



How to establish dialogue between researchers and policymakers for climate change adaptation in Mali: Analysis of challenges, constraints and opportunities

Working Paper No. 84

CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

Bougouna Sogoba, Allassane Ba, Robert Zougmoré, and Oumar B. Samaké (Eds.)
For the National Science-Policy Dialogue Platform on Climate Change, Agriculture and Food Security in Mali, c/o AEDD, Focal Point Institution



RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security



Working Paper



Republic of Mali
One People - One Goal - One Faith

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Abstract

Mali is an agro-forestry-pastoral Sahel country whose economy is based mainly on agriculture, a sector which nevertheless depends on climate variability and change. Indeed, climate change and variability affect agriculture, while agriculture and natural resources management also affect the climate system. In Mali, a country with a semi-arid tropical climate, climate change is an unprecedented threat to the food security of the population, especially people whose livelihoods depend on small-scale agriculture. In order to develop practical solutions for agriculture and food security, we now need to consider, in an innovative and understandable manner, knowledge on climate change, agriculture and food security; we therefore need to include climate issues in national policies and strategies for actions that help to enhance the resilience of rural populations. The exchange of information and knowledge between actors is therefore essential to ensure that decisions on policies, strategies and actions to fight against climate change are based on the best data. This study report, which has been produced as part of activities of the National Science-Policy Dialogue Platform on Climate Change, Agriculture and Food Security in Mali (CCAFS Mali), sheds light, for the various actors, on the current situation of institutions, challenges, constraints and opportunities for operational dialogue between researchers and policymakers for climate change adaptation. Eight key messages have been drawn from the study, and they concern: (1) the current status of the existing institutional system for operational dialogue; (2) the organization and operational difficulties of institutions involved in the fight against climate change; (3) the need for enhanced partnership between the institutions; (4) the need for adequate financial support; (5) the current status of dialogue between researchers and policymakers in Mali; (6) constraints on operational dialogue between researchers and policymakers in Mali; (7) opportunities for operational dialogue between researchers and policymakers in Mali; and (8) the need for a communication forum for researchers and policymakers in Mali. Consideration and analysis of these messages should lead to actionable recommendations to improve inter-institutional dialogue and well-informed decision-making. Any resulting policy decisions could certainly help to promote climate-smart agriculture and improve the resilience of farms in Mali.

Key Words

Climate change adaptation, science-policy dialogue, knowledge sharing, decision-making, Mali.

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Acronyms and Abbreviations

ADB	African Development Bank
AEDD	Environment and Sustainable Development Agency
AMASSA	Malian Association for Food Security and Sovereignty
AMEDD	Malian Association for Sustainable Development Awareness
ANM	National Meteorology Agency
ANSSA	National Food Health Security Agency
AOPP	Association of Professional Farmer Organizations
APCAM	Permanent Assembly of Chambers of Agriculture of Mali
CCAFS	Climate Change, Agriculture and Food Security
CCOCSAD	Municipal Committee for Orientation, Coordination and Monitoring of Development Activities
CGIAR	Consultative Group on International Agricultural Research
CLOCSAD	Local Committee for Orientation, Coordination and Monitoring of Development Activities
CMDT	Malian Textile Development Company
CNCCM	National Climate Change Committee of Mali
CNE	National Environment Council
CNOP	National Farmer Organizations Coordination
CNRA	National Agricultural Research Committee
CNRST	National Scientific and Technological Research Center
CNU	National Commission of Research Findings Users
CRA	Regional Chamber of Agriculture
CROCSAD	Regional Committee for Orientation, Coordination and Monitoring of Development Activities
CSA	Commissioner for Food Security
DGPC	General Directorate of Civil Protection
DHPS	Public Hygiene and Sanitation Division
DNA	National Directorate of Agriculture
DNEF	National Directorate of Forestry
DNGR	National Directorate of Rural Engineering
DNH	National Directorate of Water Resources
DNM	National Directorate of Meteorology
DNP	National Directorate of Fisheries
DNPD	National Directorate of Development Planning
DNPIA	National Directorate of Animal Production and Husbandry
DNS	National Directorate of Health
ECOWAS	Economic Community of West African States
ENI	National School of Engineering
EPA	Administrative Public Establishment
EPST	Scientific and Technological Public Establishment
FAO	Food and Agriculture Organization
FO	Farmer Organization
GDP	Gross Domestic Product
GEF	Global Environment Fund
GIEC	Inter-Governmental Group of Experts on Climate Change

GIPD	Integrated Production and Predators Management
GPRSF	Growth and Poverty Reduction Strategy Framework
GTPA	Multidisciplinary Assistance Working Group
HCCT	High Local Authorities Council
ICRAF	World Agroforestry Center
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IER	Institute of Rural Economy
IPR/IFRA	Rural Polytechnic Institute of Katibougou/Training and Applied Research Institute
IRD	Institute of Development Research
LCV	Central Veterinary Laboratory
LOA	Agricultural Orientation Law
NEPAD	New Partnership for Africa's Development
NEPP	National Environmental Protection Policy
NGO	Non-Governmental Organization
PAGIRE	Integrated Water Resources Management Action Plan
PAGS	Simplified Development and Management Plan
PANA	National Climate Change Adaptation Action Program
PAPAM	Agricultural Productivity Enhancement Project in Mali
PASAOP	Agricultural Services and Farmer Organizations Support Program
PASE	Energy Sector Support Project
PCVBG	Biodiversity Conservation and Development Project
PDA	Agricultural Development Policy
PDSEC	Social, Economic and Cultural Development Program
PRODEFA	Aquacultural Sector Development Project
R/GRC ACC	Risk and Disaster Reduction/Management / Climate Change Adaptation
RGRC	Risk and Disaster Reduction and Management
RRC	Risk and Disaster Reduction
SDDR	Rural Sector Development Master Plan
SNRA	National Agricultural Research System
SNSA	National Food Security Strategy
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
UNSCPC	National Union of Cotton Producers' Cooperative Societies
WAEMU	West African Economic and Monetary Union

I. Introduction

According to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2014), the impacts of climate change are becoming increasingly severe and will seriously affect developing countries. It is estimated that agricultural production loss in sub-Saharan countries will stand at about 8% by 2050, with possible increases in commodity prices of up to 84%. This loss could reach 28% if no action is taken.

Mali is an agro-forestry-pastoral Sahel country. Although the land suitable for agriculture accounts for only 14% of the total area, agriculture is the main activity of the country, in terms of both employment and contribution to the economy. Indeed, with 75% of the population living in rural areas, this sector contributes about 50% of GNP (PANA, 2007). The Malian economy is therefore heavily dependent on the performance of the agricultural sector, whose major productivity constraints are low soil fertility, low mechanization, limited knowledge and ability of farmers to use efficient intensive production technology, etc. The country's agriculture is mainly rain-fed and is particularly sensitive to climatic variations, impacts of weather extremes, and continuous extension of the desert to the South over several decades. According to studies conducted within the context of PANA, droughts, floods, high winds and significant temperature fluctuations are the major climate risks to which Mali is exposed. These climate risks will have consequences such as early drying up of water sources, shorter or delayed rainy seasons, decline in agricultural and crop production, disappearance of some plant and animal species, clearing of new lands, a higher degree of human and animal mobility to the most favourable areas, etc. All this helps to accelerate competition among actors for access to natural resources. This also means that the production and productivity of agro-forestry-pastoral systems depend on climate change, which could impact on food security and significantly affect the country's economy. To better respond and adapt to climate change for a resilient agriculture and sustainable food security, the Government of the Republic of Mali has prepared policies and strategies for rural sector development and natural resources management such as the Agricultural Development Policy (PDA), the National Environmental Protection Policy (PNPE), the National Climate Change Policy and Strategy, the Agricultural Orientation Law (LOA), Sector Master Plans, particularly the Rural Sector Development Master Plan (SDDR), the National Food Security Strategy (SNSA), the Growth and Poverty Reduction Strategy Framework (GPRSF), etc.

The expected outcome is to contribute significantly to: (i) increasing the primary sector's share in GDP; (ii) strengthening food security so as to achieve food self-sufficiency; (iii) increasing incomes and improving living conditions in rural areas; and (iv) protecting the environment and natural resources. Institutional frameworks have been put in place to operationalize these various policies and strategies, in particular:

- the National Environment Council (CNE), which is a consultation framework for giving advice and making recommendations for environmental protection, desertification control, climate change, and sustainable development;
- the National Climate Change Committee of Mali (CNCCM) which provides the CNE with technical information and advice on issues related to climate change;
- the Climate Fund for domestic and international resource mobilization to provide financial support for national policies and strategies on climate change.

These institutional frameworks have helped to develop national action programs and plans so as to improve people's resilience to the effects of climate change. However, it is increasingly recognized today that given the specific needs of various sectors of country economies as they face the current effects and expected long-term impacts of climate change, it is imperative to manage adaptation and mitigation issues on a sector basis. In this connection and with the support of the

CGIAR Program on Climate Change, Agriculture and Food Security (CCAFS), Mali deemed it necessary to put in place in 2012 a national science-policy dialogue platform on climate change adaptation in agriculture and food security (CCAFS Platform). The platform brings together actors involved in the design of development strategies, policies and plans of these two sectors. With AEDD as the focal point institution, the CCAFS Platform mainly seeks to facilitate the “difficult” communication/interaction between policymakers and researchers on climate change adaptation issues in agriculture and food security. Some difficulties are often mentioned as regards the need for interaction between the key national actors, in particular:

- some policymakers’ poor understanding of climate change adaptation issues in agriculture;
- poor understanding and involvement of researchers in the development of agricultural strategies and policies, especially within the context of climate change;
- researchers’ limited consideration of policymakers’ concerns/needs to guide them in the development of appropriate policies;
- poor communication and dialogue between researchers and policymakers, etc.

To inform actors of these constraints, a study was commissioned by the platform to explore the current situation of actors, as well as analyze the challenges, constraints and opportunities for operational dialogue between researchers and policymakers on climate change adaptation in agriculture and food security in Mali. The study was conducted using an inclusive and participatory approach, and is expected to result in findings and analyses which, if taken into consideration, could lead to actionable recommendations to improve inter-institutional dialogue and ensure well-informed decision-making in Mali.

II. Methodology

2.1. Mapping of Actors

In Mali, the National Environment Council (CNE) is the highest body that makes proposals and recommendations on environmental issues, particularly through initiatives to promote the participation of all national actors in environmental preservation and protection, desertification control, climate change and sustainable development.

Within the Council, a technical instrument (CNCCM) has been established to provide information and opinions on all issues relating to climate change.

For the specific needs of this study, the national science-policy dialogue platform (CCAFS) has, in participatory manner, selected from the 54 members of CNCCM 17 structures considered as key institutions in climate change adaptation, agriculture and food security in Mali. These structures include technical rural development departments, national agricultural research coordination structures (CNRST, CNRA), and some policy institutions such as HCCT, which is supposed to influence decision-making in State institutions.

2.2. Missions of the Structures and Operational Constraints

A team of experts has been appointed by the National CCAFS Platform; the team is made up of the platform focal point within AEDD, resource persons who are platform members with good experience in the conduct of a study of this kind and also have a good knowledge of the institutional environment in Mali.

Based on interview guides prepared by the team in charge of the study and that have been validated by CCAFS Mali Platform, interviews in focus groups were held with officials of selected institutions. These interviews also helped to identify specific internal and external constraints on institutional collaboration.

2.3. Analysis of operational dialogue between policymakers and researchers

The team in charge of the study analyzed the information collected through the interviews, as well as cross-checked the information with documents relating to the creation, missions and operational methods of the institutions. It should be noted that the analyses were discussed, amended and validated by the CCAFS platform members.

The same applies to recommendations for establishing operational dialogue between policymakers and researchers for climate change adaptation in agriculture and food security. The recommendations drew mainly on the contributions made by the various structures following their self-analysis, as well as on additional information provided by the team in charge of the study and suggestions made by CCAFS platform members during validation of the document.

III. Mapping, missions and constraints of national actors

3.1. Mapping of Actors

By Decree No. 10-390/PM-RM of 26 July 2010, the Government of Mali created, within the Ministry of the Environment, the National Environment Council (CNE) to give opinions and make proposals and recommendations on environmental issues, particularly through initiatives to promote the participation of all national actors in environmental preservation and protection, desertification control, climate change and sustainable development.

The National Environment Council, chaired by the Minister of the Environment, comprises members from:

- the public sector;
- the private sector;
- Local Authorities;
- the Profession and Civil Society.

Within the CNE, the National Climate Change Committee of Mali (CNCCM) was established by Decree No. 2011-107/PM-RM of 11 March 2011; the Committee is responsible for:

- working towards implementation of obligations to the United Nations Framework Convention on Climate Change (UNFCCC) and any multilateral or bilateral agreement on climate change;
- helping to search for funding for UNFCCC implementation at national and international levels;
- preparing Mali's participation in conferences and other meetings related to climate change;
- organizing the presentation of research findings at conferences, meetings and other activities;
- promoting the development of synergies with other conventions, particularly the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD);

- enhancing national capacities for climate change;
- providing the National Environment Council with information and opinions on all climate change issues.

Chaired also by the Minister of the Environment or his/her representative, the National Climate Change Committee of Mali comprises fifty-four (54) members representing the public sector, the private sector, Local Authorities and Civil Society.

Based on the mapping of actors as explained above, the structures below were selected for interviews and various analyses required in this study. The institutions and organizations are as follows:

- the Environment and Sustainable Development Agency,
- the National Directorate of Agriculture,
- the National Directorate of Animal Production and Husbandry,
- the National Directorate of Fisheries,
- the National Directorate of Forestry,
- the National Directorate of Rural Engineering,
- the Commissioner for Food Security,
- the National Directorate of Water Resources,
- the National Directorate of Meteorology,
- the National Directorate of Development Planning,
- the Institute of Rural Economy,
- the National Directorate of Health,
- the General Directorate of Civil Protection,
- the High Local Authorities Council,
- the National Scientific and Technological Research Center,
- the National Agricultural Research Committee,
- the National Union of Cotton Producers' Cooperative Societies,
- the National Farmer Organizations Coordination (CNOP),
- the Communicators Network,
- the Permanent Assembly of Chambers of Agriculture of Mali (APCAM).

It should be noted that AEDD, as the institution providing secretarial services for the CNCCM, also provides secretarial services for the National Science-Policy Dialogue Platform (CCAFS Mali) and to that end, has formalized the existence of the platform by Administrative Decision No. 12 008/MEA-AEDD of 20/11/2012.

3.2. Missions of the Selected Structures

3.2.1. Environment and Sustainable Development Agency (AEDD)

The AEDD was established by Law No. 10-027 of 12 July 2010. Its mission is to coordinate the implementation of the National Environmental Protection Policy and ensure the mainstreaming of environmental issues in all national policies through:

- capacity building for actors involved in environmental management, desertification control, climate change and sustainable development by developing modules, as well as information,

- education and communication tools, and organizing training, information and awareness sessions;
- monitoring of financial mechanisms and mobilization of funding for environmental protection, desertification control, climate change and sustainable development;
 - coordination and monitoring of implementation of the international Conventions, Agreements and Treaties ratified by Mali and relating to the environment, desertification control, climate change and sustainable development;
 - inclusion of environmental aspects in the design of development programs and projects and land development plans by preparing guides for coherence in environmental actions, as well as advisory and support services for Local Authorities;
 - preparation of the national environmental status report;
 - monitoring of implementation of recommendations made by the National Environment Council;
 - collection of statistical data and products on the environment and sustainable development;
 - dissemination of biotechnology research findings on environmental protection, desertification control, climate change and sustainable development;
 - participation in implementation of the Environmental Action Plan Programs.

In light of its above-mentioned missions, AEDD is at the crossroads of several priorities in line with the conventions, particularly the Rio Generation and the implementation of Agenda 21. It is not expected to carry out climate change activities, but rather to support the other structures in this area. In this capacity, it provides secretarial services for many consultation frameworks on climate change, particularly the National Environment Council, the National Climate Change Committee of Mali, the Steering Committee of Climat Mali Fund launched in 2012. The AEDD monitors and evaluates the implementation of the Strategic Investment Framework for Sustainable Land Management in Mali, as well as the National Climate Change Policy and its 2014-2018 Action Plan. It is the focal point of the national exchange platform for policymakers and researchers for climate change adaptation in agriculture and food security; the platform is supported by the CCAFS Program (Climate Change in Agriculture and Food Security; www.ccafs.cgiar.org).

3.2.2. National Directorate of Agriculture

The National Directorate of Agriculture (DNA) was established by Law No. 05-012 of 11 February 2005; it is responsible for:

- designing and monitoring the implementation of measures and actions to increase production and improve the quality of agricultural, food and non-food items;
- promoting and modernizing the agricultural sector;
- designing and monitoring the implementation of training, counseling, outreach and communication activities for farmers;
- preparing and ensuring the implementation of regulations on plant control and packaging of agricultural products;
- participating in the definition and implementation of the agricultural research policy;
- developing and implementing measures for processing and promoting of wild food products;
- contributing to the design and implementation of the human resource training policy in the agricultural sector;
- participating in the development and monitoring of quality standards for agricultural products and inputs; and
- collecting, processing and disseminating agricultural data.

The DNA is one of the oldest rural development structures responsible for supervising and implementing agricultural sector activities so as to improve agricultural production and productivity in agro-ecological zones. As regards climate change, one of DNA's missions is to ensure wide dissemination and grassroots farmers' adoption of smart agriculture options to cope with the climate.

3.2.3. National Directorate of Animal Production and Husbandry

The National Directorate of Animal Production and Husbandry (DNPIA) was established by Law No. 05-008 of 11 February 2005 to develop national policy in the production and processing of animal products and by-products, as well as to coordinate and monitor its implementation by:

- designing and monitoring the implementation and evaluation of policies and strategies to promote animal production and husbandry;
- developing and monitoring the implementation of measures to improve livestock feed and husbandry;
- designing and monitoring the implementation of sustainable pastoral resources development, protection and management;
- developing and modernizing animal production sectors and participating in the design and implementation of measures to improve the conditions for marketing and processing animal products;
- designing and monitoring the implementation of advisory support, extension, training and communication programs and activities relating to animal production and husbandry;
- preparing and implementing regulations for animal production and husbandry; and
- pooling, processing and disseminating information and statistical data on animal production and husbandry.

In the fulfilment of its missions, the National Directorate of Animal Production and Husbandry carries out activities to enable graziers to better adapt to climate change, while encouraging mitigation practices. Thus, at national level, it has developed 20 irrigation areas covering 20 000 hectares with water tanks and troughs. Similarly, it intends to develop and restore available spaces in non-agricultural areas, wherever they exist, so as not to be dependent on the climate.

3.2.4 National Directorate of Fisheries

The National Directorate of Fisheries (DNP) was established by Law No. 05-009 of 11 February 2005 to develop the national fisheries policy, as well as coordinate and monitor the implementation of the policy by:

- designing and implementing the fisheries and aquaculture sector development policy;
- promoting and modernizing the fisheries and aquaculture sectors within the context of sustainable management of fishery resources;
- preparing and implementing fishery regulations;
- designing and implementing advisory support, outreach, extension, training and information programs and activities for actors in the sector; and
- pooling, processing and disseminating information and statistical data relating to the fisheries sector.

In light of these missions, the DNP in 2012 coordinated the development and adoption of the Action Plan of the National Fisheries and Aquaculture Development Policy. It is expected to promote the implementation of the national policy with the involvement of private individuals, particularly as regards climate change. To that end, the DNP supports climate change adaptation activities through capacity building for fishermen and fish farmers, who have already developed adaptation practices such as extensive fish farming with different techniques like dams or quarantines for the growth and reproduction of fish populations.

3.2.5. National Directorate of Forestry

The National Directorate of Forestry (DNEF) was established by Law No. 09-028 of 27 July 2009. Its main mission is to develop the national policy on soil and water conservation, desertification control, the sustainable management of forests, wetlands, wildlife and habitat, the conservation of the biological diversity of species of wild fauna and flora, and the promotion and utilization of forest products and wildlife, as well as coordinate and monitor its implementation. DNEF's specific missions are to:

- develop and ensure the implementation of inventory and mapping studies on forestry, wildlife and habitat;
- design, monitor the implementation and evaluate national strategies and programs for combatting desertification;
- design, monitor the implementation and evaluate national development strategies and programs for forests, wetlands, wildlife and habitat, as well as promote and develop the timber industry, wild products and wildlife products and habitat;
- develop and monitor the implementation of national water and soil conservation programs, as well as the restoration of forest areas, river banks and their watersheds;
- prepare regulations on the conservation and sustainable use of forests, wildlife and its habitat, and ensure their implementation;
- develop and monitor the implementation of programs and projects for the classification and declassification of forests and wildlife conservation areas;
- contribute to the definition and application of national standards on the development and exploitation of forests and wildlife, packaging of timber, product picking and wildlife products;
- participate in the negotiation of International Conventions, Agreements and Treaties relating to the conservation and sustainable use of flora and wildlife, and ensure their implementation; and
- pool, process and disseminate information and statistics on forest resources, as well as wildlife and their habitat.

The DNEF needs to assist communities and local authorities in preparing and implementing development and simplified management plans (PAGS) for natural resources within their territories. This would help to empower actors in the rational management of natural resources (water, forests, wildlife, etc.) within the context of climate change. Thus, as part of its “Fuelwood Unit” program, the DNEF helped to establish many PAGS throughout the country in places where rural wood markets can be created to supply energy wood to urban areas, while incorporating a dimension for the development and reforestation of rural areas.

3.2.6. National Directorate of Rural Engineering

The National Directorate of Rural Engineering was established by Law No. 05-013 of 11 February 2005 to develop the national planning rural development and equipment policy, as well as monitor and coordinate the implementation of the policy by:

- assessing the exploitable agricultural potential and resources, as well as preparing the related land development schemes and master plans;
- developing rational and sustainable management methodologies and systems for agricultural equipment;
- managing the preparation and implementation of regulations on rural development and equipment;
- participating in preparing and monitoring the implementation of the rural land policy;
- participating in the definition of management and technical standards for rural facilities;
- developing and monitoring the implementation of investment projects and programs with respect to the development of agricultural resources and rural facilities;
- supervising, coordinating and controlling actors in the development of irrigation schemes and facilities;
- supporting local authorities in the development, implementation and monitoring of their rural development and equipment projects and programs; and
- pooling, processing and disseminating statistical data on irrigation schemes and equipment.

As regards its sovereign mission of planning rural development and equipment, the DNGR needs to take into account climatic factors and parameters in calibrating irrigation schemes and assessing agricultural potential and resources. With respect to climate change, DNGR's definition of technical rural development and equipment standards which take into account extreme weather events, is expected to ensure sustainability of structures and investments, while minimizing the risk of disasters.

3.2.7. Commissioner for Food Security

The Commissioner for Food Security (CSA) was established by Decree No. 04-150/P-RM of 18 May 2004 under the supervision of the President of the Republic. Its mission is to develop and ensure the implementation of the national food security policy by:

- proposing strategies, as well as preparing and implementing, in consultation with the Ministries concerned, measures to ensure full coverage of the country's food needs;
- ensuring the creation, restoration and good management of the national buffer stock and cereal banks;
- analyzing food sector outlook in light of the farming season and identifying the affected or deficit areas;
- planning, coordinating and controlling food distribution operations in the affected areas;
- developing and implementing, in consultation with the public and private structures concerned, measures to organize cereal markets and modernize food distribution channels; and
- ensuring that consumers are informed, particularly of prices of foodstuffs as well as their health and nutritional quality.

Given the direct impact of climate change on food production, the Commissioner for Food Security takes measures to address food insecurity that could be caused by natural disasters. It takes the measures using the Early Warning System and the Agricultural Market Observatory, with the assistance of its attached services which are:

- the Directorate of World Food Program Projects,
- the Nara Integrated Food Security Project,
- the Food Security and Incomes Project in Kidal Region,
- the Special Food Security Program,
- the Agricultural Products Promotion and Marketing Support Program,
- the Agricultural Sectors Promotion Agency,
- the Agricultural Markets Decentralized Information System Support Project,
- the Cereal Market Restructuring Program, and
- the Agricultural Products Authority of Mali.

The Commissioner for Food Safety is mainly responsible for:

- developing and implementing the response plan in the event of climate disasters;
- guaranteeing the national cereal reserve with a maximum capacity of thirty-five thousand (35,000) tonnes; and
- providing regular food assistance, even in the absence of cereal deficit, to some vulnerable populations without sufficient income to feed themselves.

3.2.8. National Directorate of Water Resources

The National Directorate of Water Resources (DNH) was established by Ordinance No. 10-001/P-RM of 18 January 2010. Its mission is to develop the national policy on water resources, as well as coordinate and monitor the implementation of the policy by:

- developing and implementing strategies for drinking water supply, as well as water resource mobilization and management;
- developing and applying standards for the water sector;
- identifying, assessing and monitoring water resources and hydraulic structures;
- planning, controlling and developing the public water service;
- evaluating water resource infrastructure and development programs and projects; and
- participating in the promotion of sub-regional cooperation in water control and management.
- The availability and quality of water resources is the fundamental purpose of the National Directorate of Water Resources. The quantity and quality of water resources are influenced by climate change; that is why the DNH has made climate change the core of all its projects. Given water resource vulnerability to climate change, the DNH gives priority to the protection, conservation and management of Malian and cross-border water resources by:
 - carrying out awareness activities for grassroots populations;
 - introducing technological innovations such as water barns; and
 - adopting innovative climate change adaptation techniques, such as the development of the banks of River Niger to better cope with the low water in some years, and thereby help to ensure hydropower for Sélingué, Manantali and Sotuba dams.

3.2.9. National Meteorology Agency

The National Meteorology Agency was established by Ordinance No. 2012-004/P-RM of 24 February 2012. Its mission is to observe and study the weather, climate and atmospheric constituents of the environment so as to ensure the safety of people and goods, as well as contribute to the economic and social development of Mali by providing appropriate information and services to all users. It is involved in developing the national meteorology policy and ensures its implementation and monitoring by:

- managing and developing the national meteorological and surveillance observation network of the atmospheric environment;
- carrying out meteorological activities at national level;
- providing meteorological information and services, as well as promoting their use in the various socio-economic sectors;
- participating in meteorological and climate studies, as well as research related to its mission;
- coordinating meteorological activities throughout the country;
- carrying out artificial weather modification activities throughout the country; and
- monitoring and implementing measures related to Mali's international commitments as regards meteorology and climate.

For its missions, the National Meteorology Agency inherited from its ancestor (the National Directorate of Meteorology) a meteorological support program in rural areas, which mainly comprises agro-meteorological activities and tools used in the field. Within this context, its contribution is to incorporate weather and climate aspects in the agricultural technical package (improved varieties, good farming practices, etc.) already used by farmers. Assistance to rural areas is given in a participatory manner to farmers who receive agro-meteorological advice. The farmers are also trained in methods of measuring rainfall in their villages, observations on crops, etc. This involves transfer of knowledge and information to producers for better decision-making on climate risk management on their farms.

3.2.10. National Directorate of Development Planning

The National Directorate of Development Planning (DPNP) was established by Ordinance No. 04-007/P-RM of 25 March 2004 to develop the development planning and management policy, and to ensure its implementation by:

- preparing the medium and long-term broad economic, social and cultural development guidelines of the nation;
- coordinating economic, social and cultural development sector strategies at national, regional and local levels;
- monitoring, developing and ensuring the macroeconomic, temporal, spatial and sector consistency of development policies, strategies, plans and programs, including the Public Investment Program; and
- preparing macroeconomic forecasts, as well as monitoring the economic environment and analysis.

Indeed, it should be noted that, in general, environmental issues constitute a major priority for the National Directorate of Development Planning. Consequently, the inclusion of environmental issues in project proposals is an eligibility criterion in the arbitration of investment budgets. The eligibility of each project depends on the conduct of an environmental impact assessment, as well as consideration of the impacts of climate change on ecosystems.

3.2.11. Institute of Rural Economy

The Institute of Rural Economy (IER) was established in 1960. It was transformed into a public scientific and technological establishment by Ordinance No. 01-024/P-RM of 22 March 2001 with the following tasks:

- contributing to the definition and implementation of research objectives and resources for agricultural development research and study;
- developing and implementing agricultural research programs;
- providing technical support for agricultural development;
- contributing to training and scientific and technical information for research and agricultural development staff;
- developing appropriate technologies for increased production and improved productivity in rural areas;
- disseminating research and study findings; and
- providing services in areas within its competence.

Since its inception, the Institute of Rural Economy has become the main research institution in Mali for implementing national research and rural development policies (agriculture, livestock, fisheries, forestry, and water resources). It seeks to contribute to agricultural productivity through research tailored to the needs of rural areas, ensure the conservation of natural resources, increase food security and farmers' incomes, and ensure sustainable rural development, making the agricultural sector the engine of the country's economic growth.

The IER identifies research needs, implements research programs, and ensures wide dissemination of research findings. It gives priority to control of the adverse effects of climate change by:

- providing farmers with crop varieties that adapt to climate variability (e.g. Sotubaka maize, dembagnouman, etc.);
- creating new fodder varieties for animal feed; and
- initiating climate change impact assessments on agriculture for small farmers in Mali.

3.2.12. National Directorate of Health

The National Directorate of Health (DNS) was established by Ordinance No. 01-020/P-RM of 20 March 2001. It is responsible for developing the national public health, hygiene and sanitation policy, and for coordinating and controlling regional services and its attached services that help to implement this policy by:

- designing and developing public health, sanitation and hygiene strategies;
- contributing to the development and implementation of standard regulations;
- conducting appropriate research and studies, as well as preparing and implementing projects, programs and action plans; and
- coordinating, supervising and controlling the activities of implementation services, and assessing their results.

Following the Libreville Declaration in 2008, Mali prepared documents on health and the environment, including a study on the current situation, the joint environment and health plan, and the adaptation plan for the adverse effects of climate change on health in Mali. All these documents seek to guide actions to be taken to curb the adverse effects of climate change on the health of human beings, animals and the living environment. Indeed, in a tropical country like Mali, the risk of progression or recurrence of diseases linked to the emergence of pathogens can aggravate health problems.

3.2.13. Directorate General of Civil Protection

The General Directorate of Civil Protection (DGPC) was established by Ordinance No. 98-026/P-RM of 25 August 1998, as amended by Law No. 06-004 of 6 January 2006. Under Section 2 (new) of the amending law, the General Directorate of Civil Protection is responsible for developing the national civil protection policy, and ensuring its implementation by:

- organizing, coordinating and assessing risk prevention and assistance measures in the event of disaster;
- participating in the development and implementation of assistance and protection plans for persons, property and the environment in case of accidents, disasters and catastrophes, in collaboration with other relevant services;
- sensitizing and informing the public on activities to fulfill its mission;
- participating in actions for peace and human assistance;
- participating in civil defense; and
- training staff in charge of civil protection.

As part of its mission, the DGPC is primarily engaged in the management of climate change-related risks and disasters. As a focal point institution, it hosts the National Platform for Risk and Disaster Reduction and Management (RGRC). It also coordinated preparation of the National Risk and Disaster Management Strategy in Mali.

3.2.14. High Local Authorities Council

The High Local Authorities Council (HCCT) is one of the eight (08) institutions of the Republic of Mali as stipulated in Article 25 of the Constitution of 25 February 1992. The High Local Authorities Council is responsible for:

- reviewing and giving a reasoned opinion on any local and regional development policy;
- making proposals to the Government on any matter concerning environmental protection and improvement of the quality of life of citizens;
- giving opinions to the Government on all matters relating to the above-mentioned areas;
- representing local authorities of the Republic and Malians abroad; and
- sitting, in closed session, at the request of the Prime Minister, with the National Assembly to consider local or regional issues of national interest.

The above analysis shows that one of the responsibilities of the High Local Authorities Council, which functions as a Senate, is to define guidelines and give advice to Government institutions on environmental protection, including the issue of climate change.

3.2.15. National Union of Cotton Producers' Cooperative Societies

The National Union of Cotton Producers' Cooperative Societies (UNSCPC) is an organization of cotton producers at national level. It is mainly responsible for:

- primary marketing of cotton by producers;
- supplying inputs to producers;
- representing producers; and
- providing training and information to producers.

Climate change is a direct threat to production activities by members of the National Union of Cotton Producers' Cooperative Societies, namely farming and livestock breeding, and is therefore a major priority of the Union. Given the continuing decline in crop yields and the increasing lack of pasturelands for livestock, the UNSCPC is making efforts to improve the adaptation capacity of its members, particularly through:

- the use of new short-season varieties, especially for cotton;
- the adoption of new techniques and technologies for adaptation to climate change; and
- the implementation of agricultural insurance projects for the management of climate risks.

3.2.16. National Scientific and Technological Research Center (CNRST)

The CNRST was created in 1986, but it is currently established by Law No. 04-032 of 27 July 2004. It is a public administrative institution attached to the Ministry in charge of Scientific Research. It is currently responsible for:

- coordinating and ensuring the coherence of scientific and technological research programs;
- promoting scientific and technological research;
- collecting and disseminating scientific and technological information;
- issuing research permits to foreign researchers; and
- mobilizing funding for scientific and technological research.

Given these sovereign missions, its function of coordinating and ensuring the consistency of scientific and technological research programs seeks to guide and influence national research organizations (institutes, universities and graduate schools) on the effective integration of climate change into research programs. One of the important actions undertaken by CNRST was reform of the status of researchers in 1990 and 2001. However, it should be noted that for various reasons, including institutional and financial reasons, the structure has been facing enormous difficulties in its coordination mission.

3.2.17. National Agricultural Research Committee (CNRA)

The CNRA was established in 1993 following restructuring of Agricultural Research of Mali, which witnessed the emergence of a genuine National Agricultural Research System (SNRA). The SNRA is coordinated by the CNRA and comprises:

1. The Institute of Rural Economy (IER), which is the main agricultural research institute of Mali;
2. The Central Veterinary Laboratory (LCV), which conducts animal health diagnoses research, and produces vaccines;
3. Universities and professional schools such as the Rural Polytechnic Institute of Katibougou/ Training Institute for Applied Research ((IPR/IFRA); and
4. Farmer organizations, NGOs and the private sector involved in the implementation of national agricultural research projects and programs.

The CNRA is responsible for sector coordination of agricultural research in the Ministries in charge of rural development. It is an ideal framework for dialogue between the various agricultural research actors, particularly agricultural research institutions, users of research findings and development partners involved in the funding of agricultural research.

The CNRA assists Ministries in charge of Rural Development in designing and controlling the implementation and monitoring of the national agricultural research policy. In this capacity, it is responsible for:

- ensuring effective translation of the national rural development policy into research priorities for institutions responsible for agricultural research in Mali;
- assessing the relevance and scientific quality of programs and agricultural research findings;
- ensuring proper use of all the human, material and financial resources of the national agricultural research system;
- assisting in the definition of the national agricultural research policy, and advising on the strategy for its implementation;
- overseeing the preparation and updating of the long-term agricultural research strategic plan;
- taking decisions on research projects and their budgets;
- advising on agricultural research findings, the results of external evaluations of programs and on the audits of agricultural research institutions and organizations;
- approving the annual report on technical and financial activities and the annual program budget of the Executive Secretariat of the National Agricultural Research Committee;
- supporting consolidation measures for financing mechanisms to ensure sustainable financing of agricultural research;
- helping to promote and strengthen institutional and cooperation relations between agricultural research institutions at national and international levels;
- making recommendations and advising on agricultural research matters brought to its attention; and
- advising the Ministers in charge of Rural Development on all matters relating to agricultural research.

The CNRA has three (3) working committees:

- the Scientific Committee;
- the Financial Committee; and
- the National Committee of Research Findings Users.

As arbitrator in the allocation of agricultural research investments, the CNRA is in a strategic position to influence the mainstreaming of climate change issues in research projects in Mali.

The organization of a platform of structures constituting the SNRA in Mali will facilitate inter-institutional consultations between research institutions, and would therefore organize dialogue between researchers and policymakers.

3.2.18. National Farmer Organizations Coordination (CNOP)

Following the meeting held in 1996 in Segou, Mali's FOs embarked on establishing a convergence framework for their concerns, actions and strategies so as to find a common ground for real representativeness, formulation of common strategies against other actors, and enhanced impacts of their lobbying and advocacy. For example, the CNOP coordinated consultations between State and non-State actors for the drafting of the LOA in Mali.

The CNOP was established in May 2002. It is made up of national and/or sub-national farmer organizations that adhere to the statutes and regulations of the organization. The Coordination was established by consensus of the national and sub-national umbrella organizations. The CNOP has two main functions: political representation and defense of farmers' interests.

The impacts of climate variability and change directly affect farmers and their organizations. Therefore the CNOP is an important lever in communicating to policymakers the concerns and constraints of farmers as regards specific strategic options to be taken to address the threats of climate variability and change. The CNOP also provides a platform for researchers and rural development technical services to ensure better dissemination of technological innovations for agricultural adaptation to climate change.

3.2.19. Permanent Assembly of Chambers of Agriculture of Mali (APCAM)

APCAM was established in 1988 by Decree No. 133. It is a professional institution with legal personality and financial autonomy, whose structuring into Regional Chambers of Agriculture and the Permanent Assembly of Chambers of Agriculture of Mali was established by Decree No. 93-295/P-RM of 18 August 1993 defining the organization and operation of APCAM. APCAM, which is an offshoot of the CRA, coordinates and represents the network of Chambers of Agriculture at national and international levels. As a consular chamber and official representation organization for farmers in the institutions of the Republic, regional chambers of agriculture, depending on the specific climate change constraints of the regions, not only manage climate-smart agriculture programs, but also provide information on the effectiveness of technologies and innovations for adaptation of agriculture to climate variability and change. As an arbitrator in the management of farmer support projects (e.g. PAPAM), APCAM can influence the mainstreaming of climate change in sub-projects proposed by farmer organizations or their members.

3.2.20. Network of Agriculture and Climate Change Journalists

The Network of Agriculture and Climate Change Journalists was established in 2008, and currently comprises forty journalists from several public and private communication, press and audiovisual structures operating in Mali. It primarily seeks to sensitize and inform actors and the general public of the effects of climate change, as well as technologies and practices for adaptation to the adverse effects of climate change.

The network works closely with the Ministry of the Environment through AEDD and DNEF, as well as with the Ministry of Agriculture through the DNA. The network is currently working with the DNA in the Project for Enhancing Agricultural Resilience to Climate Change.

It is a key large-scale communication instrument for disseminating information and knowledge on climate change, agriculture and food security to wherever necessary.

3.3. Constraints on fulfilment of the missions

The above-mentioned national structures have identified several constraints on the fulfilment of their missions, in particular:

- organizational and operational difficulties;
- inadequate reinforced partnership; and
- inadequate funding to meet growing needs.

3.3.1. Organizational and operational difficulties

They can be summarized as follows as per structure:

- **Environment and Sustainable Development Agency:**
 - lack of information and/or complete documentation on all projects, programs, and findings of research and initiatives in the fight against climate change;
 - inadequate understanding, by development sector services, of AEDD's roles in the implementation of projects for adaptation or mitigation of the effects of climate change in Mali; and
 - misinterpretation, by most Government technical services, of the coordination tasks for which the AEDD is responsible.
- **National Directorate of Agriculture:**
 - lack of skills required by many DNA workers and policymakers to improve the adaptation capacity of farmers. Furthermore, this is often reflected by low dynamic leadership of federative initiatives in the agricultural sector (large agricultural development programs, rural development authorities, basin agencies, CMDT, etc.) and lack of actor impetus for better mainstreaming of climate change in agricultural activities;
 - incomplete funding of all activities under the National Action Plan for Climate Change Adaptation (NAPA);
 - continued evolution and transformation of the rural development sector over the past twenty years, which demotivates government supervisory staff in rural areas;
 - limited mainstreaming of the coordination and coherence role in interventions by non-State actors due to widespread weakening of the mechanism; and
 - inadequate resources for concrete activities on the ground, taking into account the planning of the crop year.
- **National Directorate of Animal Production and Husbandry:**
 - inadequate skills and capacity, leading to low territorial coverage;
 - lack of human and financial resources to assist communities and local authorities in developing and implementing pastoral development schemes in accordance with the pastoral charter;
 - little attention paid by local authorities to silvo-pastoral management aspects in development plans, especially within the context of climate change;
 - limited mainstreaming of animal production in the government cereal self-sufficiency policy; and
 - widespread prejudice of Malians, who refer to livestock as a sub-culture.
- **National Directorate of Fisheries:**
 - weak institutional capacity to identify the needs and priorities of the fisheries sector throughout Mali;
 - o lack of information on water availability for fish farming in Mali;
 - o weak ownership by actors and scaling-up of initiatives in fish farming projects/programs (e.g. Aquaculture Development Project (PRODEFA-Sikasso));
 - o lack of census and surveys on the availability of suitable land for fish farming;
 - o insufficient human resources in aquaculture; and
 - mono-ethnic consideration of fishery activity in the mentality of Malians.

- **Commissioner for Food Security:**
 - inadequate information and knowledge for food crisis prevention measures within the context of climate change (disaster risk warning systems, etc.);
 - inadequate technical means to carry-out enough relief efforts for people affected by food crisis;
 - limited inter-institutional collaboration for useful information in the supply and management of emergency stocks, as well as for risk and disaster management; and
 - poor strategic planning to generate internal resources for constituting the national security stock (e.g. supply from private economic operators, various sponsorships); hence the failure to achieve the maximum level of national security stock of thirty-five thousand (35,000) tonnes of cereal.
- **National Directorate of Water Resources:**
 - failure, by users, to consult the DNH in time when constructing water infrastructure;
 - inadequate consultations for water resources management at national level;
 - lack of comprehensive and current inventory of surface water and groundwater resources; this hampers initiative and sound advice for smart management of water resources that depend on climate; and
 - limited consideration of the DNH as a national structure authorized to produce scientific knowledge based on research in hydrology/hydraulics.
- **National Meteorology Agency:**
 - lack of qualified human resources in agro-meteorology (diploma course in agro-meteorology in Malian universities and education institutions);
 - sporadic coverage of the country, most often based on short-term projects that do not allow for construction of a sustainable mechanism for delivery of climate services and information to users;
 - inadequate modern facilities to provide more reliable and accurate meteorological data; and
 - policymakers' limited analysis of climate risk forecasts from the NDA, which would have made it possible to anticipate climate-related disasters and crises.
- **Institute of Rural Economy (IER):**
 - since the research conducted by IER is financed mainly with external funds, it scarcely meets national development needs and priorities;
 - difficulties in disseminating research findings;
 - low representation of users of research findings in national (CNU) and regional (CRU) committees set up by the Malian Government to orientate agricultural research and make it more participatory and close to user needs; and
 - limited interaction with technical development institutions to upscale technological innovations, including those for adaptation of agriculture, livestock, forestry and fisheries to climate change. It should be noted that growth-oriented technical institutions in these development areas are already suffering from poor national coverage.
- **General Directorate of Civil Protection (DGPC):**
 - population's limited behavioral change with respect to civil protection habits;
 - lack of or inadequate DRPC relief centers and stations at sub-regional level and in Bamako District;
 - inadequate skilled human resources; and

- lack of funding required by DGPC to strengthen its operational and logistic capacity by operating its sub-regional services, increasing the number of centers in Bamako in accordance with international standards, and training its staff, especially in information management for other climate change sectors.
- **National Agricultural Research Committee (CNRA)**
 - lack of operational and permanent communication with the various agricultural research actors, users of research findings, and policymakers;
 - low representation of users of research findings within SNRA, thereby limiting their contribution to orienting agricultural research to take into account the broad territorial diversity of Mali;
 - an executive secretariat with human resources so limited that the capacity for managing relations and activities is quite inadequate; and
 - low operability of working committees.
- **National Scientific and Technological Research Center (CNRST)**
 - limited Government resources to make it operational in the coordination of national research;
 - weak leadership and control over institutions in charge of national scientific and technological research, partly due to limited CNRST control over bilateral funding of research institutions (most of research funding comes from external donors and is managed directly with the research institutes and universities; consequently, CNRST does not have any information on these projects and is completely ineffective in coordinating such research initiatives); and
 - poor interaction with the other rural development structures, especially DNA, AEDD, DNEF, and Meteorology Services.
- **National Farmer Organizations Coordination (CNOP)**
 - low spirit of autonomy due to deep concerns of member organizations, which therefore can no longer really unite around CNOP;
 - although CNOP has revealed itself as an excellent civil society structure for political influence, the links of its leaders with the base no longer seem to reflect the real concerns of member farmer organizations, including capacity building needs for adaptation to climate variability and change; and
 - umbrella structure of farmer organizations, but jurisdictional disputes arise frequently with member organizations on the implementation of some technical projects.
- **Permanent Assembly of Chambers of Agriculture of Mali (APCAM)**
 - the elected national representatives and technical advisors often lack technical information and knowledge to analyze development issues, especially those related to climate change, agriculture and food security; and
 - highly centralized management of APCAM projects and programs, which makes delivery and quality of services to actors cumbersome.
- **Network of Agriculture and Climate Change Journalists:**
 - poor knowledge of the network by key partners and/or actors of the rural development sector;
 - low media coverage of climate change issues on existing communication channels; and
 - limited resources (time to spend and adequate financial resources) for rigorous and consistent approach by policymakers and researchers.

3.3.2. Inadequate enhanced partnership

Enhanced partnership here refers to operational long-term partnership, demonstrated by permanent partnership relations and effectiveness in decision-making based on such partnership.

As aforementioned, the main national meeting forums for the various climate change actors are the National Environment Council and the National Climate Change Committee of Mali.

The National Environment Council meets in regular session once every six months, when convened by its Chairperson. It may meet in extraordinary session whenever necessary, when convened by its Chairperson or at the request of 2/3 of its members. It is represented at regional and local levels by the Regional Development Activities Orientation, Coordination and Monitoring Committees (CROCSAD) and the Local Development Activities Orientation, Coordination and Monitoring Committees (CLOCSAD) respectively.

The National Climate Change Committee of Mali also meets in regular session once every six months, when convened by its Chairperson. It may also meet in extraordinary session at the request of 2/3 of its members or its Chairperson. It has five thematic groups:

- Adaptation to climate change, including risks and disasters;
- Mitigation and reduction of greenhouse gas emissions, prevention of deforestation;
- Transfer of technology;
- Financing; and
- Capacity building.

It has been noted that with only two regular sessions each year, these forums do not allow national actors to have regular and up-to-date information to take decisions and make arrangements required for effective mainstreaming of climate change in development activities. In addition, this low frequency of exchanges somewhat limits the quality of identification of national priorities to be discussed for well-informed orientation and decision-making. To that end, it is unfortunate to witness very frequent change of representatives of institutions in these exchange forums, which limits the continuity and effectiveness of priority ideas defined as contributions by the various institutions to these national forums.

Unlike the National Environment Council, the National Climate Change Committee of Mali is not represented at regional and local levels. CROCSAD and CLOCSAD should be instruments of synergistic action at regional and local levels between CNE and CNCCM, especially as these committees are normally set up to be exchange forums on development issues, including those inherent in climate change.

As regards CNCCM, although the five thematic groups cover national climate change priority areas, they do not seem so far to generate products and/or information that can serve as support tools in decision-making by politicians.

In this connection, the idea of considering the national science-policy dialogue platform on CCAFS as an impetus for the “adaptation to climate change including risks and disasters” component could serve as an example for boosting and operationalizing these thematic groups. However, this remains to be implemented.

Furthermore, the lack of resources and expertise on climate change at all levels is certainly an obstacle to the regularity and operability of the above-mentioned consultation frameworks.

However, it is important to note that despite these shortcomings, some climate change actors are somehow trying to develop operational partnership relations between themselves.

In the coordination of all climate change activities, the **Environment and Sustainable Development Agency** has a national carbon experts' network that acts as the National MDP Authority in Mali. Through a social approach supported by AEDD, these experts from various institutions and organizations in Mali could therefore be resource persons and focal points of their institutions. This very social approach should be applied to CNCCM members, as well as other national exchange instruments and frameworks such as the National CCAFS Platform.

The National Directorate of Agriculture normally coordinates activities relating to technology and skills transfer, in partnership with all structures in charge of agricultural advisory support to rural areas, particularly IER, AEDD, the decentralized services of DNA (regional sector directorates of agriculture), the National Directorate of Animal Production and Husbandry, the National Meteorology Agency, the National Directorate of Forestry, the National Food Security Agency, local authorities, civil society organizations and several technical and financial partners (Global Environment Fund, UNDP, and FAO).

One of the expected roles of DNA is that of making proposals and providing information for the weekly meeting in the office of the Minister of Agriculture, which brings together the various key technical and agricultural research departments. With its good territorial coverage and land contacts, DNA should receive regular feedback on shortfalls in technologies to be disseminated. This information and its consolidation should also enable DNA to be an institution that can influence the formulation of project ideas, or at least the implementation of innovative projects and scaling-up of useful findings.

In accordance with its missions, DNA should also propose appropriate strategies for nationwide dissemination of technological innovations, and hence provide feedback to the national directorate of agricultural research on new research needs. However, it is clear that since the end of PASAOP, DNA seems to be increasingly losing its quality control role in agricultural extension, as previously done by various actors in a "make-do" spirit (e.g. NGOs). Indeed, the current role seems more oriented towards agricultural extension by DNA and its decentralized services at sub-national level, which is similar to the situation before PASAOP.

The National Directorate of Animal Production and Husbandry works in partnership with DNA, the Institute of Rural Economy, the National Meteorology Agency, the International Crops Research Institute for the Semi-Arid Tropics, the Central Veterinary Laboratory, the National Directorate of Rural Engineering, the National Directorate of Water Resources, etc. as regards extension, dissemination of livestock and pasture management technologies. However, to allow for synergy of actions, DNPIA wants to organize more discussions and increase meeting forums with policymakers, since problems relating to climate change deserve collaborative thinking between the various actors, including technical and partners and civil society.

The links between DNPIA and local authorities should be strengthened to ensure implementation of the Pastoral Charter requirement throughout the country. Indeed, the pastoral management plans developed using a participatory approach would facilitate peaceful coexistence between natural resource users (farmers, graziers, fishermen, loggers, etc.).

The National Directorate of Fisheries, through successful partnerships:

- maintains relations with the National Directorate of Water Resources, the Environment and Sustainable Development Agency (through support tools for program development and evaluation mechanisms for the use of tools provided by AEDD to DNP), the Malian civil society, etc.;
- is member of a water management committee in which all development actors are represented; and

- works, at sub-regional level, with the West African Monetary Economic Union (WAEMU) for capacity building in statistics and database creation.

The Commissioner for Food Security (CSA) is member of the Multi-disciplinary Assistance Working Group (GTPA) and has strong collaborative relations with several structures, including some government technical services, communities, and non-governmental organizations. In addition to contribution from the Government of Mali, the CSA receives support from some technical and financial partners such as WFP, FAO, UNDP, and the International Red Cross. Furthermore, it works with the General Directorate of Civil Protection in the implementation of disaster response plans.

The National Directorate of Water Resources (DNH) is a structure that works with several institutions involved in the fight against climate change, through:

- the link between the Agricultural Orientation Law (LOA) and the water policy;
- strong involvement in various platforms, including that of Risk and Disaster Reduction (DRR) and particularly the General Directorate of Civil Protection; participation in identifying priorities and preparing national development policy documents following the conventional process (study, diagnosis, analysis, workshop, validation).

The National Meteorology Agency, as a crosscutting structure and focal point of the Intergovernmental Panel on Climate Change (IPCC), works with all development actors in Mali, particularly:

- for disaster forecasts: with the General Directorate of Civil Protection; and
- for agro-meteorology: with the National Directorate of Agriculture, the National Directorate of Animal Production and Husbandry, the Institute of Rural Economy, the Permanent Assembly of Chambers of Agriculture of Mali (APCAM), the Association of Professional Farmer Organizations (AOPP), the National Farmer Organizations Coordination (CNOP) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

The National Directorate of Planning and Development is a member of several platforms and works with all national directorates. It supports structures to better design and plan development activities in the fight against climate change. Therefore, it would be appropriate to opt for joint approaches between the National Directorate of Planning and Development and other national directorates for the use of tools to integrate climate themes into national investment planning.

In view of the arbitration role of this institution in the planning and management of national development, it should play a leading role in facilitating and managing the platforms to which it belongs.

The Institute of Rural Economy is a structure that works with all actors in the rural development sector. It conducts research and specialized studies in agriculture, livestock, fisheries, meteorology, agricultural engineering, farmer organizations, etc. However, the use of IER research findings would produce more positive impacts if the findings were more widely shared in exchange platforms at national level (e.g. CNCCM, CCAFS Platform), as well as among the immediate beneficiaries, who are mainly:

- the Local Committee for Orientation, Coordination and Monitoring of Development Activities (CLOCSAD);
- the Municipal Committee for Orientation, Coordination and Monitoring of Development Activities (CCOCSAD);
- The Regional Committee for Orientation, Coordination and Monitoring of Development Activities (CROCSAD).

The National Directorate of Health is responsible for coordinating the implementation of the health adaptation plan for the adverse effects of climate change in close collaboration with the National Institute of Public Health Research, the National Support Center for Disease Control, the National Center for Health Information, Education and Communication, the National Environment and Sustainable Development Agency, the National Directorate of Sanitation and Pollution and Nuisance Control, the National Directorate of Water Resources, the National Directorate of Meteorology, the civil society, technical and financial partners, etc.

The General Directorate of Civil Protection:

- receives each week, under a partnership with ANM, a weather forecast bulletin and a hydrological bulletin through which workers can draw attention to potential disasters such as floods;
- works with the Mali Red Cross and the National Directorate of Health to share information on climate risks and disasters; and
- coordinates the National Risk and Disaster Reduction Platform.

The High Local Authorities Council works with departments in charge of decentralization and is an important lever to influence policy decisions on current issues at national level. In addition, it participates in several important meetings at national level and in preparing policy documents, including those related to environmental issues.

The National Union of Cotton Producers' Cooperative Societies works directly with the Permanent Assembly of Chambers of Agriculture, the National Directorate of Agriculture, the Malian Textile Development Company, and Non-Governmental Organizations. It contributes to capacity building for farmer organizations and their associations in rural communities.

The National Agricultural Research Committee (CNRA)

In view of its mandate to manage or coordinate agricultural research projects, CNRA has a direct relationship with the Ministries responsible for rural development (DNA, DNEF, DNPIA, AEDD) and umbrella organizations of farmer organizations (APCAM, National Union of Cotton and Food Producers, AOPP, and CNOP).

As a national hub and respondent in resource mobilization for agricultural research, the enhanced partnership for this structure seeks to facilitate ongoing dialogue between organizations that make-up SNRA (IER, LCV, Universities, professional schools, IPR/Katibougou) extended to farmer umbrella organizations.

National Scientific and Technological Research Center (CNRST)

One of the highlights in CNRST interaction with other national structures is certainly the conduct of consultations between research institutes and technical services of the Ministry of Public Services for the preparation of special rules and regulations governing researchers.

However, if CNRST, given its administrative power of research control, undertakes a social initiative towards research actors, Ministries and political institutions (Prime Minister's Office, General Secretariat of the Presidency, National Assembly), this can result in actions to ensure better expression of sovereignty and national priorities in research strategies and programs in Mali.

National Farmer Organizations Coordination (CNOP)

CNOP was the backbone of inter-actor consultations for the preparation of the Agricultural Orientation Law. To that end, it mainly worked with the regional directorates of technical services, civil society organizations in all administrative regions, regional local authorities councils,

and other national institutions and organizations. This initiative has given more visibility and legitimacy to CNOP to play a key policy role at national level.

It should be noted that even more enhanced partnership for CNOP would result in greater interaction with DNA, AEDD and DNEF so as to facilitate the dissemination of technologies, particularly those relating to adaptation of agriculture to climate change as well as feedback to research institutions as regards the results of innovation. CNOP influence should also focus on drawing the attention of national directorates to their sovereign missions. CNOP could then give itself a citizen oversight dimension for research and development activities, especially in rural development.

Permanent Assembly of Chambers of Agriculture of Mali (APCAM)

As a consular representative chamber for all farmers in Mali, APCAM is in several actor networks. Consequently, APCAM works with IER, CNRA, University of Bamako, NGOs and farmer structures to determine the relevance (from the perspective of farmer priorities) of sub-projects under the PASE. That is why, in its proactive approach and interaction with the institutions of the republic, APCAM needs to draw on a partnership approach based on well-informed dialogue on key issues affecting the living conditions of farmers in general, and in particular, inclusion of the fight against climate change in government priorities.

Mention could also be made of the PAPAM case, in which APCAM works with CRA, DNA, economic operators and private companies, etc., for the financing of infrastructure and equipment-based agricultural projects.

3.3.3. Growing Financing Requirements

According to the National Agricultural Development Policy (PDA) adopted by the Government of the Republic of Mali in 2013, “the agricultural sector’s contribution to economic and social stability is crucial given its central role in the national economy, the creation of employment and income-generating activities as well as food security, and improving the living conditions of the population.

Indeed, the agricultural sector contributes nearly 30% of export earnings. The main agricultural exports are cotton, live cattle, hides and skins, fish, fruits and vegetables, and gum arabic. Over the 2007-2010 period, growth of the Malian economy was mainly driven by the primary sector with 2.9% as against a forecast of 2.1%. The secondary and tertiary sectors contributed 2.1% and 0.5% respectively as against a forecast of 2.7% and 1.6%. Over the same period, the primary sub-sectors that contributed most to the overall growth of the economy are subsistence farming excluding rice (2.3%), the consolidated branch of rice (0.9%), and livestock (0.4%). The agricultural sector employs nearly 80% of the country’s working population and contributes 23% of the trade balance.”

Upon analysis, it is worth mentioning that this significant contribution by the agricultural sector to the country’s trade balance is very fragile due to the decline in agricultural productivity within the context of:

- climate variability;
- global warming;
- competition for water and arable land;
- negative impacts of climate change on livestock (due mainly to heat stress, pests and diseases);
- destruction of fishery areas due to over-exploitation and accelerated destruction of estuarine habitat by the various water pollution agents; and
- inappropriate agricultural practices.

To reduce the vulnerability of the agricultural sector and make it resilient to the adverse effects of climate change, it is necessary to reconsider the current methods of agricultural production through the application of climate-smart agriculture, that is to say, agriculture that seeks to: (1) sustainably increase productivity; (2) increase resilience (adaptation); (3) reduce greenhouse gas emission when possible; and (4) contribute to the achievement of food security and national development goals.

To support such a fundamental change in production, it is necessary to mobilize adequate funding for targeted investments that take into account climate change (climate-smart Investments). Much more than the lack of funding, it is more often the lack of appropriate mechanisms for mobilization and rational management of existing resources that is the major constraint. Such mechanisms should, if properly designed and applied, help to provide key actors with public or private funds needed for the implementation of targeted initiatives to benefit the grassroots population. Similarly, the mobilization of resources (including government resources) would be more effective if the financial needs are assessed in a rational and realistic manner. It should be noted that timely release of budgets allocated by the State to the various technical departments would help to ensure sound management of available funds.

Furthermore, the limited use of forums for dialogue between the Government and some actors, such as NGOs, makes it difficult to benefit from pooling and synergic use of existing financial resources by each of the actors.

As regards private funding, it is necessary for the Government to adopt a social approach with private companies to ensure their commitment to private investment within the general context of safeguarding the environment, and particularly mitigating climate change. Similarly, the development, by some specialized technical services, of products of interest to the private sector (e.g. climate indices for insurance, risk thresholds for certain infrastructure and equipment, vulnerability maps, land use change maps, etc.) could be an incentive niche for mobilizing even more funding in public-private partnerships.

Although multilateral funding is fairly significant and most often available, it is regrettable that such funding does not always support existing initiatives in a spirit of continuity and in line with the national strategic vision.

Lastly, efforts can be made to benefit from existing funding in regional institutions (ADB, ECOWAS, WAEMU, etc.).

IV. Need to establish operational dialogue between researchers and policymakers for climate change adaptation in Mali

The foregoing analyses show that one of the bottlenecks in dialogue between Malian researchers and policymakers is inadequate or lack of sustained animation of institutional dialogue forums and knowledge sharing mechanisms.

The examples below illustrate this fact.

4.1. Status of inter-institutional dialogue

4.1.1. National Meteorology Agency

Weather information communication channels between the **National Meteorology Agency** and policymakers seem to be operational. For example, ANM regularly informs some national policy bodies (e.g. the Council of Ministers, the National Assembly Commission in charge of Rural Development and Environment, Bamako Municipality) of the weather situation in the country so as to enable these bodies to take informed measures to overcome, no matter how little, the harmful effects of natural disasters on the people. However, in some cases, the said authorities fail to implement appropriate anticipatory responses.

Coordination problems between the institutions for the implementation of anticipatory actions, as well as problems of ineffective skills transfer to local authorities are some of the reasons cited as major causes of such a situation.

It is therefore important to continue raising awareness among Malian policymakers at all levels by providing regular updates on climate risks and their expected impacts.

4.1.2. National Directorate of Animal Production and Husbandry

The National Directorate of Production and Animal Husbandry has conducted some research with the Institute of Rural Economy and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) on fodder varieties and improvement of cattle breeds. However, because of poor interaction between the National Directorate of Animal Production and Husbandry, the National Directorate of Agriculture, the National Directorate of Water Resources, IER and the Regional Commissions of Research Findings Users, the findings of these studies seem to be scarcely adopted by users because they very often do not solve priority user problems and have sometimes been kept in the drawers.

4.1.3. National Directorate of Planning and Development (DNPDP)

In development planning, there are many research findings on climate change that can be used by the **National Directorate of Planning and Development**. For example, DNPDP could promote the use of “Climate Proofing” to enable local authorities to develop their Social, Economic and Cultural Development Programs (PDSEC), taking into account climate change.

4.1.4. High Local Authorities Council (HCCT)

HCCT is, in itself, an appropriate framework for dialogue, as well as for drawing the attention of technical services and policymaking institutions. As such, it is a consultation framework that enables researchers to explain, with supporting arguments, the consequences of climate change on socio-economic and social life, as well as the need to find solutions at local level. HCCT therefore needs to take initiatives in this direction to enlighten national elected officers and policymakers to make well-informed decisions.

4.1.5. Institute of Rural Economy (IER)

The IER is at the core of the agricultural research system in Mali. To that end, the Institute needs to share maximum scientific and technical information with all rural development actors, as well as with policymakers. However, it should be noted that researchers and policymakers suffer from communication constraints in Mali. These problems also arise as regards the form and content of communication products (information format, language and style, inappropriate to policy needs). Therefore IER needs to be more convincing and aggressive in efforts to give more visibility to research findings, and particularly their benefits or impacts, through a communicative approach towards its policy-making bodies and end users of research findings.

4.2. Analysis of dialogue between researchers and policymakers in Mali

The research approach should adapt to social dynamics (participatory research, demand and needs-based research) to allow for effective use of findings by the various users.

4.2.1. Status of national research forums and policies

In Mali, there is no national research policy document in which the related priorities are defined. This prevents research institutions and organizations, particularly the National Scientific and Technological Research Center (CNRST), from:

- coordinating and ensuring consistency of programs related to the strategic vision of national research;
- controlling sector research conducted by the various national actors;
- ensuring the financing of national research with Government resources, as well as external financing to supplement resources mobilized at national level; and
- establishing its leadership over research institutions and organizations as regards strategic directions for research at national level.

More specifically, in the agricultural sector, the National Agricultural Research Committee (CNRA) prepares a ten-year strategic agricultural research plan that defines research priorities. The research plan is implemented by the Institute of Rural Economy, which is the main agricultural research institute in Mali. It takes into account the results of the previous plan, government priorities, and national policy documents (e.g. Growth and Poverty Reduction Strategy Framework). It is validated at national level by a committee made-up of several structures, particularly national directorates of rural development sectors, non-governmental organizations, and farmer organizations. It is subject to review for incorporation of new relevant research elements. Although CNRA is not directly involved in initiating national agricultural or environmental policies, it contributes significantly to their preparation.

However, it is clear that the agricultural research sector is facing operational and financial problems, in particular:

- mismatch between research demand and supply. Indeed, the usual impression is that research findings do not meet the technical requirements expressed by users; indeed, it is as if researchers do not adequately take into account the real needs of agriculture sector actors, such as farmers, graziers, fishermen and loggers;
- insufficient involvement (small contribution) of farmer umbrella organizations in the definition of research needs, even though they are involved in all statutory platforms and meetings on agriculture and food security, and therefore have a good knowledge of the sector;
- as from 2002, ineffective feedback from the regional commissions of users of research findings, partly due to operational difficulties encountered by these regional bodies;
- insufficient support from research in the water, livestock and fisheries sectors; and
- limited development of applied research findings which have not necessarily gone through the conventional validation process of scientific publications. Indeed, the performance evaluation system for researchers gives importance only to findings published in scientific journals, which tend to attach more value to findings of basic research than applied research.

The key institutions and organizations involved in formulating research priorities include:

Government departments managed by policymakers who are directly involved or consulted in the preparation of laws and regulations. To that end, their direct involvement (e.g. active participation in some high policy level events) or indirect involvement (strategic vision and leadership of the department expressed through their representatives) in the science-policy dialogue platforms could help keep them abreast of knowledge and information on research and their findings. This would facilitate their contribution to well informed decision-making, particularly with respect to climate change.

The Environment and Sustainable Development Agency, as a crosscutting structure and given its technical and institutional nature, should play a key role of advice and dissemination of research findings. Indeed, it has already prepared national climate change policy documents and conducted different studies on climate change in Mali. This work has enabled it to highlight various climate change issues, and has thus contributed to the definition of research priorities. However, it has not yet established an operational partnership with research institutes and national directorates on the orientation of research in Mali. Similarly, through some programs (e.g. climate funds), AEDD should be in a strong position to push for effective mainstreaming of climate change in projects implemented on the ground.

Technical rural development directorates (National Directorates of Agriculture, Livestock, Fisheries, and Forestry) take part in preparing the agricultural research strategic plan, while ensuring that their research concerns and needs are taken into account. They also include research activities in their respective rural development sector plans. They have formal working links with research institutes, but their research needs are not always extensively discussed with various researchers before conducting field experiments. Notwithstanding financial and material constraints, these directorates help to disseminate research findings to immediate users, and thus can collect feedback from users and inform researchers.

National directorates of the water and health sectors also include their research needs in their sector plans. For example, following the Libreville Declaration on Health and Environment, the National Directorate of Health (with the participation of several structures such as the National Directorate of Water Resources, the Environment and Sustainable Development Agency, the Directorate General of Civil Protection, etc.) has developed a plan for adaptation to the adverse effects of climate change in Mali, defining health and environmental research priorities.

Farmer Umbrella Organizations and Non-Governmental Organizations (e.g. APCAM, CNOP, AMEDD, TONUS, and AMASSA) identify farmers' problems and concerns in the field. Since they are involved in all agricultural activities and platforms, they try to provide guidance to technical services and the Government in the search for solutions to the problems encountered. This is the case, for example, with research needs on the quality of appropriate fertilizers based on soil types in Mali, as well as research needs on the introduction of *Jatropha* as a new crop in the production systems of Mali.

International research institutes, such as the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the World Agroforestry Centre (ICRAF), the Institute for Development Research (IRD), etc., have developed partnerships with national research institutes, non-governmental organizations, technical services of rural development sectors, and the National Assembly of Mali. In this way, they bring global research issues to the attention of their national partners in Mali for inclusion in research to be conducted at national level. Similarly, these institutions provide skills in terms of research methodological approach and tools to national researchers.

4.3. Success stories in operational dialogue

The Case of Risk and Disaster Management Platform

The General Directorate of Civil Protection (DGPC) has undertaken several climate change adaptation activities. Indeed, it manages the Risk and Disaster Reduction/Management and Climate Change Adaptation pilot integrated project, and in this respect, is member and focal point of the Steering Committee of the "Risk and Disaster Management and Climate Change Adaptation" Platform.

DGPC coordinates the national Risk and Disaster Reduction (RDR) Platform, and has prepared the Malian National RDR strategy, on the basis of the international platform. Under this platform, DGPC works with the Malian Red Cross and technical services, such as Meteorology Service, DNH, Humanitarian Actions Division, DNS, etc.

One of the success stories of partnership between key structures is that every week, DGPC receives a weather forecast bulletin and a hydrological bulletin on the basis of which they can draw attention to future disasters such as floods or others. Furthermore, DGPC sends the bulletin to regional directorates of civil protection, which in turn draw the attention of the population concerned. It also maintains operational relations with its regional directorates. Similarly, DGPC management maintains operational relations with its Ministry, to which it submit Bills to be considered by the Executive.

In order to test the operability of services in case of disaster risks, DGPC undertakes, in collaboration with many other institutions, simulation exercises on alleged hazards (floods, tornadoes, extreme heat, sandstorms, etc.) so as to develop response skills and capacity to actual disasters.

Mention should be made of two national action plans to be implemented: the Emergency (Red) Plan and the ORSEC Plan. However, these two plans have yet to be adopted by laws and decrees to allow for their operationalization.

The Cases of GIPD and resilience of the agricultural sector projects in Mali

As regards the DNA, two experiences of climate change adaptation can be cited:

The first project is entitled “Project for Improving Adaptation and Resilience Capacity to Climate Change in Agriculture in Mali”. It is scheduled to be implemented from 2012 to 2014 as a pilot project in 6 municipalities out of the 166 municipalities vulnerable to climate change in Mali. It is very interesting to note that all the project interventions are in partnership with all structures in charge of advisory support to rural areas and working in the area of climate change. The collaborator structures include DNPIA, the National Directorate of Forestry, AEDD, ANSSA, the National Directorate of Meteorology, local authorities and CSOs of the project municipalities, and IER.

Although the project’s impacts have not yet been assessed, its approach is innovative in that it places rural communities at the core of development of adaptation practices. This has led particularly to the involvement of local councilors in project management bodies. The mayor is, for example, a member of the steering committee and as such, can mainstream climate change in the PDSEC (five-year plan document of the municipality).

If such an approach were replicated in the 703 municipalities of Mali, climate change would be taken into account at all levels of national policies. Thus, the political system in Mali, from the base to the top, would be involved in the fight against climate change.

The second project entitled “GIPD/CEP” seeks to build farmers’ capacity through knowledge transfer in field schools. It is funded by FAO and coordinated by DNA. However, it is implemented using a multi-institutional partnership approach, with IER and AEDD as the main implementation actors. AEDD is responsible for mainstreaming climate change issues in development policies and programs. The IER is responsible for building actors’ capacity, knowledge transfer, adaptation techniques, resilient varieties, etc. It is clear here that while the DNA will develop the project, it needs IER and AEDD skills and expertise for successful project implementation, thereby showing the need for inter-institutional dialogue for the implementation of development projects or programs, including those for climate change adaptation.

The trigger for these projects is the political will of the Government of Mali, which has led to ratification of the UNFCCC. Following the ratification, the Government initiated actions to adapt agriculture to climate change, with the preparation of PANA as the first initiative.

4.4. Constraints on operational dialogue between researchers and policymakers

Despite numerous actors in climate change, Mali has consultation frameworks or exchange platforms to enable them to undertake fruitful discussions or interactions. As previously illustrated, there are relations between the structures, but they have not yet helped to establish operational dialogue between all the key actors so as to generate tangible suggestions and recommendations on specific issues of national importance. Consequently, strategic issues are not often discussed and debated at length. In the specific case of relations between researchers and policymakers, the major constraints are as follows:

First, there is poor interaction between researchers of the various national research institutes and organizations. Such interactions should help to align research programs at national level, while ensuring synergy of action and economy of scale on unifying themes. Furthermore, CNRST leadership can help to establish the bases of such dialogue between researchers (e.g. the National Forum for Scientific Research and Technological Innovations in Burkina Faso).

Research findings are neither disseminated nor consolidated. Communication on research findings is limited to publication by researchers. The findings do not reach policymakers, and even where they are received, they are not written in understandable language and easily convertible into pragmatic action. This creates a large rift between research mechanisms and urgent development needs in a country like Mali, considered as one of the least developed countries.

Secondly, there is generally low credit or incentive for research findings, especially from policymakers (Ministries, institutions of the Republic, etc.).

The involvement of researchers and use of their findings in decision-making is not adequately recognized by policymakers as a fundamental principle in the development of national policies and strategies. While it is true that policymakers generally need concrete and immediate solutions to manage risks or crises, the fact remains that research findings can be helpful to them because the findings can provide updated technical information for preventive measures and medium and long-term plans, especially as regards climate change.

Thirdly, we can see that there are few opportunities for “structured dialogue” between researchers and policymakers. For example, there has been no meeting between the researchers of the Institute of Rural Economy and the High Local Authorities Council since this institution was established in 2002. Yet this State institution has the power to reflect and decide on issues that can affect national life and the life of local communities, in particular; it can also advise the Government on any translation of the findings into concrete action. Regular discussions with HCCT could therefore enable researchers to disseminate and promote their research findings. Similarly, there is little interaction between research institutes and the National Assembly of Mali, especially with the Commission in charge of Rural Development.

Fourthly, it has been generally noted that researchers are scarcely considered as potential sources of useful knowledge and information that can be used by all national actors. This is further compounded by the fact that many researchers are limited to scientific publications at international level, and their findings have not always been translated into practical application for use on the field. In addition, the weak research-extension link does not help to ensure wide distribution of conclusive research findings.

Furthermore, in view of the importance of external financing, the research findings usually meet specific objectives defined by the donors of the projects and programs, and are often less responsive to national priority concerns. Consequently, the need for inter-actor dialogue on national priority issues becomes secondary to the interests of external financing.

4.5. Opportunities for operational science-policy dialogue

There are opportunities for improving dialogue between researchers and policymakers as regards citizen participation of national actors in the sustainable development of Mali, especially within the context of climate change. Some inter-organizational partnerships or collaboration could provide a conducive environment for operational science-policy dialogue; these include:

National Climate Change Committee: It comprises most national institutions and organizations involved in shaping national strategies and policies on climate change; therefore, it is an appropriate discussion and influence framework for informed decision-making.

National Agricultural Research Committee: It is an institution that coordinates the national agricultural research system in Mali, and works closely with the umbrella structures of farmer organizations. Thus, it provides a forum for researcher-user interactions of research findings

and can be a vital link in the establishment of operational dialogue between researchers and policymakers in Mali.

The High Local Authorities Council works with the departments in charge of decentralization and is an important lever in influencing policy decisions on current issues at national level. In addition, it participates in several important meetings at national level and in the preparation of policy documents, including those related to environmental issues.

Municipalities Association of Mali: It comprises local elected officials involved in decentralization, and brings together mayors of urban and rural municipalities in Mali. As such, it is the mouthpiece of rural and urban communities in national policy-making bodies for improving living conditions, including constraints on the management of their environment.

RESO Climat Mali: It is a network of more than one hundred civil society organizations actively involved in climate change. It seeks to improve the knowledge of all actors on climate change, as well as undertake advocacy and lobbying activities with policymakers at local, national and international levels on climate change issues, and support its members in the search for means of improving the living conditions of the most vulnerable population.

Network of Climate Change Journalists: It is a structure that seeks to share information on climate change with the general public. It is also an effective tool for drawing the attention of public authorities and researchers and influencing them to assume their sovereign responsibilities for the benefit of the population.

CCAFS Platform: It is made-up of key structures and organizations working for adaptation of agriculture and food security to climate change. Its secretarial services are provided by AEDD, and it has an institutional anchorage that encourages lively dialogue between government policymakers, civil society and the various research institutions and organizations. Its development in a unifying spirit will allow for: (i) its institutional redesign for sustainability of its actions, and (ii) its strong influence on decision-making methods and greater mobilization of actors around national priorities in agriculture and food security within the context of climate change. With scientific and technical support from the CGIAR system, the platform benefits from initiatives at regional level (ECOWAS, NEPAD, etc.) and at global level (UNFCCC, Climate-smart alliance, initiative 25 x 25, etc.).

Need for a forum for effective communication between researchers and policymakers

In order to sustainably maintain a forum for dialogue between researchers and policymakers, it will be necessary to develop a communication mechanism that incorporates a social approach to State institutions and pressure groups (umbrella farmer organizations, umbrella civil society structures). To that end, great efforts must be made by research institutions to present scientific and technical information in styles and formats that facilitate understanding and practical use by ordinary users. The scientific information should help elucidate the impact of climate change on sectors of national life (e.g. the agricultural sector), while indicating solutions/adaptation options, as well as data on their costs and benefits.

Farmer organizations also need to be informed and sensitized on the impact of climate change on ecosystems, and the resulting goods and services. With this sensitization, the organizations should take advantage of their influence over public authorities to call for meetings between them and researchers on priority issues identified by farmers. At these meetings, researchers and policymakers can agree on research priorities and translate them into concrete action (e.g. policy decision) with evidence or success stories of research findings on the ground.

V. Key Messages

1. Mapping and analysis of the missions of State actors and civil society organizations involved in the management of climate change in Mali have shown that there is **a satisfactory institutional framework** required to ensure State leadership in sustainable development of the various sectors of activity. Given their missions, State institutions cover a wide range of sectors (agriculture, environment, water, health, civil protection, research, etc.) and have been mandated to develop sustainable sector development policies that take into account environmental protection.

With specific regard to climate change mainstreaming, the National Climate Change Committee of Mali appears as the multi-institutional body that should provide information and advice on any matter relating to climate change. Its organization into sub-committees is expected to help fulfill the mission for various areas or national strategic sectors such as agriculture, food security, environment, health, energy, etc. To that end, the CNCCM Secretariat would benefit from obtaining an institutional status that would give it a multi-sector dimension. For such a crosscutting theme as environment and climate change, the status would enable it to provide leadership beyond visions that are rather separated from the various departments or sectors of national life.

2. **Operational/organizational difficulties of institutions** involved in climate change: It happens that in the fulfilment of their respective missions, State institutions face many constraints, the most prominent of which are:

- limited operability of institutions in the fulfilment of their sovereign missions. For most institutions, this is due to: (1) weak leadership often accompanied by weak ownership of the entrusted missions, and (2) lack of adequate qualified human resources to cover the country in a satisfactory manner;
- lack of institutional capacities and required skills;
- poor interaction with national sister institutions to pool efforts and resources; and
- inadequate and limited use of existing knowledge and scientific information in strategic planning of actions.

3. **Need for enhanced partnership between institutions:** Two national frameworks appear as the main operational statutory dialogue bodies for the various climate change actors, namely CNE and CNCCM. With only two regular sessions each year, these forums do not provide national actors with regular and up-to-date information to take decisions and make arrangements required for effective mainstreaming of climate change in development activities. In addition, this low frequency of exchanges somewhat limits the quality of identification of national priorities to be discussed for well-informed orientation and decision-making. Consequently, it is regrettable to witness very frequent change of representatives of institutions in these exchange forums, which limits the continuity and effectiveness of priority ideas defined as contributions by the various institutions to these national frameworks.

Although the five thematic groups cover national climate change priority areas, they do not seem so far to generate products and/or information that can serve as support tools in decision-making by politicians.

In this connection, the idea of considering the national science-policy dialogue platform on CCAFS as an impetus for the “adaptation to climate change including risks and disasters” component could serve as an example for boosting and operationalizing these thematic groups. By adopting a sustained social approach, the platform will boost and better use the existing partnership relations between certain institutions.

- 4. Need for support with adequate funding:** The practice of climate-smart agriculture as a useful production method to cope with the adverse effects of climate change requires adequate financial support for investments. First of all, it requires the establishment of appropriate mechanisms for the rational mobilization and management of existing resources. If well designed and implemented, such mechanisms should provide key actors with public or private funds required for the implementation of targeted initiatives to benefit the grassroots population. Similarly, the mobilization of resources (including Government resources) would be more effective if the financial needs are assessed in a rational and realistic manner. It should be noted that the timely release of budgets allocated by the State to the various technical departments would be a key contribution to sound management of the funds already available. To that end, dialogue forums should help to pool the utilization of financial resources, including the private funding of each actor.
- 5. Current state of dialogue between researchers and policymakers in Mali:** Despite numerous actors in climate change, Mali has formal consultation frameworks that should allow for operational and fruitful dialogue between researchers and policymakers. Although there are relations between the structures, they have not yet helped to establish operational dialogue between all the key actors so as to generate tangible suggestions and recommendations on specific issues of national importance. Consequently, strategic issues are not often discussed and debated at length.
- 6. Constraints on operational dialogue between researchers and policymakers in Mali:** Analyses show that one of the bottlenecks in dialogue between Malian researchers and policymakers is inadequate or lack of sustained animation of institutional dialogue forums and knowledge sharing mechanisms. The major constraints are as follows:
- poor interaction between researchers of the various national research institutes and organizations. Such interactions should help to align research programs at national level, while ensuring synergy of action and economy of scale on unifying themes;
 - low credit or incentive for research findings, especially from policymakers (Ministries, institutions of the Republic, etc.). The involvement of researchers and use of their findings in decision-making are not adequately acknowledged by policymakers as a fundamental principle in the development of national policies and strategies;
 - few opportunities for “structured dialogue” between researchers and policymakers. For example, there has been no meeting between the researchers of the Institute of Rural Economy and the High Local Authorities Council since this institution was established in 2002; and
 - it has been generally noted that researchers are scarcely considered as potential sources of useful knowledge and information that can be used by all national actors. This is further compounded by the fact that many researchers are limited to scientific publications at international level, and their findings have not always been translated into practical application for use on the field. In addition, the weak research-extension link does not help to ensure wide distribution of conclusive research findings.
- 7. Opportunities for operational dialogue between researchers and policymakers in Mali:** Some inter-organizational partnerships or collaboration could provide a conducive environment for operational science-policy dialogue frameworks; these include:
- **National Climate Change Committee:** It comprises most national institutions and organizations involved in shaping national strategies and policies on climate change; therefore, it is an appropriate discussion and influence framework for informed decision-making;
 - **National Agricultural Research Committee:** It is an institution that coordinates the national agricultural research system in Mali, and works closely with the umbrella

structures of farmer organizations. Thus, it provides a forum for researcher-user interactions of research findings and can be a vital link in the establishment of operational dialogue between researchers and policymakers in Mali;

- **The High Local Authorities Council** works with the departments in charge of decentralization and is an important lever in influencing policy decisions on current issues at national level. In addition, it participates in several important meetings at national level and in the preparation of policy documents, including those related to environmental issues;
 - **Municipalities Association of Mali:** It comprises local elected officials involved in decentralization, and brings together mayors of urban and rural municipalities in Mali. As such, it is the mouthpiece of rural and urban communities in national policy-making bodies for improving living conditions, including constraints on the management of their environment;
 - **RESO Climat Mali:** It is a network of more than one hundred civil society organizations actively involved in climate change. It seeks to improve the knowledge of all actors on climate change, as well as undertake advocacy and lobbying activities with policymakers at local, national and international levels on climate change issues, and support its members in the search for means of improving the living conditions of the most vulnerable population;
 - **Network of Climate Change Journalists:** It is a structure that seeks to share information on climate change to the general public. It is also an effective tool for drawing the attention of public authorities and researchers and influencing them to assume their sovereign responsibilities for the benefit of the population;
 - **CCAFS Platform:** It is made-up of key structures and organizations working for adaptation of agriculture and food security to climate change. Its secretarial services are provided by AEDD, and it has an institutional anchorage that encourages lively dialogue between government policymakers, civil society, and the various research institutions and organizations. Its development in a unifying spirit will allow for: (i) its institutional redesign for sustainability of its actions, (ii) its strong influence on decision-making methods and greater mobilization of actors around national priorities in agriculture and food security within the context of climate change. With scientific and technical support from the CGIAR system, the platform benefits from initiatives at regional level (ECOWAS, NEPAD, etc.) and at global level (UNFCCC, Climate-smart alliance, initiative 25 x 25, etc.). All the above-mentioned partnerships could become stakeholders, and thereby help to strengthen this national platform;
- 8. Need for a forum for effective communication between researchers and policymakers in Mali:** In order to sustainably maintain a forum for dialogue between researchers and policymakers, it will be necessary to develop a communication mechanism that incorporates a social approach to State institutions and pressure groups (umbrella farmer organizations, umbrella civil society structures). To that end, great efforts must be made by research institutions to present scientific and technical information in styles and formats that facilitate understanding and practical use by ordinary users. The scientific information should help to elucidate the impact of climate change on sectors of national life (e.g. the agricultural sector) while indicating solutions/adaptation options, as well as data on their costs and benefits.

Farmer organizations also need to be informed and sensitized on the impact of climate change on ecosystems, and the resulting goods and services. With such sensitization, the organizations should take advantage of their influence on public authorities and call for meetings between them and researchers on priority issues identified by farmers. At these meetings, researchers and policymakers can agree on research priorities and translate them into concrete actions (e.g. policy decision), with evidence or success stories of research findings on the ground.

Annex: Structures and persons met during the study

N°	Structures		Persons met		Function		Contacts	
1	National Scientific and Technological Research Center (CNRST)		Dr. Boubacar GUIINDO		Head of Planning and Training		20 21 66 98	
2	National Agronomic Research Center		Dr. Réjane KONE		Executive Secretary		20 22 71 65	
3	National Directorate of Development Planning (DNPD)		Mrs. DIARRA Lala CAMARA		Head of Regional and Local Planning Environment Focal Point Division		66 72 28 47	
4	National Directorate of Water Resources		Damassa BOUJARE		Regional Director of Gao		77 09 51 56	
5	National Directorate of Water Resources		Chaka TRAORE		Coordinator PAGIRE		65 58 12 70	
6	National Directorate of Health (DNS)		Moussa Ag HAMMA		Head of Public Hygiene and Sanitation Division (DHPS)		76 04 46 57	
7	National Directorate of Civil Protection		Cdt Adama SIDIBE		Training Officer		76 39 48 12	
8	National Directorate of Civil Protection		Seydou F. TRAORE		Point Focal CCAFS Platform		76 30 96 23	
9	National Directorate of Agriculture		Mrs. NIAMBELE Aminata DIARRA		Coordinator UNDP/DNA CC Project		76 07 66 11	
10	National Directorate of Agriculture		Siaka FOFANA		Deputy National Director		76 02 33 66	
11	National Directorate of Agriculture		Mr. Abdow Gado		Monitoring-Evaluation Officer, DNA/FAO CC Project		66 76 45 42	
12	National Directorate of Animal Production and Husbandry (DNPIA)		Bowa NOUMANTA		Pastoral Development Officer		20 23 12 17	
13	National Directorate of Animal Production and Husbandry (DNPIA)		Dr. Amadou A. CISSÉ		National Director		20 23 12 17	
10	National Directorate of Fisheries		Oumar Alassane TOURE		National Director		20 22 58 54	
11	National Directorate of Fisheries		Tiémoko DIAKITE		Head of Fishery Resources Regulation and Control Division		20 22 58 54	
12	Institute of Rural Economy (IER)		Dr. Daouda DEMBELE		Scientific Coordinator		66 81 30 24	
			Mamadou SIMPARA		Climate Change Focal Point			
13	Environment and Sustainable Development Agency		Dr. Alassane BA		Head of Partnerships and international Actions Department		66 73 73 64	
14	Environment and Sustainable Development Agency		Sékou KONE		Head of Partnerships and Financial Resource Mobilization Section and GEF Focal Point		66 76 29 61	
15	Environment and Sustainable Development Agency		Abdrmane DEME		Head of Studies and Planning		20 22 68 30	

N°		Structures	Persons met	Function	Contacts
16	National Assembly of Mali	Mohamed Adideye MAÏGA	Chairman of Sustainable Development and Environment Commission	76 43 63 17	
17	National Meteorology Agency	Mohamed KOITE	Head of Weather Forecasts Service/Research-Environment Division	20 20 62 04	
18	National Meteorology Agency	Sékou N'Faly SISSOKO	Head of the Research and Development Division	20 20 62 04	
19	High Local Authorities Council (HCCT)	Seydou DIARRA	Elected Official	76 33 54 11	
20	High Local Authorities Council (HCCT)	Fousséni DEMBELE	Elected Official	76 07 22 03	
21	High Local Authorities Council (HCCT)	Dr. Mamadou TRAORE	Elected Official	66 75 10 32	
22	High Local Authorities Council (HCCT)	Mamadou S. DIAKITE	Elected Official	66 75 00 02	
23	High Local Authorities Council (HCCT)	Zéna SAMAKÉ	Elected Official	75 87 53 62	
24	Ministry of Agriculture	Moussa CAMARA	Technical Adviser	20 22 62 92	
25	Ministry of the Environment / Biodiversity Conservation and Development Project (PCVBG)	Biramou SISSOKO	Coordinator	20 21 58 88 / 76 31 08 63	
26	Commissioner for Food Security	Ibrahima DIAKITE	Technical Adviser	20 29 15 36	
27	Commissioner for Food Security	Abdoulaye KOSSIBO	Program Officer	20 29 15 36	
28	Rural Polytechnic Institute of Training and Applied Research of Katibougou (IPR/IFRA)	Pr. Amoro COULIBALY	Head, Animal Biotechnologies Laboratory	77 62 99 71	
29	National Commission of Users of Research Findings (CNU)	IBRAHIM DIAKITE	Chairman CNU	76 44 21 12	
30	National School of Engineering (ENI)	Dr. Sidi KONATE	Director of Studies and Research	66 96 75 62	
31	National School of Engineering (ENI)	Dr. Abdoulaye BAYOKO	Climate Change Expert	66 72 70 11	
32	National Union of Cotton Producers' Cooperative Societies (UNSCPC)	Vamara SANOGO	Monitoring-Evaluation Officer	76 36 97 78	
33	Federation of Cotton and Food Producers' Unions - North-East Chapter	Anfa COULIBALY	Vice-Chairman	66 72 70 67	

Key Bibliographical References

1. Laws and Regulations

1.1 Laws

- Loi n°05-008 du 11 février 2005 portant création de la Direction Nationale des Productions et des Industries Animales ;
- Loi n°05-009 du 11 février 2005 portant création de la Direction Nationale de la Pêche ;
- Loi n°05-012 du 11 février 2005 portant création de la Direction Nationale de l'Agriculture ;
- Loi n°05-013 du 11 février 2005 portant création de la Direction Nationale du Génie Rural ;
- Loi n°06-045 du 5 septembre 2006 portant Loi d'Orientation Agricole ;
- Loi n°09-028 du 27 juillet 2009 portant création de la Direction Nationale des Eaux et Forêts ;
- Loi n°19-027 du 12 juillet portant création de l'Agence de l'Environnement et du Développement Durable.

1.2 Ordinances

- Ordonnance n°98-026/P-RM du 25 août 1998 portant création de la Direction Générale de la Protection Civile, ratifiée par la Loi n°98-057 du 17 décembre 1998 et modifiée par la Loi n°06-004 du 06 janvier 2006 ;
- Ordonnance n°01-020/P-RM du 20 mars 2001 portant création de la Direction Nationale de la Santé ;
- Ordonnance n°01-024/P-RM du 22 mars 2001 portant création de l'Institut d'Economie Rurale ;
- Ordonnance n°04-011/P-RM du 25 mars 2004 portant création du Centre National de la Recherche Scientifique et Technologique ;
- Ordonnance n°04-007/P-RM du 25 mars 2004 portant création de la Direction Nationale de la Panification du Développement ;
- Ordonnance n°10-001/P-RM du 18 janvier 2010 portant création de la Direction Nationale de l'Hydraulique ;
- Ordonnance n°2012-004/P-RM du 24 février 2012 portant création de l'Agence Nationale de la Météorologie.

1.3 Decrees

- Décret n°04-150/P-RM du 18 mai 2004 relatif au Commissariat à la Sécurité Alimentaire ;
- Décret n°10-702/P-RM du 31 décembre 2010 portant création, organisation et modalités de fonctionnement du Comité Nationale de la Recherche Agricole ;
- Décret n°10-390/PM-RM du 26 juillet 2010 portant création et modalités de fonctionnement du Conseil National de l'Environnement ;
- Décret n°2011-107/P-RM du 11 mars 2011 portant création du Comité National Changements Climatiques du Mali.

2. Other documents

- CNRST, UNDP, Ministère de l'Équipement et des Transports (2007) : « Programme d'Action National d'Adaptation aux Changements Climatiques », Bamako ;
- Ministère de la Santé (2012) : « Plan d'adaptation aux effets néfastes du changement climatique sur la santé au Mali », Bamako ;
- PNUD, GEF, Ministère de l'Environnement et de l'Assainissement (2011), « Seconde communication nationale du Mali sur les changements climatiques », Bamako ;
- Document de stratégie du Fonds pour l'Environnement Mondial ;
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- Document de Politique et de Stratégie Nationale sur les Changements Climatiques au Mali ;
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- Stratégie Changements Climatiques de la Banque Mondiale en Afrique Sub-saharienne ;
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- Togola I, Maiga A, Bayoko : Rapport d'étude sur la Cartographie des Initiatives d'Adaptation aux Changements Climatiques 2009-2011 Mali/Suède,
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