture. Climate changes greatly accentuate existing vulnerabilities relating to climate characteristics (high year-to-year variability), as well as cricket attacks or economic factors. This is why the policy aims more globally to strengthen the resilience of production systems and of populations by anticipating various types of risks. However, it is beginning to take account of new phenomena that have been observed or forecast, especially in terms of shorter periods of rainfall. Here again, implementation takes place mainly within projects. No explicit reference is made to family farming, although it constitutes the majority of the country's agriculture.

There is also a serious gap between policy documents and effective implementation of actions, which depend on funding opportunities in the form of projects.

In terms of orientations, actions aimed at adaptation to climate changes mainly focus on irrigation, soil restoration, and regeneration of grazing land, reforestation, and use of improved plant varieties resulting from selection work featuring national genetic resources. This work is mainly aimed at resistance to drought and reduction of crop cycles. Several of these actions (soil restoration, forestation, etc.) also provide opportunities to offer paid work to the most vulnerable populations, thus creating a social security safety net. In addition, risk management – particularly climate risks – is a central element of the agricultural policy, in a country where food security is frequently endangered by accidents. It is based on an early warning system and on the existence of public food stocks that have an objective in terms of market regulation in case of tension, and in terms of distribution of food products in case of a serious shortage.

Actions aimed at adaptation often also contribute to mitigation, but there is no real national strategy aimed at integrating mitigation and adaptation objectives.

Niger also has a national system for the prevention and management of food crises (DNPGCA) and an early warning system.

Various national programmes also include objectives for adaptation of agriculture to climate changes.

The "3N" initiative – For sustainable food security and agricultural development, "Nigeriens Nourishing Nigeriens" is the country's global strategy in terms of agriculture and food security. It aims to *"strengthening national capacities for food production, supply and resilience to cope with food crises and catastrophes"*.

It was defined under the authority of the Presidency of the Republic, via a participative process. It is being implemented though Priority Investment Plans (the first of which covers the 2012-15 period). The 2012-15 PIP is part of the 2012-2015 Economic and social development plan (PDES) and is in line with the Strategy for sustainable development and inclusive growth (SDDCI 2035).

"*Improving the resilience of Nigerians faced with climate changes, crises and catastrophes*" is one of the five strategic goals of the 3N initiative. In reality, the primary focus is on risk management actions (not only climate risks). It aims mainly to anticipate, coordinate and implement emergency interventions in case of a climate accident or natural catastrophe, while improving households' and populations response capacities when faced with food shortage situations.

The budget for this goal is 5 % of the 3N initiative's budget. Although the first goal of the initiative - "*the increase and diversification of agro-sylvi-pastoral and fishery production*" - does not make direct reference to an objective in terms of adaptation to climate changes. The latter is based on actions that in fact contribute to this adaptation: irrigation, securing of traditional livestock farming systems, intensification of livestock production, and promotion of forestry production. This goal alone absorbs 73 % of the initiative's budget.

The project on early warning systems and forecast of agricultural productions is implemented by the Agrymet Centre in the CILSS context and as part of the fight against drought and desertification.

More recently, as part of the 3N initiative and with the support of the World Bank, the Action plan on agricultural risk management in Niger (PAGRA) was drawn up for the 2014-2023 period.

The specific objectives of the PAGRA are to:

- increase the capacity of agro-sylvi-pastoral production systems to cope with the main risk factors in the agricultural sector;
- strengthen the capacity of the State, local authorities and communities to anticipate and respond when faced with the main agricultural risk factors.

The PAGRA will be implemented via three components, one of which is related to facilitation and coordination:

- component 1: capacity of farming and pastoral systems to cope with risks;
- component 2: anticipation, adaptation and response of communities, the State and local authorities in emergency situations;
- component 3: facilitation and coordination in terms of agricultural risk management (ARM);
- each component features 2 or 3 aspects and each aspect focuses on types of risk management measures (table below).

Components	Sub-components Aspects	Types of risk management measures
Component 1: Capacity of agricultural and pastoral production systems to cope with risks	1. stabilisation of vegetal production	Use of varieties selected with high yield and resistance to drought
		application of Soil and Water Conservation (SWC)/Soil Protection and Restoration (SPR) and Natural Resource Management (NRM) techniques for rainfed crops
		extension of irrigation with total or partial water control
	2. stabilisation of animal production	Health security of herd - vaccination
		Pastoral developments (application of SWC/SPR and NRM techniques in pastoral areas)
		extension of fodder crops
Component 2: anticipation, adaptation and response of communities, States and local authorities in emergency situations	1. mitigation of vulnerability (stabilisation of accessibility for vulnerable groups to food and nutrients)	strengthening communities' capacity for adaptation and rebound when faced with food, nutritional and pastoral crises
	2. anticipation and effectiveness of the response to emergency	strengthening of the institutional system (CNLA, DGPV) for prevention and management of locust risks
		strengthening of DNPGCCA
Component 3: facilitation and coordination in terms of ARM	1. Consideration of ARM in development initiatives	advocacy aimed at public institutions for political measures relating to ARM
		strengthening of stakeholders' capacities for ARM
		advocacy aimed at development partners
	2. visibility and coordination of PAGRA implementation	information and multi-stakeholder consultations
		capitalisation, monitoring-evaluation of experiences

Over the last ten years, given the recurrence of catastrophes and deficits in cereal and fodder crop production, the government of Niger and its partners prioritised the mitigation of their humanitarian consequences rather than the resilience of production systems and vulnerable populations. The 3N Initiative's strategy for food and nutritional security and agricultural development, and its 2013-2015 investment plan, were defined to rectify this. They propose measures that could, on the one hand, make it possible to provide solutions to the constraints facing farmers and agricultural processing units, and, on the other hand, to shortcomings observed in the response provided to vulnerable populations in emergency situations. However, the priority investment programmes (PIP) are still designed using a sub-sectoral approach to respond to constraints instead of a long-term risk management strategy.

3. VIET NAM

In Vietnam, over 70% of the working population works in agriculture. The country has become not just globally self-sufficient in terms of food, it also exports rice, which is the main crop and staple food. Vietnam, where agriculture is largely concentrated in coastal and delta regions, should be one of the countries most affected by climate changes, with the rise in sea level and an increase in temperatures, higher levels of rainfall during the rainy season and decrease in rainfall during the dry season. The main risks are risks of storms, flooding and salinisation of land in the Mekong delta region, as well as soil degradation and erosion, and drought in some mountainous regions.

1. Climate policies and strategies

The Vietnamese government started to fully include the issue of climate changes in its policies in 2008, with a view to real coordination between the global climate strategy and sectoral policies, with each ministry being responsible for integrating global orientations and making them operational. This is particularly the case for the Ministry of Agriculture and rural development (MARD).

The ministry of Natural resources and the environment (MoNRE) is the reference institution for climate change. In 2008, Vietnam adopted the National Target Program to respond to climate change, NTP-RCC. There is strong focus on:

- research work to define evolution scenarios and identify the impacts of climate change, and to identify and test adaptation and mitigation solutions;
- development of actions for awareness-raising and strengthening of human resources and institutional capacities (including coordination between institutions) to deal with issues relating to climate changes;
- full inclusion of the issue of climate in sectoral policies and at local authority level, beginning with pilot projects, with a view to making interventions systematic.

Agriculture is fully integrated in the plan. However, implementation of the programme met with several stumbling blocks: lack of expertise regarding financial resources, particularly at local team level; difficulties in accessing sufficiently reliable satellite images and climate data; and problems regarding poor inter-institutional coordination. In addition, social aspects (populations' adaptation to climate changes) receive less attention than biophysical aspects (rising sea level scenarios) and infrastructures (construction of dykes in particular).

It was particularly in 2011 that climate changes became a top political priority. Mitigation of and adaptation to climate changes are included in the 2011-2020 National Socio-Economic Development Strategy and the 2011-2015 Socio-Economic Development Plan. The 2011-2015 Action plan to respond to climate change in environment and natural resources sector and the National Climate Change Strategy (NCCS) were also drawn up. The latter highlights the fact that adaptation must, as a first step, be considered a priority. Agriculture plays a major role in this strategy.

Agriculture is concerned by several of the strategic approaches:

- approach n°1 (preventive management of disasters and climate monitoring), in particular with the implementation of an early warning system for climate risks and rise in sea level; climate mapping, integrating scenarios on climatic evolution and sea level; and reforestation actions;
- approach n°2 (food security and access to water), in particular with the adjustment of crop and livestock systems; identification and application of biotechnological responses; implementation of a system to control pests and diseases; definition of mechanisms and policies for insurance and shared risk management; monitoring and management of water resources; and the construction of infrastructures to protect from flooding and salinisation;
- approach n°3 (responses to the rise in sea level in vulnerable regions): research, infrastructures, adjustment of production processes.
- approach n°6 (relating to an increase in the government's role in responding to climate changes): also plans for integration of the strategy in sectoral plans and local policies, and the creation of a National Climate Change Committee (NCCP) attached to the Prime Minister with a view to ensuring coordination and monitoring of the various actions;

- approach n°7 (development of local capacities with a view to participation of local authorities and communities in activities relating to climate changes);
- approach n°8 focuses on the role of research (in particular with the evaluation of actions implemented, monitoring of forecasts related to climate, definition and implementation of adaptation solutions).

Furthermore, in 2012, the ministry of Planning and Investment drew up the Vietnam National Green Growth Strategy (VGGS) and the 2013-2020 National Action Plan on Green Growth (GGAP). In the latter, agriculture is dealt with mainly in terms of contribution to mitigation of climate changes: the principles of organic farming, recycling of by-products and waste, use of fortified foods for animals in order to accelerate their growth rates and reduce GHG emissions per unit of animal product.

The ministry of Agriculture and Rural Development (MARD) is the institution in charge of coordinating the Central Commission for Flood and Storm Control (CCFSC), which is responsible for management of natural disasters. The production of research work to steer actions is also a priority of the climate strategy, as are awareness-raising actions (public servants, population) and institutional strengthening to deal with the issue.

Various initiatives were undertaken with a view to preventing and minimizing the effects of climate risks, in particular the National Strategy for Natural Disaster Prevention, Response and Mitigation in 2007 and the Community Awareness Raising and Community-Based Disaster Risk Management (CBDRM) programme for 2020.

The law on the prevention and control of natural disasters, which, to a large extent, concerns agriculture, was promulgated in 2013. The necessity for better coordination between actions for adaptation to climate changes and management of disasters is being increasingly acknowledged, with the implementation of the National Platform for Disaster Risk Reduction and Climate Change Adaptation.

Vietnam's INDC includes a component relating to mitigation and a component focusing on adaptation. Agriculture is one of the four sectors for mitigation, with one of the three other sectors (LULUCF) also partly concerning agriculture. With regards adaptation, it is pointed out that it must be coordinated with actions relating to mitigation.

A distinction is made between:

- On the one hand, the period before 2020, where reference is made to climate strategies and policies that have already been defined, without specific reference to agriculture. It is pointed out that the legal framework for integrating the issue of adaptation in economic and social development plans is still limited, with difficulties in terms of inter-institutional coordination to implement cross-sectoral and joint actions for several regions;
- On the other hand, the post-2020 period, where various priorities are mentioned, in particular: improvement of weather forecasts; prevention of natural disasters, more specifically concerning agriculture; food security, through protection and sustainable management of land; restructuring of crops and livestock; the creation of new varieties that are resilient to climate changes; and improvement of the system for the control and prevention of diseases.

2. Agricultural policies

The 2008-2020 Action Plan Framework for Adaptation and Mitigation of Climate Change in the Agriculture and Rural Development Sector corresponds to the sectoral deployment of the NTP-RCC for the agriculture sector and rural development. As part of this action plan, a study was conducted in 2010 with a view to analysing the impacts of climate changes on agriculture and proposing adaptation option recommendations in terms of policies.

The action plan is broken down into five-year action plans, with the current plan corresponding to the 2016-2020 period (Action Plan in response to Climate Change in agriculture and rural development period 2016-2020 with visions to 2050). These sectoral plans must also ensure the operational roll-out of the various strategies (particularly the NCCS

and VGGS). The current plan aims in particular to produce guidelines for integrating climate changes in programmes, projects and activities in the sector, to encourage investments in adaptation and mitigation through public-private partnerships, to evaluate the various actions implemented for better selection of the most effective measures, to develop awareness-raising actions and strengthen early-warning systems. With regards options, the issues of mitigation and adaptation are dealt with distinctly, without explicit identification of options that would contribute jointly to both objectives or of possible contradictions. Yet, certain options for mitigation and for adaptation overlap. However, certain options seem potentially contradictory. Strengthening of integration between farming and livestock breeding is put forward for adaptation, whereas the conversion of small-scale livestock farms into large-scale livestock farms is mentioned for mitigation.

In terms of adaptation, priority options include agroecological practices, even if the concept is not used: integration of agriculture-livestock-fish farming, agroforestry, diversification of crops, Ecosystem-based Adaptation (EbA), Vietnamese Good Agricultural Practices VietGAP, management of grazing land. The options mentioned for mitigation also include practices aligned with agroecology (Vietnamese Good Agricultural Practices VietGAP, integrated crop management, systems of rice intensification (SRI), minimum tillage, crop cover of soil). Among options for adaptation, focus is also placed on plant varieties suited to salinity, drought, flooding, as well as on selection of animals suited to climate changes. Whether for plant or animal production, focus is placed on both adaptation and obtaining high yield potential, with reference to the concept of Climate Smart Agriculture. Generally speaking, whether for plant or animal production, the focus is placed on appropriate systems of intensification, using cutting-edge technologies for animal production and closed-loop livestock production. Certain adaptation options are designed at community level: community-based adaptation to climate changes and risks, eco-villages, new rural models to protect the environment, improvement of infrastructures for protection against natural and extreme climate events (in particular dykes), relocation of certain populations.

In terms of policies, focus is also placed on scientific research, in particular to define agricultural practices aimed at both high levels of productivity and better adaptation to climate changes. Strengthening agricultural extension services and strengthening monitoring of animal epidemics, as well as actions on climate change communication and training, are also prioritised.

An agricultural insurance pilot programme was also implemented for the 2011-2013 period.

Coordination SUD
Solidarité Urgence Développement

14, passage Dubail 75010 Paris
Tél. : +33 1 44 72 93 72
Site web : www.coordinationsud.org