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April 11, 2018

Closing Date: Monday, April 30, 2018 at 6:00 p.m.

FROM: Vice President and Corporate Secretary

Chad – Climate-Resilient Agriculture and Productivity Enhancement Project

Project Appraisal Document

Attached is the Project Appraisal Document regarding a proposed grant to Chad for a Climate-Resilient Agriculture and Productivity Enhancement Project (IDA/R2018-0092), which is being processed on an absence-of-objection basis.

Distribution:
Executive Directors and Alternates
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Bank Group Senior Management
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The World Bank
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Report No: PAD2625

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED GRANT

IN THE AMOUNT OF SDR 28.4 MILLION
(US$41 MILLION EQUIVALENT)

TO THE

REPUBLIC OF CHAD

FOR A

CLIMATE RESILIENT AGRICULTURE AND PRODUCTIVITY ENHANCEMENT PROJECT

April 9, 2018

Agriculture Global Practice
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective {February 28, 2018})

Currency Unit =	XAF (Central African CFA Franc)
XAF 534 =	US$1
US$1.45 =	SDR 1

FISCAL YEAR
January 1 - December 31

ABBREVIATIONS AND ACRONYMS

AEZ	Agro-ecological Zone
ANADER	*Agence Nationale de Développement Rural* (National Agency for Rural Development)
ANAM	*Agence Nationale de Météorologie* (National Agency for Meteorology)
APO	Agricultural Producers Organization
AR&D	Agricultural Research and Development
ARAP	Abbreviated Resettlement Action Plans
ASRR	Agriculture Sector Review Report
AWP&B	Annual Work Program and Budget
CAADP	Comprehensive Africa Agriculture Development Program
CCP	*Centre de Coordination de Projets* (Project Coordination Department)
CDA	*Comité Départemental d'Actions* (Departmental Actions Committee)
CERC	Contingency Emergency Response Component
CNAR	*Centre National d'Appui à la Recherche* (National Center for Research Support)
CNCPRT	*Conseil National de Concertation des Producteurs Ruraux du Tchad* (National Dialogue Council for the Rural Producers of Chad)
CORAF	*Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles*/ (West and Central African Council for Agricultural Research and Development)
CPF	Country Partnership Framework
CSA	Climate-smart Agriculture
DA	Designated Account
DEELCPN	*Direction des. Evaluations Environnementales et de la Lutte Contre les Pollutions et les nuisances* (Directorate of Environment, the Environmental Assessment, and Pollution and Nuisance Control. Department)
DFIL	Disbursement and Financial Information Letter
ECOWAS	Economic Community of West African States
EFA	Economic and Financial Analysis
ESMF	Environmental and Social Management Framework
FAO	Food and Agriculture Organization of the United Nations

FCFA	*Franc Communauté Financière Africaine* (Central Africa CFA Franc)
FM	Financial Management
FMS	Financial Management Specialist
GBV	Gender-based Violence
GDP	Gross Domestic Product
GHG	Green House Gas
GIL	Gender Innovation Lab
GIS	Geographic Information System
GoC	Government of Chad
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
GTP	*Groupe Technique Pluri-disciplinaire (*Agro-Meteorological Multi-disciplinary Working Group)
HDI	Human Development Index
IBM	Iterative Beneficiary Monitoring
IBRD	International Bank for Reconstruction and Development
ICT	Information and Communication Technologies
IDA	International Development Association
IFRs	Interim Financial Reports
INDC	Intended Nationally Determined Contribution
IPCC	Inter-Governmental Panel on Climate Change
IPF	Investment Project Financing
IPMP	Integrated Pest Management Policy
IRED	*Institut de Recherche en Elevage pour le Développement* (Livestock Research Institute for Development)
IRM	Immediate Response Mechanism
IRR	Internal Rate of Return
ITRAD	*Institut Tchadien de Recherche Agricole pour le Développement* (Chadian Institute for Agriculture Research and Development)
LDP	Local Development Plan
M&E	Monitoring and Evaluation
MAIEA	*Ministère de la Production, de l'Irrigation et des Equipements Agricoles* (Ministry of Agriculture, Irrigation and Agricultural Equipment)
NAPA	National Action Program of Adaptation
NCoS	National Center of Specialization
NGOs	Non-governmental Organizations
NPV	Net Present Value
NSC	National Steering Committee
OP/BP	Operations Procedures/Bank Procedures
PAPAT	*Project d'Appui a la Production Agricole au Tchad* (Agriculture Production Support Project for Chad)
PDO	Project Development Objective
PIM	Project Implementation Manual
PNISR	*Plan National d'Investissement pour le Secteur Rural* (National Investment Plan for the Rural Sector of Chad)
PPA	Project Preparation Advance

PPSD	Project Procurement Strategy for Development
PRAPS	*Projet Régional d'Appui au Pastoralisme au Sahel* (Regional Sahel Pastoralism Support Project)
ProPAD	*Projet d'appui à la productivité et à la résilience climatique* (Climate Resilience Agriculture and Productivity Enhancement Project)
RAP	Resettlement Action Plans
RCoE	Regional Center of Excellence
RPF	Resettlement Policy Framework
RTSU	Regional Technical Support Unit
SAN	*Sécurité Alimentaire et Nutritionnelle* (Food and Nutritional Security)
SCD	Systematic Country Diagnosis
SDR	Special Drawing Rights
SME	Small and Medium Size Enterprises
SORT	Systematic Operations Risk Rating Tool
SSA	Sub-Saharan Africa
STEP	Systematic Tracking of Exchanges in Procurement system of World Bank
ToR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organization
UCTF	*Unité de Coordination Technique et Fiduciaire* (Technical and Fiduciary Coordination Unit)
WAAPP	West Africa Agriculture Productivity Program
WAATP	West Africa Agriculture Transformation Program
WBG	World Bank Group
WOP	Without Project
WP	With Project
XAF	Central African CFA Franc

Regional Vice President: Makhtar Diop

Country Director: Soukeyna Kane

Senior Global Practice Director: Juergen Voegele

Practice Manager: Marianne Grosclaude

Task Team Leaders: Amadou Ba, Ziva Razafintsalama

BASIC INFORMATION

Is this a regionally tagged project?	Country(ies)	Financing Instrument
No		Investment Project Financing

[ ] Situations of Urgent Need of Assistance or Capacity Constraints

[ ] Financial Intermediaries

[ ] Series of Projects

Approval Date	Closing Date	Environmental Assessment Category
30-Apr-2018	31-Dec-2023	B - Partial Assessment

Bank/IFC Collaboration
No

Proposed Development Objective(s)

The proposed Project Development Objective (PDO) is to “to promote the adoption of improved technologies leading to increased productivity and to enhance the climate resilience of agricultural production systems in the areas targeted by the Project”.

Components

Component Name	Cost (US$, millions)
Institutional support for sustainable agriculture development and climate resilience	12.60
Supporting adoption of demand driven technologies and climate-smart agriculture	23.60
Contingency emergency response	0.00
Project management, coordination, monitoring and evaluation and knowledge management	4.80

Organizations

Borrower : Republic of Chad

Implementing Agency :	Ministry of Agriculture, Irrigation and Agricultural Equipment West and Central African Council for Agricultural Research and Development (CORAF/WECARD)

PROJECT FINANCING DATA (US$, Millions)

[✓] Counterpart Funding	[ ] IBRD	[ ] IDA Credit	[✓] IDA Grant	[ ] Trust Funds	[ ] Parallel Financing

Total Project Cost:	Total Financing:	Financing Gap:
44.60	44.60	0.00
	Of Which Bank Financing (IBRD/IDA): 41.00	

Financing (in US$, millions)

Financing Source	Amount
IDA-D3020	41.00
LOCAL: BENEFICIARIES	3.60
Total	**44.60**

Expected Disbursements (in US$, millions)

Fiscal Year	2018	2019	2020	2021	2022	2023	2024
Annual	0.00	3.67	5.39	7.90	8.97	9.53	5.54
Cumulative	0.00	3.67	9.06	16.96	25.93	35.46	41.00

INSTITUTIONAL DATA

Practice Area (Lead)

Agriculture

Contributing Practice Areas

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

Gender Tag

Does the project plan to undertake any of the following?

a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF

Yes

b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment

Yes

c. Include Indicators in results framework to monitor outcomes from actions identified in (b)

Yes

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	High
2. Macroeconomic	High
3. Sector Strategies and Policies	High
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	Substantial
8. Stakeholders	Moderate
9. Other	
10. Overall	High

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Natural Habitats OP/BP 4.04		✓
Forests OP/BP 4.36		✓
Pest Management OP 4.09	✓	
Physical Cultural Resources OP/BP 4.11	✓	
Indigenous Peoples OP/BP 4.10		✓
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37		✓
Projects on International Waterways OP/BP 7.50		✓
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description

No later than three (3) months after effectiveness,the Recipient has established and shall thereafter maintain, the RTSU, with functions, compositions, terms of reference, resources and staffing satisfactory to the Association, to be responsible for, inter alia, support to the day-to-day Project implementation at the local level, as further set forth in the Project Manuals (Schedule 2, Section I, A, 2(a)(i) of the Financing Agreement).

Sections and Description

No later than three (3) months after the effectiveness date, the Recipient has acquired and installed a computerized accounting software capable of correctly recording and automatically generating financial statements (interim and annual), schedule 2, Section I, A, 2(a)(iii) of the Financing Agreement.

Sections and Description

No later than three (3) months after the effectiveness date,the Recipient has hired an accountant and an internal auditor as part of the UCTF (Schedule 2, Section I, A, 2(a)(ii) of the Financing Agreement).

Sections and Description
No later than three (3) months after the effectiveness date, the CORAF has customized its existing TOM2PRO accounting system to fit the needs of the Project, satisfactory to the Association (Section I, A, 4 (a) of the Project Agreement.

Sections and Description
No later than three (3) months after the effectiveness date, the CORAF has updated the procurement section of its procedures manual ("CORAF Procedures Manual"), in form and substance satisfactory to the Association, and shall thereafter carry out its Respective Part of the Project in accordance with such CORAF Procedures Manual and the Project Manuals, as applicable (Section I, A, 4 (b) of the Project Agreement.

Sections and Description
No later than three (3) months after the effectiveness date, the CORAF has identified and assigned an accountant to be dedicated to Project implementation (Section I, A, 4 (c) of the Project Agreement).

Sections and Description
No later than six (6) months after the effectiveness date, the Recipient has recruited an external auditor (Schedule 2, Section I, A, 2(b)(i) of the Financing Agreement).

Sections and Description
No later than six (6) months after the effectiveness date, the Recipient has prepared and adopted the Administrative, Accounting, and Financial Manual of Procedures (Schedule 2, Section I, A, 2(b)(ii) of the Financing Agreement).

Sections and Description
Schedule 2, Section I, F, 1(c): In order to ensure the proper implementation of Part C of the Project ("Contingent Emergency Response") ("IRM Part"), the Recipient shall promptly adopt operations manual for the IRM Part as shall have been approved by the Association ("IRM Operations Manual") no later than six (6) months after the Effective Date

Conditions

Type	Description
Effectiveness	The following have been established with staffing satisfactory to the Association and are fully functional: (i) the National Steering Committee; and (ii) the UCTF, including a project coordinator, financial management specialist, procurement specialist, principal accountant (Article V, 5.01, (a), (i) and (ii) of the Financing

	Agreement).
Type Effectiveness	Description The Recipient has adopted and submitted to the Assosciation the the Project implementation manual (PIM) (Article V, 5.01, (b) of the Financing Agreement)
Type Effectiveness	Description The Subsidiary Agreement has been executed on behalf of the Recipient and CORAF (General Conditions, Section 10.01(a))
Type Effectiveness	Description A legal opinion confirming that the Financing Agreement has been duly authorized by, and executed and delivered on behalf of, the Recipient and is legally binding upon the Recipient in accordance with its terms (General Conditions, Section Section 10.02).
Type Disbursement	Description Under Category (3), for Emergency Expenditures under Part C of the Project, unless and until the Association is satisfied, and notified the Recipient of its satisfaction, that : the Recipient has determined that an Eligible Crisis or Emergency has occurred, has furnished to the Association a request to include said activities in the IRM Part in order to respond to said Eligible Crisis or Emergency, and the Association has agreed with such determination, accepted said request and notified the Recipient thereof.
Type Disbursement	Description Under Category (3), for Emergency Expenditures under Part C of the Project, unless and until the Association is satisfied, and notified the Recipient of its satisfaction, that : the Recipient has prepared and disclosed all safeguards instruments required for said activities, and the Recipient has implemented any actions which are required to be taken under said instruments, all in accordance with the provisions of the Financing Agreement (Section I.F.3 of Schedule 2)
Type Disbursement	Description Under Category (3), for Emergency Expenditures under Part C of the Project, unless and until the Association is satisfied, and notified the Recipient of its satisfaction, that: the Recipient's Coordinating Authority has adequate staff and resources, in accordance with the provisions of the Financing Agreement (Section I.F.2 of Schedule 2), for the purposes of said activities.
Type Disbursement	Description Under Category (3), for Emergency Expenditures under Part C of the Project, unless and until the Association is satisfied, and notified the Recipient of its satisfaction, that : the Recipient has adopted an IRM Operations Manual in form, substance and

	manner acceptable to the Association and the provisions of the IRM Operations Manual remain-or have been updated in accordance with the provisions of Section I.F.1 of Schedule 2 of the Financing Agreement so as to be-appropriate for the inclusion and implementation of said activities under the IRM Part (Schedule 2, Section1, F of the Financing Agreement).

PROJECT TEAM

Bank Staff

Name	Role	Specialization	Unit
Amadou Ba	Team Leader(ADM Responsible)	Senior Agriculture Economist	GFA01
Ziva Razafintsalama	Team Leader	Senior Agriculture Economist	GFA01
Haoussia Tchaoussala	Procurement Specialist(ADM Responsible)	Senior Procurement Specialist	GGOPF
Josue Akre	Financial Management Specialist	Financial Management Specialist	GGOAW
Abdoulaye Toure	Team Member	Lead Agriculture Economist	GFA01
Aletheia Amalia Donald	Team Member	Gender Analyst	AFRGI
Andrianirina Michel Eric Ranjeva	Team Member	Finance Officer	WFACS
Bleoue Nicaise Ehoue	Team Member	Senior Agriculture Economist	GFAGE
Bougadare Kone	Environmental Safeguards Specialist	Environmental Specialiste	GEN07
Brahim Sall	Team Member	Senior Rural Development specialis	GFA01
Cheikh A. T. Sagna	Social Safeguards Specialist	Senior Social Development Specialist	GSU01
Demba Balde	Social Safeguards Specialist	Senior Social Development Specialist	GSU01
Emeran Serge M. Menang Evouna	Environmental Safeguards Specialist	Senior Environmentalist	GEN07
Julie Rieger	Counsel	Country Lawyer	LEGAM
Kandi Magendo	Team Member	Financial management specialist	GGOAW
Mahaman Sani	Team Member	Private Sector specialist	GFCAW
Michael Morris	Peer Reviewer	Lead Agriculture Specialist	GFA04

Mohamed Nanzoul	Team Member	Senior Water and irrigation specialist	GWA07
Mousson Estelle Jamel Koussoube	Team Member	Gender Specialist	AFRGI
Paulette C.E. Aida Thioune Zoua	Team Member	Program Assistant	AFMTD
Sossena Tassew	Team Member	Operations Analyst	GFA01
Tayelim Berthe Ngarbaye	Team Member	Program Assistant	AFMTD
Vikas Choudhary	Peer Reviewer	Senior Agriculture Specialist	GFA13

Extended Team

Name	Title	Organization	Location
Gabriel Boc	Economist	FAO	Italy
Hermann PFEIFFER	Consultant Agriculturist		

CHAD – AGRO-SYLVO-PASTORAL CLIMATE RESILIENCE AND PRODUCTIVITY ENHANCEMENT PROJECT

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I. STRATEGIC CONTEXT

A. Country Context

1. **Chad is a vast, landlocked country in Central Africa, characterized by land degradation and erratic climatic conditions.** Its total land area of 1,284,000 km^2 encompasses three agro-ecological zones (AEZs), namely Saharan, Sahelian, and Sudanian. The population is over 14 million, 47 percent of which lives below the poverty line. Rapid population growth at a rate of 3.5 percent[1] per year is a serious concern for the country. More than 65 percent of the population is under the age of 25. Chad ranked 186 out of 188 on the 2016 Human Development Index (HDI, 2016), thus being one of the poorest and most deprived countries in the world. Over three-quarters of Chad's population lives in rural areas, and is engaged in subsistence farming for both household food security and income. The country is faced with a high unemployment rate, particularly among the youth.

2. **Chad's economy continues to underperform due to low oil prices and elevated regional insecurity.** The oil and agriculture sectors were Chad's main growth drivers until the worldwide decline in oil prices in 2014. Since then, Chad has experienced a serious economic slow-down causing substantial reduction in government revenue, which has resulted in significant decrease in public expenses. It has negatively affected the Gross Domestic Product (GDP) growth, plunging it down from 6.3 percent in 2014 to 0.2 percent in 2017[2], and has thrown the economy into a deep recession. This difficult economic situation has been further complicated by current serious security threats in the region originating from civil conflicts and insurgencies in the neighboring countries (Sudan, Nigeria, Central African Republic and Libya). Insecurity has forced the Chadian Government to divert some of its economic development funds for defense and hosting of foreign refugees and internally displaced persons. The cross-border trade has also suffered from collapse of internal and external trade, especially for livestock, and from disruption in the Sahel trade routes, used for importing goods.

3. **The short- and medium-term economic outlook remains bleak in view of the GDP's low growth of 3.15 percent projected for 2019**. The Government has assigned top priority to the diversification of the economy by focusing on non-oil sectors such as agriculture to mitigate the external shock from volatile oil prices. The agriculture sector employs 80 percent of the Chadian workforce, and accounts for 22.6 percent of the national GDP. After oil, it is the second largest source of export income. Chad's 2017–2021 National Development Plan aims at transforming the agriculture sector, with the objectives of boosting exports, diversifying the economy, reducing the dependence on oil exports, and increasing the tax-based revenue.

4. **The rural population depends on traditional subsistence farming and herding activities**, with limited access to markets and services (Systematic Country Diagnosis – (SCD), 2015) in particular for women farmers. Chad ranks 140 out of 144 countries on the Global Gender Gap Index. Women are often confined to cultivating subsistence crops through traditional farming practices, with little access to extension advisory services and farm inputs. In addition, according to United Nations Educational, Scientific and Cultural Organization (UNESCO), adult female literacy rate in Chad is 13.9 percent, which is about half that of male literacy.

5. **Food insecurity is a serious concern that is likely to be exacerbated by climate change**. It is estimated that 1.4 million people (that is, one out of ten Chadians) are chronically food-insecure as they are unable to meet their basic food requirements even during the "good" years of crop harvest. The

[1] Last population census was conducted in 2009.
[2] The World Bank Group countries statistics (2017) (*https://data.worldbank.org/country/chad*).

situation worsens during the "bad" years when the rainfall is scant and millions more suffer from at least temporary food shortage. Food insecurity stems from among other things, low productivity of the food crops and livestock sub-sectors due to a lack of improved technologies, under-investment in research on developing resilient technologies, and farming challenges resulting from climate variability. The crop and livestock production sub-sectors are very sensitive to scarcity and poor distribution of rainfall which is worsened by climate change. Generally speaking, the entire country is vulnerable to both short- and long-term climate change related risks. According to Chad's National Action Program of Adaptation (NAPA, 2010) report, short-term climate risks are associated with droughts, floods, poor spatial and temporal distribution of rainfall, extreme heat, and strong winds.

B. Sectoral and Institutional Context

6. **Chad has enormous but yet to be exploited agricultural potential.** Presently, only 6 percent of the country's total agricultural area (over 49 million hectares) is under cultivation. Similarly, only 9 percent of the largely untapped water resources are being utilized, and less than 1 percent of the agricultural land is under irrigation. The main AEZs of Chad, from North to South, are the Saharian (average annual rainfall up to 200 mm), the Sahelian (average annual rainfall of 200-700 mm) and the Sudanian (average annual rainfall over 700 mm). These distinct AEZs offer valuable opportunities to diversify agricultural production and to develop dynamic and complementary crop and livestock value chains. While other projects are concentrating on livestock systems in the Sahelian AEZ, the proposed project will focus on the higher potential Sudanian AEZ where smallholder farmers are engaged in mainly traditional, rain-fed cereal-based farming systems (sorghum, millet and *berbéré* and associated pulses*)*, along with some livestock production. This AEZ is considered as a transit zone for livestock herds as they move southwards from the Sahelian AEZ during the dry season, at times triggering farmer-livestock herder conflicts.

7. Average yields and yield gains of key cereals in Chad are far below the averages in other countries of sub-Saharan Africa (SSA). For example, sorghum average yields stand between 720 and 785 kg/ha[3] respectively for the Sahelian and Sudanian zones of Chad, against an average of 980 kg/ha in the ECOWAS[4] region.

8. The average rainfall ranges from 700 to 1,250 mm in the Sudanian AEZ, but when moving from south towards north, its intensity and distribution variability increases. The main crops are cereals (sorghum, *berbéré*, maize and rice), usually intercropped with legumes, roots and tubers, and mainly grown for household consumption. Farmers also cultivate cotton for cash, but the production of cotton is sharply declining due to weak value chain organization. The Sudanian AEZ is also classified as a cattle husbandry and transhumance area. The collection of wild fruits and plants, especially shea nuts, is a common practice.

9. **The 2017 Agriculture Sector Review Report (ASRR) describes how Chadian agriculture is going through a deep crisis**. The agriculture sector is struggling to modernize and remains largely dependent on weather conditions. The report, however, emphasizes the potential for developing family farming in terms of productivity, profitability and resilience to climatic shocks for meeting the national and external food demand, and for improving the welfare of the rural population.

10. The ASRR has identified the following reasons for the low productivity of Chadian agriculture:

[3] Chad – Agriculture Sector Review (ASRR), May 2017.
[4] Feeding Africa (2015): Report on Cereal Crops: Rice, Maize, Millet, Sorghum, Wheat, H. Mac Cauley (Africa Rice), Tabo Ramadjita (ICRISAT).

- Inadequate institutional capacity, particularly in agricultural research and extension services, coupled with weak agriculture research and development (AR&D) system due to limited human resources, poor infrastructure, and a lack of sustained public support. In addition, insufficient delivery of public and private agricultural extension and advisory services to producers significantly affects the dissemination and adoption of improved technologies.
- Chadian subsistence farming is characterized by the widespread use of low-yielding agricultural technologies and unsustainable traditional farming practices as well as the lack of incentives for innovation. Farmers lack both access to improved agricultural technologies and knowledge about productivity improvements. Presently, less than 5 percent of farmers use improved seeds.
- The fast-growing population is increasing pressure on existing production resources, hence it is bound to create more serious challenges over time to the extensive subsistence farming and traditional livestock management systems. Tensions between various user communities with conflicting interests could increase while competing for ever shrinking natural resources. It is well known that the growing pressure on natural resources, particularly in marginal areas and their fragile eco-systems, is resulting in lower soil fertility levels, soil erosion and degradation.
- Climate shocks are exacting an increasing toll on Chadian agriculture. The Inter-Governmental Panel on Climate Change (IPCC) categorizes Chad as one of the countries that is highly vulnerable to the impacts of climate change. Challenges such as the ever increasing scarcity of natural resources, fragile and substantially degraded soils, high level of food insecurity and poverty, and a lack of proper infrastructure, all constitute hurdles for the local population in their efforts to adapt to severe weather conditions. Indeed, the Intended Nationally Determined Contribution (INDC) of the Republic of Chad (September 2015) indicates that over the past decades, the Saharan and Sahelian climatic zones of the country have progressed southwards by 150 km.
- Weak or lack of coherent agricultural policies in Chad create cumbersome administrative and organizational procedures. The ASRR highlights the persistent lack of concrete measures needed to effectively address the issues that impact food and nutritional security. In practice, efforts to address those issues are not only very limited, but also often questionable. For example, the ASRR has proposed a process for setting up a pastoral code, but so far, no progress has been made in spite of a resurgence of conflicts related to the access and control of natural resources by different users. The insecurity of land tenure is discouraging private investment, and also negatively affecting the sector's performance.

11. The ASRR has recommended the improvement in productivity and strengthening of the resilience of family farming as effective and appropriate means of addressing the above-mentioned constraints and thus reducing poverty in rural areas.

12. The project will coordinate closely with other IDA-financed projects and with the projects being implemented by other partners to ensure effective synergies on the ground. For example, the project will rely on the Chad Hydrological and Meteorological Services Modernization Project (P164256) to strengthen the capacity of the National Agency for Meteorology (*Agence Nationale de Météorologie;* ANAM) to provide effective agro-meteorological services in support of the project's activities, including training and acquisition of digital solutions for data collection and analysis and weather forecasting (e.g. remote sensing application and GIS products). The project will also complement interventions in pastoralism management which are supported under the Regional Sahel Pastoralism Support Project (PRAPS–P147674). The project will support mixed crops and livestock systems in agro-pastoral zones, while PRAPS

will target purely pastoral zones. The project will establish strategical and operational linkages with the Rural Mobility and Connectivity Project (P164747), which will be implemented in two of the three targeted regions. The latter will improve road access to selected agricultural production basin and markets in the project area. Technologies to be introduced by the project will also be used in the irrigation schemes developed by the Chad's Component of the Regional Sahel Irrigation Initiative Project (P154482). The project is aligned with the Sahel Alliance initiative whose objective is to improve the support and coordination of development partners in the region to contribute effectively and more broadly to the eradication of poverty by developing rural areas, creating employment for youth, improving energy infrastructure, and strengthening governance.

C. Higher Level Objectives to which the Project Contributes

13. The project is consistent with and aligned with both the National Development Plan of Chad (2017-2021), and the World Bank Group (WBG) Strategic Goals as follows:

14. **WBG Strategic Goals**: The project will contribute to the strategic objectives of the World Bank's Country Partnership Framework (CPF-2016-2020)[5], helping Chad to strengthen the management of public resources by improving agricultural returns and strengthening value chains, consolidating human capital, and reducing vulnerability. It supports the CPF Commitment No. II: "improve returns to agriculture and build value chains". The CPF provides answers to the major constraints to poverty reduction, identified in the SCD [6],, in line with the government's objectives of improving governance and productivity, strengthening human capital, and reducing inequalities. Moreover, the project is aligned with the 2016 WBG Africa Climate Business Plan, as it will significantly contribute to farmers' access to climate services and the adoption of climate smart agricultural practices. Eventually, the project is expected to contribute to the WBG's strategic goals of ending poverty and boosting shared prosperity in a sustainable manner, including the provision of better jobs and income opportunities, especially for disadvantaged youth and women. It will also generate substantial climate change co-benefits by promoting the adaptation of local farming systems to increased climate variability and climate change, while also increasing the contribution of those farming systems to climate change mitigation.

15. **National Development Plan**: The project is aligned with Chad's *National Development Plan (2017-2021)* whose third pillar focuses on diversifying the sources of economic growth and boosting the sectors that generate growth and create high-quality jobs. The project also aims at operating within: (i) the framework of the *Five-year Agricultural Development Plan (August 2013)*, whose objective is to increase cereal supplies (the principal food crops for the Chadian population) and to give real impetus to agricultural production; and within (ii) *the National Rural Investment Plan* (*Plan National d'Investissement pour le Secteur Rural du Tchad, (PNISR 2016-2022),* prepared within the framework of the Comprehensive Africa Agriculture Development Program (CAADP). The objective of the PNISR is to make the rural sector an important source of economic growth to ensure the food and nutritional security of Chadian people.

[5] Report No. 95277-TD, approved on November 3, 2015.
[6] Report No. No. 96537-TD, approved on September 2, 2015.

II. PROJECT DEVELOPMENT OBJECTIVES

A. Project Development Objective (PDO)

16. The PDO is "to promote the adoption of improved technologies leading to increased productivity and to enhance the climate resilience of agricultural production systems in the areas targeted by the project." The project will focus on: (i) improving access to and accelerating the adoption of improved technologies adapted to smallholder farmer production systems of the Sudanian AEZ, especially in the *Salamat*, *Moyen-Chari* and *Mandoul* regions; and (ii) strengthening resilience of the agricultural production systems of targeted communities to climate variability and change to enable them to make informed decisions and proactively manage anticipated pressures linked to climate variability and change. The project will focus on the intensification of key value chains, namely rain-fed cereals (sorghum, millet, corn, rice) and their associated crops (peanut, cowpea and sesame), and will also encourage diversification by promoting livestock production (primarily small ruminants such as goats, sheep, pigs, poultry), agro-forestry, gum arabic and milk production in peri-urban areas.

B. Project Beneficiaries

17. The number of project's direct beneficiaries is estimated at 360,000 people. The priority target group will consist of smallholder rural families that annually farm between one (1) and five (5) ha of land. In addition to enhancing household food security and nutrition, the project aims at increasing the market orientation of smallholder agriculture and raising household income among rural families by promoting technology adoption and sustainable management of resources in ways that allow rural families to market a larger share of their production. Special attention will be given to women and youth empowerment by using gender and youth sensitive extension approaches and methodologies, provision of increased access to support activities, subsidies and inputs, labor-saving technologies, allowing free time to women for other activities such as childcare and participation in training and strategic community or group meetings. Similarly, in order to enhance youth involvement in agricultural and rural entrepreneurship along targeted value chains, project-supported activities will promote opportunities for increased productivity and revenues, use of mobile-phone based agricultural advice for smallholder farmers, and adapted mechanization options to increase the sector's attractiveness. It is anticipated that 40 percent of the beneficiaries will be women and 50 percent will be youth (adult men and women below 35 years).

18. The project will primarily target selected areas within the Sudanian AEZ of Chad, which are considered as high potential for agricultural activities, but experience serious risks of food and nutritional security (SAN) and rural poverty. Field activities of the project will be implemented in three administrative regions, namely *Salamat*, *Moyen-Chari* and *Mandoul*, located in the south-eastern part of Chad. The project areas are home to about 1.55 million people, representing over 11 percent of the country's total population. The targeted regions are further characterized by high poverty rates of 70.9 percent in *Mandoul*, 61.4 percent in *Moyen-Chari*, and 48.4 percent in *Salamat*.

19. **Gender.** The project is classified as gender informed.

- **Analysis**. Women play a variety of roles in Chad's agricultural production and marketing system but their overall productivity is very low. In most value chains, women predominate as producers and agro-processors, delivering small quantities to local markets, while they are retail sellers in major markets. The primary factors contributing to low women productivity are: (i) farm labor, with women

facing significant challenges in accessing, using, and supervising male farm labor; (ii) low access to appropriate production and processing technologies; (iii) weak technical and business development skills, and (iv) land ownership characteristics, with men owning more land and enjoying higher returns to ownership than women.

- **Action**. The project is expected to reduce gender disparities through specific activities based on women needs. Under sub-component A.1, the project will support the training of young female scientists, the production of foundation seed for the crops preferred by women (sesame, groundnut, cowpea), and gender-sensitive agriculture research. The sub-component A.2 includes support to women farmers' associations, smart subsidies through e-voucher, targeting specifically women. The sub-component A.3 includes support to the preparation of specific strategy/projects focusing on women empowerment in agriculture, and mainstreaming gender in sector policies and reforms. The sub-component B.1 will provide local extension services corresponding to women's specific needs while sub-component B.2 includes small grants for production and agro-processing technology adoption, with 50 percent of the sub-projects to be provided to women. Under Component D, the project staff will include a gender specialist. The detailed description of these activities is included in Annex 1.
- **Monitoring & evaluation (M&E)**. The Results Framework includes mechanisms to monitor the project's gender impact and to facilitate gender disaggregated analysis. The project's M&E plan also includes a gender impact evaluation to be carried out by the World Bank's Africa Region Gender Innovation Lab (GIL). The evaluation will assess the impact of one or more sub-interventions aimed at empowering women in agriculture and will generate evidence on how to close the gender gap in earnings, productivity, and assets.

C. PDO-Level Results Indicators

20. The PDO-Level Results Indicators are:

i. Number of farmers reached with agricultural assets or services (including female aggregated);

ii. Surface area (in hectares) under improved technologies disseminated by the project (including surface area under climate-smart agriculture technologies and practices);

iii. Percentage increase in average agriculture yields of the direct beneficiaries compared to average yields in the project area;

iv. Share of targeted beneficiaries with rating 'Satisfied' or above on project interventions (female aggregated data).

III. PROJECT DESCRIPTION

A. Project Components

21. The total project amount is the equivalent of US$44.6 million (IDA grant of US$41 million and project beneficiaries' (farmers, farmers organization, women and youth associations and local communities) contribution of US$3.6 million) over a period of five years. The project consists of four components, namely: (a) Institutional support for sustainable agriculture development and climate resilience; (b) Supporting the adoption of demand-driven technologies and climate-smart agriculture; (c)

Contingency emergency response; and (d) Project management, coordination, M&E and knowledge management. A description of the project components is summarized below and further detailed in Annex 1.

22. **COMPONENT A: INSTITUTIONAL SUPPORT FOR SUSTAINABLE AGRICULTURE DEVELOPMENT AND CLIMATE RESILIENCE (US$12.6 million equivalent from IDA).** This component is designed to strengthen institutional capacities for agricultural research and development (AR&D) and climate change adaptation at national level. The component includes three sub-components:

23. **A.1 Strengthening the agricultural research and development system** (US$6 million). Under this sub-component, the project will focus on the following key areas:

(i) *Supporting adaptive research systems*. The project will finance: (a) the rehabilitation of infrastructure (laboratories and facilities) and equipment for the Chadian Institute for Agriculture Research and Development (ITRAD); (b) specialized short- and long-term training of young researchers and technicians (50 percent female) from ITRAD and national cooperating institutions; (c) support to the setting-up of an innovative and sustainable AR&D funding system; (d) the production of high-quality breeder and foundation seeds for targeted crops (cereals: sorghum, millet, maize, rice, and their associated crops: peanut, cowpea and sesame), agro-forestry and gum arabic; (e) competitive funding for adaptive research activities centered on increased productivity and value generation in Sudanian AEZ farming systems with special emphasis on women empowerment;

(ii) *Supporting the strengthening of research-extension-farmer linkages.* The project will provide support to improve matching of technology supply and demand through supporting consultation and cooperation among the AR&D stakeholders including research institutions, universities, extension services, farmers' organizations, women and youth organizations, and the private sector;

(iii) *Participation in the regional WAAPP (P122065)/WAATP (P164810) networks:* The project will support Chad's integration into the existing networks of National Centers of Specialization (NCoS) and ongoing regional cooperation in agriculture. To this end, a contribution of US$0.77 million will be made available to the West and Central African Council for Agricultural Research and Development (*Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles* (CORAF) under a subsidiary project agreement. CORAF will use these resources to undertake the following activities: (a) extension of CORAF's technical networks to Chad for strengthening regional cooperation and sharing of experience, knowledge and training; (b) development and implementation of annual communication action plans based on the regional communication strategy prepared by CORAF, including the networking of knowledge management, information, and communication systems to accelerate the sharing of agricultural technology, tools, and best practices; (c) support to the Government of Chad (GoC) in preparing and implementing an action plan to mainstream climate change considerations in AR&D programs; (d) support for developing and implementing an action plan to mainstream gender considerations in AR&D programs, based on the gender strategy prepared by CORAF; (e) expansion of CORAF's regional Competitive Agricultural Research Grant Scheme to the recipient; and (f) technical assistance for the creation and implementation of a national Competitive Agriculture Research Grant Mechanism.

24. **A.2: Strengthening of national support services for sustainable agricultural development and**

climate resilience (US$4.6 million): This sub-component focuses on three areas:

(i) Revitalizing participatory extension and advisory support services at the national level through capacity building of the staff of the National Agency for Rural Development (*Agence Nationale d'Appui au Développement Rural;* ANADER) including training on gender aspects and encouraging training of more female extension workers, setting-up and management of innovative ICT-based operational tools for extension services (e-extension, mobile phone-based agricultural advice for smallholder farmers) and smart subsidies (e-voucher, pilot targeting women and youth); facilitation of regional cooperation. The project will also support an agriculture application competition in Chad, and support the development and scaling up of the three best digital solutions addressing farmers' needs (advisory services, access to market, and access to climate services).

(ii) Supporting the organizational and technical capacity of the National Dialogue Council for the Rural Producers of Chad (*Conseil National de Concertation des Producteurs Ruraux du Tchad;* CNCPRT), and the National Women Farmers Association.

(iii) Supporting the development of farmer-oriented agro-climatic services by the Agro-Meteorological Multi-Disciplinary Working Group (GTP) with the help of ICT (mobile phone, community based radios) to provide informed and timely advice to farmers. The project will also support the acquisition of reliable weather data at high spatial and temporal resolution for farmers use. With regard to adaptation to climate change, the project will finance the updating and dissemination of cropping calendars and crop variety maps to farmers.

25. **A.3: Strengthening the framework for sectoral strategies and reforms preparation and monitoring** (US$2.0 million). The project will finance activities related to the design and implementation of sectoral reforms to improve sectoral policies. The project will also contribute to the financing of strategic and regulatory capacity building (agriculture inputs quality control and certification), knowledge dissemination focusing on key topics (climate resilience agriculture, women empowerment in agriculture and nutrition sensitive agriculture), public expenditure review ("Ag PER lite[7]") and training of the Ministry of Agriculture, Irrigation and Agricultural Equipment (MAIEA) officers in the subject of policy analysis and evaluation. The project will fund the cost of the gender impact evaluation to be carried out with the support of the GIL.

26. **COMPONENT B: SUPPORTING ADOPTION OF DEMAND-DRIVEN TECHNOLOGIES AND CLIMATE-SMART AGRICULTURE (US$27.2 million equivalent; of which US$23.6 million equivalent from IDA).** This component will support the adoption of high productivity and climate resilient technologies and practices. It is divided into the following three sub-components:

27. **B.1. Improving the efficiency of agricultural support services in the targeted areas** (US$13.4 million). The project will foster demand-driven agricultural advisory services through financing the implementation of regional innovation platforms, strengthening capacities of public and private local extension services and supporting agro-climatic services delivery to farmers, using suitable ICT channels, such as community-based radio and mobile phones. The project will also provide matching grants to small and medium enterprises (SMEs) and farmers groups (including women and youth associations) to finance sub-projects in the following areas: (i) production of improved seeds and seedlings for the targeted crops;

[7] The Agriculture Public Expenditure Review Light (AgPER Lite) is a tool that helps conducting expenditures' reviews in a way that is faster, simpler, less resource demanding and more strategic to address key issues or policy debates on expenditure-results linkages.

(ii) multiplication and dissemination of improved livestock breeds and fish fingerlings; and (iii) facilitating access to inputs and small mechanization services through technical and financial support to agro-dealers and local input shop establishment, management of group input purchases by agricultural producers' organizations (APOs), support to small and medium enterprises (SMEs) specialized in animal-draft or motorized mechanized services (production, processing, repair services).

28. **B.2: Accelerating the adoption of improved technologies and innovations** (US$10.5 million). This sub-component builds upon the priority action programs defined by the partners of the regional innovation platforms in sub-component B.1, and benefits from the strengthening of the agricultural extension advisory network and other support services for the implementation of innovative rural investments, with special attention to the integration of women and young people. The project will support the establishment of demonstration plots or adaptive action research under real conditions, showing the use of proven technologies to promote sustainable intensification of local production systems to gradually increase marketable quantities of quality products. Technologies with proven track records for promoting sustainable productivity of production systems in the Sudanian AEZ notably include: (i) improved, high-yielding varieties and breeds for the main targeted commodities, adapted to local conditions, and resilient to climate variability/change and other stresses; (ii) sustainable soil and water management practices, especially for increasing soil organic matter, prevention of soil erosion, use of crop rotations and associations, improved fallowing, integration of crop-livestock, water harvesting techniques, agro-forestry practices, etc.; (iii) integrated management of pests and weeds; and (iv) improved harvest practices and reduction of post-harvest losses and organized marketing. The project will also provide matching grants to SMEs and farmers groups (with focus on women and youth that will receive 50 percent of the grants) for the use of technologies and innovations developed by WAAPP-country AR&D teams and adapted to local technical and business conditions.

29. **B.3: Support to the implementation of Climate-Smart Agriculture Plans (CSA-Plans)** (US$3.3 million). The project will support the preparation and funding of community investment plans for climate-smart agriculture (CSA), to integrate climate resilience into long-term sustainable landscape management. Those plans will supplement existing Local Development Plans (LDP) of targeted cantons by encouraging greater use of climate resilient practices and technologies including water harvesting and storage for small scale irrigation by households. The CSA sub-projects, implemented by the canton[8] councils with the project's support, are public investments, which have the potential to increase agricultural productivity and income while building resilience to climate change into agricultural production systems of the targeted project area, and in reducing carbon emissions.

30. **COMPONENT C: CONTINGENT EMERGENCY RESPONSE (US$0 million).** This component will create a mechanism for financing emergency eligible expenses in case of a disaster event by including a "zero-dollar" Contingent Emergency Response Component (CERC). Should this component be activated, it will allow rapid disbursement of funds to help reduce damage to infrastructure, ensure business continuity, and enable early rehabilitation. Following an adverse event that causes a major disaster, the GoC will be able to request that the World Bank channel resources from other components into an Immediate Response Mechanism (IRM). The IRM will enable the use of a portion of uncommitted funds from the overall IDA portfolio to respond to emergencies. To mobilize resources from the component, it will use the "IRM Operational Manual", which will be included as an annex to the Project Operation

[8] Canton: administrative unit including a various number of villages.

Manual.

31. **COMPONENT D: PROJECT MANAGEMENT, COORDINATION, MONITORING AND EVALUATION (M&E) AND KNOWLEDGE MANAGEMENT (US$4.8 million equivalent from IDA).** This component will support: (i) coordination and management, including human resources, financial management (FM) and procurement; (ii) monitoring and evaluation and technical studies; (iii) knowledge management and communication; (iv) safeguards and citizen engagement, including piloting an iterative beneficiary monitoring (IBM) system for obtaining feedback and informing on project implementation; (v) establishing a Grievance Redress Mechanism (GRM); (vi) financing of Incremental Operating Costs; (vii) rehabilitation of office space required for project management; and (viii) equipment required for project management and supervision. The sub-component will also support the implementation of the GRM in view of the risks related to governance, fraud, and corruption, especially in the selection of beneficiaries for procurement of goods and works under the matching grants' sub-projects.

B. Project Cost and Financing

32. Total project cost is estimated at US$44.6 million, including financing from an IDA18 grant of US$41 million over five years. The project's cost summary is presented in Table 1 below:

Table 1: Project Costs (US$ million)

Project Components	Project cost	IBRD or IDA Financing	Beneficiaries Funding
Institutional support for sustainable agriculture development and climate resilience	12.6	12.6	0
Supporting the adoption of demand-driven technologies and climate-smart agriculture	27.2	23.6	3.6
Contingency Emergency Response	0	0	0
Project management, Coordination, M&E and Knowledge Management	4.8	4.8	0
Total Costs	43.6	41	0
Total Project Costs	**44.6**	**41**	**3.6**

33. A project preparation advance of US$1,493,985 was signed between the World Bank and the Client to finances cost related to the project preparation.

C. Lessons Learned and Reflected in the Project Design

34. The design of the project has capitalized on lessons learned and recommendations from past and ongoing experiences of IDA and other partner-financed operations in the region, including: (i) agriculture

sector support projects in Chad, especially the recently closed Emergency Agriculture Production Support Project (PAPAT, P126576); (ii) sustainable agriculture and natural resource management in the Sahel zone; and (iii) regional agricultural productivity technology generation and exchange in the framework of the West Africa Agricultural Productivity Program (WAAPP, P122065). Strengths and weaknesses of other programs/projects operating in Chad have also been incorporated in the design, with special attention to the area of institutional development.

35. Lessons learned from the implementation experience of the PAPAT include:

- **Technical Support**. Sound and consistent technical support to productive and social infrastructure investments, both upstream and downstream, has a better chance to ensure sound execution and good returns from the investments;
- **Gender/Poverty Targeting Mechanisms**. Mechanisms that are simple, verifiable and based on objective criteria, can foster transparency, minimize political interference in project resource allocation and ensure that project resources reach the targeted beneficiaries;
- **Emergency Response Financing.** Chad, being prone to disaster and extreme climate events, needs to have very strong mechanisms to promptly respond to crisis. The systematic inclusion of CERC in project design is a key lesson learnt from the past and allows timely and adequate financial resources to crisis management.

Other lessons from agriculture operations in Western and Central Africa reflected in the project design include the following: (i) a regional approach can help in accelerating the development and dissemination of the "Green Revolution" technology in Africa by facilitating regional seed availability, technologies and innovation markets, using the centers of excellence and their networks as channels; (ii) a large stock of technologies has been developed under WAAPP (P122065) and made freely available, while accelerating their adoption through various means such as attracting private sector investment and developing vibrant small-scale enterprises remains a challenge; (iii) experience in grassroots local planning constitutes a basis for determining and supporting local CSA-oriented actions; (iv) there is significant potential for scaling up technologies/practices to achieve the CSA triple outcomes (productivity, adaptation, and mitigation); and (v) operations in fragile, low-capacity contexts need tailored implementation support from the World Bank team in the form of regular supervision, customized assistance to proactively address critical implementation challenges, and provision of close support in cases of critical deficiencies.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

36. The project will be implemented by the Ministry of Agriculture, Irrigation and Agricultural Equipment (MAIEA). The project implementation will be steered by the National Steering Committee (NSC) that administers all projects/programs in the agriculture sector. The NSC is chaired by the Ministry's General Secretary. Its composition and mandate for this project is specified in a MAIEA decree.

37. The MAIEA created a special Project Coordination Department (*Cellule de Coordination des Projets;* CCP) by a Ministerial Decree on October 5, 2017. The CCP's mandate is to ensure: (i) alignment of agricultural projects/programs with national and regional policies and strategies; (ii) development of synergies and collaborative frameworks between agricultural projects/programs funded by different donors; (iii) monitoring the progress of projects/programs by periodic updating of the MAIEA's indicators dashboard; (iv) knowledge management and communication on the projects/programs achievements; (v)

the organization of capacity building activities, and exchange of information between different projects/programs; and (vi) to support the release of counterpart funds for sector projects/programs.

38. The day-to-day project management and coordination will be under the responsibility of the Technical and Fiduciary Coordination Unit (*Unité de Coordination Technique et Fiduciaire*, UCTF).

39. Reporting to the CCP, the UCTF's main functions are: (i) the coordination of project implementation and ensuring efficient working relationships with technical departments of the Ministry; (ii) the preparation and signing of various memoranda of understanding, agreements and contracts linking the project to various partners and service providers; (iii) FM and procurement activities in accordance with the provisions of the Financing Agreement between IDA and GoC, and with the World Bank's procurement and FM guidelines; (iv) the preparation of ToRs, recruitment and management of the project staff; and (v) the preparation of annual work plans and budgets (AWP&B) and progress reports, and the presentation of these documents to the NSC in collaboration with the CCP.

40. Headed by a National Project Coordinator, the UCTF will be staffed with an Internal Auditor, an Administrative and Financial Officer, an Accountant, a Procurement Officer, an Environmental Specialist, a Gender and Social Development Specialist, an M&E and Knowledge Management Officer, and other support staff.

41. The project's field level activities will be coordinated by a Regional Technical Support Unit (RTSU), which will report to the UCTF, and will work directly with the three regional rural development representations, decentralized research centers and extension services. The staff of RTSU will include a Regional Coordinator, two Technical Experts (one dealing with agriculture production and marketing, and the other with CSA/environment/resilience/environment), an M&E Assistant, an Accounting Assistant, a Procurement Assistant, and other support staff. A small management team (Salamat Office) will be placed at *Am-Timan* for the main reason that it is almost impossible to travel to *Salamat* region during the long rainy season. The RTSU will be located within the MAIEA's rural development representation of *Sarh*, and will work directly with the regional rural development representations of the targeted regions and also with the zonal/regional units of ANADER as well as other locally active organizations and projects. The RTSU's principal mandate is to : (i) support the implementation of project activities within its specific coverage area; (ii) provide technical and management support to project beneficiaries; (iii) prepare terms of references (ToR) and facilitate the selection of service providers; (iv) prepare AWP&B and periodic progress reports; (v) implement the M&E system in collaboration with the regional rural development representations (decentralized branches of the MAIEA); (vi) undertake field activities for follow-up and data transmission to the UCTF; (vii) ensure the compliance of various sub-projects with the operational rules and procedures; and (viii) provide technical support to beneficiaries and service providers.

42. The regional activities of the project under sub-component A3 (iii) will be implemented by CORAF. A subsidiary agreement between GoC and CORAF will be signed for this purpose.

43. The PIM will be adopted before project effectiveness as a compendium of procedures for implementation of the project, encompassing the administrative, fiduciary, M&E, and social and environmental safeguard procedures. The PIM will contain detailed ToRs for all the UCTF staff.

44. A specific manual for the management of the Immediate Response Mechanism will be prepared

and validated no later than six months after the project effectiveness.

B. Results Monitoring and Evaluation

45. **General characteristics.** The results monitoring framework consists of expected results, indicators, relevant baseline data of outputs and outcomes, milestones, and a suggested timeline for monitoring progress. The project's M&E system has been designed following the M&E guidelines, to provide necessary information for the results monitoring framework. The M&E system will be computerized so that it could provide accurate information to verify the progress and eventual achievement of results (outputs, outcomes, and impacts), support learning on the basis of experience, determine accountability for results, and facilitate informed decision-making by the project team.

46. **Results measurement for project performance.** A baseline study, to be completed before effectiveness as part of the preparatory works, will be the starting point for setting targets and measuring project results. It will serve as a benchmark for routine monitoring (quarterly report, annual project report) of project implementation to facilitate an informed strategic decision-making process. A mid-term review will be conducted during the project implementation as well as an impact evaluation study at the end of the project implementation.

47. **Learning from experience**. The UCTF will be responsible for ensuring that there are strong links between M&E and knowledge management and strategic communication. The M&E evaluation system will generate knowledge products and services that will be disseminated among project beneficiaries through a wide range of communication channels, using user-friendly communication tools.

48. **Accountability for results.** The project's M&E system will involve, in addition to the required M&E reporting, an accountability mechanism comprising of NSC meetings, stakeholder consultations and the mid-term review. Information-sharing and stakeholders' involvement throughout the project cycle will be a core component of the project's accountability in terms of results. The project management will ensure that stakeholders/beneficiaries have access through various channels to timely, relevant, and unambiguous information about the project's M&E findings, and are also able to incorporate their views in the project's review and decision-making process.

49. **Gender impact evaluation**: The project will conduct a gender impact evaluation, supported by the World Bank's Africa Region GIL. The evaluation would assess the impact of one or more sub-interventions, aimed at empowering women in agriculture, and generate evidence on how to close the gender gap in income, productivity, assets and employment. These interventions may include the provision of e-vouchers to woman farmers for hiring farm labor, encouragement of small-scale woman entrepreneurs to enter higher-earning sectors, and enhancing woman farmers' exposure to role models and gender-informed content within e-extension materials.

50. **Institutional arrangements**. At the national level, the UCTF M&E Officer will lead all aspects of M&E, and will provide operational tools and instruments for data collection at the regional and local levels. The M&E Officer will collect, analyze and validate upstream reports, and monitor information coming from the regional M&E specialists based in the RTSU, and from each of the national institutions involved in project activities.

51. **Harmonization and integration with national and sectoral M&E systems**. The project will make consistent efforts to empower national institutions to ensure that the M&E of project outcomes feed into

the national MAIEA M&E system.

C. Sustainability

52. Project sustainability is ensured by the following six key considerations:

- First, the Government is strongly committed to pursuing its key sectoral strategies, including the Five-year Agricultural Development Plan, which is already being implemented, and the Agro-sylvo-pastoral Act, which is currently under preparation.
- Second, the project will: (i) contribute to enhancing sustainable productivity through farmers' access to improved agricultural technologies that will be disseminated by competent extension services providers; and (ii) ensure sustained support to farmers' access to agro-meteorological information and best practices that are useful in enhancing resilience of local production systems as well as rural livelihoods.
- Third, the project will encourage investment in climate resilience through promotion of climate-smart agricultural technologies and practices such as sustainable land/landscape management.
- Fourth, the project will empower local stakeholders through the provision of training and capacity-building, tailored to their specific needs.
- Fifth, a knowledge management and sharing system will be defined and implemented to efficiently capitalize on lessons learned and to mainstream them into the national policy formulation process.
- Sixth, the project will invest in strengthening the capacities of both public and private institutions. Specifically, the support to ANADER's operations and agricultural research revitalization will ensure the generation, adaptation and adoption of sustainable technologies by farmers.

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

53. As indicated in datasheet, the overall risk rating is high, mainly due to the highly volatile situation, which prevails both in the sub-region (i.e., security concerns in the area) and in-country (i.e. high vulnerability related to production and price shocks).

54. Detailed explanation of the risks is as follows:

- **Political and Governance – HIGH:** The risk rating is based on current political developments that may affect the government's priorities. Ongoing violence by Boko Haram has increased insecurity along Chad's borders with Nigeria and Cameroon, compounding an already fragile situation at the borders with Libya, Central African Republic and, to a lesser extent, Sudan. These issues could divert scarce institutional and financial resources away from development to security priorities. There are also some risks of political interferences in the selection of beneficiaries and service providers. The project will mitigate these political risks by supporting full delegation of selection processes to technical selection committees, and ensuring that they strictly abide by the selection procedures set forth in the PIM. Reporting on the selection of beneficiaries will be closely monitored and reviewed during implementation support missions.
- **Macroeconomic – HIGH:** Risks related to the oil sector continue to pose the most immediate and severe macroeconomic threat. A decline in oil prices or production shortfalls would put additional pressure on fiscal accounts, further compromising the government's ability to finance vital

expenditures. While the Bank is supporting structural economic reforms under the budget support series, the Project will support the introduction of innovative solutions to diversify the economy and build resilience of the smallholders.

- **Sector Strategies and Policies – HIGH:** There is high risk of adverse impact on the project implementation, stemming from sector strategies and policies. The project's development objective is consistent with the country's main strategy (Chad National Development Plan 2016-2020). However, there are many challenging issues related to policy, sector strategy development and implementation (such as land, pastoral code, cotton reform, re-organization of extension services) that may hinder successful implementation. To mitigate this high risk, the capacities of the Ministry of Agriculture, Irrigation and Agriculture Equipment will be strengthened to design and implement informed policies and strategies and to sustain project outcomes.
- **Technical Design of Project or Program – MODERATE:** There is moderate likelihood that factors related to the technical design of the project may adversely affect the achievement of the PDO. Both the client and the World Bank have experience in implementing similar projects and components. The key risk associated with the technical design of the project is the re-vitalization of agricultural extension and advisory services. In order to mitigate this risk, the MAIEA will draw an operationalization plan for the newly created extension agency (ANADER) to train and equip the extension services.
- **Institutional Capacity for Implementation and Sustainability – SUBSTANTIAL:** The key risk associated with the institutional capacity for implementing and sustaining the project activities is the uncertainty regarding the client's procurement procedures, and its capacity to sustain the achievements and outcomes of the project after it ends. For example, the country's agricultural extension and advisory services, which are supposed to play a key role during the project, will most probably be still inadequate to sustain the gains of the project after closing. This issue is recognized by the MAIEA as a top concern and priority. For this reason, the Ministry plans to allocate additional budget to boost extension services. Another important concern is the much-needed multi-stakeholder mobilization, participation and coordination, and it is expected that implementation arrangements would address this concern.
- **Fiduciary – SUBSTANTIAL:** The country's overall fiduciary environment is characterized by substantial weakness in the integrity of the FM and procurement system. An FM assessment has revealed that the system is inadequate and does not comply with the Bank's minimum requirements under OP/BP10.00, mainly due to a lack of FM staff who could properly handle project activities. It was, therefore, agreed that the new UCTF be created. In light of the experiences of CORAF in implementing IDA-funded projects, the FM residual risk for CORAF is moderate. The overall procurement system risk is rated as high. A detailed action plan has been prepared to reduce this risk.
- **Environmental and Social – SUBSTANTIAL:** The project activities are expected to have minimal environmental and social impacts. However, the risk is substantial due to combination of climate change and disaster risks (i.e., droughts and floods), high poverty rate and frequent conflicts. Climate change, rapid population growth and weak governance have been reinforcing each other to create a fragile situation, whereas growing competition for natural and economic resources has been exacerbating tensions amongst communities as well as instability in the country. To ensure compliance with World Bank safeguards policies, the GoC prepared an Environmental and Social Management Framework (ESMF), an Integrated Pest and Pesticides Management Plan (IPPMP), and

a Resettlement Policy Framework (RPF). These documents have been disclosed before appraisal (February 23, 2018 in-country and in Infoshop).

- **Stakeholders – MODERATE:** Opposition from stakeholders could have a negative impact on the achievement of the PDO, but the likelihood of such an occurrence is moderate. A project stakeholder assessment was conducted during project preparation. The multi-disciplinary project preparation team, put together by the Government, is working to ensure that project activities are in line with the national policies. The team comprises representatives from farmers' organizations, women associations and private firms to ensure that their needs are effectively addressed in the designing and implementation of the project. Community members will be actively engaged in local level planning and implementation of project activities.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis (EFA)

55. **Rationale for public sector provision**: After oil industry, agriculture is the most important sector of Chad's economy and is the principle source of livelihoods for over 80 percent of the country's population. Agricultural production is still dominated by small-scale farmers who are the target beneficiaries for the project. Fostering family farming through spreading sustainable production technologies and developing local markets is still a key challenge for the Government of Chad which fits into the National Development Plan 2016-2020. As such, the public sector plays a vital role in a number of aspects to support the agriculture sector, through the provision of public goods, such as infrastructure including agriculture research facilities, labs, and the dissemination of new technologies through the agricultural research and extension services.

56. Project activities are expected to generate three main categories of benefits: (i) direct benefits to farmers such as increased crop yields, increased revenues, enhanced resilience to climate variability and climate change risks, along with more intangible social benefits such as improved food security and nutrition, human capital strengthening, as well as women and youth empowerment; (ii) community level benefits to farmers' organizations such as additional income generated through small rural enterprises, along with capacity development; and (iii) environmental benefits, such as natural resources protection and reduced Green House Gas (GHG) emissions through the use of sustainable technologies. These benefits may be attributed to the activities of Component B (the proposed production sub-projects, including access to improved seeds, and income-generating activities). It is important to recognize, however, that the national level activities, specified in Component A, would be creating the enabling environment for successful implementation of project activities in the field.

57. A financial and economic analysis was conducted to assess the soundness of the project activities, modelled from the perspective of the target beneficiaries, and compared with the *without-project* situation (which reflects the current situation and has been considered static for the purpose of the analysis). Crop and activity budgets have been prepared for the main crops, with computed costs and benefits experienced by the beneficiaries with and without the project intervention, using market prices. A total of 11 models have been prepared: five crop budgets (sorghum, *berbéré*[9] and maize with full support package and improved seed package, groundnut and cowpea) and three income-generating activity budgets (storage facility, small processing unit, and small livestock rearing). The economic analysis

[9] Transplanted sorghum mainly in river flood recession areas.

followed a similar approach, but using economic prices and aggregating the results at the level of the project, and from the society's viewpoint. The economic analysis uses the incremental benefits, adoption rates and expected total number of beneficiaries (aligned to the results framework), adding to that the environmental co-benefits arising from reduced GHG emissions and subtracting the total project economic costs to determine the overall economic viability of the project.

58. **Financial analysis:** All profitability indicators suggest the viability of the models prepared in this analysis, with significant margins for additional income and returns on investment. For the production models, the additional income obtained at full benefits ranges from 23,575 FCFA per year per ha (i.e., US$41) for the *berbéré* cropping with improved seeds to 42,988 FCFA per year per ha (i.e., US$74) for maize production, using a full package of project support. Similarly, improved companion crops have potential of generating an additional income of 79,777 FCFA per year per ha (i.e. US$138) for groundnuts and 44,300 FCFA per year per ha (i.e., US$76) for cowpea. The income-generating activities have very positive internal rates of return ranging from 27 to 29 percent. Overall, all models indicate positive net present values (NPVs) and cost-benefit ratios higher than one.

59. **The GHG accounting calculations:** The calculations were based on characteristics of the Sudanian AEZ (sub-humid tropical climatic conditions with sandy soils) and the land use and crop management practices for With Project (WP) and Without Project (WOP) situations**.** The changes expected to result from the project were included in the tool's different modules (in full alignment with the EFA assumptions and budget provisions). The carbon balance results are positive and significant, with the proposed project's activities leading to a total reduction in CO_2e emissions of 4.26 million tons over a period of 20 years starting from project implementation. The mitigation potential is roughly 213, 068 tons of CO_2-e, or -0.7 tons of CO_2e per hectare per year. Following the World Bank guidelines, this analysis presents three scenarios (in addition to the baseline one without the environmental benefits), using the low and high range social cost of carbon and at market prices.

60. **Economic analysis:** Overall, the project is an economically sound undertaking under all scenarios, without and with valuation of environmental benefits (based on a total cost of US$43.6 million). The scenario without the valuation of environmental benefits is considered as the baseline scenario; in this scenario, the NPV is estimated to be US$14.7 million, and the economic internal rate of return (IRR) is estimated to be 14.2 percent. With environmental valuation at market prices, the project is expected to generate a NPV of US$32.4 million and an economic IRR of 22.6 percent. Including the GHG mitigation valued at the low estimate range (on average, US$49 /t|CO2e), the project could generate a NPV of US$68.7 million and an economic IRR of 56.7 percent. With environmental benefits valued at the high estimate range (on average, US$98/tCO2e), the project's results would be an NPV of US$129.0 million and an economic IRR of 97.1 percent.

61. Annex 4 provides details about the economic and financial analysis and the GHG.

B. Technical

62. The technical feasibility of the project is based on the following key factors:

a) The selection of approaches and activities that have been successfully tested and used by other World Bank-financed projects such as the West Africa Agriculture Productivity Program (WAAPP – P122065), which has a proven track record of supporting the adoption of released technologies/innovations, and the Niger Climate-smart Agriculture Support Project (P153420);

b) The lessons learned from PAPAT (P126576), which experienced significant delays in implementing productive and community sub-projects;

c) The preparation of a pluralistic annual operation plan for ANADER, strategic plan for the AR&D sector, and need assessment for the CNCPRT;

d) The use of 'Innovation Platforms' in which value chain actors will build direct and sustainable commercial and business relationships to improve productivity and value along the targeted chains, and implement viable investment sub-projects;

e) The integration of modern Information and Communication Technologies (ICT) in participatory extension and technical support services, using effective digital solutions such as e-extension and e-voucher, already tested in other countries in the region including under WAAPP.

C. Financial Management

63. The FM aspects of the project will be managed by the UCTF to be established within the Ministry of Agriculture, Irrigation and Agricultural Equipment (MAIEA) by a legal act, and by the CORAF for the sub-component A.1 (iii) (Participation in regional WAAPP (P122065)/WAATP (P164810) networks). The Ministry has recently hosted the IDA- funded Agriculture Production Support Project (P126576, IDA Credit: US$25.0 million; TF-14414: US$4.6 million, and TF-14415: US$4.6 million), closed in June 2017, and the IDA-funded Emergency Food and Livestock Crisis Response Project (P151215, IDA Grant H9930: US$18.0 million). Fiduciary compliance for the Agriculture Production Support Project (P126576 and P131019) was deemed satisfactory as the unaudited Interim Financial Reports (IFRs) were submitted on time, and found acceptable. The last audited financial statements, for the period ending October 31, 2017, including the grace period, are due on April 30, 2018.

64. On the other hand, CORAF is currently managing the regional part of the IDA-funded WAAPP-1C project (P122065) in the amount of US$45.0 million. CORAF has also recently managed some activities of WAAPP – 1 B (P117148), and WAAPP – 2 A (P129565). CORAF has a long-standing relationship with several donors, technical partners and the regional economic communities as well. The FM performance was rated as satisfactory for the IDA-financed WAAPP-2A (P129565), WAAPP-1B (P117148), and WAAPP-1C (P122065), following the last supervision mission conducted in November 2017.

65. The FM assessment concluded that the fiduciary arrangements of CORAF fully comply with IDA's rules and regulations. Nonetheless, key actions were identified to strengthen the FM system of CORAF. These actions include the following: (i) customize, within three months of the project effectiveness, the existing TOM2PRO accounting software to handle the project's activities under the responsibility of CORAF; (ii) identify and assign an accountant to be dedicated to project implementation within three months of the project effectiveness; and (ii) a subsidiary agreement in form and substance satisfactory to IDA between CORAF and the GoC to provide one fifteenth ($1/15^{th}$) of the value of Component A to CORAF has been executed.

66. Regarding the MAIEA's FM system, the FM assessment concluded that the system is not adequate and does not comply with the World Bank's minimum requirements under Investment Project Financing (IPF) Directive and Policy, mainly due to a lack of FM staff to handle the project activities. As a result, it was agreed that a new UCTF will be established within the Ministry, through a ministerial act. For this end, the GoC requested a Project Preparation Advance (PPA) to help, among other things, to recruit key staff members including: (i) a Financial Management Specialist (FMS); (ii) a Procurement Specialist; and (iii) a

Monitoring and Evaluation Specialist. The PPA is being managed by the PCU of the IDA-funded Regional Sahel Pastoralism Support Project (P147674).

67. The conclusion of the assessment is that, due to the proposed mitigation measures and based on the experiences of CORAF in the implementation of IDA-funded projects, the FM residual risk for CORAF is moderate while for MAIEA the risk is substantial. Once the proposed mitigation measures and action plans have been implemented, the FM arrangements will satisfy the Bank's minimum requirements under OP/BP10.00, to provide, with reasonable assurance, accurate and timely information on the status of the project as required by the IDA.

68. The audit of the annual financial statements of the components of the project managed by MAIEA will be carried out by a reputable auditing firm as per the ToRs to be agreed upon with the World Bank. In addition, an annual financial audit of CORAF as a project implementation agency will be performed. The financial statements will include specific appendices reporting on the use of funds and the operations made under the subsidiary agreement. The format of these appendices will be agreed upon and attached to the subsidiary agreement.

69. The detailed FM assessment and proposed mitigation measures including staffing, internal control, internal and external audit arrangement, FM conditions and covenants are found in Annex 2.

D. Procurement

70. **Applicable procurement rules and procedures.** Procurement for goods, works, non-consulting and consulting services for the project will be done in accordance with the procedures specified in the "World Bank Procurement Regulations for IPF Borrowers", dated July 2016 (Procurement Regulations) and the World Bank's Anti-Corruption Guidelines: "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants (revised as of July 1, 2016)", as well as the provisions stipulated in the Financing Agreement.

71. All goods, works and non-consulting services will be procured in accordance with the requirements set forth or referred to in Section VI. Approved Selection Methods: Goods, Works and Non-Consulting Services of the "Procurement Regulations" and the consulting services will be procured in accordance with the requirements set forth or referred to in Section VII. Approved Selection Methods: Consulting Services of the "Procurement Regulations", the PPSD (Project Procurement Strategy for Development), and the Procurement Plan approved by the World Bank.

72. **Procurement assessment**. The overall project risk for procurement is rated high. The risks are associated with the current country situation, delays experienced in the past in the approval of bid evaluation reports, important delays in signing off and approval of contracts, and overall poor management of contracts, even though arrangements were in place at the level of the MAIEA. For CORAF, the main weaknesses identified during the assessment are (i) limited experience of the procurement staff in the World Bank Procurement Regulation; (ii) the tender committee is not trained in the World Bank Procurement Regulation; (iii) the procurement section of the CORAF's procedures manual is not aligned with the new World Bank Procurement Regulation. The following is recommended to ensure that the procurement activities are implemented on time with high quality service: (i) the UCTF will be responsible for all fiduciary activities comprising, notably, the management of all the project's procurement process, including the signing and approval of contracts during implementation; (ii) anticipate the implementation of all procurement activities as indicated in the PPSD and the Procurement Plan; and (iii) the MAIEA to closely supervise all procurement activities. To address the risks identified at CORAF level, the following

mitigation measures should be put in place: (a) an update of the procurement section of CORAF's procedures manual in a form and substance acceptable to the World Bank; and (ii) training of the procurement staff to strengthen their capabilities in the World Bank Procurement Regulation. With the implementation of the proposed measures of the action plan and the support of the World Bank team, the overall residual procurement risk should be rated substantial**.**

73. **PPSD**. The GoC has prepared and submitted a PPSD to the World Bank for review. The PPSD (including Procurement Plan) indicates *inter alia,* whether or not: (i) the national and international environment is favorable for the procurement of goods intended for project implementation; (ii) the national market is able to meet the needs of works, computer equipment, office equipment and furniture as well as office supplies, which will be purchased according to the relevant procedures; (iii) the same applies to the market for consultant services; and (iv) the contracts are open to the sub-regional and international market for specific supplies and services that may require the participation of international companies. The PPSD summary is presented in Annex 2.

74. **Procurement Plan.** A Procurement Plan (PP) for the first 18 months of project implementation was prepared during appraisal and the final version was discussed and approved during negotiations.. Any updates of the Procurement Plan should be submitted to the World Bank for approval. The UCTF should use the World Bank's online procurement planning and tracking tools (STEP) to prepare, clear, and update its Procurement Plans, and conduct all procurement transactions. During implementation, the simplified Procurement Plan will be updated by agreement between the project team and the World Bank as required but at least annually, to reflect project's actual implementation needs and any enhancement in institutional capacity.

E. Social (including Safeguards)

75. The project triggers OP/BP 4.12 on Involuntary Resettlement, as economic displacement of project-affected populations (PAPs) may occur. Such displacement may lead to land acquisition, creating the need to compensate adversely affected people for loss of assets and/or livelihoods. In addition, it calls for screening of future investments and identification of mitigation measures that take into account potential social risks and impacts of the project. As the project's sites are not yet known, a RPF has been prepared and disclosed on February 22, 2018 to address requirements under World Bank's Social Safeguard Policies on Involuntary Resettlement (OP/BP 4.12) as well as the government's laws and regulations on social safeguards. The RPF provides clear guidance on minimizing land acquisition and resultant economic displacement; compensating project-affected population; rehabilitating livelihoods; addressing grievances; and implementing the RPF through Resettlement Action Plans (RAP) as needed by fully detailing the operational process of undertaking resettlement. If displacement does occur in any of the sub-projects then Resettlement Actions Plans (RAPs) or Abbreviated Resettlement Action Plans (ARAPs) will be prepared for the specific sub-projects, following the guidelines set out in the project's RPF. The resettlement process is meant to be inclusive to encompass vulnerable social groups and guarantee that they receive equitable treatment. After validation by the Directorate of Environment, the Environmental Assessment, and Pollution and Nuisance Control (DEELCPN) and the World Bank, the RPF has been publicly disclosed in compliance with the principles set forth by the World Bank Group policy on disclosure (OP/BP 4.50), both in-country and on February 23, 2018.

76. **Gender inclusion and Gender-based violence (GBV)**. The Borrower will review the existing national policy directives of the Government on gender, within the context of the project, that are applicable to the envisaged activities of the project. Gender aspects being critical to the implementation

of project activities, the project will be gender-sensitive in its approach to: (i) increase economic opportunities for women; (ii) provide need-based services to women; and (iii) establish a gender-disaggregated baseline against which impacts and results of the project could be evaluated. In principle, much can be achieved by mainstreaming gender and social inclusion in the project, and simultaneously mitigating any negative impact on women. As such, the project aims at promoting the incorporation of gender policies in all activities of the project. The project will include a gender assessment study, to be carried out before project's effectiveness as part of the preparatory studies, to analyze inequalities between women and men within the context of the project. The assessment will provide a more informed understanding of potential impacts of the project on women.

77. Regarding GBV, while recognizing the fact that addressing GBV and sexual exploitation and abuse (SEA) risks is a highly complex matter and cannot be fully addressed, the project design does include several key actions to pre-empt and protect local communities from these risks. The project will (i) prevent exploitation and abuse of women and children through improved social risk assessment and monitoring, and meaningful community engagement by developing environmental, social and procurement frameworks to raise awareness and accountability around sexual exploitation and abuse; (ii) sensitize Project Implementation Unit staff and relevant government officials and contractors about protecting women, children and other vulnerable groups during project implementation, and ensure that they follow contractually mandated social and labor practices.

78. **Youth.** As women and youth are the main intended beneficiaries of the project, a Youth Employment Assessment study focusing on the targeted communities will be conducted before the project's effectiveness. It is a recognized fact that the youth in Chad are trapped into a vicious cycle of underemployment, unemployment, social hazards and potential radicalization. As the number and size of the youth groups are expanding, it is important that they be properly absorbed in the labor market for them to contribute to both economic development of local communities and social stability in the country.

79. **Citizens' engagement.** The Government will organize a series of gender-sensitive citizen consultations in all beneficiary communities. A community monitoring system will be implemented and complemented by a GRM that will be operated by the relevant local and regional stakeholders, allowing project beneficiaries to submit questions, complaints or suggestions via email, phone, text message, or regular mail. As part of the project's preparation a comprehensive citizen's engagement strategy, which will be developed, before the project's effectiveness, following community meetings prior to any work identification. The strategy will include semi-annual consultations throughout the project duration for sharing project progress and identifying problem areas. The project includes an Iterative Beneficiary Monitoring (IBM) that will be implemented to obtain beneficiaries' feedback. The Project Results Framework also includes an indicator on the project beneficiaries' satisfaction.

F. Environment (including Safeguards)

80. The environmental and social impacts and possible risks of project activities are expected to be moderate to low and mostly site-specific, typical of Category B projects, and easily manageable to an acceptable level.

81. The project, in general, is expected to have a large positive impact on the sustainability of agricultural development in Chad, as its activities are meant to mitigate impacts of climate change, implement adaptation measures, enhance the resilience of agricultural production systems, promote

natural resources management, and strengthen rural livelihoods. The project, in its effort to improve agricultural productivity and preserve the environment, will support the use of improved agricultural inputs with simultaneous environmental assessment to ensure the mitigation of potential adverse effects. Project funds will not be used to purchase and distribute pesticides. Rather, the project will encourage farmers to do intensive agriculture using climate-smart and environmentally friendlier methodologies.

82. Environmental and social impacts of the project are mainly related to the implementation of Component B, which has been designed to promote local development and enhance sustainable productivity of agricultural production systems by: (i) developing local extension services in line with producers' needs; (ii) increasing access to improved seed, other agricultural inputs, equipment and services; (iii) promoting sustainable productivity of targeted sectors (directed at individual producers); and (iv) implementing local pilot programs for CSA (directed at the community/public sector).

83. Activities proposed under various project components trigger the following Environmental and Social Safeguard Policies: OP/BP 4.01 (Environmental Assessment), OP 4.09 (Pest Management), and OP/BP 4.11 (Physical Cultural Resources). Due diligence regarding environmental safeguards requires the following:

- *OP/BP 4.01 (Environmental Assessment)*: As the project' sites are not yet known, the Borrower has prepared an ESMF, which sets up the principles, rules, guidelines and procedures to assess possible environmental and social impacts of the project. The framework describes and proposes measures and plans to reduce, mitigate and/or offset adverse impacts and enhance positive impacts. The ESMF has been prepared, discussed, and disclosed in-country and in the Bank's Infoshop on February 22, 2018.
- *OP 4.09 (Pest Management)*: Project funds will not be used for purchasing and distributing pesticides. Rather, the project will encourage farmers to engage in intensive agriculture, using integrated, climate-smart and socio-environmentally friendly methodologies. The Borrower has prepared an Integrated Pest Management Policy (IPMP) to ensure safe management of pesticides. After validation by the DEELCPN and the World Bank, the IPMP has been publicly disclosed in compliance with the principles set forth by the World Bank Group policy on disclosure (OP/BP 4.50), both in-country and on February 23, 2018.The project will encourage farmers to do intensive agriculture using climate-smart and socio-environmentally friendlier methodologies to ensure efficient utilization of pesticides and integrated soil fertility management through training of farmers that will have positive impact on the environment. Furthermore, a strict control mechanism will be put in place to avoid potential adverse impacts, such as pollution from agricultural runoffs and drainage.
- *OP/BP 4.11 (Physical Cultural Resources)*: The project will follow a careful approach to cultural issues ("chance finds" procedure) to address potential impacts on cultural resources at any time when any civil employment sub-project is being implemented.

84. **Strengthening Environmental and Social Safeguards Capacity**: The project will conduct an assessment study on the capacity within the sector and at relevant levels of project implementation. The objective of the study will be to identify inadequacies and capacity gaps, and to recommend necessary actions to be taken to address the capacity gaps identified during the course of project implementation. Based on previous experience, capacity gaps in managing and implementing potential safeguards do exist

both within the Ministry and in the country in general. The project will contribute towards strengthening of CCP safeguard capacities in the interest of sustainable sector support.

G. World Bank Grievance Redress

85. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project, may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project-affected communities and individuals may submit their complaints to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of World Bank's non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and the Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit *http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service*. For information on how to submit complaints to the World Bank Inspection Panel, please visit *www.inspectionpanel.org.*

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY : Chad

Climate Resilient Agriculture and Productivity Enhancement Project

Project Development Objectives

The proposed Project Development Objective (PDO) is to "to promote the adoption of improved technologies leading to increased productivity and to enhance the climate resilience of agricultural production systems in the areas targeted by the Project".

Project Development Objective Indicators

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Farmers reached with agricultural assets or services	✓	Number	0.00	360000.00	Yearly	M&E	UCTF
Farmers reached with agricultural assets or services - Female	✓	Number	0.00	108000.00	Yearl	M&E	UCTF
Description:							
Name: Surface area under improved technology disseminated by the Project		Hectare(Ha)	0.00	21400.00	Yearly	M&E, Survey (year 3 and 5)	UCTF, ANADER, APO
Surface area under Climate-		Hectare(Ha)	0.00	10700.00	yearly	M&E and survey year 3 and	UCTF, ANADER APO

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
smart Agriculture technolgies/practices						5	
Description: Surface area covered by technology including seeds, CSA practices, agricultural equipment, bio-pestices, bio-fertilizers,... disseminated by the Project							
Name: Percentage increase in average agriculture yield of direct beneficiaries compared to average yields in the Project area		Percentage	0.00	25.00	Years 3 and 5	Survey	UCTF, ANADER, APOs
Description: The indicator measures the productivity increase of the crop production of farmers supported by the Project compared to farmers to the average yields in the project area. Crops to be considered are sorghum, millet, maize, rice and their associated crops (peanut, cowpea and sesame							
Name: Share of targeted beneficiaries with rating 'Satisfied' or above on project interventions		Percentage	0.00	80.00	Year 3 and 5	Survey	UCTF
Share of targeted female beneficiaries with rating 'Satisfied' or above on project interventions		Percentage	0.00	90.00	Year 3 and 5	Survey	UCTF
Description: This indicator measures the percentage of beneficiaries who expressed satisfaction with the services provided in the project areas based on formal surveys. It is expected that a survey to measure this indicator will be carried out twice throughout the project (mid-term and project completion). The sample size should be representative of the total number of beneficiaries (i.e."Beneficiaries" means all beneficiaries targeted by the project components)							

Intermediate Results Indicators

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Improved technologies disseminated by the project		Number	0.00	20.00	Yearly	M&E	UCTF
Description: This indicator measures the number of technologies (seeds, breeds, equipment, agriculture practices) disseminated by the project to increase productivity of agriculture/livestock/agro-processing systems.							
Name: Young researchers trained		Number	0.00	17.00	Yearly	M&E	UCTF
Young researchers trained - female		Percentage	0.00	50.00	yearly	M&E	UCTF
Description: This indicator measures the number of young researchers from ITRAD, IRED and CNAR receiving financial support from the project to complete training at master or PhD level.							
Name: Quantity of foundation seeds produced - cereals		Metric ton	0.00	97.00	Yearly	M&E	UCTF, ITRAD
Quantity of foundation seeds - other crops		Metric ton	0.00	48.00	Yearly	M&E	UCTF, ITRAD
Description: This indicator measure the quantity of foundation cereal seeds (sorghum, berbéré, maize, rice, millet) produced by ITRAD.							

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Agriculture sector reform/ policies & strategies supported		Number	0.00	5.00	yearly	M&E	UCTF, MPIEA
Description: This indicator measure the number of reform document, policies and/or sector strategies that have been prepared with the Project's financial support.							
Name: Operational regional innovation platforms		Number	0.00	9.00	Yearly	M&E	UCTF
Description: This indicator measures the number of innovation platforms created and implemented with the project financial support.							
Name: Direct beneficiaries using agricultural climate services		Percentage	0.00	50.00	Years 3 and 5	Survey	UCTF
Description: This indicator measures the number of project beneficiaries that have access and are using climate information for crop production and/or livestock.							
Name: Improved seeds produced by the targegeted beneficiairies		Metric ton	0.00	3000.00	Yearly	M&E	PCMU
Description: This indicator measures the quantity of seeds produced by farmers, theirs organization and the private sector.							
Name: Number of sub-projects to intensify		Number	0.00	2100.00	Yearly	M&E	UCTF

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
sustainable production systems							
Description: This indicator measure the number of sub-projects funded by the project to allow farmers to adopt innovations and increase their marketable surplus, and eventually their revenues							
Name: Number of diversification sub-projects supported		Number	0.00	360.00	Yearly	M&E	UCTF
Description: The sub-projects will involve activities related to (i) market gardening, (ii) short-cycle livestock production (small ruminants, poultry/guinea fowl for eggs, pigs); (iii) innovative aquaculture production ; (iv) processing and other downstream activities of selected agricultural value chains, including marketing of short-cycle perishable products (vegetable, meat, milk); (v) establishment/consolidation of SMEs for delivery of demand-driven local services, such as mechanization, repair shops; (v) establishment and management of input shops for crop and animal production; (vi) other off-season rural activities, such as value addition to wood and non-wood forest products (e.g. arabic gum, moringafruits, honey, etc.).							
Name: Number of CSA sub-projects		Number	0.00	100.00	Yearly	M&E	UCTF
Description: This indicator measure the number of sub-project combining activities that may achieve one or more of the following objectives: (i) improving soil fertility and water management for rain-fed crops; (ii) water control; (iii) livestock integration; (iv) improving market access; (v) improving agro-forestry and natural resources management.							
Name: Time required for the government to make requested funds available for an eligible crisis or		Weeks	0.00	4.00	Yearly	M&E	UCTF

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
emergency							
Description: 4-week target for availability of funds according to need.							
Name: Annual audits submitted on time and without major qualification		Number	0.00	4.00	Yearly	M&E	UCTF
Description:							
Name: Grievance Resolution Mechanism established and operational		Yes/No	N	Y	Yearly	M&E	UCTF
Description: This indicator measures the implementation of the mechanism to ensure that complaints are being promptly reviewed and addressed.							
Name: Technical audit report for matching grants funded sub-projects		Number	0.00	5.00	Yearly	M&E	UCTF
Description: This indicator measures the number of technical audit prepared for the matching grant funds.							

Target Values

Project Development Objective Indicators

Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	End Target
Farmers reached with agricultural assets or services	0.00	15540.00	78360.00	172920.00	287100.00	360000.00	360000.00
Farmers reached with agricultural assets or services - Female	0.00	6000.00	30000.00	52000.00	80000.00	108000.00	108000.00
Surface area under improved technology disseminated by the Project	0.00	1090.00	4770.00	11040.00	16220.00	21400.00	21400.00
Surface area under Climate-smart Agriculture technolgies/practices	0.00	0.00	1000.00	3500.00	7000.00	10700.00	10700.00
Percentage increase in average agriculture yield of direct beneficiaries compared to average yields in the Project area	0.00	0.00	0.00	10.00	10.00	25.00	25.00
Share of targeted beneficiaries with rating 'Satisfied' or above on project interventions	0.00			60.00		80.00	80.00
Share of targeted female beneficiaries with rating 'Satisfied' or above on project interventions	0.00			70.00		90.00	90.00

Intermediate Results Indicators

Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	End Target
Improved technologies disseminated by the project	0.00	0.00	0.00	10.00	15.00	20.00	20.00
Young researchers trained	0.00	0.00	5.00	8.00	13.00	17.00	17.00
Young researchers trained - female	0.00	50.00	50.00	50.00	50.00	50.00	50.00
Quantity of foundation seeds produced - cereals	0.00	7.00	22.00	47.00	72.00	97.00	97.00
Quantity of foundation seeds - other crops	0.00	3.00	8.00	18.00	33.00	48.00	48.00
Agriculture sector reform/ policies & strategies supported	0.00	0.00	0.00	3.00	3.00	5.00	5.00
Operational regional innovation platforms	0.00	0.00	6.00	9.00	9.00	3.00	9.00
Direct beneficiaries using agricultural climate services	0.00	0.00	0.00	30.00	30.00	50.00	50.00
Improved seeds produced by the targegeted beneficiairies	0.00	190.00	506.00	980.00	2242.00	3000.00	3000.00
Number of sub-projects to intensify sustainable production systems	0.00	150.00	600.00	1200.00	1800.00	2100.00	2100.00
Number of diversification sub-projects	0.00	0.00	60.00	180.00	300.00	360.00	360.00

Indicator Name	Baseline	YR1	YR2	YR3	YR4	YR5	End Target
supported							
Number of CSA sub-projects	0.00	0.00	15.00	45.00	75.00	100.00	100.00
Time required for the government to make requested funds available for an eligible crisis or emergency	0.00	4.00	4.00	4.00	4.00	4.00	4.00
Annual audits submitted on time and without major qualification	0.00	1.00	2.00	3.00	4.00	5.00	4.00
Grievance Resolution Mechanism established and operational	N	Y	Y	Y	Y	Y	Y
Technical audit report for matching grants funded sub-projects	0.00	0.00	1.00	2.00	3.00	4.00	5.00

ANNEX 1: DETAILED PROJECT DESCRIPTION

COMPONENT A: INSTITUTIONAL SUPPORT FOR SUSTAINABLE AGRICULTURE DEVELOPMENT AND CLIMATE RESILIENCE (US$12.6 million equivalent from IDA)

1. This component has been designed to strengthen institutional capacity at the national level for providing operational and technical support for planning, implementation and monitoring of field operations (under Component B). Component A would also strengthen Chad's agricultural policies and regulatory framework with the objective of strengthening regional cooperation in agriculture development.

A.1: Strengthening the agricultural research and development (AR&D) system (US$6 million)

2. *A.1.1: Supporting adaptive AR&D systems (crops and livestock)*. Based on the Agricultural R&D Strategy Plan for Chad (2018-23), the project will help boost priority AR&D to enable it to support agricultural transformation in the Sudanian AEZ. Working closely with the WAAPP NCoS and Regional Center of Excellence (RCoE) networks, the implementation of adaptive AR&D programs will create and introduce technical innovations for achieving sustainable outputs from production systems to meet priority requirements of farmers in the Sudanian AEZ. The project support for rain-fed farming will include: (i) improvement of participatory varietal selection, and foundation seed production; (ii) adaptation (through on-farm trials) of production techniques, including integrated land/water/plant management, particularly through appropriate plowing of farmland (using agriculture equipment), increasing organic content (crop residue management, fallow planting) and managing soil fertility; (iii) integrated pest management to protect crops from diseases and weeds (through rotation, association); and (iv) improving harvest and post-harvest operations, particularly drying and storage.

3. The project will fund: (i) rehabilitation of national and regional AR&D infrastructure and equipment, including laboratories, priority equipment for research centers and experimental farms in the Sudanian AEZ; (ii) training of young researchers through degree programs (10 M.Sc. and 5 Ph.D.) at ITRAD and Livestock Research Institute for Development (IRED), the National Center for Research Support (CNAR), and through short specialized training courses; and (iii) Chad's integration in the regional AR&D network of WAAPP N NCoS/RCoE and international agricultural research system institutions (CGIAR, ICRISAT, IITA, CIRAD to allow the country to benefit from the introduction of improved seeds and animal breeds and high productive fishery technologies; (iv) establishment and implementation of a competitive AR&D fund; and (v) production of foundation seeds (including additional support[10] for seed processing (mobile processing machinery and certification) and improved animal semen.

4. *A.1.2. Strengthening research-extension-farmer linkages.* To better match demand and supply of technologies, the project will support research institutions in organizing consultation and stimulating cooperation among the stakeholders involved in AR&D (ITRAD, IRED, CNAR, universities, technical colleges, etc.), extension services and technology end-users (farmers and private sector[11] organizations).

[10] Close collaboration with the German Cooperation Office (GIZ)-funded production project to make the Chad seed production value chain operational (phase 1 2014-18; CFA 3.2 billion) aimed at developing key links in the seed production chain: (i) improve the political and institutional framework; (ii) strengthen industry oversight institutions; and (iii) support private seed producers and operators; Regional focus on *Moyen Chari/Logone Occidental* and *Oriental.*

[11] Represented primarily by the Chamber of Commerce, Industry, Agriculture, Mines and Artisans (CCIAMA).

5. The project will strengthen the internal dynamics between the above-mentioned partners by funding a semi-annual forum to schedule and jointly monitor AR&D activities in the targeted regions of the Sudanian AEZ. These forums will: (i) assess the IPMP, prepared by the Borrower as well as results of the AR&D activities, carried out during the growing season; (ii) reflect the priority production requirements, identified at regional level in the Sudanian AEZ; and (iii) approve the AR&D priorities (and training if required) for the next season in all sub-sectors. Technical monitoring and discussion meetings (four per year), participation in technology fairs (two per year) and targeted field tours (12 per year) will be organized by specialized ad-hoc committees, as needed during the season. These priority AR&D programs will be then incorporated into the annual work plan of participating organizations. The implementation of the agreed measures will be monitored and results discussed in the forums.

6. *A.1.3: Participating in the regional WAAPP/WAATP networks.* The project will support Chad's integration into the existing networks of NCoS and ongoing regional cooperation in agriculture including: (i) regional harmonization and updating of national regulations governing seed and other agricultural input production, quality control, certification and marketing; and (ii) ensuring the country's participation in regional exchanges on AR&D, currently supported by WAAPP (P122065) in 13 West African countries.

7. *Regional harmonization of agricultural seed and input regulations*. The key actions will include additional[12] support to: (i) the updating and harmonization of national regulations governing plant seeds and animal stock, and inputs such as fertilizers, phytosanitary products/pesticides, veterinary products, and other agricultural inputs; (ii) the setting up and operationalization of national regulatory, quality control and certification bodies for seeds, pesticides, and fertilizers; and (iii) the integration of harmonized Intellectual Property Rights (IPR) and varietal protection into Chadian laws. This support will primarily include short-term training for young civil servants, participation in specialized workshops and conferences, consultancy services, workshops to bring public and private partners together, and possibly infrastructure upgrading and equipment procurement.

8. *Contribution to regional coordination and technical exchanges* (CORAF/WECARD). Chad will participate in exchanges in the WAAPP network for AR&D cooperation, which was developed at West Africa level involving most of the Sahelian countries. Like other countries participating in the WAAPP, a contribution (one fifteenth of the value of Component A) will be provided to CORAF through a subsidiary agreement. Specifically, CORAF will undertake the following activities: (i) extension of CORAF's technical networks to Chad for strengthening regional cooperation and sharing of experience, knowledge and training; (ii) development and implementation of annual communication action plans, based on the regional communication strategy prepared by CORAF, including the networking of knowledge management, information, and communication systems to accelerate the sharing of agricultural technology, tools, and best practices; (iii) support to GoC in preparing and executing an action plan to mainstream climate change considerations in AR&D programs; (iv) support for developing and executing an action plan to mainstream gender considerations in AR&D programs, based on the gender strategy prepared by CORAF; (v) expansion of CORAF's regional Competitive Agricultural Research Grant Scheme to the recipient; and (vi) technical assistance for the creation and implementation of a national Competitive Agriculture Research Grant Mechanism.

[12] Primarily through collaboration with and complementing the project for the "Operationalization of the seed production value chain in Chad" financed by the German Cooperation Office (*Gesellschaft für Internationale Zusammenarbeit*/GIZ initiative).

A.2: Strengthening of national support services for sustainable agricultural development and climate resilience (US$4.6 million equivalent)

9. The slow uptake of improved technologies and sustainable innovations in the Chadian agriculture is responsible for persistent low and variable yields in almost all sub-sectors. Farmers continue to be hindered by limited access to improved technologies, innovations and technical/economic expertise, needed to sustainably improve the use of resources to boost productivity. This unsatisfactory situation is largely attributable to under-investment in AR&D and, above all, the inability to expand agriculture support services to meet farmers' needs. The Government has already taken steps to streamline agriculture extension and advisory services by establishing ANADER, which was created through merger of three public entities, namely National Office for Rural Development (ONDR), Lake Chad Development Company (SODELAC), and National Program for Food Security (PNSA).

10. This sub-component includes three parts: *A.2.1.* Strengthening capacity of the CNCPRT and Women Agriculture Associations; *A.2.2.* Revitalizing agricultural advisory support services; mainstreaming ICT; and A.2.3. Developing farmer-oriented agro-climatic services.

11. *A.2.1: Strengthening capacity of the CNCPRT and Women Agriculture Associations*. The project will support the Borrower to undertake the following activities: (i) participatory organizational and technical assessment of APOs and; (ii) development of a strategic plan for capacity building of APOs.

12. These studies will help in identifying project activities that can contribute towards strengthening CNCPRT national support capacities, both at organizational (governance, advocacy, leadership, autonomy) and technical/economic levels. The project will finance the implementation of CNCPRT and APO capacity building strategic plan, with special focus on women associations, including: (i) provision of training of trainers (ToT) to strengthen their internal organizational, managerial and technical support capacities to member organizations in the target regions; (ii) organization of short specialized training courses for young men and women CNCPRT managers within sister organizations in West Africa; (iii) conducting of technical studies focused on priority issues, combined with training of leaders and technicians of farmers' organizations; (iv) preparation of an action plan for women empowerment in APOs, and contribution towards its implementation; (iv) organization of workshops in cooperation with the private sector and annual national APOs forums involving major regional federations.

13. In addition, the project will assist in setting up and strengthening regional APOs' cooperation, particularly through experience sharing and participation in regional APOs network workshops in Western and Central Africa[13].

14. The project will provide support to CNCPRT, Women Agriculture Association and national federations' operations to allow acquisition of office equipment, communication/information equipment and motorbikes.

15. *A.2.2: Revitalizing agricultural advisory support services and mainstreaming ICT*. The project will support the operationalization of ANADER[14], based on its assessment and the new national extension strategy. As such, the project will provide assistance in implementing the ANADER five-year Action Plan (2018-23)[15] that includes introducing innovative extension methodologies/approaches, increasing the use

[13] See also: *http://roppa-afrique.org/.*
[14] (Agence Nationale d'Appui au Développement Rural / National Rural Development Support Agency).
[15] As defined by the partners with the support of the PPA.

of ICT, especially to enhance women empowerment in agriculture, and keeping the mainstreaming of CSA at the core of all approaches. At national level[16], the revitalization of agriculture extension services includes the following: (i) capacity building of technical staff; (ii) introduction and management of innovative ICT-based tools such as e-extension and e-vouchers (for targeting women); (iii) strengthening regional cooperation in the field of agricultural extension to identify and adopt best practices from the Western and Central Africa; and (iv) support to ANADER's operations for delivery of services (office equipment, operational costs, communication and information dissemination including use of Internet and mobile phones; logistics support such as provision of vehicles and motorbikes). The project will also support the launching of a national agriculture application competition, and will assist in the development and scaling up of three best digital solutions, addressing farmers' needs in three main areas, namely meaningful advisory services, access to market, and climate related services.

16. *A.2.3: Developing farmer-oriented agro-climatic services*. Chad is currently preparing its National Adaptation Program (NAP), which will cover, among others, sectors of agriculture, animal husbandry, forestry, and fisheries. The INDC was ratified by the country in January 2017. This important document defines agriculture and animal husbandry as the key sectors for climate resilience. The 2009 National Adaptation Program of Action (NAPA) identifies agricultural adaptation as one of the priority areas. The project will support this policy-making process through the establishment of a central climate services facility for farmers - a priority project for both, the NAPA and INDC.

17. ANAM, the national weather service, which is currently being established, will harmonize different mandates of existing weather services. ANAM intends to strengthen its coverage with synoptic stations (in particular stations that are automated or use remote transmission technology). Such stations are less expensive to run, and are expected to be procured under the Chad Hydrological and Meteorological Services Modernization Project (P164256) planned to be delivered in FY19.

18. Benefiting from the strengthening of data collection and analytical capacities of ANAM (to be financed under HYDROMET Project), the project will focus on supporting the GTP, active since 1986, to produce[17] the 10-day agro-hydro-meteorological advisory bulletins by: (i) rebuilding the GTP meeting room, supporting ANAM consumables and running costs for producing the advisory bulletins by region; and (ii) setting up an integrated web page to host the 10-day bulletins in order to provide real time agro-meteorological advice for the development of a mobile phone-based application to enable stakeholders to view the bulletins.

19. The project will support ANAM in providing timely and adequate climate services for producers. For this purpose, the project will finance the following: (i) consultations between ANAM and farmers' organizations to properly define farmers' climate information needs, and the technical response that ANAM/GTP can provide (type of agro-meteorological information, communication channels, type of agronomic advice, farming calendar); (ii) updating/refining the agro-meteorological messages to the farmers, based on available rainfall data and the finalization of accurate varietal maps and crop calendars. This latter tool is designed to estimate statistically the ideal periods and deadlines for sowing most promising crop varieties in relevant geographical zones. In the past, these documents were produced as part of the collaboration between the CILSS/AGRHYMET Center and Mali-*Météo*, but they need updating based on more recent local rainfall datasets and also to incorporate new crop varieties. These cropping

[16] See B1 for local level,

[17] For support for the dissemination of agro-meteorological information, see section C2.

calendars will help producers in taking more climate-informed decisions on managing rain-fed crops, reducing the sowing failure risk, and increasing their overall adaptation to climate risks.

A.3: Strengthening the framework for sectoral strategies and reforms preparation and monitoring of (US$2.0 million)

20. The project will finance activities related to the design and implementation of reforms to improve the framework of sectoral policies. The project will also contribute to the financing of strategic and regulatory capacity building (quality control and certification of agricultural inputs), knowledge dissemination focusing on key topics (CSA, women empowerment in agriculture, and nutrition-sensitive agriculture), and the training of MAIEA officers in the subjects of policy analysis and evaluation.

21. *Strengthening the framework for preparation and implementation of sectoral reforms*. The targeted topics include, among others, AR&D, public agriculture expenditure review, agricultural extension and advisory services, enabling conditions to attract more private sector investment in the agriculture sector, the cotton sector re-organization including provision of support to Cotton Chad SA privatization process and reforms related to other specialized services for agriculture (mechanization, agriculture finance).

22. The project will support, on demand-driven basis, the preparation of: (i) technical studies; (ii) preparation of background of legal documents; (iii) strategies to boost private sector engagement in the agriculture sector; (iv) preparation of a detailed action plan for women empowerment in agriculture; and (iv) contribution to action plans to implement the agricultural mechanization strategy, including animal-drawn and adapted motorized mechanization services for production and post-harvest operations.

23. *Strengthening the policy design and regulatory capacities*: The project will support rural sector ministries in key areas such as: (i) policy-making capacity, statistics, planning and policy monitoring; and (ii) regulatory functions, and in particular matters related to quality control (and certification, if any) of agricultural inputs. With regard to control and certification of seeds, the project will provide additional support for the operationalization of the seed control and certification system, including short training courses, participation in workshops, and strengthening of analytical capabilities of central lab(s) for seeds, fertilizers and other inputs for plant and animal production.

24. This support will primarily include short, specialized training sessions intended for young civil servants (including at least 50 percent women professionals), and participation in specialized workshops and conferences, specific technical assistance (by national and international consultants), discussion and validation workshops bringing public and private partners together, and additional work resources including communication ones for dissemination of useful information to decision-makers.

25. Under this component, the project will also fund the cost of gender impact evaluation study to be conducted with the support of the GIL.

COMPONENT B: SUPPORTING ADOPTION OF DEMAND-DRIVEN TECHNOLOGIES AND CLIMATE-SMART AGRICULTURE (US$27.2 million equivalent, of which US$23.6 equivalent from IDA)

26. The project will promote the transfer and adoption of improved technologies, tested under Sudanian AEZ conditions, and adapted to the agricultural production systems of the targeted regions. The project will focus not only on high-potential activities in the Sudanian region, such as intensification of rain-fed cereals (e.g. sorghum, *berbéré*, millet, maize, rice) and their associated crops (e.g. groundnuts,

cowpea, sesame and other pulses), but also on diversification of small-holder livestock farming (e.g. small ruminants, poultry and agroforestry – gum arabic).

27. This component has the following sub-components: (i) improving effectiveness of agricultural extension and advisory services in the targeted areas; (ii) accelerating adoption of agricultural technologies and innovations; and (iii) supporting implementation of CSA plans.

B.1. Improving the efficiency of agricultural support services in target areas (US$13.4 million)

28. This sub-component will enhance the quality and sustainability of local/field-level extension services so that they could effectively address farmers' needs for improving productivity and resilience of local agricultural production systems. As such, the project will contribute to: (B.1.1) fostering demand-driven agricultural extension and advisory services; and (B.1.2) boosting local agricultural inputs supply chains.

29. *B.1.1: Fostering demand-driven agricultural extension and advisory services*. This action will enhance the quality and sustainability of local/field-level extension services necessary for improving productivity and resilience of local agricultural production systems. The project will support:

(i) *Promotion of regional innovation platforms for targeted value chains*. The project will use the innovation platforms to support value chain development and facilitate dialogue among all stakeholders of selected agricultural value chains, including farmers, training institutions, extension workers, traders, processors, private enterprises, policy makers, non-governmental organizations (NGOs), financial service providers, and researchers. The innovation platforms will bring together different stakeholders and provide them with a space to interact, facilitate knowledge flows, and identify and disseminate best practices. The innovation platforms will, therefore, be able to identify challenges and opportunities for the adoption of agricultural technologies and value chain development solutions. The innovation platforms in each commune will generate site-specific solutions to align production with market requirements, which, in turn, will ensure better prices for smallholder producers. Leadership of the platforms will be in the hands of farmers' organizations, the private sector and the NGO/CSO, while technical and administrative aspects will be managed by Rural Development Representations. The project will finance the following key activities: (i) creation and management of three regional innovation platforms to foster collaboration among key regional stakeholders in targeted value chains; (ii) drafting, implementing and monitoring of an annual action plan for each platform; (iii) internal and external dissemination and exchange of information; (iv) on-demand training sessions, addressing specific value chain's needs; and (v) study tours of representatives (including women leaders) to innovation platforms and innovation centers located in other regions.

(ii) *Improving governance and internal support capacities of regional federations of local APOs*, with special focus on women's *'college des femmes'* and youth associations. The project will address the following priorities: (i) enhance capacities of APOs through need-based organizational training (such as in governance, leadership, management, self-sufficiency) for regional federations and local unions ,and groups that are members of CNCPRT, focusing on priority activities for men and women, within small-holder production systems; (ii) improve representation of APOs by providing assistance in organizing local and regional forums for APOs, and hold meetings every semester, with emphasis on raising awareness about project activities; (iii) professionalize APOs by providing technical and business training (repeating twice a year), giving greater independence and control to APOs' internal technical and business services, especially at the grassroots level unions and groups; and (iv) provide

technical training (repeating four times a year) to ”lead farmers” and ”animal health community assistants”, and encourage them to participate in monthly program monitoring meetings especially during the growing season.

(iii) *Strengthening capacities of public and private local extension services.* Based on the new extension strategy, and the related ANADER's action plan, the project will support: (i) short term training of extension agents in participatory and gender-sensitive extension approaches, use of information and communication technologies (ICT), innovation platforms, farmer field schools), and in technical concepts and skills (nutrition-sensitive agriculture, CSA, sustainable management of natural resources); (ii) activating agricultural extension and advisory services and their coordination with internal APO services; (iii) implementation of an e-extension pilot program simultaneously using community based radios. For this purpose, the project will fund the upgrading of office equipment (furniture, laptop and desktop computers, printers, solar chargers), means of transportation, and communication equipment (computer tablets for regional and field teams), and provision of necessary training in the operation and maintenance of equipment for the duration of the project.

(iv) *Development of agro-climatic services delivery.* This activity will help the participating producers in accessing national level agro-climatic services. It will also facilitate producers' access to location-specific cropping/livestock advice, based on the 10-day bulletins produced by the GTP, disseminated via local radio. Another aspect will be the distribution of periodically updated cropping calendars among the extension agents, APOs, and individual farmers, with the objective of optimizing selection of crop type and seed varieties, adapted to local climatic conditions using the following medium:

- *Radio Broadcasting***.** Local radio station staff in the project zone will be trained in transmitting the 10-day agricultural advice to farmers, while the same information would also be disseminated through the Internet (under Component A). The project will support: (i) a pilot program of three (3) training workshops for local radio journalists that will be repeated during the fifth year of the project; (ii) broadcasting of region-specific agricultural advice to farmers by local radio stations every tenth day. A survey will be conducted in the third and the fifth year of the project to evaluate the information uptake by the farmers in targeted zones, and how effectively have the farmers used the cropping calendars.

- *Training in the use of the climate-sensitive cropping calendar tool, and dissemination of information***.** The project will assist the GTP in disseminating updated climate-sensitive cropping calendar through: (i) training of extension agents (ANADER, private operators, APOs, other related services) in the use and updating of cropping calendars for the targeted regions, rain gauge readings, and provision of advice to producers; (ii) distribution of 4,000 heavy-duty (plastic-covered) project zones-specific calendars among the extension agents and producers; (iii) installation of simple rain gauges (to be managed by APOs) in the zones where such stations do not exist, with the objective of improving the use of cropping calendars. The project will distribute 210 rain gauges in targeted villages to obtain long-term village level rainfall data in addition to the data already being collected through the national network. This will reduce the cost of data transmission, ensure long-term sustainability of data collection, and improve local level data quality, leading eventually to the adoption of the cropping calendar by the producers. A study tour to Mali will be organized for 15 producers during the fourth year of the project with the aim of exchanging experience and promoting long-term use of cropping calendars.

30. *B.1.2: Provision of matching grants to finance sub-projects to effective technical support services for sustainable agricultural:* Enhancing producers' access to technical knowledge through improved extension services (see B.1.1. – e-extension services pilot program) is as important as facilitating producers' access to quality inputs (e.g. seed, fertilizer, agro-chemicals) and value chain services (e.g. mechanization). The proposed strategy aims at simultaneous strengthening of the supply and private distribution networks for high-quality agricultural inputs. It also aims at stimulating smallholder demand, especially through frequent communication on innovations and improved technologies (demonstration plots, information channels). It also encourages the use of specific temporary subsidies such as e-vouchers, for accessing selected production products and services, not only those offered by private-sector firms/SME, but also by internal APO services.

31. The project, in collaboration with other actors and partners in the targeted areas, will support the following actions to encourage the private sector entry: (i) planning and production of improved seeds and seedlings for targeted crops; (ii) multiplication and dissemination of improved livestock breeds and fish fingerlings; and (ii) facilitate access to inputs and routine mechanization services.

32. ***Facilitating production of improved seed for targeted value chains*** *(by SME/APO).* The project will support, in partnership with relevant actors: (i) annual evaluation of seed demand for main crops in the targeted regions, and establishment of a coordinated production plan; (ii) strengthening of technical and management capacities of seed producers and their organizations/networks; (iii) technical and business advisory support services and mobile equipment for seed processing and packaging; (iv) production of foundation seeds seeds by local specialized seed producers and specialized groups to meet expected local demand; (iv) local seed treatment, packaging and certification (training/minor equipment for controlling quality); and (v) organization of seed storage facilities.

33. In addition to financing training and technical assistance for seed producers and their organizations, the project will provide basic seed (produced under sub-component A.1.1), and support seed production during the first three years. For this purpose, production contracts will be used equivalent to the commercial value of seed, produced by seed producers/SMEs. The project will reduce its fund contribution over time, with 100 percent of the costs in the first year, 75 percent in the second year and 50 percent in the third year.

34. The project will also strengthen national certification capacities (field and laboratory) through training of regional and sector technicians, and acquisition of minor equipment. Additionally, the project will finance mobile seed processing and packaging units (two per region) while covering initial analytic costs for seed samples; these costs would be gradually integrated into the seed price.

35. ***Access to inputs and mechanization services (private sector)***. The objective of this activity is to develop and disseminate innovative and effective models for improving producers' access to high quality agricultural services (e.g. mechanization, processing) in the targeted zone, while stimulating growth in the local private sector (individuals, SMEs, APOs). Building on the promoted seed producing systems (see above) and e-voucher program (A.2.1), the project will assist in local marketing of agricultural inputs, tools/equipment and suitable mechanization services, contributing to higher efficiency and saving labor costs in production and post-harvest operations.

36. The project will improve producers' long-term access to high-quality inputs on the basis of priority needs expressed at partners' regional platforms. The access will be improved through: (i) strengthening technical and business capacity of input producers, distributors and agro-dealers by, providing them with technical documentation and samples, and establishing demonstration plots to showcase innovation near

marketing sites; (ii) promoting grassroots input marketing by facilitating the establishment of local input shops by APOs or private agro-dealers; and (iii) promoting group purchases of inputs by APO federations/unions.

37. The project will provide support to the development of adapted mechanization[18] services suitable for motorized and animal-drawn cultivation (tools for soil preparation, seed planters, and cultivators) and post-harvest operations. The support will concentrate not only on technical and business (re)training for entrepreneurs and their technicians, but also on targeted "matching-grants" for the acquisition of suitable equipment for providing mechanized services in the project area. The project will also promote demand for mechanization services by providing a temporary subsidy to the SMEs that will be offering mechanized services on project sites. This support will be directed at 3,600 e-voucher users, including at least 40 percent women and 30 percent youth. Specialized training for blacksmiths and mechanics in the repair of agricultural equipment, along with a free set of tools, will be a bonus for successful apprentices.

38. The project will fund on-demand technical assistance, technical and business training, and "matching grants" (requiring a minimum of 20 percent beneficiary co-financing) for the purposes of (i) establishing 12 agro-dealerships and 50 local markets of agricultural inputs; (ii) facilitating the organization and management of 50 group purchases by APOs; (iii) promoting the start-up of l 60 local SMEs, specialized in mechanized production and processing services; (iv) temporary subsidies for mechanized services; and (v) (re)training of 50 blacksmiths and mechanics in repairing mechanized equipment.

B.2: Accelerating adoption of improved technologies and innovations (US$10.5 million)

39. This sub-component will build on the priority action programs proposed by the partners' regional innovation platforms with special attention given to integrating women and young people into these agricultural and rural innovations platforms.

40. *B.2.1: Sustainable intensification of targeted local production systems (directed at the private-sector).* The project will assist in selecting, implementing and monitoring those sub-projects, which are promoting sustainable productivity in critical segments of targeted sectors. These sub-projects are based on demonstration plots or are subjects of adaptive action research under real farm conditions, (0.5 ha) allowing farmers to test proven technologies that have potential to contribute to sustainable intensification of local production systems.

41. Productive sub-projects, whether in production or in processing/marketing activities of the targeted value chains, are directed at smallholder producers (women 40 percent and youth 30 percent), enjoying potential marketable surplus. The proposed activities will allow producers to gradually adopt innovations and increase their marketable surplus, and eventually their revenues.

42. Technologies with proven track record that are offered to individuals or farmers groups will comprise: (i) improved, high-yielding varieties, adapted to local AEZ and farming conditions, including resilience to climate risks; (ii) sustainable soil and water management through higher concentration of soil organic matter and integrated fertility management, prevention of soil erosion, use of crop associations and rotations, appropriate soil preparation, improved fallows (e.g. *Cajanus spp.*), alley cropping, agro-forestry activities (high potential for increased carbon sequestration in soils and biomass, mitigation co-

[18] Ongoing FAO support to develop national agricultural mechanization strategy.

benefits), integration of livestock; (iii) integrated management of pests, diseases and weeds; (iv) improved harvest practices and reduction of post-harvest losses by appropriate drying and storage.

43. The project will fund approximately 2,100 sub-projects, distributed across the three project regions. This matching grant facility will target priority women's groups (at least 40 percent) and youth groups (at least 30 percent). The matching grant mechanisms are detailed in the PIM.

44. *B.2.2: Diversification and value addition by integrating WAAPP/WAATP innovations.* The project will support diversification, value addition and marketing of farm products by private actors (including APOs), especially for the management and use of technologies and innovations, developed by WAAPP (P122065) and in-country R&D teams, and adapted to local technical and business conditions. This support will target priority women's groups (at least 40 percent) and youth groups (at least 30 percent) in order to motivate them to return to labor market and diversify their opportunities for (self-) employment with the eventual aim of increasing rural revenues.

45. The sub-projects, proposed for promoting diversification, will include a wide range of activities whose feasibility, profitability and sustainability were deemed attractive at the pilot stage. The sub-projects will involve activities related to: (i) special short-cycle cropping (market gardening); (ii) short-cycle livestock production (small ruminants, poultry/guinea fowl for eggs, pigs); (iii) innovative aquaculture production; (iv) processing and other downstream activities of selected agricultural value chains, including marketing of short-cycle perishable products (vegetable, meat, milk); (v) establishment/consolidation of SMEs for delivery of demand-driven local services, such as mechanization, repair shops; (v) establishment and management of input shops for crop and animal production; (vi) other off-season rural activities, such as value addition to wood and non-wood forest products (e.g. arabic gum, *moringa,* fruits, honey, etc.).

46. The project will fund around 360 diversification sub-projects. The matching grant mechanism for financing the diversification sub-project is described in the PIM.

B.3. Support to the implementation of Climate-Smart Agriculture (CSA-Plans) (US$3.3 million)

Box 1.1: Climate-Smart Agriculture

Climate-smart agriculture (CSA) contributes to the achievement of sustainable development goals. It integrates three dimensions of sustainable development (economic, social and environmental) by jointly addressing food security and climate challenges. It is composed of three main pillars: (i) sustainably increasing agricultural productivity and incomes; (ii) adapting and building resilience to climate change; and (iii) reducing and/or removing greenhouse gases emissions.

The CSA approach is designed to identify and operationalize sustainable agricultural development within the explicit parameters of climate change. This approach aims to strengthen livelihoods and food security, especially of smallholders, by improving the management and use of natural resources and adopting appropriate methods and technologies for production, processing, and marketing of agricultural goods. CSA seeks to support countries in putting in place necessary policy, technical, and financial means to mainstream climate change concerns into agriculture sector and to provide a basis for operationalizing sustainable agricultural development under changing conditions.

CSA is not a single specific agricultural technology or practice that can be universally applied, but it is more about 'triple-outcomes'. It is an approach that requires site-specific assessments to identify suitable integrated agricultural production technologies and practices that could deliver the three outcomes, i.e. improved productivity, enhanced resilience, and reduced emissions**.** A key element is the integrated landscape approach, which follows the principles of ecosystem management and sustainable use of land and water.

47. CSA corresponds to practices and technologies that can lead to the following outcomes: (i) overall greater productivity relative to arable land, capital, and output; (ii) adaptation to climate change; and (iii) climate change mitigation by reducing the carbon footprint of agricultural activities.

48. *B.3.1: Integration of CSA in LDPs*. The project will support the drafting of two dozen local community investment plans for CSA at the canton level for incorporating climate resilience into long-term sustainable management of territories. These documents will supplement the cantons' existing LDP in terms of local impact and use of innovations. Building upon methods used in the CSA Project in Niger (P153420), the project will promote development of local investment plans for CSA.

49. To explore these opportunities, the project will support 24 cantons to draft their own CSA investment plans. The pilot program will focus on providing opportunities for investment in community's CSA priority areas, and align them with the existing list of activities in the LDPs. Participatory diagnosis will be conducted in the targeted cantons to assess the opportunities and risks related to holistic climate change influence on agricultural production in the targeted territory. Next, investment plans will be prepared with the support of experts to address the community's diagnosed opportunities and risks. The proposals will be submitted to the Departmental Action Committee, the steering body for LDPs, for review and approval.

50. It will be made clear from the very start that community activities must meet the "triple win" principle of CSA, and also be backed by local co-funding. Given the innovative nature of this approach and the often-limited short-term profitability of community/territorial investments in CSA, participants of

each CSA sub-project will be asked to contribute 20 percent (cash or in-kind contribution) of the total cost of the CSA investment plan. It is important to note that these 24 cantons, like the other cantons in the targeted area, fall within the broadcasting coverage area for agro-climatic information, directed at producers, thus collaborating with the local investments for increasing climate resilience.

51. Project promoters will not be individuals but local groups with strong preference for women and/or young people. Productive activities that do not generate benefits for the community will be assisted through a facility dedicated to support the private sector (see B2). A standard, non-exhaustive list will be presented to communities to assist in understanding and executing the process, as illustrated below:

52. A CSA sub-project will be a combination of activities that may achieve one or more of the following objectives: (i) improving soil fertility and water management for rain-fed crops; (ii) water control; (iii) livestock integration; (iv) improving market access; (v) improving agro-forestry and natural resources management. These five intervention categories were selected after an exhaustive review of interventions proven to be successful in improving productivity, building resilience, and reducing GHG emissions in dryland conditions. The Table 1.2 below shows a list of indicative typical CSA actions that would be supported by the project.

Table 1.1: Typical CSA actions and their intended outcomes

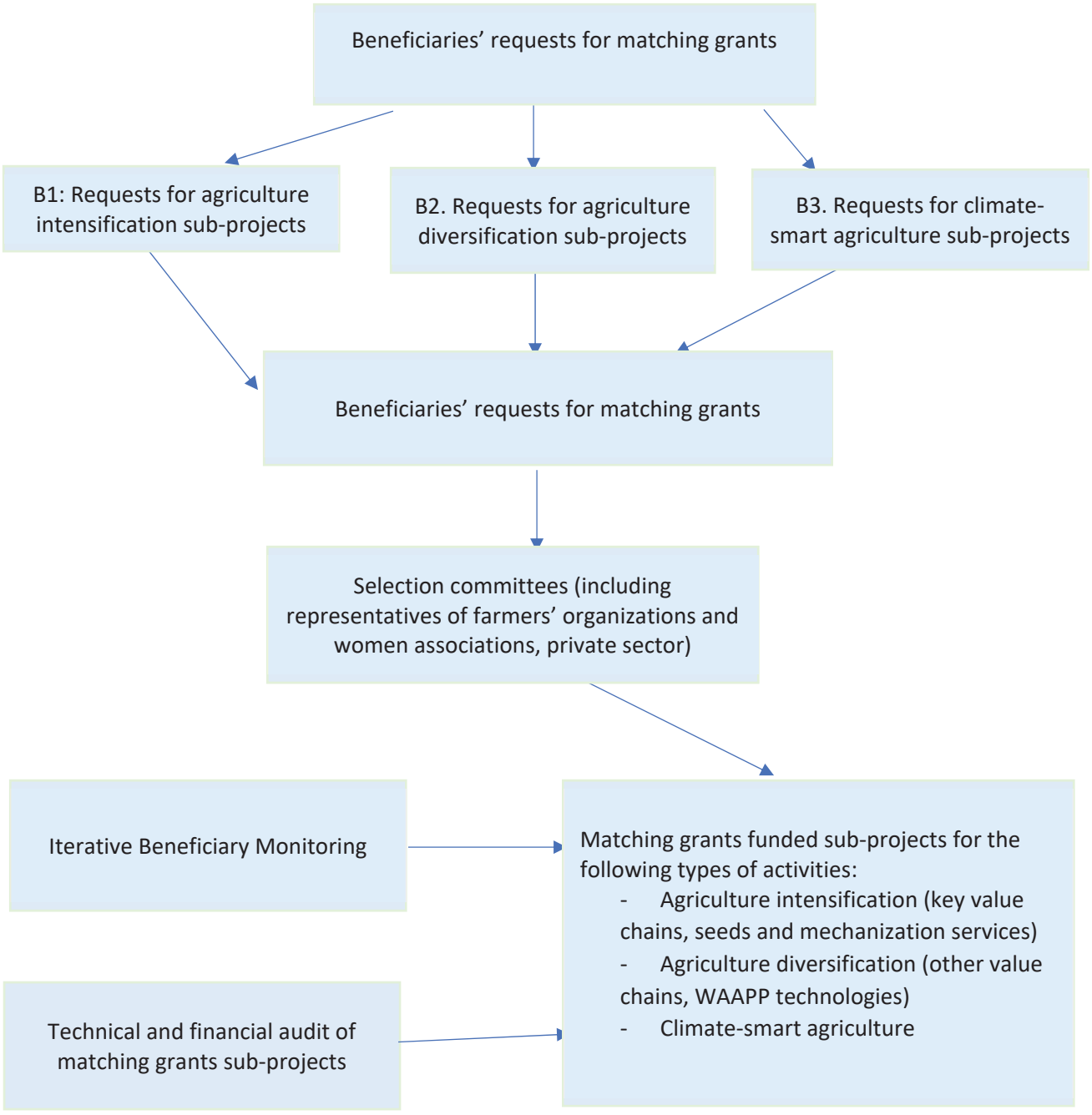
Typical action and CSA relevance	Productivity	Climate-change resilience	Climate-change mitigation
Restoration of forest ecosystems to improve territorial resilience (++)	X - Increases production relative to no-project scenario	X - Maintains forest coverage, reduces erosion caused by climate change	X - Increases biomass carbon sequestration
Sustainable management of fish farming resources (++)	X - Increases production relative to no-project scenario (improved food supply)	X - Protects embankments and reproductive capacity of resources, mitigates the effects of climate stress	X - Maintains high productivity of biomass, protects embankments, reduces carbon footprint
Enhanced community agro-forestry actions (+++)	X - Improves yields and creates new sources of revenue	X - Reduces soil erosion, improves filtration and diversifies revenue sources	X - Increases long-term biomass on agricultural plots
Community infrastructur for climate resilience (+++)	X - Maintains access to market	X - Reduces sensitivity to climate stress	X - Reduces trade's carbon footprint, maintains soil carbon sequestration

53. *B.3.2: Funding for local community CSA action investments.* The project will operate a co-financing facility for subsidies covering up to 80 percent of the total cost of micro-projects of the CSA investment plans. The project will provide financing to 100 CSA investment plans with an average subsidy of 14.5 million XAF over two years, of which 20 percent will be covered by in-kind beneficiaries' contribution.

54. Matching grants: Procurement actions and FM of the matching grant will be carried out by the beneficiaries. The matching grant agreement will include an annex describing the applicable FM and procurement guidelines. The sub-component will include annual technical audit of matching grant sub-projects in view of the risks related to governance, especially in the selection of beneficiaries for procurement of goods and works within the implementation matching grants' sub-projects.

55. The matching grants mechanisms under Component B are described in the figure below:

Figure 1.1: Matching Grant Mechanisms



COMPONENT C: CONTINGENCY EMERGENCY RESPONSE (US$0 million)

56. This component will create a mechanism for financing emergency eligible expenses in case of a natural disaster event by including a "zero-dollar" CERC. Should this component be activated, it will allow rapid disbursement of funds for reducing damage to infrastructure, ensure business continuity, and enable early rehabilitation. Following an adverse event that causes a major disaster, the GoC will be able to request that the World Bank channel resources from other components into an IRM. The IRM will enable the use of a portion of uncommitted funds to respond to emergencies. The "IRM Operational Manual", included in the Project Operation Manual as an annex, will be used for mobilizing resources from the component.

COMPONENT D: PROJECT MANAGEMENT, COORDINATION, M&E AND KNOWLEDGE MANAGEMENT (US$4.8 million equivalent from IDA)

57. This component supports project implementation, including: (i) coordination and management, including human resources, financial management and procurement; (ii) M&E and technical studies; (iii) knowledge management and communication; (iv) safeguards and citizen engagement, including piloting an IBM system for obtaining feedback and informing on project implementation; (v) establishing a GRM; (vi) financing of incremental operating costs; (vii) rehabilitation of office space required for project management and (viii) equipment required for project management and supervision. This component has two sub-components: (D.1) Coordination, management and support to the implementation; and (D.2) Monitoring and evaluation, knowledge management, and communication. The institutional arrangements are detailed in Annex 2.

Sub-component D.1 Coordination, management and implementation support

58. This sub-component will support: (i) the establishment and operation of both the UCTF and the RTSU, which will be based in *Sarh*; (ii) contribution to the establishment and operationalization of the MAIEA's CCP and the national NSC. The sub-component will include management of staff (including national and international consultants) and equipment, FM, procurement activities, management of environmental and social risks, organization of works, and joint supervision missions. This sub-component will finance: (i) rehabilitation of office space required for project implementation; and (ii) the operating costs and equipment required for project management and supervision.

Sub-component D.2 Monitoring and evaluation, knowledge management and communication

59. The project will develop a participatory M&E system focused on results and their use in decision-making and in facilitating the steering and execution of the project. The M&E mechanism will essentially be based on the ProPAD (*Projet d'appui à la productivité et à la résilience climatique* (Climate Resilience Agriculture and Productivity Enhancement Project) logical framework, including that for the promotion of gender equality and inclusion of young people at every level. Specifically, the project's M&E mechanism will include: (i) quantitative and qualitative reference surveys (year zero reference study) and specific studies in the third and fifth years of the project ; (ii) the setup of an adapted and integrated M&E system, populated by the local introduction of data on tablets (software integrating GIS); (iii) bi-annual meetings of the national Steering Committee, quarterly national coordination meetings, and bi-annual meetings with technical and financial partners; (iv) annual participatory self-assessment workshops; (vi) annual joint supervision missions; (v) a mid-term internal and external evaluation; and (vi) a final mission when a project completion report will be drafted and a project completion workshop will be organized. Regional

representatives and their divisions will participate in data collection and validation while the MAIEA's CCP will be responsible for incorporating them into the national M&E system.

60. The project will also pilot the IBM system, which is essentially a feedback mechanism used to identify bottlenecks during project implementation. This mechanism regularly identifies and quantifies distortions and shortcomings that could put the achievement of project objectives at risk. Those distortions are brought to the attention of project leaders and project managers who use them to improve the project management. Implementation of projects in relatively fragile environment could face a variety of external and internal constraints, including non-compliance with procedural manuals, weak governance, delay in scheduled activities, communication issues with beneficiaries, lack of commitment from project managers, and overall poor capacities. Such constraints delay implementation of activities thus hampering the achievement of project objectives. Potential impact of the constraints could be mitigated by alleviating them early at the start of implementation and then by monitoring them frequently. Contrary to other systems, the IBM system is rather light, low-cost, short, rapid, iterative (with high frequency), and with a feedback loop that collects information directly from beneficiaries and produces short reports on challenges that can be addressed by the project team. It regularly repeats data collection, creating a positive and self-reinforcing cycle of improvement. Given that little information is collected on small samples, its analysis is rapid and inexpensive. It is a mechanism that may help in improving project implementation quickly without needing elaborate, lengthy and costly evaluations.

61. The sub-component will support implementation of a GRM in view of the risks related to governance, fraud, and corruption, especially in the selection of beneficiaries for procurement of goods and works in matching grants' sub-projects.

62. **Local communication and knowledge management for sustainable agricultural development.** This aspect will comprise, among other things: the preparation and implementation of (i) a knowledge management plan; (ii) an internal and external communication plan; (iii) information activities for the target populations to encourage the preparation of quality sub-project and micro-project proposals, and transmission of information on project implementation; (iv) capitalization of technologies (Sudanian AEZ) and project experiences (ownership of innovations emanating from research, dissemination of farmer innovations through adaptive research, use of climate information services; and (v) knowledge sharing with beneficiaries and partners in the project area.

63. This sub-component will finance: (i) costs related to baseline studies and M&E manuals preparation; (ii) setting-up of an M&E system (including the procurement of IT equipment needed for data collection and the softwares); (iii) organization of missions, workshops and meetings for coordination, planning, supervision and evaluation purposes; (iv) capacity building (in M&E, and awarding of contracts) and institutional support for MAIEA; (v) preparation and implementation of a knowledge management plan (approach yet to be developed); and (vi) preparation and implementation of a communication plan (approach yet to be developed).

ANNEX 2: IMPLEMENTATION ARRANGEMENTS

Project Institutional and Implementation Arrangements

64. The project will be implemented under the supervision of the MAIEA. It will be supported by a national NSC, responsible for all projects/programs in the agriculture sector, and chaired by the Ministry's General Secretary, the membership composition and mandate of which will be specified in an MAIEA decree[19], to be issued before the project financing agreement is signed.

65. The MAIEA has created a Project Coordination Department (CCP) through a Ministerial Decree, dated October 5, 2017. The mandates of the CCP are to ensure: (i) the alignment of agricultural projects/programs with national and regional policies and strategies; (ii) development of synergies and collaborative frameworks between agricultural projects/programs funded by different donors; (iii) monitoring the progress of projects/programs by updating the MAIEA's indicators dashboard; (vi) knowledge management and communication on projects and programs achievements; (iv) organization of capacity building activities and exchange of information between different projects/programs; and (v) support for the release of counterpart funds for sector projects/programs.

66. The project will contribute to the CCP's operating costs for an amount not exceeding 10 percent of the costs of the Project Management Component cots to finance expenses eligible for IDA financing. Financial statements of the CCP will be audited annually, based on ToRs and the selection of an auditor acceptable to IDA.

67. The day to day project management and coordination will be under the responsibility of a UCTF.

68. Reporting to the CCP, main functions of UCTF are to: (i) coordinate project implementation and ascertain its relationships with technical departments of the Ministry; (ii) preparation and signing of various memoranda of understanding, agreements and contracts between projects and various partners and service providers; (iii) FM and procurement activities in accordance with the provisions of the Financing Agreement signed between IDA and the Government, and in line with the procurement and FM guidelines; (iv) preparation of ToRs for recruitment and management of the project's staff; (v) preparation of annual work plans, budgets and progress reports, and presentation of these documents to the NSC in relation to the CCP; (vi) daily liaison with all national partners, including communication on agricultural projects/programs funded by the World Bank; and (vii) organization of supervision missions, mid-term and final evaluations of the World Bank agricultural program/projects.

69. Headed by a National Program Coordinator, the UCTF will be staffed as follows: an Internal Auditor, an Administrative and Financial Officer, an Accountant, a Procurement Officer, an Environmental Specialist, a Gender and Social Development Specialist, an M&E and Knowledge Management Officer, and other support staff.

70. **At field level, a RTSU** will be established in *Sarh* for coordination of field activities and follow-up. The RTSU, reporting to the UCTF, will be rather a small organizational unit that will work closely with the regional rural development representations. The RTSU functions are to: (i) ensure and support the implementation of project activities within its specified coverage area; (ii) provide technical and management support to project beneficiaries; (iii) prepare ToRs, and facilitate the selection of service providers; (iv) prepare annual work plans and budgets as well as periodic progress reports; (v) implement the M&E system in collaboration with the rural development representations; (vi) undertake field

[19] See MAIEA Minister Decree n°91/PR/PM/MAIEA/SE//SG/2017 – of October 5, 2017.

activities for follow-up and data transmission to the UCTF; (vii) ensure the compliance of various sub-projects with the operational rules and procedures; and (ix) provide technical support to beneficiaries and service providers.

71. The RTSU will be based in the rural development representation of *Sarh* and will work directly with the three regional rural development representations, decentralized research centers and extension services. A small management team (antenna) will be placed at *Am-Timan* since is almost impossible to travel to the *Salamat* region during the long rainy season. The RTSU will be staffed with a Regional Coordinator, two Technical Experts (one dealing with agriculture production and marketing and the other with CSA/environment/resilience/environment), an M&E Assistant, an Accounting Assistant, a Procurement Assistant, and other support staff. This team will work directly with the regional rural development representations of the targeted regions, ANADER zonal/regional units, and other locally active organizations and projects.

Implementation Arrangements –CORAF (West and Central African Council for Agricultural Research and Development)

72. The project will support Chad's integration into the existing networks of NCoS and ongoing regional cooperation in agriculture. Sub-component A.1 (iii) will be implemented by the CORAF. CORAF is a sub-regional organization, contributing to alleviation of poverty and food insecurity in the Western and Central Africa, enhancing the economic growth generated by agriculture, and improving the agricultural research system in the sub-region. CORAF is the regional implementing entity of the Bank-financed WAPP series of projects (WAAPP-1C (P122065) and WAAPP-2A (P129565) and is also responsible for coordination of the currently under preparation West Africa Agriculture Transformation Program (WAATP-p164810). To this end, a contribution of 1/15th of the value of Component A (US$0.770 million) will be made available to CORAF under a subsidiary agreement to implement activities under the sub-component A.1 (iii).

73. Specifically, CORAF will implement and undertake the following activities:

(i) extension of CORAF's technical networks on strengthening regional cooperation and sharing of experience, knowledge and training to Chad;
(ii) development and implementation of annual communication action plans, based on the regional communication strategy prepared by CORAF, including the networking of knowledge management, information, and communication systems to accelerate the sharing of agricultural technology, tools and best practices;
(iii) support to the GoC in preparing and implementing an action plan to mainstream climate change considerations in AR&D programs;
(iv) support for developing and implementing an action plan to mainstream gender considerations in AR&D programs, based on the gender strategy prepared by CORAF;
(v) expansion of CORAF's regional Competitive Agricultural Research Grant Scheme to the Borrower, and provision of technical assistance for the creation and implementation of a national Competitive Agriculture Research Grant Mechanism.

74. The CORAF shall include Chad's specific activities (addressing the above points) in its annual work plan and budget, and ensure the MAIEA participation in its regional (WAAPP/WAATP) steering committee

meetings. The CORAF will submit individual progress reports to the MAIEA no later than one month after the end of each calendar semester, covering activities of that particular calendar semester.

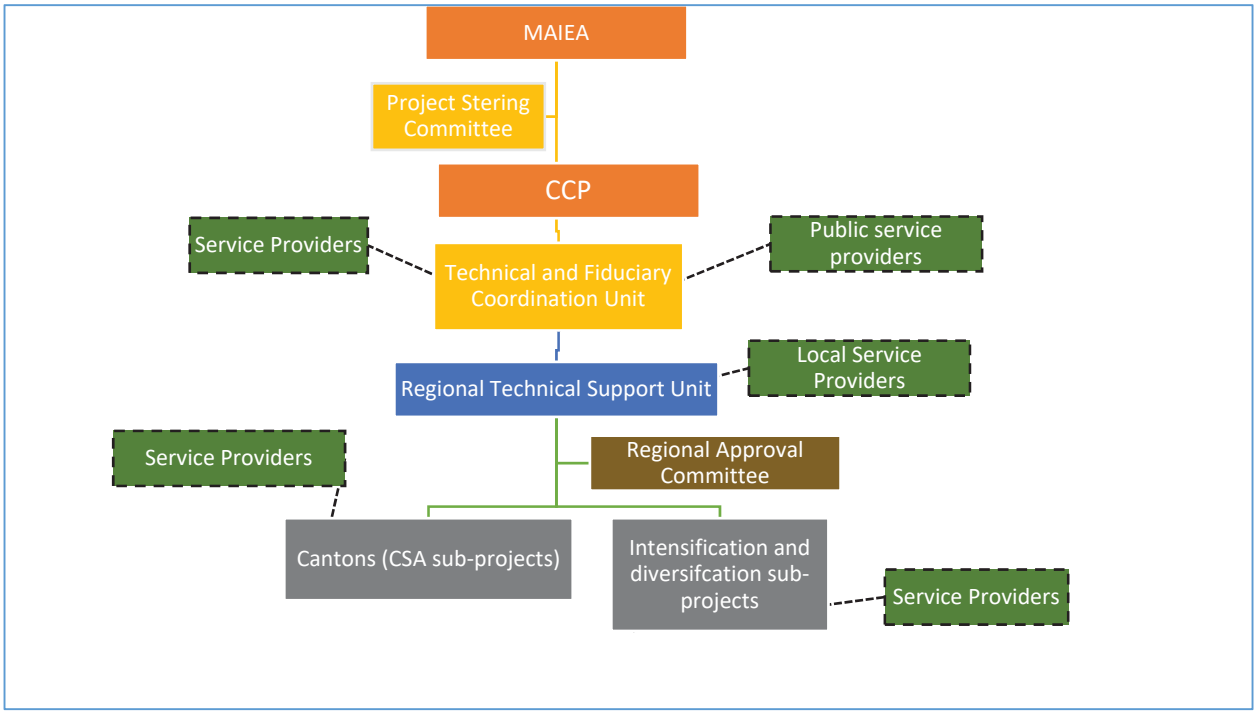
PIM

75. The PIM will be adopted before the project effectiveness, as a compendium of procedures for the project's operational implementation, encompassing the technical, administrative, and fiduciary, M&E, and social and environmental safeguards procedures. It will include detailed ToRs for the entire project UCTF staff.

76. A specific document, "IRM Operations Manual, based on the World Bank's guidelines, will be prepared and adopted within 6 months after project effectiveness.

77. The ProPAD institutional arrangements are presented in Figure 2.2 below:

Figure 2.2: ProPAD Institutional Structure



FM

A) Summary

78. The proposed project will be implemented by MAIEA through a new UCTF yet to be established by a ministerial act, and by CORAF for the part A1.(iii).

79. The MAIEA has recently hosted the IDA-funded Agriculture Production Support Project (P126576, IDA Credit in the amount of US$25.0 million; P131019: TF-14414: US$4.6 million, and TF-14415: US$4.6 million) closed in June 2017, and the IDA-funded Emergency Food and Livestock Crisis Response Project (P151215, IDA Grant H9930: US$18.0 million), closed in December 2017. The fiduciary compliance was deemed satisfactory for the above projects. Final audit for the Agriculture Production Support Project

(P126576 and P131019) has been performed and the audit reports are due on April 30, 2018. In general, the unaudited IFRs were submitted on time, and found acceptable.

80. On the other hand, CORAF is currently managing the regional window of the IDA-financed first phase program in support to the West Africa Agricultural Productivity Program (WAAPP-1C) (P122065) in the amount of US$45.0 million. CORAF has also recently managed some activities of WAAPP – 1 B (P117148), and WAAPP – 2 A (P129565). CORAF has a long-standing relationship with various technical and financial partners. The FM performance was rated as satisfactory for the IDA-financed WAAPP-2A (P129565), WAAPP-1B (P117148), and WAAPP-1C (P122065), following the last supervision mission conducted in November 2017.

81. Given the current lack of a fiduciary team within the MAIEA, the assessment concluded that the MAIEA's FM system is not adequate and does not comply with the World Bank's minimum requirements under World Bank IPF Directive and Policy. Once the proposed mitigation measures and action plans have been implemented, the FM arrangements will satisfy the World Bank's minimum requirements under World Bank IPF Directive and Policy, to provide, with reasonable assurance, accurate and timely information on the status of the project as required by the IDA. The proposed mitigation measures are identified as follows. (i) MAIEA will be reinforced by establishing a new Technical and Fiduciary Coordination Unit (UCTF), which will be staffed with necessary external resources and be responsible for the implementation of the mitigation measures. With respect to CORAF's financial management system, the FM assessment concluded that the fiduciary arrangements of CORAF fully comply with IDA's rules and regulations. However, key actions to be taken to strengthen the FM system of CORAF were also identified.

82. The GoC requested a PPA for, among other things, recruiting key staff including: (i) a FMS; (ii) a Procurement Specialist, (iii) a Monitoring and Evaluation Specialist, and to put in place necessary elements of an FM system (see the mitigation measures proposed below). Thus, subject to the implementation of the plan to strengthen MAIEA with the resources available under the PPA, MAIEA's FM system will meet the World Bank's minimum requirements by the date of project effectiveness. The FM assessment concluded that the FM residual risk for MAIEA is substantial.

83. The conclusion of the assessment was that, due to the proposed mitigation measures and based on the experiences of CORAF in the implementation of IDA funded projects, the FM residual risk for CORAF is moderate. Once the proposed mitigation measures and action plans have been implemented, the FM arrangements will satisfy the World Bank's minimum requirements under World Bank IPF Directive and Policy, to provide, with reasonable assurance, accurate and timely information on the status of the project as required by the IDA. The proposed mitigation measures are identified as follows:

84. **Proposed Mitigation Measures:**

Accounting and Staffing

- *At MAIEA level:* The recruitment, of a qualified FMS on contractual basis as per ToRs to be agreed on with the World Bank. The FMS consultant will ensure day-to-day transactions process and accounting. The recruitment of the FMS will be a condition of the project effectiveness.
- *At CORAF level:* CORAF will, no later than three months after the project effectiveness: (i) identify and assign within its current FM staff an accountant to be dedicated to the project implementation and (ii) will customize its existing TOM2PRO accounting system to fit the needs of the proposed project.

Internal control:

- The project's administrative, financial and accounting procedures manual will be elaborated and adopted by MAIEA within six (6) months of the project effectiveness date. The manual will describe the role and responsibilities of the implementing entity and the beneficiaries, applicable fiduciary procedures, reporting procedures, the funds flow arrangements, and budget management cycle and procedures.
- *At the MAIEA level:* The installation of a multi-project, multi-donor and multi-site version of an appropriate computerized accounting software is required. The staff training on using the system will take place during the preparatory phase and no later than three (3) months after the project effectiveness. Until then, the team will keep records on Excel spreadsheet.

Internal audit

- *At MAIEA level:* no later than three (3) months after the effectiveness date, the Recipient has hired an internal auditor as part of the UCTF.. The internal auditor will develop an annual audit plan using a risk-based approach. He/she will improve the effectiveness and efficiency of the internal control system of the project during its implementation.

External audit

- The audit of annual financial statements of the project components, managed by MAIEA, will be carried out by a reputable auditing firm as per the ToRs to be agreed upon with the World Bank.
- In addition, an annual financial audit of CORAF, as a project implementation agency, will be undertaken. The financial statements will include specific appendices, reporting on the use of funds and the operations made under the subsidiary agreement. The format of these appendices will be agreed upon and attached to the subsidiary agreement.

FM Conditions and FM covenants

a) Establishment of the UCTF by ministerial decree and the recruitment, of a qualified FMS and a Principal Accountant by MAIEA on contractual basis, as condition of the project effectiveness;

b) Recruitment of an accountant and an internal auditor as part of the UCTF within three months of the project effectiveness;

c) Installation of an adequate computerized accounting software for the entity by MAIEA during the preparation, and no later than three months after the project effectiveness;

d) The recruitment of an external auditor by MAIEA to annually audit the project's financial statements according to the ToRs acceptable to the Bank, no later than six months after the project effectiveness;

e) Elaboration and adoption of the project's administrative, financial and accounting procedures manual by MAIEA within six months of the project effectiveness date;

f) Customizing the existing TOM2PRO accounting system within three (3) months of the project effectiveness to handle the project's activities under the responsibility of CORAF;

g) Identification of an assigned accountant by CORAF, to be dedicated to the project implementation within three months of the project effectiveness.

B) Detailed FM Arrangements

Budgeting Arrangements

85. All of the project's transactions will be ring-fenced and, as such, will not go through the Chad Public Accounts. The budgeting process will be clearly defined in the project's administrative, financial and accounting procedures manual, and the budget will be reviewed and adopted by the NSC before beginning of the year, i.e. not later than November 30 each year. Annual budgets adopted by the NSC will be submitted to the World Bank for no-objection before the implementation starts. Budgets should be regularly monitored at all levels. The approved annual budget of the project should be monitored at least quarterly against actual expenditure incurred by MAIEA through its UCTF. The budget variances will be adequately explained and justified through the semi-annual IFRs.

86. For planning and budgeting, CORAF will utilize the same processes and procedures as used in the IDA-financed projects, WAAPP-2A (P129565), WAAPP-1B (P117148), and WAAPP-1C (P122065).

87. The risk associated with budgeting is high before mitigation measures, and is assessed as substantial after mitigation measures.

Accounting and Staffing

88. *Accounting policies and procedures*: The accounting standards, currently in use in West and Central African Francophone countries for ongoing Bank-financed projects, will be applicable[20]. Project accounts will be maintained on an accrual basis, supported by appropriate records and procedures to track commitments and to safeguard assets. Annual financial statements will be prepared by each project implementing agency in accordance with the SYSCOHADA and World Bank requirements. Accounting and control procedures will be documented in the project's administrative, financial and accounting procedures manual.

89. *Accounting staff*: The existing FM staff of MAIEA do not possess extensive experience in dealing with Bank-financed projects. Therefore, an FM Specialist and a Principal Accountant will be hired on competitive basis, specifically for the project needs, and the candidates for these positions will be assessed by the Bank. These key FM staff should be in place before the project's effectiveness date. An Assistant Accountant will be recruited within three months after the project's effectiveness date.

90. The CORAF FM team is comprised of (i) an Administrative and Financial Manager; (ii) an FMS; (iii) an acting Principal Accountant; and five Accountants (WAAPP, USAID, ECOWAS, WEAMU, and IITA). CORAF is currently recruiting a Principal Accountant who is expected to be in place within three months of the project effectiveness. CORAF will identify an accountant within its current FM team, to be dedicated to the project implementation, within three months of the project effectiveness.

91. *Accounting software*: The Borrower should acquire and install within three months of the project effectiveness, a multi-project, multi-donor, and multi-site computerized accounting software, which will

[20] SYSCOHADA: Accounting system used in West and Central Africa French speaking countries.

be capable of recording transactions and reporting project operations, including preparation of withdrawal applications (WAs) and periodic financial reports (IFRs and annual financial statements), in a timely manner.

92. CORAF is currently using TOM2PRO accounting system multi-project, multi-donor multi-site version. CORAF's accounting system will be customized within three months of the project effectiveness to handle the project's activities under the responsibility of CORAF.

93. The risk associated with accounting is substantial before mitigation measures, and is assessed as moderate after mitigation measures.

Internal Controls and Internal Audit

94. *Internal controls systems*: Detailed information on the national level institutional and implementation arrangements including implementation of technical activities, M&E, safeguards implementation, and administrative and fiduciary procedures, will be detailed in the PIM, to be prepared by the UCTF, and to be cleared by the World Bank before the project effectiveness date. The PIM will describe specifically (i) the selection process for beneficiaries, and the role of the Matching Grant Specialist; (ii) the minimum eligibility requirements, i.e. qualified and experienced FM staff, feasibility and usefulness of the operation, financial capacity; (iii) simplified management tools for accounting and reporting purposes; and (iv) external control mechanism. In addition, the NSC will ensure that sufficient staffing arrangements are in place to ensure adequate internal controls, preparation, approval, and recording of transactions as well as segregation of duties.

95. In addition, a Project Manual of Administrative, Finance and Accounting Procedures will be prepared, elaborated and adopted by the national Steering Committee with the Bank's approval within six months after the project's effectiveness date. The Manual of Administrative, Finance and Accounting procedures will be prepared in order to document FM arrangements, including internal controls, budget process, asset safeguards, and to clarify the roles and responsibilities of all stakeholders.

96. *Internal auditing:* An Internal Auditor whose qualifications, experience and ToRs are acceptable to the Association, will be recruited no later than three months after the project's effective date to provide reasonable assurance on the project transactions. The Internal Auditor will develop an annual audit plan following a risk-based approach. He will be responsible for close monitoring of implementation of the action plans, aimed at addressing weaknesses revealed during supervision and audit missions, and will pay special attention to the subprojects mechanism (selection, implementation, reporting).

97. CORAF has an effective internal controller system in place.

98. The risk associated with internal controls is substantial before mitigation measures, and is assessed as substantial after mitigation measures.

Financial Reporting and Monitoring

99. Project management-oriented unaudited IFRs will be used for project monitoring and supervision. The Secretary General of MAIEA will delegate the responsibility for the preparation of consolidated semi-annual reports of the project including the activities implemented by CORAF. This implies that CORAF will submit quarterly IFRs to MAIEA. The IFRs formats were agreed upon and attached to the minutes of negotiations. The reports will be submitted to IDA within forty-five days after the calendar semester-end.

100. The project will also prepare, for information purposes the project's consolidated annual accounts/financial statements including the activities implemented under the responsibility of CORAF, within three months after the end of the accounting year in accordance with the accounting system implemented in the sub-region (SYSCOHADA). The audited financial statements should be submitted to the World Bank within six months after the end of the accounting year.

101. The risk associated with reporting and monitoring is assessed as substantial before mitigation measures and substantial after mitigation measures.

External Audit

102. The project's financial statements will be audited in accordance with auditing standards acceptable to the Bank. Accordingly, as with all the IDA-financed projects in Chad, the Recipient, through the Project Implementation Unit will recruit an independent external auditor acceptable to the World Bank to conduct the audit of the project's accounts in accordance with International Standards on Auditing (ISA) and under ToRs satisfactory to the Bank. Audit report together with the auditor's management letter and management responses, will be submitted to World Bank within six months after closing date of the Recipient's fiscal year. However, no audit report will be required during the PPA period; the audit report to be prepared after the first year of project's implementation, will include the transactions made under the PPA, which has been managed by the PCU of Regional Sahel Pastoralism Support Project (P147674).

103. UCTF will recruit, no later than six months after the effective date of the Financing Agreement, the external auditor referred to in Section 4.09 (b) of the General Conditions in accordance with Section II of the Disbursement and Financial Information Letter (DFIL), and pursuant to ToRs acceptable to the Association.

104. CORAF will have its financial statements audited by an independent auditor with qualifications and experiences satisfactory to the World Bank. CORAF will submit its annual audited financial statements to the Ministry of Agriculture. The World Bank will rely on the comments of the audit reports.

105. The risk associated with reporting and monitoring is assessed as substantial before mitigation measures and substantial after mitigation measures.

Table 2.1: Audit Completion Timetable

Audit Report	Due Date
Project Specific Financial Statements and management letter to be submitted by MAIEA	Submitted within six months after the end of each financial year

106. The risk associated with external audit is considered substantial.

Funds Flow and Disbursement Arrangements

107. *Disbursements arrangements:* The disbursement methods that would be used under this project will be based on the DFIL and the Disbursement Guidelines for Investment Project Financing, dated February 2017. Disbursement methods that are commonly used could be: (a) direct payments to a third party for works, goods and services upon the Borrower's request; (b) special commitments supported by letters of credit; (c) reimbursements for expenditures prepaid from the project or government's own funds; and (d) advance through a Designated Account (DA), etc. Further details about disbursements to

the project will be included in the administrative, financial and accounting procedures manual. Each of the implementing agencies of the project, the UCTF and CORAF, will maintain their respective DAs. If ineligible expenditures are found to have been made from the DA, the Borrower will be obligated to refund the same. If the DA remains inactive for more than six months, the Borrower may be requested to refund to IDA amounts advanced to the DA. IDA will have the right, as reflected in the Financing Agreement, to suspend disbursement of the Funds if reporting requirements are not complied with.

108. *Banking arrangements for MAIEA*: MAIEA, through its UCTF will open one segregated DA denominated in XAF in a commercial bank on terms and conditions acceptable to the World Bank. The project's DA will function under the co-signature of the Project Coordinator and the FMS of the project.

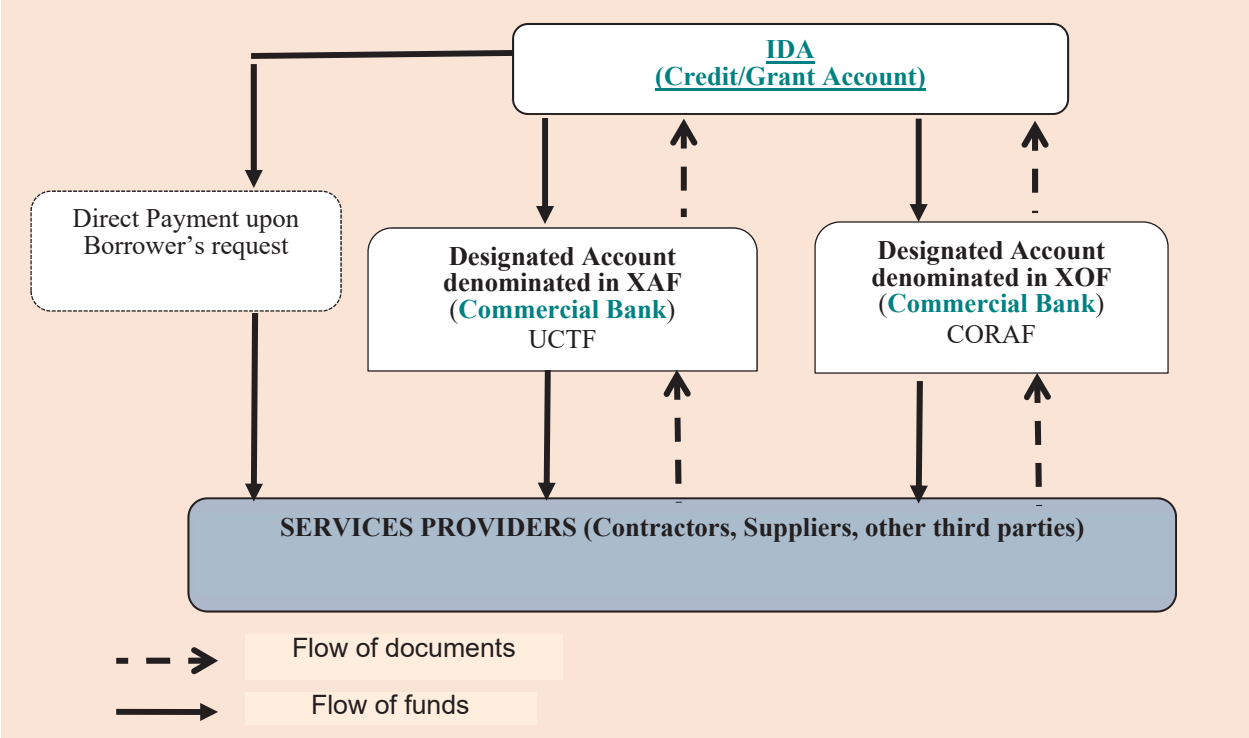
109. *Banking arrangements for CORAF*: CORAF will open one segregated DA denominated in XOF in a commercial bank acceptable to the World Bank and on terms and conditions acceptable to the Bank. The project's DA will function using the same procedures under the IDA financed WAAPP-1C (P122065).

110. *Flow of funds arrangements*: Funds-flow arrangements for the project (through the two DAs above) are as follows:

111. IDA will make an initial advance disbursement into the DAs for the project being implemented by the UCTF and CORAF in Central African CFA franc (XAF) and West African CFA (XOF) respectively, upon receiving a withdrawal application from the respective project implementing agencies.

112. Replenishment of funds from IDA to the two DAs will be made upon evidence of satisfactory utilization of the advance, reflected in the Statement of Expenditures (SOEs) and/or on full documentation for payments above SOEs thresholds. Replenishment applications would be required to be submitted regularly on a monthly basis. Further details about disbursements to the project will be included in the disbursement procedures described in the DFIL.

Figure 2.3: Proposed Flow of Funds



113. The transfer of funds to CORAF will be made quarterly by the GoC using report-based disbursements. After the initial advance to the DA, CORAF will submit to IDA a consolidated IFR for the quarter for the deposit of subsequent advances. The World Bank FMS would thus help ensure that: (i) CORAF's financial situation is on track; and (ii) the consolidated report is acceptable to the World Bank at quarter end, for disbursement purposes. CORAF will provide the GoC with a reporting package including annual activity report, financial statement and audit report, all approved by the General Assembly of CORAF. A provision will be included in the subsidiary project agreement, so that the GoC could suspend or refund its financing contribution in case CORAF doesn't fulfill its duties.

114. The risk associated with Funds-Flow and Disbursement Arrangements is assessed as substantial before mitigation measures and moderate after mitigation measures.

Procurement

115. **Applicable procurement rules and procedures**. Procurement for the project will be carried out in accordance with the World Bank Procurement Regulations for IPF Borrowers (Borrowers Regulations), dated July 2016, and the provisions stipulated in the Financing Agreement. The Borrower will use the World Bank's online procurement planning and tracking tools to prepare, clear and update its Procurement Plans and conduct all procurement transactions.

116. **Institutional arrangement for procurement.** The UCTF (under the CCP supervision), based in the MAIEA, is retained to be responsible for implementation of all fiduciary activities comprising FM and procurement. Based on the current procurement context characterized by the lack of procurement capacity and in order to mitigate the financial risk, the World Bank team agreed with the project

preparation team that the following measures are to be taken; (i) anticipating all procurement activities as indicated in the PPSD and the Procurement Plan; and (ii) closely supervising all procurement activities. These measures will be pursued during the implementation of the project.

117. **CORAF**: Procurement of all goods, works, non-consulting and consulting services required for the implementation of Part A.1(iii) of the project will be procured in accordance with the World Bank Procurement Regulations for IPF Borrowers (Borrowers Regulations), dated July 2016, revised in November 2017, and the provisions stipulated in the Financing Agreement

118. **Procurement risk assessment.** A summary procurement risk assessment of the UCTF in charge of the implementation of procurement activities for the project was carried out; the overall procurement risk rating is high.

119. The risks are associated with the current country situation, delays experienced in the past in the approval of bid evaluation reports, important delays in signing off and approval of contracts, and overall poor management of contracts, even though arrangements were in place at the level of the MAIEA. For CORAF, the main weaknesses identified during the assessment are (i) limited experience of the procurement staff in the World Bank Procurement Regulation; (ii) the tender committee is not trained in the World Bank Procurement Regulation; (iii) the procurement section of the CORAF's procedures manual is not aligned with the new World Bank Procurement Regulation. The following is recommended to ensure that the procurement activities are implemented on time with high quality service: (i) the UCTF will be responsible for all fiduciary activities comprising, notably, the management of all the project's procurement process, including the signing and approval of contracts during implementation; (ii) anticipate the implementation of all procurement activities as indicated in the PPSD and the Procurement Plan; and (iii) the MAIEA to closely supervise all procurement activities. To address the risks identified at CORAF level, the following mitigation measures should be put in place: (a) an update of the procurement section of CORAF's procedures manual in a form and substance acceptable to the World Bank; and (ii) training of the procurement staff to strengthen their capabilities in the World Bank Procurement Regulation. With the implementation of the proposed measures of the action plan and the support of the World Bank team, the overall residual procurement risk should be rated substantial**.**

120. **National Procurement Arrangement**. In accordance with Paragraph 5.3 of the Procurement Regulations, when approaching the national market, as specified in the Procurement Plan tables in Systematic Tracking and Exchanges in Procurement (STEP), the country's own procurement procedures may be used. When the Beneficiary uses its own national open competitive procurement arrangements as set forth in Public Procurement Code, such arrangements will be subject to Paragraph 5.4 of the Procurement Regulations and the following conditions : (i) the procurement is open to eligible firms from any country ; (ii) the request for bids/request for proposal documents will require that Bidders/Proposers submitting Bids/Proposals present a signed acceptance at the time of bidding, to be incorporated in any resulting contracts, confirming application of, and in compliance with, the World Bank's Anti-Corruption Guidelines, including without limitation the Bank's right to sanction and the World Bank's inspection and audit rights; and (iii) maintenance of records of the Procurement Process. When national procurement

arrangements other than national open competitive procurement arrangements are applied by the Beneficiary, such arrangements will be subject to Paragraph 5.5 of the Procurement Regulations.

121. **Procurement methods.** Various procurement methods to be used for activities financed by the proposed Credit will be set in the procurement plan.

122. **Procurement of works.** Procurement of works will include the rehabilitation and/or construction of laboratories; rehabilitation of harvest storage facilities; rehabilitation of water sources, notably canals, wells and boreholes.

123. **Procurement of goods and non-consulting services.** Procurement of goods will include training materials and tools, computer equipment, communication materials, and vehicles.

124. **Procurement of consulting services (firms and individuals).** Procurement of consulting services will be carried out in accordance with the World Bank Procurement Regulation for Investment Project Financing Borrowers. Consulting services also include the services of training, the recruitment of NGOs, consultants (firms) and individual consultants including all the project's staff.

125. **Frequency of procurement supervision.** In addition to the prior review to be carried out by the World Bank, supervision missions will be undertaken at least once a year. One in five procurement packages, not subject to World Bank prior review, will be examined ex post on an annual basis.

126. **Procurement Plan**. The draft Procurement Plan for the first 18 months has been prepared. The Procurement Plan will be updated by the UCTF on an annual or as-needed basis to reflect actual project implementation needs. Updating of the Procurement Plan will be submitted to the World Bank for No Objection, and the PPSD updated accordingly.

127. **Procurement Planning and Tracking Tool**. In accordance with Paragraph 5.9 of the "World Bank Procurement Regulations for IPF Borrowers" (July 2016) ("Procurement Regulations") the Bank's STEP system will be used to prepare, clear and update Procurement Plans and conduct all procurement transactions for the project.

128. **PIM.** The PIM will define the project's internal organization and implementation procedures, and will include: (i) the procedures of calling for bids, selecting consultants, and awarding contracts; (ii) procedures for community-based procurement and sample contracts; (iii) internal organization for supervision and control, including operational guidelines defining the role of the executing agency and reporting requirements; and (iv) disbursement procedures. The PIM comprising the Manual for Administrative, Financial, and Accounting Procedures, prepared for the UCTF, will be updated.

129. **PPSD**. A PPSD was prepared to ensure that procurement activities are packaged and prepared in such a way as to minimize the risk. The PPSD concludes that the environment is favorable for procurement of the activities envisaged under the proposed project. These comprise primarily (i) the smalls works: construction and rehabilitation; (ii) the goods and non-consulting services: vehicles and motorcycles; computers and IT equipment and laboratory equipment; and (iii) consulting services: individual consultants and consulting firms for specific activities. In the latter case, the PPSD makes a distinction between specialized consultants and others.

130. The national market can meet project needs for small works, vehicles and motorcycle, computers, IT equipment, communication equipment, and consulting services. It important to notice that there are many local firms which have capability and competencies to participate in open competition. Also, there

are a few firms with capability to offer vehicles and motorcycles. The procurement process will need to ensure that sufficient attention is paid to the recruitment of individual consultants and firms.

131. The Borrower client will need to actively search in the region for identifying specialized consultants. Some consultants may be identified in the sub-region.

Table 2.2: PPSD Summary Table

Type of contract,	Cost per contract	Prior review by the Bank	Approach	Selection method	Evaluation method
Construction and rehabilitation	Up to US$500,000; Mean contract US$200,000 (medium risk)	No	Competitive	Request for Bid	Least cost
Vehicles and motorcycles	Over US$500,000 Mean contract $200,000 (high risk)	Yes	Competitive	Request for Bid	Least cost
Computers and IT equipment's	Up to US$300,000 Mean contract US$5,000 (low risk)	No	Competitive	Request for Bid	Least cost
Communication Equipment's	Up to US$300,000 Mean contract Us$5,000 (low risk)	No	Competitive	Request for Bid	Least cost
Specialized consultant	Up to US$200,000 Mean contract Us$30,000 (medium risk)	Yes	Competitive	Selection of individual consultants	Scoring of selection criteria
consultants	Up to US$300,000 Mean contract US$100,000 (medium risk)	Yes	Competitive	Consultants Quality and Cost based Selection	Scoring of selection criteria

132. **Procurement Prior review thresholds**: Procurement methods and World Bank review requirements for the procurement are summarized in tables below:

Table 2.3: Procurement Prior review thresholds (US$ millions):

Type of Procurement	High R	Substantial Ri	Moderate Risk	Low Risk
Works (including turnkey, supply & installation of plant and equipment, and PPP)	5	10	15	20
Goods, information technology and Non-Consultin Services	1.5	2	4	6
Consultants: Firms	0.5	1	2	4
Consultants: Individual	0.2	0.3	0.4	0.5

Table 2.4: Thresholds for Procurement Approaches and Methods (US$ thousands):

Works			Goods, IT and Non-Consulting Services			Shortlist of national Consultants	
Open International ≥	Open National <	RfQ ≤	Open International ≥	Open National <	RfQ ≤	Consulting services <	Engineering & construction supervision ≤
10,000	10,000	200	1,000	1,000	100	100	300

86. **The overall procurement risk is rated high.** The main weaknesses identified during the assessment are: (i) the limited experience of the CORAF procurement staff in the World Bank Procurement Regulation for the Investment Project Financing; (ii) the CORAF tender committee is not trained in the World Bank Procurement regulation; (iv) the procurement section of the CORAF's procedures manual does not comply with the World Bank Procurement Regulation. To address the above risks, the following mitigation measures should be taken: (a) update the procurement section of CORAF's procedures manual in a form and substance acceptable to the World Bank; and (ii) provide training to the procurement staff to strengthen their knowledge on the World Bank procurement regulation. With the implementation of the proposed measures in the action plan, and with the expected support of the World Bank team, the residual procurement risk should be rated as **substantial.**

Table 2.5: Action Plan for Strengthening Procurement Capacity

	Keys risk	Mitigation Action	By Whom	When
1	A lack of experience of the procurement staff of the CORAF in the World Bank Procurement Regulation for the Investment Project Financing Borrowers	A workshop will be organized at the beginning of the project to train/update all keys stakeholders involved in procurement following the World Bank procurement regulation	WORLD BANK	No later than three months after the project effectiveness
2	The lack of PIM	Update the Procurement Manual of CORAF as part of the PIM, to include the procurement provisions as described in the World Bank Procurement Regulation	CORAF	No later than three months after the project effectiveness

Monitoring and Evaluation

133. **General characteristics**. The results monitoring framework summarizes: expected results; indicators and related baseline data of outputs and outcomes; milestones; and a timeline for progress. Based on the M&E guidance prepared, the project's M&E system is designed to inform the results monitoring framework. The M&E system will be computerized to provide accurate information to verify progress toward and achievement of results (outputs, outcomes and impacts); support learning from experience; and promote accountability for results.

134. **Results measurement for project performance.** The M&E mechanism will be based primarily on the ProPAD results framework including for the promotion of gender equality and the inclusion of youth at all levels. The project's M&E mechanism will include: (i) quantitative and qualitative baseline surveys (baseline study in year zero) and specific surveys in years three and five; (ii) creation of a tailored and integrated M&E system, fed by local input of data on computer tablets (software integrating a GIS); (iii) tools to integrate internally and in real time the physical and financial execution of the activities of the Annual Work Program and Budget (AWP&B); (iv) bi-annual meetings of the national NSC, quarterly national coordination meetings, and bi-annual meetings with technical and financial partners; (v) annual participatory self-assessment workshops; (vi) joint annual supervision missions; (vii) mid-term internal and external evaluations; and (viii) a final mission including the preparation of a project completion report and a project closure workshop. The regional representations and their local services will participate in data gathering and validation, and the MAIEA will be responsible for their inclusion in the national M&E system.

135. **Learning from experience.** The project will strengthen the links between M&E, knowledge management and strategic communication. The M&E system will support knowledge products and services that will be widely disseminated through a communication channel, using user-friendly communication tools, targeting project beneficiaries.

136. **Accountability for results.** The project M&E system will involve, in addition to the M&E reporting requirement, an accountability mechanism and process (NSC meetings, stakeholder consultations, a mid-

term review). Information-sharing and stakeholder involvement and participation at all stages of the project cycle will be a core component of the project's accountability for results. The project will ensure that stakeholders/beneficiaries have access through various channels to timely, relevant, and unambiguous information about the project's M&E findings, and are able to incorporate their views in the project review and decision-making process.

137. **Gender study.** The GIL will support the Recipient to conduct a gender impact evaluation. The evaluation will assess the impact of one or more sub-interventions aimed at empowering women in agriculture, and generate evidence on how to close the gender gap in earnings, productivity, assets, and employment. These sub-interventions may include the provision of e-vouchers to female farmers for hiring farm labor, interventions to encourage small-scale female entrepreneurs to cross over into higher earning sectors, and increasing female farmers' exposure to role models and gender-informed content through e-extension materials.

138. **Institutional arrangements.** At the national level, the M&E Officer will lead all aspects of M&E, and provide operational tools and instruments for data collection at the regional and local levels. The M&E Officer, to facilitate decision-making process, will collect and validate upstream reports, and monitor information coming from the regional M&E specialists in the RTSUs and from each of the national institutions involved in project activities.

139. **Harmonization and integration with national and sectoral M&E systems.** ProPAD will make consistent efforts to empower national institutions in the M&E of project outcomes, ensuring that the system is strongly linked to the national MAIEA M&E system.

ANNEX 3: IMPLEMENTATION SUPPORT PLAN

Strategy and Approach for Implementation Support

1. The strategy for Implementation Support Plan (ISP) was developed on the basis of the nature and characteristics of the project as well as its risk profile, and as such responds to the complexities of the project in light of the GoC's current capacity for implementation. The objective of implementation support is to ensure that the relevant government agencies implement the project properly. It also ensures that the resources and staff allocated by the World Bank are sufficient to supervise and support this implementation. The strategy basically aims at making the implementation support to the client more flexible and efficient, and therefore focuses on the principal risks identified and the agreed risk mitigation measures to be undertaken as described in the SORT. The ISP ascertains the provision of technical advice needed to facilitate the achievement of the PDOs, and also identifies the minimum requirements to meet the World Bank's fiduciary obligations.

2. Collaboration of the GoC with key stakeholders is the central factor in project implementation. The GoC has developed several key policies and created and/or strengthened national institutions directly linked to agriculture development, agriculture research, agricultural extension and adaptation to climate change. These organizational structures and institutions, whose missions and mandates are clearly defined, will play a major role in project implementation.

3. **Implementation support missions**. One of the biggest implementation challenges identified is the overall low capacity of MAIEA. The supervision strategy, in order to tackle this particular challenge, and to ensure that project resources are used effectively to achieve the PDOs, will use the following instruments to review progress and address implementation issues:

a) *Implementation Support Missions*: The World Bank team will undertake semi-annual implementation support missions to review ProPAD implementation performance and progress towards achieving the PDOs. Given the overall design and scope of the project, a multi-disciplinary team comprising technical fiduciary, environmental, social, and operations specialists will be needed to assist the GoC in implementing the project. Support from technical partners, such as the FAO, CORAF/WECARD will be sought when needed. The first implementation support mission will be fielded as soon as possible after the project's effectiveness to provide start-up support through direct and timely feedback on the quality of implementation plans and their likely soundness and acceptability.

b) *Mid-term review (MTR*): An MTR will be carried out mid-way during the project implementation. It will include a comprehensive assessment of the progress in achieving ProPAD objectives as laid out in the Results Framework. The MTR will also serve as a platform for revisiting design issues that may require adjustments to ensure satisfactory achievement of the PDOs.

c) *Other reviews*: Each year, the World Bank and the Government will determine the need for additional analytical, advisory and knowledge sharing activities. Such reviews will be planned in addition to the semi-annual implementation support missions.

d) *Implementation completion*: At the end of the project, the World Bank will carry out an Implementation Completion Results and Review (ICRR) to assess the success of the project, and draw lessons from its implementation.

4. **Objectives of implementation support missions**. The implementation support and oversight missions would have the joint aim of reviewing the quality of implementation, providing solutions to implementation problems, and assessing the likelihood of achieving the PDOs. More specifically, they will: (i) review implementation progress by component, including institutional development aspects; (ii) provide solutions to implementation problems as they arise; (iii) review with the UCTF the action plan and disbursement programs for the next six months; (iv) review the project's fiduciary aspects, including disbursement and procurement; (v) verify compliance of project activities with the Bank's environmental and social safeguard policies; (vi) review case studies and survey results to measure results indicators to determine progress toward the PDOs against the targets set within the Results Framework, and the quality of implementation; and (vii) review the quality of capacity-building activities, which are crucial for an effective implementation of the program. The missions would combine field visits, field-based focus group discussions and interactive national and regional workshops with stakeholders to get feedback, highlight implementation issues, pick up emerging implementation lessons, and share mission recommendations, including agreements on actions to be taken for moving forward. The missions will also review quarterly/annual reports and various studies conducted.

5. **Technical Assistance**. Implementation support will include technical assistance from the Bank, and possibly other partners for critical aspects of the project, for ensuring proper FM/procurement, and monitoring of social and environmental safeguards. The objective of the technical support would be to help the project teams to internalize good practices and to remove implementation bottlenecks as they are identified during implementation support missions. Technical assistance will include training workshops to develop core resource teams within project implementing units, helping in finalizing manuals, and reviewing and advising on ToRs for required studies and technical backstopping missions.

Implementation support plan

6. **Technical support**. Some of the activities planned under the project are relatively complex from a technical standpoint, especially in terms of ensuring that the activities to be funded actually lead to expected efficiency improvements. In addition to the Bank's core supervision team, the FAO Investment Center, CORAF/WECARD as well as a number of consultants may be mobilized periodically to provide technical assistance to implementing agencies in the form of hands-on training and mentoring.

7. **Focus of support**. The first two years of implementation will require substantial technical support. Thereafter, the focus will change to more routine monitoring of progress, trouble-shooting and assessments based on the Results Framework. The support missions will be complemented by regular short visits by individual specialists to follow up on specific thematic issues as needed.

8. **Financial support**. As part of its project supervision missions, IDA will conduct risk-based FM supervision and implementation support visits, at appropriate intervals. During project implementation, IDA will supervise the project's FM arrangements in the following ways: (a) review the project's quarterly IFRs as well as the project's annual audited financial statements and auditor's management letter, remedial actions recommended in the auditor's Management Letters; (b) during IDA's on-site supervision and implementation support missions, review the following key areas: (i) project accounting and internal control systems; (ii) budgeting and financial planning arrangements; (iii*)* disbursement management and financial flows, including counterpart funds, as applicable; and (iv) any incidences of corrupt practices involving project resources; and (c) joint FM and procurement contract post reviews will be conducted once per year. As required, a World Bank-accredited FMS will assist in the supervision process.

9. The following Table 3.1 contains the ISP, proposed in light of the outcome of the FM risk assessment. The objective of the ISP is to ensure that the project maintains a satisfactory FM system throughout the project's life.

Table 3.1 : FM Implementation Support Plan

FM Activity	Frequency
Desk reviews	
(IFRs review	Semi-annually
Audit report review of the project	Annually
Review of other relevant information such as interim internal control systems reports.	Continuous as they become available
On site visits	
Review of overall operation of the FM system	Semi-annual (Implementation Support Mission)
Monitoring of actions taken on issues highlighted in audit reports, auditors' management letters, internal audit and other reports	As needed
Transaction reviews (if needed)	As needed
Capacity building support	
FM training sessions	During implementation and as and when needed.

10. **Procurement support.** The World Bank will provide implementation support to the Borrower through a combination of prior and ex-post reviews, procurement training to project staff and relevant implementing agencies, and periodic assessment of the project's compliance with the procurement manual. Implementation support missions will be geared toward: (i) reviewing procurement documents; (ii) providing detailed guidance on the World Bank's Procurement Guidelines; and (iii) monitoring procurement progress against the detailed Procurement Plan. Based on the recommendations of the fiduciary assessments of the Implementing Agencies, and in addition to the prior review supervision to be carried out from the World Bank office, the semi-annual supervision missions will include field visits, of which at least one mission will involve ex-post review of procurement activities.

11. **Safeguards**. The World Bank specialists in Social and Environmental Safeguards will have responsibility for supervising safeguard activities. They will conduct supervision of the project's safeguard activities at least once a year, participate in regional meetings to discuss findings, and draft action plans to improve implementation.

12. **Main focus of implementation support**. Table 3.2 below shows main of implementation support activities to be undertaken during the project's implementation, while Table 3.3 indicates the required skill mix.

Table 3.2: Main Implementation Support Activities

Time	Focus	Skills needed
First 12 months	• Project start up • Support to implementation activities (sensitization, council/ community consultations, planning, capacity building, strengthening implementation capacity including M&E) • Guidance on applying safeguard instruments • Development of impact evaluation methodology and oversight of baseline survey • Procurement, FM, M&E and safeguards training of staff at all levels • Establishing coordination mechanisms with complementary project (PRAPS, PACV, etc.)	• TTL+ operation officer+ co-TTL • Agriculture research • Agriculture • Livestock • Extension services • Climate services • FM • Procurement • Environment • Communication • Monitoring and evaluation
12-48 months	• Monitoring implementation performance including progress • Review of annual work plans and disbursement schedule • Review strength of participatory process and capacity building activities • Review quality of quarterly/annual reports, data and various produced studies • Assess quality of implementation process • Assess quality of M&E system (incl. quality of data collected) • Review of audit reports and IFR • Review adequacy of the FM system and compliance with FM covenants • Assess quality of safeguards instruments and their application	• TTL+ operation officer + co-TTL • Agriculture research • • Climate-smart Agriculture • Extension services • Climate services • FM • Procurement • Environment • Communication • Monitoring and evaluation

Table 3.3: Skill Mix required for the Proposed Project (per year)

Skills Needed	Staff Weeks	Number of Trips	Comments
Team leader	20		CO based
Agriculture specialist (Co-TTL)	10	2	Niamey based
Agriculture research and extension specialist	8	2	Consultant
Climate services specialist	4	1	Consultant
Operations officer	4		CO based
Procurement specialist	6		CO based
FM specialist	6		CO based
Environmental safeguards specialist	6	2	Bamako based
Social safeguards specialist	6	2	Bamako based
M&E specialist	4	1	Consultant
Communication specialist	4	1	CO based
Gender specialist	4	1	DC based

A. Role of Development Partners

13. The project was prepared in close collaboration with other development partners, including FAO and bi-lateral donors. These partners will not finance any of the proposed activities, because they have their own complementary operations, but the UCTF within MAIEA will ensure that collaboration and information sharing will occur systematically during implementation of the proposed LDP. Partners will also be invited to join implementation missions when and if they desire. The PCU will encourage the establishment of a task force of development partners involved in the targeted areas, and to meet on a regular basis to monitor the matrix of interventions and action plan.

14. The following Table 3.4 provides additional detail on the development partners cooperating with the ProPAD and the roles they are expected to play.

Table 3.4: Role of Development Partners

Name	Institution	Role
Development partners supporting the agriculture sector	Swiss Cooperation, IsDB, IFAD, AfDB, EU, GIZ	*Development synergies and partnerships*
CORAF/WECARD Experts	CORAF/WECARD	*Technical support for technologies dissemination*
FAO – Investment Center	FAO	*Particpation to project implementation support mission*
World Bank funded project (PRAPS, PACV, etc.)	World Bank Group / GoC	*Ensure synergies and coordination with the proposed Project*

ANNEX 4: ECONOMIC AND FINANCIAL ANALYSIS

1. This annex presents the economic and financial analysis (EFA) of the proposed World Bank-funded Climate Resilience Agriculture and Productivity Enhancement Project in Chad. The evaluation is built on the cost-benefit analysis (CBA) applied to a range of agricultural production models (rain-fed cereals and companion crops) and income-generating activities (storage, processing and small livestock), and it incorporates the estimated benefits resulting from the GHG accounting, using the EX-ACT methodology. Part I of this annex introduces the identification of benefit streams, followed by Part II which describes the methodology and assumptions used for the CBA analysis, Part III summarizes the financial results of the main models. The GHG accounting is presented in Part IV, and finally Part V summarizes the results of the economic analysis, including sensitivity analysis to explore how the results might change under different scenarios.

2. Overall, the operation is projected to be profitable, generating a NPV of US$14.7 million and an economic IRR of 14.2 percent (on a total budget of US$43.6 million), not accounting for environmental benefits. The full potential of the project, if the GHG mitigation is valued at social price, ranges from a NPV of US$68.7 million and an economic IRR of 56.7 percent (for the lower estimate carbon price range) to an NPV of US$129.0 million and an economic IRR of 97.1 percent (for the higher estimate carbon price range). A more conservative estimate, including the GHG mitigation valued at current market prices, indicates that ProPAD could generate a NPV of US$18.2 million and an economic IRR of 22.6 percent. Any of these sets of results is very satisfying, given that the EFA has conservatively estimated the benefits of Component A activities for the entire Sudanian AEZ.

I. Identification of benefits

3. The project activities are expected to generate three main categories of benefits: (i) direct benefits to farmers, such as increased crop yields, increased revenues, enhanced resilience to climate variability and change risks, along with more intangible social benefits such as improved food security and nutrition, human capital strengthening and women empowerment; (ii) community level benefits to farmers' organizations, such as additional income generated through small rural enterprises, along with capacity development; and (iii) environmental benefits, such as natural resources protection and reduced GHG emissions through the use of sustainable technologies. These benefits may be attributed to the activities of Component B (the proposed production sub-projects, including access to improved seeds, and income-generating activities)[21]. It is important to recognize, however, that these are the national-level activities specified in Component A, which are envisaged to generate the enabling environment for successful implementation of the project. They may encourage additional farmers living in the Sudanian AEZ but outside the project area to adopt improved practices and technologies.

4. Productivity gains and additional income generation for the farmers will be realized through four main sources: (i) 2,100 sustainable production sub-projects (each designed for 10 farmers, each with 0.5 ha, thus for a total of 10,500 ha and 21,000 beneficiaries) for which improved seeds, fertilizer and other inputs, as well as extension services will be provided; (ii) support to the production of companion crops (combined with the production sub-projects, designed on 0.25 ha for each farmer, for a total of 5,250 ha (it is subset of the total shown under the first source); (iii) enhanced access to improved seed (covering 10,900 ha for 21,800 beneficiary households); and (iv) spillover effects leading to technology adoption in the rest of the Sudanian AEZ (an estimated additional 7,062 ha). The first three sources will create a

[21] Direct benefits generated by community-based public micro-projects (s/c B.2) still to be evaluated and integrated.

demonstration effect throughout the duration of the project, both by extending the area under improved, sustainable cropping of the target farmers (across the project area, rural households have on average between 1 and 2 ha of cropped land) and by attracting other farmers to apply the technologies and practices promoted by the project.

5. The project is also planning to invest in the creation of small rural enterprises for farmers' organizations/communities for the purposes of income-diversification and value-addition. Organized by groups of 20 beneficiaries each, a total of 360 small enterprises will be supported by business development services, capacity building and the initial investment of US$10,000 (financed 80 percent by the project and 20 percent by the beneficiaries). The types of activities will be decided in the early stages of the project in a competitive manner; the discussions held during the project formulation demonstrated clear interest for storage facilities, small processing units and small livestock. Promising innovations, generated by the WAAPP and WAATP, will be given priority in terms of dissemination and financing.

6. The project is also expected to generate significant environmental benefits through GHG mitigation. In the current analysis, the GHG mitigation would be derived from improved agricultural practices and avoiding deforestation (given integrated fertility management and gradual expansion of the number of cropping cycles, the pressure on farmers to shift to other plots would be reduced), while a small GHG generation would result from additional livestock, use of fertilizers and other investments. Further benefits could be quantified at a later stage, when the proposed CSA interventions are better quantified.

II. Methodology and assumptions

7. This analysis follows the standard methodology recommended by the World Bank**,** as described in Gittinger (1982) and Belli et al. (2001), and is aligned to the recent guidelines for economic and financial analysis. The financial analysis was conducted to assess the profitability of the project activities, proposed from the perspective of the target beneficiaries, and compared with the *without-project* situation (which reflects the current situation and has been considered static for the purpose of the analysis). Crop and activity budgets have been prepared for the main crops, with computed costs and benefits experienced by the beneficiaries with and without the project intervention, using market prices (full list in the Excel file). A total of 11 models have been prepared: eight crop budgets (sorghum, *berbéré*[22] and maize with full support package and improved seed package, groundnut and cowpea) and three income-generating activity budgets (storage facility, small processing unit, and small livestock rearing). The economic analysis followed a similar approach, but using economic prices and aggregating the results at the level of the project, and from the society viewpoint. The economic analysis uses the incremental benefits, adoption rates and expected total number of beneficiaries (aligned to the results framework in Annex 1), adding to that the environmental co-benefits arising from reduced GHG emissions and subtracting the total project economic costs to determine the overall economic viability of the project. The discount rates used are in line with the World Bank guidelines, the practice of recent project and in-country discussions (8 percent for the financial analysis and 6 percent for the economic analysis).

8. The analysis had to include some strong assumptions about the overall mix of benefits, given the difficulty of carrying out economic and financial analysis of community-driven/beneficiary-driven sub-projects. In general, it is difficult to predict the crop choice and the type or uptake of investment activities by the farmers, as well as preferred type of income-generating activities. Nonetheless, the recent

[22] Transplanted sorghum mainly in river flood recession areas.

experience of the World Bank-funded PAPAT project, along with the consultations with stakeholders in the project area, and agricultural statistics allowed plausible assumptions. For the production of rain-fed cereals, the assumption is that on average, sorghum will cover 40 percent of the area, *berbéré* 50 percent and maize 10 percent. For the production of companion crops, it was assumed that groundnuts will be cultivated on 70 percent of the target area and cowpea on the remaining 30 percent of the target area. For the income-generating activities, it was assumed that community groups would opt for 30 percent storage facilities, 30 percent small processing units, and 40 percent small livestock activities.

9. Market prices for the financial analysis were collected on the ground during the formulation mission, and economic prices were estimated using conversion factors designed to reflect prevailing taxes and subsidies. The conversion factors were estimated as follows: 0.9 for imported inputs (like fertilizer and pesticides), 0.85 for local tradeable inputs (given the applicable 18percent VAT rate) and 0.75 for labor given the current market conditions, while for non-tradeable local inputs and for the outputs it has been considered that the economic prices were in line with the market prices. It is important to mention that as accurate information on the use of non-family labor (paid labor) in the total labor requirements was not readily available, the analysis estimated that 75 percent of the labor needs are met by family members (with a day of work valued at 1,000 FCFA), while the remaining 25 percent is contracted outside of the family at a price of 1,500 FCFA (food and other costs included).

10. The WOP and WP parameters for yields, prices, and outputs are presented in Table 4.1 below. Across the models, the analysis assumed gradual uptake of improvements over 3 to 5 years, while the models have been developed over a 10-year period.

Table 4.1: WOP and WP Parameters for Yields, Prices and Outputs

Model	Parameters	Evolution						
		WOP	WP Y1	Y2	Y3	Y4	Y5	Delta
Sorghum	Yield (kg)	800	1080	1120	1160	1200	1200	400
Full package (incl. fertilizers)	Evolution	0%	35%	40%	45%	50%	50%	50%
		WOP	WP Y1	Y2	Y3	Y4	Y5	Delta
Sorghum	Yield (kg)	800	880	920	960	960	960	160
Improved seed only	Evolution	0%	10%	15%	20%	20%	20%	20%
		WOP	WP Y1	Y2	Y3	Y4	Y5	Delta
Berbéré	Yield (kg)	1000	1,250	1,300	1,350	1,400	1,450	450
Full package (incl. fertilizers)	Evolution	0%	25%	30%	35%	40%	45%	45%
		WOP	WP Y1	Y2	Y3	Y4	Y5	Delta
Berbéré	Yield (kg)	1,000	1,100	1,150	1,200	1,200	1,200	200
Improved seed only	Evolution	0%	10%	15%	20%	20%	20%	20%
		WOP	WP Y1	Y2	Y3	Y4	Y5	Delta
Maize	Yield (kg)	900	1260	1305	1350	1395	1395	495
Full package (incl. fertilizers)	Evolution	0%	40%	45%	50%	55%	55%	55%
		WOP	WP Y1	Y2	Y3	Y4	Y5	Delta
Maize	Yield (kg)	900	990	1035	1080	1080	1080	180
Improved seed only	Evolution	0%	10%	15%	20%	20%	20%	20%
		WOP	WP Y1	Y2	Y3	Y4	Y5	Delta
Groundnut	Yield (kg)	1000	1050	1100	1150	1200	1250	250
Improved seed only	Evolution	0%	5%	10%	15%	20%	25%	25%
		WOP	WP Y1	Y2	Y3	Y4	Y5	Delta
Cowpea	Yield (kg)	600	630	660	690	720	750	150
Improved seed only	Evolution	0%	5%	10%	15%	20%	25%	25%
		WOP	WP Y1	Y2	Y3	Y4	Y5	Delta
Storage facility	Quantity	32 t sold @	30 t sold @	30 t sold @	30 t sold @	30 t sold @	30 t sold @	
40 sqm - 32 t	Price	harvest price	price +15%	price +15%	price +15%	price +15%	price +15%	15%
WP: other secondary revenue streams from member fees and temporary storage for non-members								
		WOP	WP Y1	Y2	Y3	Y4	Y5	Delta
Processing unit	Quantity	0	5 bags/day	5 bags/day	5 bags/day	5 bags/day	5 bags/day	
Mixed cereal milling		0	20 days/mth	20 days/mth	20 days/mth	20 days/mth	20 days/mth	
and nuts processing		0	6 mth/year	6 mth/year	7 mth/year	7 mth/year	8 mth/year	
	Price	0	5000	5000	5000	5000	5000	
		WOP	WP Y1	Y2	Y3	Y4	Y5	Delta
Small livestock	Quantity	34 heads	70 heads	70 heads	70 heads	70 heads	70 heads	36
Shelter, vaccination and	Price	market price	+40%	+40%	+40%	+40%	+40%	+40%
limited feeding for fathening								

III. Financial results

11. All of the models assessed as part of this analysis appear viable, generating significant amounts of additional income and attractive returns on the investment (see Table 12 below). For the production models, the additional income generated ranges from 23,575 FCFA/year/ha (US$41) for *berbéré* cropping with improved seeds to 42,988 FCFA/year/ha (US$74) for the maize production using a full package of support. Similarly, improved companion crops have the potential to generate additional income of 79,777 FCFA/year/ha (US$138) for groundnuts and 44,300 FCFA/year/ha (US$76) for cowpea. The income-generating activities have very positive internal rates of return of 27-29 percent, when compared with the 8 percent benchmark. Overall, all models indicate positive NPVs and cost-benefit ratios higher than one.

Table 4.2: Summary of the Profitability Indicators for the Financial Models

Summary of the profitability indicators for the financial models											
	Dry cereals						Companion crops		Income generating activities		
Model	Sorghum (FM)	Sorghum (SM)	Berbéré (FM)	Berbéré (SM)	Maize (FM)	Maize (SM)	Groundnut	Cowpea	Storage	Processing	Livestock
Additional income (FCFA	36,025	26,650	38,688	23,575	42,988	42,650	79,777	44,300	N/A	N/A	N/A
Discount rate	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
NPV @ 0.08 (FCFA	161,053	142,185	179,915	120,642	222,928	238,349	361,326	218,048	2,081,179	4,741,954	1,777,006
NPV @ 0.08 (USD)	278	245	310	208	384	411	623	376	3,588	8,176	3,064
IRR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	27%	29%	27%
NPVb	1,097,690	886,663	1,627,447	1,385,412	1,596,469	1,246,871	3,779,898	1,671,113	40,111,288	24,292,630	11,507,790
NPVc	1,042,489	850,330	1,290,265	1,107,502	1,391,407	1,026,387	1,585,162	848,655	38,030,110	19,550,676	6,946,100
B/C ratio	1.05	1.04	1.26	1.25	1.15	1.21	2.38	1.97	1.05	1.24	1.66
Switching values Benefits	-5%	-4%	-21%	-20%	-13%	-18%	-58%	-49%	-5%	-20%	-40%
Switching values Costs	5%	4%	26%	25%	15%	21%	138%	97%	5%	24%	66%

FM = Full support package model
SM = Improved seed support package model

IV. Greenhouse gas (GHG) accounting

12. The environmental externalities of the project were estimated using the EX-ACT tool, developed by FAO, to provide estimations of the impact of AFOLU (agriculture, forestry and other land use) projects and policies on the carbon balance. The carbon balance is defined as the net balance across all GHGs expressed in CO_2 equivalents (CO_2e) that will be emitted or sequestered due to project implementation (WP), as compared to a business-as-usual scenario (WOP). EX-ACT is a land-based accounting system, estimating CO_2e stock changes (i.e. emissions or sinks of CO_2) expressed in equivalent tons of CO_2 per hectare and year. The tool was designed using mostly data from the IPPCC Guidelines for National Greenhouse Gas Inventories (NGGI-IPCC, 2006), which furnishes EX-ACT with recognized default values for emission factors and carbon values in soils and biomass (the so-called "Tier 1 level" of precision).

13. For ProPAD, the GHG accounting calculations were based on characteristics in the Sudanian AEZ in Chad (sub-humid tropical climatic conditions with sandy soils) and the land use and crop management practices for WP and WOP situations. The changes expected to result from the project were included in the tool's different modules (in full alignment with the EFA assumptions and budget provisions), and include:

(i) improved crop productivity and production with less GHG emissions on a total of 36,947 ha under different crops (resulting from improved agronomic practices, nutrient management and manure application, adoption of improved seeds, etc. in Component B);

(ii) gradual land use change, given that without the project a total of 267,807 ha of tropical shrub land would likely be deforested, while with the project only 254,076 ha would be deforested, resulting in a positive balance of 13,731 ha of avoided deforestation (as a result of less burning of forest to access new agricultural land, given the Component B support to soil fertility and productivity enhancement);

(iii) further avoided deforestation of about 1,500 ha of tropical dry forest (as a result of the CSA activities in sub-component B3);

(iv) the afforestation/reforestation with tropical dry forest of about 750 ha of degraded land (as a result of the CSA activities in sub-component B3);

(v) a small increase in livestock population (resulting from expected small livestock enterprises, supported in sub-component B2); and

(vi) additional use of fertilizer and other investments and inputs (resulting from all activities of Component B).

14. The carbon balance results are positive and significant, with ProPAD's activities leading to a total reduction in CO_2 emissions of 4.26 million tons over a period of 20 years starting from project implementation. Per year, the mitigation potential is roughly -213,068 tons of CO_2-e, or -0.7 tons of CO_2e per hectare (the summary table of results is attached at the end of this analysis, and Excel results are made available together with the EFA). Assigning an economic value to this mitigation potential is a complex task. According to the World Bank Guidance Note on the Social Value of Carbon (2014), the value of carbon can be derived from three different measures: (i) the social cost of carbon; (ii) the marginal abatement costs; and (iii) the carbon market prices. The social cost of carbon attempts to capture the marginal global damage (cost) of an additional unit of CO_2e emitted. The recent draft Guidance Note on Shadow Price of Carbon in Economic Analysis (September 2017) recommends "projects' economic analysis use a low and high estimate of the carbon price starting at US$40 and 80 respectively, in 2020 and increasing to US$50 and 100 by 2030". Marginal abatement costs are designed to reflect the carbon price necessary to achieve various climate change targets. Carbon market prices are the market value of CO_2 emission reductions or sequestration (offsets) that are registered and sold through various market structures. Carbon market prices currently average US$8 per ton. Following the World Bank guidelines, this analysis presents three scenarios (in addition to the baseline one without the environmental benefits): using the low and high range social cost of carbon and at market prices.

V. Economic results

15. The overall benefits of the project were estimated using the economic results of the models and of the carbon balance, against the economic project costs and including adoption and phasing rates. The analysis, developed over 20 years, assumed an adoption rate of 75 percent for the production sub-projects and 90 percent for the income-generating activities. The adoption rate for crop production is also reflected in the carbon balance calculations. Project financial costs were converted into economic costs in Costab, by removing the effects of inflation and transfer payments (i.e. taxes and subsidies). In addition, costs already included in the models were removed from Costab to avoid double-counting.

16. Under these assumptions, the project is projected to be profitable under all scenarios, without and with valuation of environmental benefits (on a budget of US$43.6 million). The scenario without the valuation of environmental benefits is considered the baseline scenario; in this scenario, the NPV is estimated to be US$14.7 million, and the economic IRR is estimated to be 14.2 percent. With environmental valuation at market prices, the project is expected to generate a NPV of US$32.4 million and an economic IRR of 22.6 percent. Including the GHG mitigation valued at the low estimate range (on average, US$49 /t|$CO_2$), ProPAD could generate a NPV of US$68.7 million and an economic IRR of 56.7 percent. With environmental benefits valued at the high estimate range (on average, US$98 /t$CO_2$), the project's results would be an NPV of US$129.0 million and an economic IRR of 97.1 percent. These four scenarios are summarized in Table 4.3 below.

Table 4.3: Scenarios of Valuation of Environmental Benefits

Indicators	A) Results excl. ENV benefits	B) Results incl. ENV benefits, valued @ market cost (8 USD/tCO2e)	C) Results incl. ENV benefits, valued @ low estimate range (average 49 USD/tCO2e)	D) Results incl. ENV benefits, valued @ high estimate range (average 98 USD/tCO2e)
NPV NAB (FCFA, @6%)	8,221,072,050	18,153,370,725	68,717,732,701	129,045,804,005
NPV NAB (USD, @6%)	14,680,486	32,416,733	122,710,237	230,438,936
ERR	14.2%	22.6%	56.7%	97.1%
NPVb (USD, @6%)	40,679,234	58,415,481	148,708,985	256,437,684
NPVc (USD, @6%)	25,998,748	25,998,748	25,998,748	18,554,777
B/C ratio	1.56	2.25	5.72	13.82
Discount rate	6%	6%	6%	6%
Switching values - Benefits	-36%	-55%	-83%	-93%
Switching values - Costs	56%	125%	472%	1282%

17. This EFA has considered only the direct benefits resulting from the Component B – Demand-driven adoption of sustainable technologies, and some conservative indirect benefits generated by the national-level Component A for the entire Sudanian AEZ of Chad. However, in view of the project's support to agricultural research and development (AR&D) system in Chad, coupled with the contribution to the newly created ANADER for better and more comprehensive delivery of extension and advisory services to farmers, with the linkages to the WAAPP/WAATP ecosystem and with other projects in the southern regions of Chad, are expected to significantly surpass these benefit estimates.

18. Sensitivity analysis shows that the baseline results are robust under most scenarios. The robustness of these results was explored by testing the effects of changes in several critical parameters: (i) reduced project benefits; (ii) increased project costs; (iii) delayed project benefits; (iv) decreased output prices; (v) increased input prices; and (vi) reduced adoption rate. The findings are summarized in Table 4.4 below.

Table 4.4: Sensitivity Analysis

Sensitivity Analysis

Base scenario		14.2%	14,680,486
costs +	10%	12.3%	12,080,611
costs +	20%	10.7%	9,480,736
costs +	50%	6.7%	1,681,112
benefits +	10%	16.1%	18,748,409
benefits +	20%	17.9%	22,816,333
benefits +	30%	19.6%	26,884,256
benefits -	10%	12.1%	10,612,562
benefits -	20%	10.0%	6,544,639
benefits -	30%	5.9%	-123,159
benefits delayed by 1 year		11.6%	10,992,669
benefits delayed by 2 years		9.6%	7,513,596
benefits delayed by 3 years		8.0%	4,231,453
benefits delayed by 4 years		6.5%	1,135,091
production price -	10%	5.7%	-440,988
production price -	20%	-9.5%	-15,562,463
input price +	10%	12.5%	11,365,971
input price +	20%	10.7%	8,051,457
adoption rate -	10%	12.4%	11,172,483
adoption rate -	20%	10.6%	7,664,480

Table 4.5: The Carbon Balance of ProPAD's Activities Over a Period of 20 Years (EX-ACT Output)

ProPAD		**Climate**	*Tropical (Dry)*					**Duration of the Project (Years)**	*20*	
Africa		**Dominant Regional Soil Type**	*Sandy Soils*					**Total area (ha)**	*319320*	
Gross fluxes			**Share per GHG of the Balance**					**Result per year**		
Without	**With**	**Balance**	**All GHG in tCO2eq**					**Without**	**With**	**Balance**
All GHG in tCO2eq			**CO_2**			**N_2O**	**CH_4**			
Positive = source / negative = sink			**Biomass**	**Soil**	**Other**					
			CO2-Biomas	CO2-Soil	CO2-Other	N2O	CH_4			
55,542,949	52,317,400	-3,225,550	-2,640,645	-636,237		-3,095	0	2,777,147	2,615,870	-161,277
0	-141,950	-141,950	-91,972	-49,978		0	0	0	-7,097	-7,097
0	0	0	0	0		0	0	0	0	0
0	-995,718	-995,718	0	-995,718		0	0	0	-49,786	-49,786
0	0	0	0	0		0	0	0	0	0
0	0	0	0	0		0	0	0	0	0
0	0	0	0	0		0	0	0	0	0
0	5,474	5,474				3,032	2,443	0	274	274
0	0	0	0	0		0	0	0	0	0
0	0	0	0	0		0	0	0	0	0
25,814	122,190	96,376			60,113	27,406	0	1,291	6,110	4,819
0	0	0			0	0	0	0	0	0
55,568,764	51,307,396	**-4,261,368**	-2,732,617	-1,681,933	60,113	27,343	2,443	2,778,438	2,565,370	-213,068
174	161	-13	-8.4	-5.3	0.2	0.1	0.0			
8.7	8.0	-0.7	-0.4	-0.3	0.0	0.0	0.0	8.7	8.0	-0.7