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IDA/R2019-0214/1

June 12, 2019

Closing Date: Monday, July 1, 2019
at 6:00 p.m.

FROM: Vice President and Corporate Secretary

Benin – Digital Rural Transformation Project

Project Appraisal Document

Attached is the Project Appraisal Document regarding a proposed credit to Benin for a Digital Rural Transformation Project (IDA/R2019-0214/1), which is being processed on an absence-of-objection basis.

Distribution:
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Bank Group Senior Management
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Document of

The World Bank

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Report No: PAD2661

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF EURO 89.2 MILLION
(US$100 MILLION EQUIVALENT)

TO THE

REPUBLIC OF BENIN

FOR THE

DIGITAL RURAL TRANSFORMATION PROJECT

June 10, 2019

Digital Development Global Practice
Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2019)

Currency Unit =	CFA Franc
Euro 0.89190 =	US$1
US$ 1. 1212 =	Euro 1

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Hafez Ghanem
Country Director:	Pierre Frank Laporte
Global Practice Director:	Boutheina Guermazi
Practice Manager:	Michel Rogy
Task Team Leaders:	Marc Lixi, Erick Abiassi, Fatou Fadika

ABBREVIATIONS AND ACRONYMS

ABSU-CEP	Universal Telecommunications Service National Agency *(Agence Béninoise du Service Universel des Communications Electroniques et de la Poste*)
ADC	Alternative Delivery Channel
ADN	Digital Development Agency of Benin *(Agence pour le Développement du Numérique*)
AFD	French Development Agency *(Agence Française de Développement)*
AI	Artificial Intelligence
AML/CFT	Anti-Money Laundering/Countering the Financing of Terrorism
APDP	Data Protection Agency *(Autorité de Protection des Données à Caractère Personnel)*
ARPU	Average Revenue Per User
ARCEP	Telecommunications Regulatory Authority of Benin *(Autorité de Régulation des Communications Electroniques et de la Poste)*
ASSI	Information Services and Systems Agency of Benin *(Agence des Services et Systèmes d'Informations)*
ATDA	Territorial Agency for Agricultural Development *(Agence Territoriale de Développement Agricole)*
AWPB	Annual Work Plan and Budget
BCEAO	Central Bank of West African States *(Banque Centrale des États de l'Afrique de l'Ouest)*
CAA	Autonomous depreciation fund *(Caisse Autonome d'Amortissement)*
CAPEX	Capital Expenditure
CDMA	Code-division multiple access
CEA	Cost Effectiveness Analysis
CEI	Cost Effectiveness Indicator
CNIL	National Commission for IT and Freedoms *(Commission Nationale de l'Informatique et des Libertés)*
CNRA	National Center for Agronomic Research *(Centre National de Recherche Agronomique)*
CPF	Country Partnership Framework
CSA	Agriculture Service Center (*Centre de Service Agricole*)
DA	Designated Account
DAF	Directorate of Administration and Finance
DE4A	Digital Economy for Africa (Digital Moonshot)
DBI	Doing Business Index
DFIL	Disbursement and Financial Information Letter
ECOWAP	Economic Community of West Africa Agriculture Program
ECOWAS	Economic Community of West African States
EHS / OHS	Environment/Occupational, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FAO	Food and Agriculture Organization of the United Nations
FI	Financial Institutions
FIRCA	Interprofessional Fund for Research and Agricultural Council *(Fonds Interprofessionnel pour la Recherche et le Conseil Agricole)*
FM	Financial Management
FNM	National Microfinance Funds *(Fonds National de la Microfinance)*

FRR	Financial Rate of Return
FY	Fiscal Year
GBV	Gender-based Violence
GDP	Gross Domestic Product
GIL	Gender Innovation Lab
GPFI	Global Partnership for Financial Inclusion
GRM	Grievance Redress Mechanisms
GRS	Grievance Redress Service
GSMA	Global System for Mobile communications Association
ha	Acre (*hectare*)
IBRD	International Bank for Reconstruction and Development
ICT	Information and Communication Technology
IDA	International Development Association
IFC	International Finance Corporation
IFAD	International Fund for Agriculture Development
IFRs	Interim Financial Statements
IGF	General Inspectorate of Finance *(Inspection Générale des Finances)*
INSEA	National Statistical Agency *(Institut National de la Statistique et de l'Analyse Economique)*
IoT	Internet of Things
IPF	Investment Project Financing
KYC	Know Your Customer
LDC	Least developed countries
LiM	Labor-intensive Method
M&E	Monitoring and Evaluation
MAEP	Ministry of Agriculture and Fisheries *(Ministère de l'Agriculture, de l'Elevage de la Pêche)*
MCM	Mobile Micro-Credit *(Micro-credit mobile)*
MEF	Ministry of the Economy and Finance *(Ministère de l'Economie et des Finances*
MFD	Maximizing Financing for Development
MENC	Ministry of Communication and Digital Economy *(Ministère de l'Economie Numérique et de la Communication)*
MFI	Microfinance Institution
MIS	Management Information System
MNO	Mobile Network Operator
MOD	Delegated Management Contract *(Maîtrise d'Ouvrage Déléguée*)
NGO	Non-governmental organization
NPF	New Procurement Framework
NPV	Net Present Value
NRA	National Regulatory Authority
NRI	Network Readiness Index
NSRM	National Strategy for Rehabilitation and Maintenance
OCRC	Central Office for the Suppression of Cybercrime *(Office central de répression de la cybercriminalité)*

OP / BP	Operational Policy / Bank Policy
PA	Project Account
PAG	Government Action Plan *(Programme d'Actions du Gouvernement)*
PADA	Agriculture Sector Support Project *(Projet d'Appui à la Diversification Agricole)*
PDO	Project Development Objective
PEFA	Public Expenditure and Financial Assessments
PIM	Project Implementation Manual
PIMA	Public Investment Management Assessment
PIU	Project Implementation Unit
PFM	Public Financial Management
PFR	Rural Land Plan *(Plan Foncier Rural*)
PPA	Preparatory Project Advanced
PfPPP	People-first Public Private Partnership
PPP	Public Private Partnership
PPSD	Project Procurement Strategy for Development
PSW	Private Sector Window
RAF	Finance officer *(Responsable Administratif et Financier)*
RAP	Resettlement Action Plan
RC	Rural Communities
RED	Road Economic Decision model
REOIs	Requests for Expressions of Interest
RPF	Resettlement Policy Framework
SCD	Systematic Country Diagnostics
SDG	Sustainable Development Goal
SMEs	Small and Medium Enterprises
SMS	Short Message Service
SoE	Statement of Expenditures
SPN	Specific Procurement Notices
SSA	Sub-Saharan Africa
TA	Technical Assistance
TIC	Information and Communication Technology *(Technologie de l'Information et de la Communication*)
ToR	Terms of Reference
UCS	Use of Country System
VAT	Value-added Tax
VfM	Value for Money
WAAPP	West Africa Agricultural Productivity Program
WAEMU	West African Economic and Monetary Union
WARCIP	Western Africa Regional Communications Infrastructure project
WSIS	World Summit on the Information Society

BASIC INFORMATION

Country(ies)	Project Name	
Benin	Digital Rural Transformation Project	
Project ID	Financing Instrument	Environmental Assessment Category
P162599	Investment Project Financing	B-Partial Assessment

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Disbursement-linked Indicators (DLIs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	

Expected Approval Date	Expected Closing Date
01-Jul-2019	31-Jul-2024

Bank/IFC Collaboration

No

Proposed Development Objective(s)

To improve access to broadband services in targeted rural communities and promote the use of digital solutions to improve efficiency of selected value-chains, financial inclusion and access to markets.

Components

Component Name	Cost (US$, millions)
Extending connectivity in rural areas	45.00

Digital financial inclusion and skills	16.00
Digital solutions for rural development	10.00
Access to markets	20.00
Project implementation	9.00

Organizations

Borrower:	Republic of Benin
Implementing Agency:	Ministère de l'Economie Numérique et de la Communication

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	100.00
Total Financing	100.00
of which IBRD/IDA	100.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Development Association (IDA)	100.00
IDA Credit	100.00

IDA Resources (in US$, Millions)

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
National PBA	100.00	0.00	0.00	100.00
Total	**100.00**	**0.00**	**0.00**	**100.00**

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2020	2021	2022	2023	2024	2025

Annual	8.34	18.06	24.97	25.24	23.39	0.00
Cumulative	8.34	26.40	51.37	76.61	100.00	100.00

INSTITUTIONAL DATA

Practice Area (Lead)

Digital Development

Contributing Practice Areas

Agriculture, Finance, Competitiveness and Innovation, Transport

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	Substantial
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Moderate
6. Fiduciary	Substantial
7. Environment and Social	Substantial

8. Stakeholders	Moderate
9. Other	Substantial
10. Overall	Substantial

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	✓	
Performance Standards for Private Sector Activities OP/BP 4.03		✓
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

Schedule 2. Section I.A. Paragraph 5: the Recipient shall not later than three (3) months after the Effective Date, (i) acquire, install and customize a computerized accounting software for the Project, satisfactory to the Association; (ii) recruit for the Project: (A) a financial management specialist; (B) an accountant; (C) an internal auditor, and (D) a procurement specialist; all with qualifications and experience satisfactory to the Association; (iii) nominate a

representative in charge of procurement within MENC, satisfactory to the Association; and (iv) establish a procurement control unit for the Project.

Sections and Description

Schedule 2. Section I.A. Paragraph 5: the Recipient shall not later than six (6) months after the Effective Date, appoint in accordance with the Procurement Regulations an external auditor, with terms of reference acceptable to the Association.

Sections and Description

Schedule 2. Section I.B. Paragraph 1: the Recipient, through the PIU, shall: (i) adopt not later than one (1) month after the Effective Date or at a later date agreed upon with the Association, and thereafter maintain the Project Implementation Manual, under terms and conditions satisfactory to the Association.

Conditions

Type	Description
Disbursement	Schedule 2. Section III.B. Paragraph 1: no withdrawal shall be made under Category (2) of the Financing Agreement, until and unless the Operations Manual has been adopted and satisfies the requirements set forth in Section I.C. of Schedule 2 to the Financing Agreement.
Disbursement	Schedule 2. Section III.B. Paragraph 1: no withdrawal shall be made under Category (3) of the Financing Agreement, until and unless the section of the PIM relating to Sub-Grants has been approved pursuant to Section I.B. of Schedule 2 to the Financing Agreement.

BENIN
DIGITAL RURAL TRANSFORMATION

TABLE OF CONTENTS

I. STRATEGIC CONTEXT

A. Country Context

1. **Benin is a low-income economy which has made significant progress economically and politically over the last 25 years.** With a population of 11.2 million, Benin's Gross National Income per capita (Atlas method) was US$800 in 2017, well below the Sub-Saharan Africa (SSA) regional average (US$1,454). Fifty two percent of its people lives in urban areas, and the population and the economy are mostly concentrated in the southern parts of the country, close to the sea and the biggest cities of Cotonou, the economic capital, and Porto-Novo, the political capital. The economy of Benin remains dependent on subsistence agriculture, cotton production, and regional trade**.** The country's recent enhanced growth performance has been supported by the Port of Cotonou, a vital regional trade hub with access to the interior of West Africa.

2. **However, economic growth since 2011 has been too low to achieve meaningful poverty reduction**. According to the National Statistical Agency (INSAE), the national poverty headcount (US$1.25/day) actually increased from 37.5 percent in 2006 to 40.1 percent in 2015. In addition, the significant demographic growth over the past years and the low and non-inclusive pattern of growth have hindered the country's efforts to curb persistent poverty. Benin did not meet most of the Millennium Development Goals (MDGs) by 2015, including targets on universal primary education, gender equality, child mortality, maternal health and global partnership for development[1]. Benin is considered a low human development country, ranking 163rd out of 188 countries on the Human Development Index[2].

3. **The widening differences between urban and rural development hinders the achievement of shared prosperity and poverty elimination.** Significant disparities in poverty rates exist between urban areas (36 percent) and rural areas (44 percent)[3]. Approximately 65 percent of all poor reside in rural areas. Rural populations suffer from inadequate infrastructure: only 15 percent of the rural population has access to electricity compared to 68 percent of the urban population; while 72 percent of the rural population has access to potable water compared to 85 percent for the urban population. Rural communities are also more vulnerable to climate and environmental disasters. For example, the floods in 2010 affected the poverty rates in four departments (Couffo, Collines, Mono and Zou) where the poverty rates between 2009 and 2011 increased to alarming levels, at least 5 percent above the national average of 36 percent.

4. **Low and stagnant productivity in the agriculture sector explains the limited poverty reduction in rural areas**. Most rural poor are smallholder farmers, cultivating maize and yam for their own consumption and for sale and cotton, palm oil, fruits and vegetables as cash crops. Farming typically happens under rain-fed conditions using traditional means of production, like the hoe or oxen. Only 20 percent of the country's arable land is currently in use, so agricultural Gross Domestic Product (GDP) growth has been the result

[1] UNSD, MDG Indicators (indicator availability varies by year).
[2] UNDP, Human development index report, 2018.
[3] INSAE, *Evaluation de la pauvreté au Benin,* 2014. Nb. Official poverty lines in Benin are commune-specific and are divided between urban and rural areas, which limits the comparability of data

of acreage expansion and increased labor effort as opposed to increases in productivity due to the use of improved inputs and technologies.

5. **A priority of the current government is to address governance issues that have impeded development progress in the past, but Northern Benin appears increasingly at risk of experiencing violence that could thwart the Government's efforts**. President Patrice Talon was elected for a five-year term beginning in April 2016. Political transfer of power has occurred without incident and the effective separation of powers has enabled both parliament and the judiciary to act as a check on executive powers. Despite these positive outcomes, a growing body of reporting suggests violent extremist groups are present in some of the West African state's more remote areas. Although Benin does not have a history of homegrown violent militancy, recent sociocultural and security developments in the northern part of the country have created conditions more conducive to extremist activity.

6. **The Government of Benin (GoB) outlined its objectives for inclusive growth and poverty reduction in its Government Action Plan 2016-2021 (*Programme d'Actions du Gouvernement, or PAG*).** The PAG is premised on the 2030 Agenda and outlines a three-pronged approach: (i) consolidation of democracy, the rule of law and good governance; (ii) structural transformation of the economy; and (iii) improved social well-being. The government launched several new investment initiatives to boost growth.[4] These aim to increase the efficiency of public investment and state-owned enterprises, improve production capacity in the agriculture sector, develop the tourism sector and ensure access to water and electricity. However, financial constraints, a fragmented legislature and weak underlying administration capacities mean that progress on reforms and controversial restructurings may continue to be sluggish.

B. Sectoral and Institutional Context

Rural economy and rural agriculture

7. **The rural economy of Benin is mainly based on agriculture, and regional trade supported by the Port of Cotonou, a vital regional trade hub**. Agriculture[5], which is the most important sector in terms of contribution to national GDP (23 percent of GDP) provides 70 percent of the country's employment, and accounts for 75 to 90 percent of official exports[6]. Most of the farms are small to medium sized family properties. Their number was estimated to be about 550,000 in 2011, with an average area of 1.7 hectares (ha)[7].

8. **Agricultural growth is typically around 3 percent annually, often offset by the relatively high population growth (3 percent).** Cotton is the primary export commodity with 44 percent of official exports in 2014[8], followed by fruits (except nuts) which represent 19 percent` of national exports, or an equivalent of 43,705 million FCFA. Cotton production and transformation have faced many challenges which undermine its profitability and contribution to sectoral growth over the past years.

9. **The rural economy, and especially agriculture, suffers from low-productivity due to five main constraints: (i) enabling environment; (ii) access to finance; (iii) skills and technology; (iv) access to markets; and (v) access to land**:

[4] Economist Intelligence Unit, Benin Country Report, 2017.
[5] "Agriculture" here includes agriculture, animal husbandry, fishing, forest, and agribusiness.
[6] Republic of Benin, INSAE, 2014.
[7] Republic of Benin, MAEP, *Plan Stratégique de Développement du Secteur Agricole (PSDSA),* 2017.
[8] Republic of Benin, INSAE, *Echanges extérieurs au Benin*, 2014.

- **Gap #1: Lack of an enabling environment and lack of accurate relevant data –** The agriculture sector suffers from the absence of coherent policies and related certification norms and processes. The environment of the sector is characterized by low productivity and high levels of informality which impacts workers in terms of lower wages, job insecurity, and economic uncertainty. This manifests in:

    (i) **A gap in access to knowledge**, as most producers are not aware of techniques to master water, adapt to climate change effects, and produce good quality inputs. The high level of illiteracy and the decrease of the number of agricultural extension workers impact the ability of the farmer to learn and apply the best methods to increase production efficiently, in a safe and sustainable way. An example of this is the degradation of soil fertility because of the use of inadequate farming techniques.

    (ii) **A gap in the access to information on goods**, as stakeholders report an insufficient and unreliable information flow on the availability of seeds, tools, crops, and other inputs and harvest, which leads to massive loss of time and money.

- **Gap #2 – Access to financial services** – 61.5[9] percent of the population in Benin had no access to financial services in 2017. Financial sector studies conducted by the World Bank show that addressing gaps will require a strong focus on development of digital financial services and development of partnerships between banks, microfinance institutions and mobile money solution providers for the development of innovative services, and the creation of an enabling ecosystem for digital financial services.

- **Gap #3 – Skills and technology –** As noted above, farmers lack the skills and technology to increase agricultural productivity. There is also the problem of digital competencies. Most of the smallholders lack the basic skills needed to use the digital tools and platforms, which results in a very low adoption rate. This is in addition to low levels of formal education attainment which means basic numeracy and literacy skills are low, further hampering the adoption of new technology.

- **Gap #4 – Access to Markets –** Farmers cannot easily sell their products due to a lack of adequate transport infrastructure and market facilities. The bad state of roads within a generally poor context of transport infrastructure, means farmers are unable to connect to potential markets. This becomes especially difficult during the rainy period. Additionally, the lack of appropriate storerooms and markets are other major obstacles to the sale of crops which leaves farmers with low bargaining power with buyers when supply is high. In addition, due to the size of the country and of its population, the national market is relatively small.

- **Gap #5 – Access to land –** There are many problems related to tenure and land insecurity because of the coexistence of two land law regimes: the customary (traditionally more used) and statutory (mandated by law). This leads to problems including degradation of the environment, the partition of the lands, which prevents the development of larger agriculture companies, and the hoarding of big tracks of land that are not used. As a result, only a small proportion of available land is cultivated. A new land regime, the *Plan foncier rural* (*PFR*) was

[9] Findex 2017; globalfindex.worldbank.org

introduced in 2007 to address this problem. The PFR process offers great potential in securing tenure rights for women for the first time in the history in Benin. The issue of access to land is in part influenced by legal and cultural factors that may be challenging to address solely by digital solutions and is beyond the scope of this project.

10. **The agriculture sector in Benin is experiencing the adverse effects of climate change. Climate change has negative impacts on food security and livelihoods in Benin, where 70 percent of the population, especially in rural areas, depend only on agriculture**[10]. Climate projections (Coupled Model Intercomparison Model - CMIP5[11]) show that maximum daily temperatures, number of hot and very hot days, as well as the likelihood of annual severe droughts are expected to increase throughout the coming century.[12] The expected impact of climate change in Benin, especially the projected rise in temperature and rainfall is likely to compound the challenges already faced by the agriculture and forestry sectors, while the coastal areas will experience a sharp rise in sea level. The latter will threaten the people living along the coast where both income and population density is higher (between 250 and 1000 people/km², half of the population) than in other parts of Benin (from 0 to 250 people/km²). The negative consequences of intense and successive periods of drought and floods could affect food security: they may reduce the production of food by 6 percent by 2025 if no adaptive measures are taken.[13]

11. **Since agriculture is of the greatest importance for the Beninese economy, the sector will need to adopt adaptive measures to respond to the consequences of climate change that threaten food security**. Since agriculture is especially vulnerable to the consequences of climate change, it will disproportionately affect the poor, who depend on agriculture for their livelihoods and who have less capacity to adapt. Without adaptive measures such as enhanced crops and improved irrigation, agricultural production is expected to decrease by 3 to 18 percent in 2025[14]. The establishment of an early warning system, improved seed varieties, improved irrigation systems, and diversification of the economy will increase the country's resiliency and decrease its vulnerability to droughts.

12. **The four value chains targeted by the project are rice, maize, shea butter and vegetables, selected by the Ministry of Agriculture as priorities for the Northern regions covered by the project.** The choice of these value chains is based on their potential impact on food security, income and poverty reduction in a region currently characterized by high levels of food insecurity, poverty and vulnerability to climate change. These crops and their by-products are the main sources of livelihoods for most of the population engaged in agriculture in the region, and female farmers are highly involved in these value chains (40 percent) especially shea butter (near 100 percent) and vegetables (more than 60 percent). By helping unleash the potential of these value chains, the project would make a significant contribution to food and nutrition security, mitigate the expected impact of climate change in Benin, as well as increase incomes for the rural population and thus lead to poverty reduction.

13. **The implementation of the Government's new vision for the agriculture sector will be partly carried out through the *Centres de Services Agricoles* (CSAs).** With the objective of offering better adapted services,

[10] Supporting climate resilient agriculture in Benin: UNDP, March 2018.
[11] The CMIP5 experimental protocol was endorsed by the 12th Session of the WCRP Working Group on Coupled Modelling (WGCM) and is presented in the following document: Taylor, K. E., R. J. Stouffer and G. A. Meehl, 2009: A Summary of the CMIP5 Experiment Design
[12] World Bank Group Climate Change Knowledge Portal, February 2019.
[13] Climate Change Profile: Benin; Report from Government of Netherlands, February 2019.
[14] Ibid.

the Ministry of Agriculture, Livestock, and Fisheries (*Ministère de l'Agriculture, de l'Elevage, et de la Pêche* - MAEP) will establish CSAs across the seven regions of the country, where relevant training, extension services, research, and field experiments, will be provided to the producers in their respective regions.

Digital economy

14. **In Benin, the overall sector strategy and development falls under the responsibility of Ministry of Digital Economy and Communication** (*Ministère de l'Economie Numérique et de la Communication* - MENC). As part of the restructuring of the sector, a new body of law on electronic Communications and Post (No. 2017-20) was adopted on April 20, 2017 (*Code du Numérique*) and four major public players were born or consolidated over the last ten years:

- *The Telecommunications Regulatory Authority of Benin* (ARCEP), an autonomous regulatory body, which became permanent on October 9, 2014.
- The *Beninese Agency of Universal Service of Electronic Communications and Post* (ABSU-CEP), in charge of managing the universal service fund of electronic communication and post, fed by the operators, was established on December 30, 2013.
- The *Data Protection Agency* (APDP), the former National Commission for IT and Freedom (CNIL) created by Act No. 2009-09 dated April 27, 2009 on the protection of personal data in the Republic of Benin, is responsible for ensuring compliance with the standards required in the processing of personal data.
- The *Central Office for the Suppression of Cybercrime* (OCRC), a structure responsible for combating cybercrime.
- The *Control Body of Trusted Service Providers*, which is responsible for supervising the activities of trusted service providers.

In addition to these entities enshrined in the digital code should be added:

- The *Digital Development Agency* (ADN), created on December 13, 2017. Formerly known as the *Implementation Unit of the Digital Council*, it is responsible for the implementation of the national digital strategy, including Internet access and digital services.
- The *Information Services and Systems Agency of Benin* (ASSI), formerly the *Agence Béninoise des Technologies de l'Information et de la Communication*, is the national entity in charge of the governance of Benin's secure information systems and the development and implementation of structuring programs for secure infrastructures, applications, services and information systems.

The three agencies, ABSU-CEP, ADN and ASSI are in charge of the implementation of the national digital strategy, including internet access and digital services.

15. **The Benin telecommunication market has shown a noticeable growth in the last years**. It generated 260 billion of CFA[15] (US$442 million), which is 4.7 percent of the country's GDP in 2018 from 1.4 percent in

[15] GSMA Intelligence, *Market Data*, 2019.

2005. The part of revenue invested also grew from 35 percent in 2005 to 40.5 percent[16], which represents 60.6 billion of CFA[17] (US$10 million) in 2014. Based on international indicators, the ICT sector in Benin remains one of the least performing compared to other countries in the world. Several organizations which rank the ICT situation with different criteria (ICT connectivity and affordability, digital literacy, e-Government, e-Commerce) highlight the poor global ranking of Benin, which is also ranked in the second half among SSA countries.

Table 1: ICT Ranking of Cote d'Ivoire, Benin and Guinea by international institutions

Institution	Index used for ranking (2017/2018)	Cote d'Ivoire		Benin		Guinea	
		World rank	*SSA rank*	World rank	*SSA rank*	World rank	*SSA rank*
World Bank	Digital Adoption Index (value range 0.0-1.0)	***0.37***		***0.20***		***0.22***	
International Telecommunications Union (ITU)	ICT Development Index (167 countries, 38 for SSA)	**131**	*9*	**161**	*25*	**166**	*29*
World Economic Forum (WEF)	Network Readiness Index (138 countries, 32 for SSA)	**113**	*17*	**114**	*18*	**NA**	*NA*
U.N. Department of Economic and Social Affairs (UNDESA)	e-Gov. Index[a] (193 countries, 54 for Africa)	**172**	*36*	**159**	*28*	**181**	*44*
	e-Participation Index[b] (193 countries, 54 for Africa)	**171**	*41*	**136**	*24*	**138**	*25*
U.N Conference on Trade and Development (UNCTAD)	e-Commerce Index (151 countries, 44 for SSA)	**124**	*24*	**138**	*33*	**149**	*42*

(a) Reflects how a country is using information technologies to promote access and inclusion of its people: provision of online services, telecommunication connectivity and human capacity;
(b) Focuses on the use of online services to facilitate provision of information by governments to citizens (e-information sharing), interaction with stakeholders (e-consultation), and engagement in decision-making processes (e-decision making).

16. **The ICT sector in Benin has produced mixed outcomes –** Mobile voice performs well but prices remain high. While mobile broadband is growing steadily, the fixed broadband remains in its infancy:

- **Mobile standard service (voice and SMS) penetration –** There were more than 9.4 million active SIM in Benin on December 2018 (ARCEP, December 2018) for a population of around 11.18 million (INSAE, 2017), that is a mobile penetration rate of 83.27 percent, compared to 77 percent for SSA. This could be explained by a multi SIM ownership phenomenon (about 1.86 SIM per subscriber according to GSMA Intelligence, 2015). The number of unique subscribers is estimated to be about 4.9 million, that is a unique subscribers' penetration rate of 44.61 percent (GSMA, 2018). Moreover, the regulator changed the methodology of counting the subscribers in 2015, by considering only active SIM.
- **Fixed broadband penetration –** Contrary to the mobile market, fixed broadband penetration is in its infancy with 27,000 subscribers and 0.24 percent penetration rate[18] (down from

[16] World bank, Little data book of ICT, 2015.
[17] Republic of Benin, ARCEP, *Annuaire statistique*, 2014.
[18] Republic of Benin, ARCEP, *Annuaire statistique*, 2018.

48,000 and 0.45 percent penetration rate before the liquidation of Benin Telecom SA) because of the many barriers to access: first, as in most African countries, the fixed phone penetration is very low at 1.80 percent. In addition, subscribers are mainly enterprises and public institutions, of which less than one third are connected by copper wireline. The rest are connected through wireless technology (CDMA). Therefore, the broadband Internet remains a service used by industry, government, and a few privileged households, far below the regional average of 4.6 percent.

- **Mobile broadband service penetration –** Despite a significant growth of more than 600 percent in five years, the mobile broadband penetration, which represents 97.88 percent of the total internet (fixed and mobile) market, was only 19.8 percent in the fourth quarter of 2018.
- **ICT Retail Prices –** ICT services are expensive in Benin. The mobile cellular sub-basket was 13.8 US$/month against a sub-Saharan average of US$11.7/month[19], while the broadband sub-basket was US$50.6/month against US$44.9/month. Despite the installation of an IXP and the reduction of the cost of international capacity due to the landing of a second submarine cable and the restructuring of historical operators, the price of internet service to the end users remains high and unaffordable for most Beninese.

17. Almost 63 percent of the population and 75 percent of public education and health institutions are in areas covered by 3G services. Conversely, the "white zones" include approximately 1.5 million inhabitants situated in 663 villages and 30 arrondissements. Almost 1000 km of main roads and 1400 public establishments are not covered.

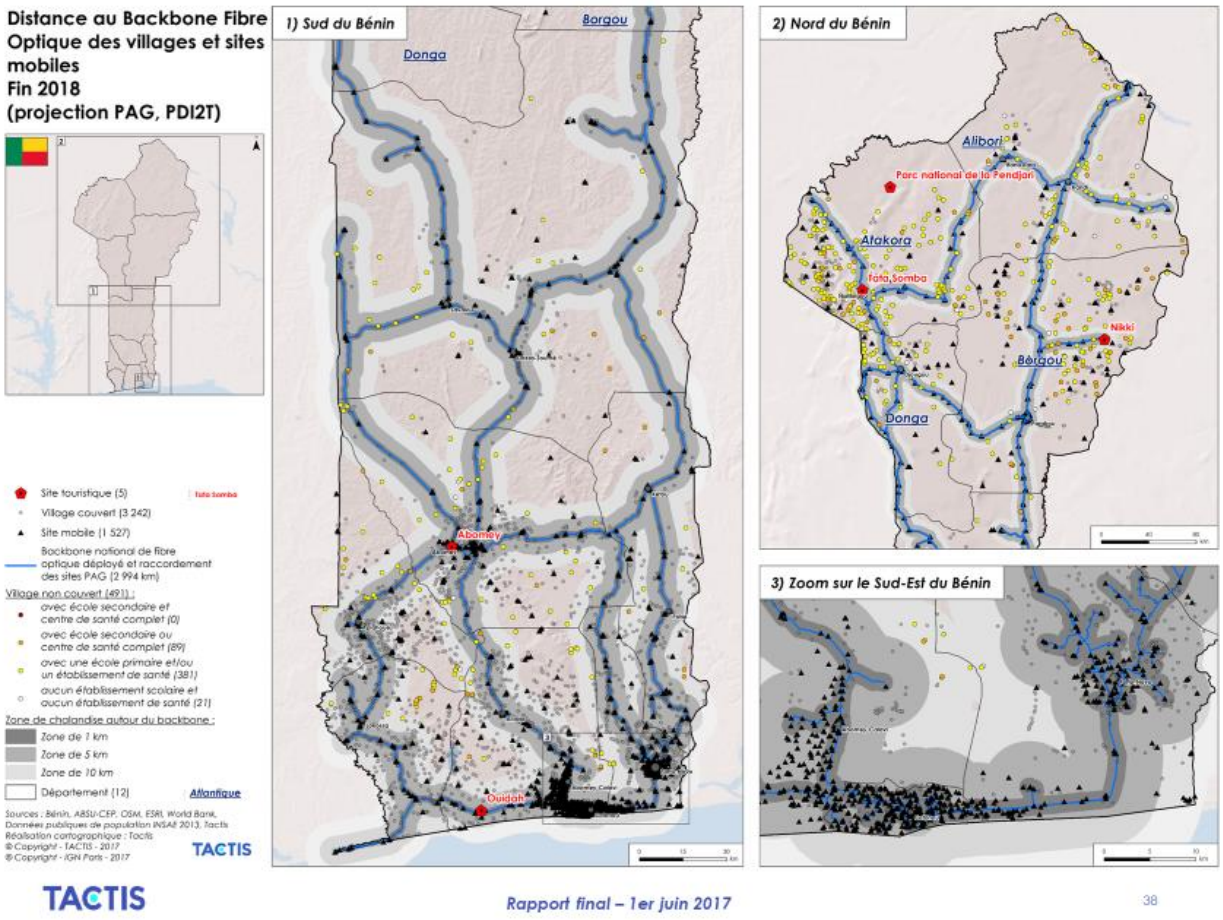
Table 2: 2G and 3G coverage in Benin (2017)

	3+ operators	2 operators	1 operator	None (white zone)	Total
Departments	12	0	0	0	**12**
Communes	71	6	0	0	**77**
Arrondissements	356	127	33	30	**546**
Villages	1,924	828	318	663	**3,733**
Population (million)	5.7	2.1	0.7	1.5	**10**
Main roads (km)	1,600	1,000	400	1,000	**4,000**
Primary schools	3,000	1,456	556	1,146	**6,158**
Secondary schools	417	158	59	54	**688**
Health sites	314	173	65	120	**672**
Partial health sites	100	63	19	68	**250**
Communes with >150,000	21	1	0	0	**22**

Source: TACTIS, 2017.

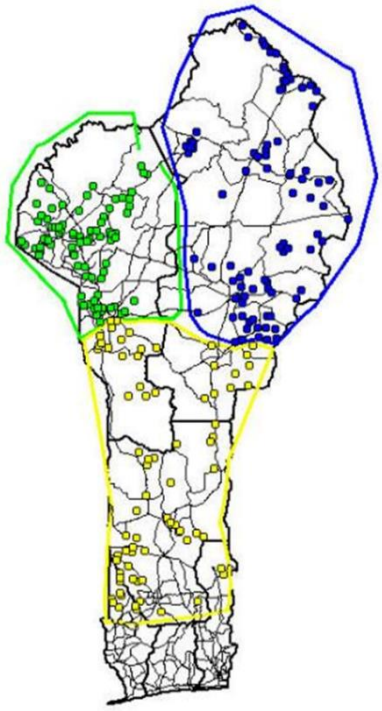
[19] ITU; World bank, Little Data book of ICT, 2015.

Map 1: Distance of villages from backbone and mobile sites in Benin (2018)



18. **In 2015, 248 localities complained (formally expressed a desire to have their localities covered by broadband connectivity) to ABSU-CEP about the lack of coverage.** The map below indicates the location of these. Some of these have populations in excess of 2000 people.

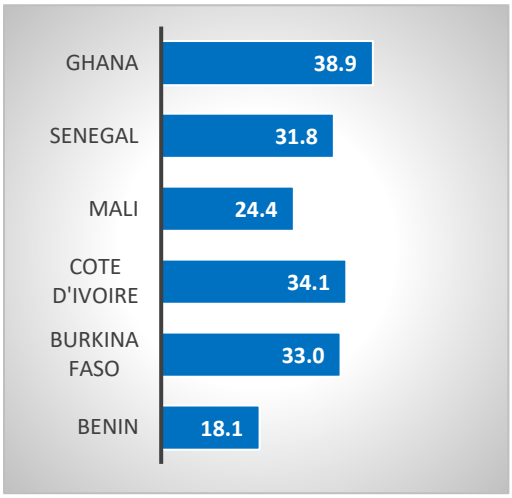
Map 2: Geo-referenced localities that have submitted a formal complaint to ABSU-CEP about lack of coverage (2015)



Digital finance and financial inclusion

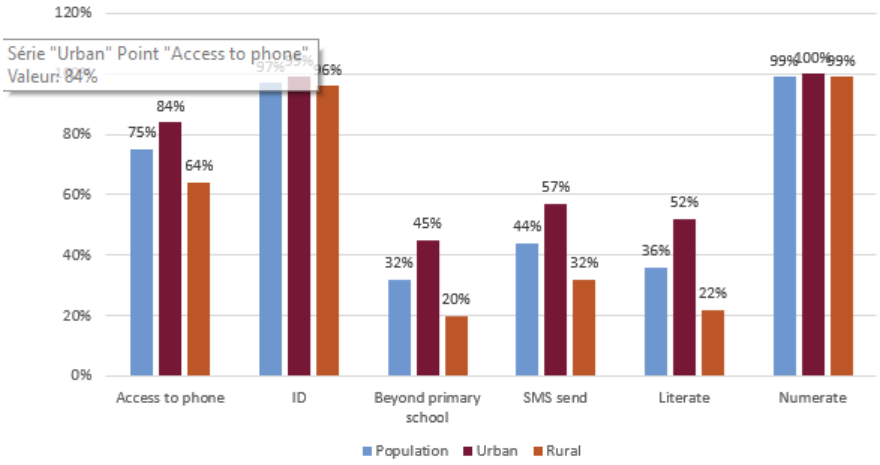
19. **Access to digital financial services remains low in Benin compared to peer countries in the WAEMU region.** Findex 2017 estimates 18 percent of the adult population holds a mobile money account. This is low compared to Burkina Faso and Côte d' Ivoire, for example, for which this percentage stands at 30.8 and 31 percent respectively. Key factors constraining the development of mobile finance in Benin include (i) limited access to national identity documents which represents a problem with regard to know your customer (KYC) and accounts opening; (ii) heavy reliance on cash and low level of acceptance of mobile payment network which restrain the use of mobile finance; (iii) the low diversification of digital finance offerings (mainly first-generation services: cash-in, cash-out, money transfer, purchase of telephone call units); (iv) weak management system of many of the financial intermediaries which inhibits their abilities to partner with mobile operators and offer diversified and more adequate digital financial services; (v) limitations in the legal framework (around data protection and privacy); and (vi) limited level of literacy and limited awareness for digital finance among rural populations. The 2015-2016 United Nations Capital Development Fund Mobile Money for Poor program (UNCDF)/Intermedia survey also confirmed that the readiness of the Beninese adults for digital financial services is most affected by literacy and to a certain extent by phone ownership.

Figure 1 –Mobile money penetration (Adults with an account (%))



Source: Global Findex 2017

Figure 2 – Key factors of rural vs urban adults' readiness for Digital Financial Services (% of adult)



20. Digital finance development in Benin, as underlined in a 2016 World Bank sectoral study[20], will require also the development of stronger partnerships between traditional financial institutions, banks and microfinance, and stronger involvement of the Government to create a favorable ecosystem especially in rural areas. Partnerships between mobile operators and microfinance institutions and existing informal saving groups offer favorable perspectives for expansion of digital financial inclusion. There are 52 microfinance institutions in Benin, with 618 points of service serving 2.139 million active customers[21]

[20] Benin financial sector strategy, Finance Competitiveness and Innovation, 2016
[21] A customer may have an account in more than one MFI; this number includes double counting.

double the banking sector clientele. Development of stronger partnerships between banks /microfinance and mobile operators will also offer a broader range of financial services than payments services to the clientele of mobile money operators. Similarly, working with informal financial services such as "tontines"[22], like ROSCAS, which are very widespread in Benin (one in 10 adults use only informal financial services[23]) will also help advance financial inclusion.

21. **Several initiatives recently developed helped plant seeds of a more conducive environment for digital finance development**. Three MFIs established partnerships with mobile money operators serving as agents and offering cash transfers (person-to-person [P2P]) and payment services to their clients. In recent years, with the boost of the UNCDF, some innovations have been tested and introduced in the market and represent an opportunity for the project to build on. Mobile operators are offering payments solutions that could greatly facilitate mobile payments expansion. The mobile operator MTN developed a merchant platform, named MoMo Shop, which offers mobile money payments with integrated business management solutions for merchants (stocks, accounting, etc) with a friendly user interface (pictures representing the goods). The network of access points for mobile money is now 90 times larger than banks and microfinance institutions' network with about 54 000 mobile money agents compared to 612 access points for banks and microfinance institutions. The MCM (*Micro-crédit Mobile*) Program for instance, launched by the *Fonds National de la Microfinance* (FNM), is expected to offer micro-credit to populations. Parakou's local authorities envisage fully digitizing the payments of taxes.

22. **While there is a strong case to catalyze digital financial inclusion, it is important to note that some key constraints in the financial sector will continue to plague the development of access to credit.** These key constraints include issues related to the limited supervision of the microfinance sector and weak credit infrastructure which restrain access to credit for rural populations.

Gender gap

23. **In Benin, women make up 55 percent of the rural population and 35 percent of employment in agriculture. Fourteen percent of agricultural households are led by women.** Only 7 percent own land alone (compared with 35 percent of men). Women are involved in the production of soybean, maize and peanut crops as well as rice cultivation in the lowlands. They are also involved in agri-food processing for shea (karité), néré, gari and rice, along with trade and commerce. The collection of shea nuts and néré are carried out primarily by women. However, these activities make up a small share of women's incomes, and women are often required to undertake more than one economic activity at a time.

24. **There is a gendered division of labor that affects crop selection, household labor, and productivity on farms.** In addition to working on their own plots of land and engaging in other economic activities, women perform a number of tasks in support of men. Men perform tasks like clearing, plowing and weeding, among others, for their wives; however, these are done after they have taken care of their own plots. Women often hire paid labor to support their agricultural activities, but male-owned plots are given priority. This is cited as one of the main differences in agricultural productivity between men and women in Benin. Indeed, evidence from neighboring Niger finds that men use more household adult male labor

[22] A type of rotating savings and credit association (ROSCA). Tontines are a savings instrument functioning as savings clubs in which each member makes regular payments and is lent the kitty in turn.
[23] UNCDF/InterMedia Quantitative Survey conducted on a sample of 3,042 Beninese aged 15+ between December 2015-February 2016.

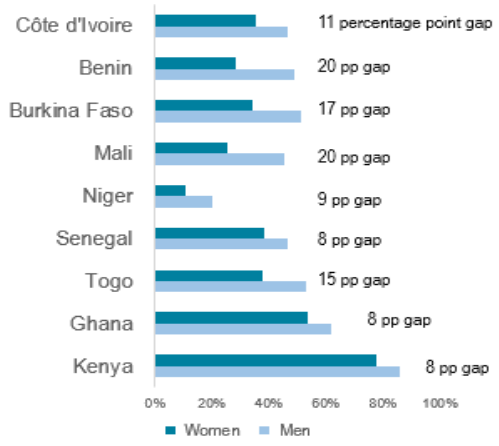
on their plots than women do, and that additional male or female labor available in the household lifts men's productivity more than it does women's. Women also often see lower returns to their time spent on agricultural activities, highlighting the need for labor- and time-saving technologies like e-platforms and apps that take into account household responsibilities – or help women manage them.

25. **Research from countries across Africa indicate that women smallholders tend to have limited access to other productive inputs** like information and knowledge, fertilizer, pesticides, farming tools, markets and extension services. Analysis in the Systematic Country Diagnosit (SCD) revealed that though labor force participation rates for women and men in Benin are similar, 70 and 73 percent respectively, the median income for women (20,000 CFA) is half of that for men (40,000 CFA). Additionally, only 35 percent of women (age 15-49) are literate compared to 61 percent of men according to data from USAID's Demographic Health Survey 011-12 with significant differences between lower wealth quantiles (24 percent of women in third quantile versus 70 percent of women in the fifth and highest quantile)**.**

26. **Women have little or no access to internet.** Available data for Benin indicates that 21 percent of women and 38 percent of men have access to mobile phones. Of those surveyed, women spent 13.3 percent of their incomes to access mobile phones. This figure was 10.9 percent for men. With respect to the Internet, 14.6 percent of women knew what the Internet was versus 27.8 percent of men. Furthermore, only 5.3 percent of women reported using the Internet versus 11.9 percent of men. While there is little data, the project assumes that, like other contexts, women smallholders and female-headed households in low-income rural communities may face additional challenges because of lower incomes and less control of resources than men, as well as social norms that limit their access and use of mobile phones.

27. **There is a significant gender gap in access to financial services.** Benin is one of the countries with the highest gender gap in access to digital financial services at almost 20 percentage points, with only an estimated 18.9 percent of women making or receiving digital payments in 2017, compared to 38.2 percent of men (see Figure 3 below).

Figure 3: Gender gap in digital financial inclusion



Source: Global Findex 2017

C. Relevance to Higher Level Objectives

28. **The proposed project is aligned with Benin's development strategy, the *Plan National de Développement 2018-2025* and the Government's action plan, the *PAG*.** By extending ICT connectivity and supporting the development and use of digital agriculture solutions, this project will contribute to the plan's objectives to increase the productivity and competitiveness of Benin's economy, and develop the country's human capital. It will support the development of two sectors identified in the national strategy as key enablers of growth: agriculture and ICT. The project is also aligned with two of the three axis of actions outlined in the PAG: (ii) structural transformation of the economy; and (iii) improved social well-being.

29. **The project is consistent with the main objective of the World Bank's Benin Country Partnership Framework (CPF) FY19-FY23 (Report No. 123031-BJ, June 6, 2018) which is "economic transformation with a focus on human capital development, inclusion and sustainability."** The project is particularly aligned with '*Focus Area 1: Structural Transformation for Competitiveness and Productivity*' which comprises three objectives that the project will directly or indirectly support on infrastructure, agriculture, and resilience:

- The project will contribute to *Objective 1: Fostering agricultural productivity.* By extending the reach of ICT connectivity and facilitating the digitization of economic transactions, the project will: (a) increase access for smallholder farmers to information, financial services and markets, leading to an increase in productivity and sales, and a reduction in post-harvest loss; and (b) enable public institutions to collect and gather agricultural and rural statistics to drive public policy and strategy. The project will contribute to women's economic empowerment in agriculture, through the extension of digital services to their communities and by providing alternative sources of electrification through solar panels and other innovative and sustainable options. New solutions such as drone technology can also be used to help increase productivity by improving agricultural methods.
- The project will also contribute to *Objective 2: Improving the quality of infrastructure.* In addition to the rehabilitation of rural roads to connect farmers with markets, this project will extend ICT connectivity and access to digital services in rural areas. The CPF states the digital economy is one of the main development priorities to promote rapid economic growth in Benin, as it can be used as a powerful tool to increase agricultural competitiveness and diversification. As such, the project will directly enhance digital infrastructure and provide alternatives to inadequate logistics services. This will positively impact the rural agricultural economy by enabling access to consumer markets at competitive costs.
- Finally, the project will contribute to *Objective 7: Building resilience at the community level*. Unpredictable weather patterns, unreliable pricing information and crop failure due to diseases are a few of the issues that digital services could tackle in Benin. The project will directly support the objective of improving resilience to these shocks by promoting digital solutions that will enhance the ability of smallholder farmers to anticipate and mitigate the impacts of adverse events.

30. **This project is part of the larger World Bank strategy to accelerate digital transformation in Africa and contributes directly to the goals of the Digital Economy for Africa (DE4A) Moonshot Initiative**. The DE4A

Moonshot initiative has set objectives to ensure every individual, business and government is digitally enabled by 2030. The DE4A Moonshot aims to achieve universal access to broadband and digital services. To make this happen, the World Bank is preparing and implementing a series of investments in digital infrastructure, integrating digital technologies into sectoral investments; building digital platforms, such as foundational ID; facilitating digital finance; investment in e-government; and supporting digital skills and digital entrepreneurship. This project contributes to all five pillars of the initiative. It will also support a range of capacity building and training activities for public officials and government workers that will improve their ability to design, implement, enforce, and monitor the legal and regulatory frameworks related to digital development. In this way, the project also supports the development of human capital within this important group of stakeholders, alongside institutional capacity enhancement.

31. **This project contributes to the achievement of the Sustainable Development Goals (SDGs).** It aims to accelerate progress towards the achievement of the SDGs by increasing access to Broadband connectivity, smart agricultural services, and digitally inclusive financial solutions, especially in unserved areas. The SDGs include several goals that require the intensive use of ICTs, notably in achieving universal identification, more efficient delivery of government services, financial inclusion and job creation. Underlying these goals is target 9(c) to significantly increase access to ICTs and strive to provide universal and affordable access to the internet in least developed countries (LDCs) by 2020. This project contributes to the realization of specific SDG goals, including SDG 1 to end poverty. The project will help reach targets 1.4 to ensure all have equal rights to economic resources and basic services and 1.5 to build resilience of the poor. The project will especially help realize SDG 2 by increasing agricultural productivity and incomes of small-scale producers and strengthening capacity for adaptation to climate change, as well as SDG 5 to empower women in rural areas. It will also contribute to SDG 8 to promote inclusive growth and economic opportunities; SDGs 9 and 11 to contribute to sustainable infrastructure and communities for all; and SDG 13 to increase climate resilience and adaptation in rural areas.

32. **The project is designed to contribute to the World Bank Group's twin goals of ending extreme poverty and boosting shared prosperity.** The project will contribute to the country's achievement of the twin objectives through increasing agricultural productivity and climate resilience in the agricultural sector and promoting economic growth which is inclusive of smallholder farmers. Benin's SCD argues that Benin's achievement of the twin goals begins with realization of its vast agricultural potential. Given Benin's favorable endowment of land and water resources, agriculture will of necessity be the driver of poverty reduction, jobs for un- and under-employed youth, improved nutritional outcomes, and inclusive growth in rural areas; and will also help meet rising food demand in growing urban centers.

33. **It will contribute also to the achievements of IDA18 targets on gender equality, which aim to support better access to the internet and better access to digital services for women**. The goal is to increase women's economic empowerment and autonomy through greater access to information, financial services and markets, which has been shown to contribute to more equitable economic growth.[24] The project seeks to contribute to all three strategic objectives stated under the World Bank Gender Strategy (2016-2023): (i) improving human endowments; (ii) expanding economic opportunities for women; and (iii) enhancing women's voice and agency. It will extend digital connectivity in rural areas, with focusing on women smallholders by targeting female-headed households and providing additional support, digital literacy and awareness, numeracy and financial skills training to ensure their equitable access and usage.

[24] Benin Systematic Country Diagnostic, 2017.

The project ensures women stakeholders are considered and engaged in each project activity. This includes targeted needs assessments of women producers to make sure that solutions are developed with them as a target audience and participatory development of digital solutions.

34. **The project will enhance resilience to climate change impacts**. For example, by enhancing farmers access to timely information on climate variability, therefore allowing farmers to adapt agriculture practices. The project will also provide connectivity to enable early warning systems and develop rural road infrastructure that is resilient to climate vulnerabilities such as floods and landslides.

II. PROJECT DEVELOPMENT OBJECTIVES

A. Project Development Objective

PDO Statement

35. To improve access to broadband services in targeted rural communities and promote the use of digital solutions to improve efficiency of selected value-chains, financial inclusion and access to markets.[25]

PDO Level Indicators

36. The PDO Level Results Indicators are:

    a. Mobile broadband (3G and above) penetration rates (DE4A Moonshot Indicator (Percentage);
    b. Population with a mobile money account (of which, female) (Percentage);
    c. Farmers reached with agricultural assets or services (of which, female) (CRI/Number);
    d. Beneficiaries using digital solutions supported by the project (Percentage);
    e. Increase in volume of produce put on the market by beneficiaries (of which, female) (Percentage);
    f. Beneficiaries that feel project investments reflected their needs (of which, female) (Percentage).

B. Project Components

37. To achieve the Project Development Objectives, the proposed project follows an integrated transformational solutions approach with five components:

[25] In the context of this project, value chain efficiency refers to the delivery of goods and services with most value at least possible cost along the various segments (production, processing and marketing).

- **Component 1: Extending digital connectivity in rural areas** by increasing the number of individuals, public administration institutions, and businesses that will be able to access both mobile services and the internet in the most climate-vulnerable areas;
- **Component 2: Digital financial inclusion and skills:** increasing use of digital financial services in targeted rural communities by supporting the digital transformation of financial institutions, catalyzing digital payments, and the improvement of digital and financial literacy;
- **Component 3: Digital solutions for rural development:** stimulating the local digital ecosystem by supporting the development of local digital content, climate-smart agriculture applications and services for the agriculture sector;
- **Component 4: Access to markets:** improving access to local markets and agricultural production zones, and resilience to climate change by leveraging digital applications and rehabilitating rural access roads that are all-weather/season practicable and flood resistant, in turn increasing the revenues of smallholder farmers; and
- **Component 5: Project implementation:** Project management, coordination, monitoring, and evaluation.

Component 1 Extending digital connectivity in rural areas (US$45 million equivalent)

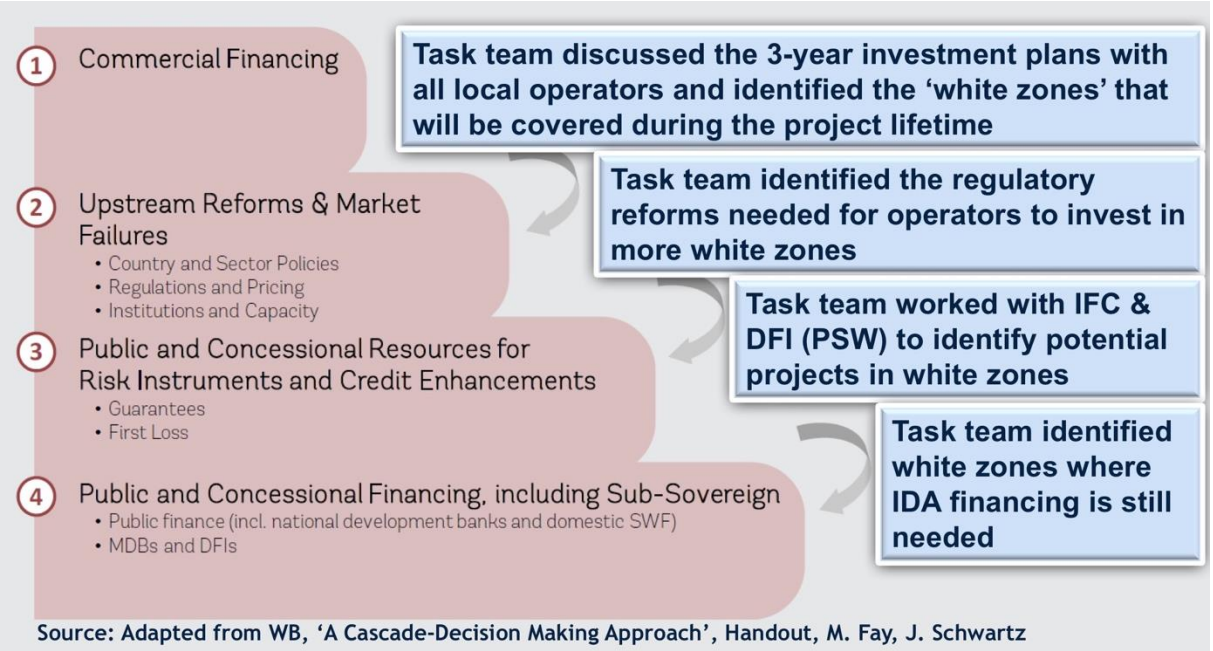
38. Component 1 will support the extension of digital infrastructure in rural areas that will be able to access both mobile services (voice and SMS) and the internet. It will support the review and improvement of the digital service environment through provision of technical assistance to strengthen the capacity of key stakeholders in defining, enhancing and enforcing an enabling environment conducive to providing digital services in rural areas.

39. This component is designed around the Maximizing Financing for Development (MFD) approach (Figure 4) to leverage private investments and optimize the use of public funding. A set of criteria (see Annex 2) was established for: (i) the identification of target areas; and (ii) infrastructure financing. The selection criteria for the target areas will include susceptibility to climate changes, and the design will incorporate multiple levels of redundancy to ensure high availability of service to the vulnerable zones.

- For target areas, workshops with public stakeholders and private operators led to the identification of geographic unserved or underserved “white areas” in which the supply of ICT connectivity is nonexistent or insufficient, have high susceptibility to climatic changes *and* may not be reached under pure market terms because the inherent profitability of investment is too low (“market failure”).
- For project design, Component 1 will first focus on improving the legal and regulatory framework (and support related capacity building initiatives for public agencies) to address the market failure and bring about positive incentives for additional infrastructure roll-out. Yet, this alone will not be sufficient to solve the lack of ICT connectivity in rural areas and reach an envisaged level of supply. Therefore, Component 1 will also provide financial support to overcome the lack of ICT connectivity if there is no alternative. Financial support will first come from private sector involvement, and second from the Public-Private Partnership (PPP) model combining private investments and public funds. The proposed project will explore appropriate business models that will help to defray some of the

Operators' CAPEX (capital expenditure) investments in exchange for subsidized services to the rural subscribers. Depending on the targeted region and community, the PPP model will be adjusted.

Figure 4: MFD-Decision Making Approach used by the team to structure Component 1



Source: Adapted from WB, 'A Cascade-Decision Making Approach', Handout, M. Fay, J. Schwartz

40. Because this component implies the subsidy of digital infrastructure, the identification of target areas (where the infrastructure will be deployed) and project design (how they will be deployed) will comply with a set of criteria in line with international best practices and the MFD approach: Criteria for market failure, general interest, synergy with World Bank and other donors' projects, and limitation of public funds to the minimum necessary (see Annex 2 for a more detailed description).

41. **Sub-Component 1.1 – Improving the digital enabling environment**. This subcomponent will help improve the institutional and regulatory environment to address market failure wherever possible. It will fund a review of the current institutional and regulatory and identify bottlenecks that hamper private investment in ICT infrastructure (stage 2 of the MFD Approach). It will also finance a strategy to enhance alternative national fiber optic networks for non-telecom network operators. This Sub-component will consist of technical assistance and capacity-building to strengthen key stakeholders (i.e. MENC, ARCEP, MAEP, ABSU-CEP) in defining, enhancing, and enforcing an enabling environment conducive to providing ICT coverage in rural areas. Activities in this sub-component will deliver training and education that will highlight climate change-related factors to be considered when providing ICT coverage in rural areas. Finally, this subcomponent will develop an operational report on a subsidy model for digital infrastructure.

42. **Sub-Component 1.2 – Supporting the extension of ICT coverage in rural areas using Open Access** People-first Public-Private Partnership (PfPPP) arrangements. In areas where public subsidy is needed (stage 4 of the MFD Approach), the project will implement a PfPPP model combining private investments and public funds to subsidize a 'wholesale open access' broadband infrastructure. Public funds will be channeled – if relevant and possible – through existing mechanisms established by ABSU-CEP. The partnership model

will explicitly encourage investments in digital infrastructure and services that will ensure resilience to climate variability such that the inhabitants of the project areas will continue to receive digital services without disruption. When designing the PfPPP, the guiding principle will be that public intervention should limit as much as possible the risk of crowding out or replacing private investments, of altering commercial investment incentives, and ultimately of distorting competition. To encourage the private sector with incentives to invest and to avoid a "free-rider" problem whereby the incentives lie with the secondary investors rather than the primary investors, the project will explore an option to postpone the requirement for open access to give the primary investor a period of exclusivity to get settled in. In addition, the Requests for Proposal will include a clause on the provision of energy (either through the grid or alternative sustainable options such as solar) to ensure the quality of services at the site and access to basic power services for the communities. More specifically, this subcomponent will finance (i) a mapping of digital infrastructure and availability in the targeted areas; (ii) a study of public and private investment options for enhanced ICT coverage in targeted rural areas; (iii) the design and review of an Operations Manual for the use of public funds supporting open access broadband; (iv) the design and support for the implementation of an open access public-private strategy in targeted rural areas; (v) schemes attracting private sector financing through PPP Arrangements, including Subsidies, to provide wireless access networks and ICT services in targeted rural areas; and (vi) the expansion of broadband coverage to MAEP's ATDAs and CSAs.

Sub-Component 1.3 – Building the metropolitan network of Parakou. The city of Parakou is the second largest city in the country and is located within the northern half of the country, at the nexus of the zones targeted by the project. This sub-component will finance the enhancement of the metropolitan fiber optic loop in the city of Parakou and the densification of the fiber optic infrastructure in downtown and suburban areas of Parakou. This infrastructure will be managed through a PfPPP. The project will finance this new infrastructure through a competitive "reversed auction" tender process to award "least-cost" capital subsidies to an operator (see Annex 2 for more details). The design and construction of the Metropolitan Area Network (MAN) of Parakou will take into consideration future climate impacts and risks in the metropolitan area. The design will accordingly incorporate climate adaptation measures through the deployment of digital infrastructure that will offer a high degree of availability and resilience of services to the residents of Parakou.

Component 2: Digital financial inclusion and skills: increasing use of digital financial services in rural communities **(US$16 million equivalent)**

43. Component 2 will catalyze the uptake of digital financial services in rural areas, with a focus on women in the agriculture sector. It will build some foundations to improve access to basic financial services but will not address fundamental issues related to financial stability and access to credit. To ensure the sustainable growth of financial services in rural areas, the project will support (i) the digitization of services offered by financial institutions serving rural areas; (ii) the digitization of payments made in rural areas within the selected value chains, and the digitization of women's informal saving groups; and (iii) the creation of a conducive environment for digital finance and a targeted approach to the services and improvement of digital skills, numeracy and financial literacy for rural populations.

44. The component was designed based on recommendations made on the financial sector strategy conducted in 2016 by the World Bank. It is based on a similar project in the region, Niger Smart Villages (P167543), and successful experiences in East and West Africa, while taking into account the IMF-World Bank Bali Fintech Agenda.

45. **Subcomponent 2.1: Digitizing the offering of financial institutions**. Embracing opportunities offered by mobile technology to advance financial inclusion requires various efforts from financial institutions including partnering with mobile network operators (MNOs), adapting their own management information systems (MIS), products and processes in order to create new solutions. To support these efforts that are costly and sometimes unbearable for some financial institutions (FIs), especially microfinance institutions (MFIs) and small banks, the project will finance: (i) the evaluation and upgrade of the information systems of selected financial institutions to allow interface with MNOs and improve data security by covering up to (a maximum of) 50 percent of the costs of the upgrade for banks and 75 percent of the costs for MFIs; (ii) the creation of a shared digital platform that could be an interface between the information systems of the selected financial institutions and the mobile network operators systems; (iii) technical assistance to manage the following risks related to the new technology: operational risks, data security, consumer protection risks, and to improve their capacities; and (iv) building capacities to develop new digital financial products such as savings via mobile, digital credit and credit rating based on transaction histories.

46. Financial institutions will be selected based on a specific set of criteria. Criteria include current outreach in the rural areas targeted by the project, strategy, governance, compliance with the BCEAO prudential requirements and principles, financial stability and performance, and capacities to manage operational risks among other things.

47. **Subcomponent 2.2: Digitizing value chain payments and women's informal saving groups.** To promote digital payments in rural areas, the project will support two clusters of activities:

- **The digitalization of the value chains.** To address limited uptake of digital finance among farmers, the project will support the digitalization of agriculture value chains. To do so, the project will finance: (i) an evaluation of the digital payment flows in four value chains including rice, maize, shea, and vegetables; (ii) up to (a maximum of) 50 percent of the total cost of acquisition and operationalization of digital payment infrastructure by agriculture input providers and agriculture cooperatives in the value chains offering the biggest opportunities for digitalization; and (iii) training of SME and agriculture cooperatives and their members to improve their capacities to use the new payment technology. Priority in the selection of the private or public buyers and agriculture cooperatives in these value chains will be given to those who have the largest number of members / clients registered and highest participation of women in regions targeted by the project. The beneficiaries under this component will themselves choose the payment solution provider based on the results of the assessment of their information systems.

- **The digitalization of the largest existing women's traditional informal saving groups called "tontines" in regions targeted by the project.** Under this program, the project will support: (i) an assessment of the opportunities to introduce a risk based KYC approach and tiered KYC with lower identification requirements for women affiliated to saving groups; (ii) the creation of apps or other technologies that could mirror the processes and features of saving groups and are intuitive to first-time users with low levels of formal education; and (iii) the creation of new financial products for women's groups where digital payments could be bundled with commitment savings, and / or insurance products, together with financial education (based on solutions developed by existing apps in the market or new apps). This will be done with the selected financial institutions in sub-component 2.1, insurance companies and MNO.

48. **Subcomponent 2.3: Creating an enabling environment for digital financial services and skills.** Ultimately, for rural populations to accept digital payments - and digital services more broadly - at scale, there is a significant need to create a conducive ecosystem and sensitize and train them. This subcomponent will support: (i) the creation of an enabling legal environment through the assessment of the law on consumer protection, interoperability, government payments and revision of recent laws and drafting decrees on data protection and privacy, and support the drafting of new laws if necessary; (ii) the preparation and adoption of consumer policies that could ensure protection of funds from risk of loss, customer services, transparency of terms and conditions for digital finance; (iii) acceptance of digital payments by providing merchants in the regions targeted by the project vouchers (representing up to 70 percent of costs) for the acquisition of digital payment devices[26] that could offer bookkeeping services and cash flow tracking that could possibly be used for credit scoring; (iv) improvement of digital skills through large campaigns to raise awareness, training of women's associations, farmers, and development of apps on financial literacy with adequate content (e.g. using voice and image). The trainings will address the low levels of basic numeracy and literacy skills of target beneficiaries and develop local support mechanisms to ensure the ongoing use of digital services. These digital skills trainings will be provided through regional agriculture service centers and Mobile Training Units that will move around the target areas.

Component 3 Digital solutions for rural development (US$10 million equivalent)

49. Component 3 will stimulate the development of digital solutions for the agricultural sector, enabled by the digital infrastructure, financial access and skills supported through the first two components. These solutions will be developed based on identified needs of target beneficiaries and will include climate-smart solutions. The component will be aligned with the implementation of a current agricultural sector vision around the CSAs, and/or through the *Agences Territoriales de Développement Agricole* (ATDA) if the CSAs are not established yet. It includes two subcomponents which aim to establish the basis for a sustainable digital ecosystem for rural development. This will enable the development of digital agriculture and other services (improvements in productivity, logistical support etc.) and benefit farmers as well as entrepreneurs in Benin.

50. The guiding principles underlying the design of this component are based on international best practices and have been considered as one of the main action lines of The World Summit on the Information Society (WSIS) implementation process focusing on e-agriculture. It also intends to benefit from synergy from the World Bank Agriculture Competitiveness and Export Diversification project (P168132) under preparation in Benin.

51. **Sub-component 3.1 – Strengthening the data ecosystem.** The first sub-component includes (i) an ecosystem review of the "data to decision making" value chain for the agricultural sector, including environment and climate-related data; (ii) review of the data policy, legal and regulatory environment; (iii) support for capacity-building for the MAEP; and (iv) digital registration of the smallholder farmers in the four selected value chains. Activities include data mapping and creation of a data inventory, as well as review of data collection, validation and publication processes. Special attention will be paid to the collection and analysis of gender-disaggregated data. The digital registry of smallholder farmers will be utilized throughout the project to enable needs assessments, communications, and for targeting training and services to smallholder farmers. The registration process will provide an effective means to collect

[26] Payment devices for merchants are currently available in Benin from MNOs. These devices allow not only digital payments, but also could produce basic financial statements, expenses

benchmarking data and will facilitate the formation or consolidation of farmer groups into more formal structures, if desired by group members.

Box 1. Coordination with *Agence Française de Développement* (AFD)

This component has been designed based on coordinated work with the AFD. AFD is preparing a project that will finance complementary activities and will scale up some of the activities mentioned below. Both agencies have prepared their respective projects in parallel and in close coordination, holding joint missions to the field, and sharing documentation.

As agreed between the two partners and the Government of Benin, AFD financing, which will come at a later stage, may fund, inter alia: (a) Platform for agricultural statistics; (b) Platform for managing public and private interventions in the four value chains supported by the project; (c) Agricultural Geographic Information System; (d) Market Information System; (e) Platform of exchanges between the actors of the project for the development of the digital ecosystem; and (f) Updating, clearing databases and creating connectors.

The AFD-funded project could also scale up some of the activities initiated under the proposed operation. For instance, the future AFD project could scale up, inter alia: (a) Capacity building and TA for MENC and MAEP; (b) Information services for rural communities; (c) Support for CSA + digital inclusion of farmers; (d) Capacity building of farmers organizations; and (e) Continue supporting the development of the local digital ecosystem.

52. **Sub-component 3.2 – Mobilization of the digital ecosystem.** The second sub-component aims to catalyze the development of digital solutions to provide services to farmers, and to developing a competent and sustainable digital ecosystem. It will support the development of solutions that tackle the problems faced by small-scale farmers in the targeted project areas, including the lack of easily accessible, affordable and useful timely and reliable data, information and knowledge on agriculture to improve productivity and income generation. This subcomponent will support: (i) a thorough needs assessment of key stakeholders; (ii) a review of existing digital services that contribute to climate-resilient rural development; (iii) trainings for students and the local developer community to create a base of technical professionals who can design and maintain the various digital solutions; (iv) the design and organization of App Challenges to develop or enhance sustainable digital solutions for agriculture; (v) the delivery and testing of services and training through the CSAs (and ATDAs, if the CSAs are not established yet); and (vi) support to technology hubs and incubators. Winners of App Challenges will be assigned to a technology hub or incubator to develop market solutions with viable business models: from prototyping through piloting and launch of their digital product or service.

53. **Sub-component 3.3 – Climate-smart agriculture and producer organizations.** This sub-component supports the development of climate-smart digital solutions and increasing the capacity of producer organizations in the selected value chains in climate smart production management. The project will analyze and address possible obstacles for women to meaningfully participate in and benefit from these activities as well as identify locally relevant climate change impacts and focus capacity building to equip farmers with the knowledge and practical skills (for example, landscape management using digital solutions and use of mobile-based climate information systems) to become more resilient to these impacts.

Component 4 Access to markets (US$20 million equivalent)

54. The objective of Component 4 is to improve farmer access to markets by (i) rehabilitating and maintaining the rural roads in the targeted areas of the project; (ii) implementing digital transport applications; (iii) implementing a pilot of Labor Intensive Method (LiM) in road maintenance; and (iv) building capacities of stakeholders. This component will tackle physical and logistical problems expressed by smallholder farmers – especially women – of access to markets and agricultural production zones in project targeted areas. It also aims to reduce vulnerability of the serviced population during flooding and landslides season. The project will also implement a climate and natural hazards monitoring, early warning and incidence response system. The high level of service provided by the roads is expected to attract more means of transport, thus improving person and goods displacement and a decrease of transport cost on these roads. Activities in this component complement digital solutions for dissemination of market prices/information and advice to farmers on market dynamics, to enable an effective access to market to improve efficient movement of agriculture products. Significant experience on this strategy was gathered through the Agricultural Productivity and Diversification Project (PADA-P115886) and other infrastructure projects funded by the World Bank

55. **Sub-component 4.1 –Rehabilitation and maintenance of rural roads.** This subcomponent will finance: (i) the technical feasibility studies, environmental and social assessments; and (ii) the works related to the rehabilitation of about 600 km and the maintenance of about 2400 km in a period of four years. The total maintained length of rural roads will be about 3,000 km (600 km rehabilitated and 600 km maintained per year) targeted in the main production areas of Malanville-Karimama, Alibori Sud, Borgou Nord-2KP, Atacora Ouest, Zou (Djidja) and northern parts of Borgou (Nikki, Perere), Sud Donga – Collines. To enhance resilience of the project impacts of climate change and natural disasters, the roads rehabilitation works will include improvements in the drainage structures to ensure all-weather/season access. The materials and design standards for road rehabilitation have an emphasis on reducing the risk of flooding and associated destruction of housing and facilities. These roads will be chosen in close consultation with targeted communities. The rehabilitation and maintenance of the feeder roads targets the high agriculture production areas in project intervention areas and complements the vast national road network rehabilitation program launched by the Government for the rehabilitation of 1362 km to improve the mobility in a balanced way in the whole territory.

56. **Sub-component 4.2 – Digital transport applications, LiM pilot and capacity-building.** This sub-component consists of: (i) developing digital applications for the Benin Road Asset Management team and rural communities (RC) to help maintain rural roads; (ii) implementing a rural roads maintenance pilot project through labor intensive methods; and (iii) strengthening the capacity of MAEP staff and rural communities in the use of digital transport application, general contracting and maintenance of rural roads, and an assessment of climate vulnerabilities and mitigation measures. This sub-component will develop GIS-enabled applications for geo-mapping of rural networks, measurement and analysis of the Road Roughness Index and Rural Accessibility Index, and management of public grievances through a smartphone-enabled Citizen Engagement System. These digital applications will be integrated into the Road Asset Management System to help the RC with the maintenance of rural roads. Selected RCs will be involved in the planning and implementation of works at a level commensurate with their capacity. The project will promote a gradual participation of rural communities in road maintenance planning, management, and supervision, acknowledging capacity constraints. Experiences and lessons learned from the LiM pilot will serve as a guide to be used by MAEP and the Ministry of Infrastructure and Transport

(MIT) to sustainably implement routine rural road maintenance, improving the rural road level of service and enabling better access to markets and social services.

Component 5 Project implementation (US$9 million equivalent)

57. This Component will support the setting up of a dedicated Project Implementation Unit (PIU) and will also cover training, office equipment, operating costs, audits and communications as well as Monitoring and Evaluation (M&E), environmental and social studies, including implementation and/or the monitoring of their implementation, and the creation of the grievance redress mechanism (GRM).

58. **Project Cost and Financing**

Project Components	Project cost	IDA Financing	Trust Funds
Component 1. Extending connectivity in rural areas	**45**	**45**	**N/A**
1.1 Improving the digital enabling environment	2	2	
1.2 Supporting the extension of ICT coverage in rural areas using Open Access PPP arrangements	40	40	
1.3 Upgrading the metropolitan network of Parakou	3	3	
Component 2. Digital financial inclusion & skills	**16**	**16**	**N/A**
2.1 Digitizing the offering of financial institutions	4	4	
2.2 Digitizing value chain payments	6	6	
2.3 Enabling environment for digital financial services and skills	6	6	
Component 3. Digital solutions for rural development	**10**	**10**	**N/A**
3.1 Strengthening the data ecosystem	3	3	
3.2 Mobilization of the digital ecosystem	6	6	
3.3 Climate-smart agriculture and producer organizations	1	1	
Component 4. Access to markets	**20**	**20**	**N/A**
4.1 Rehabilitation and maintenance of rural roads	19	19	

4.2 Digital transport applications, LiM pilot and capacity-building	1	1	
Component 5. Project implementation	**9**	**9**	**N/A**
Total Project Costs	100	100	
Total Financing Required	**100**	**100**	

C. Project Beneficiaries

59. **The project beneficiaries are smallholder farmers in the Northern part of Benin.** The north of Benin suffers from (i) high levels of poverty incidence and high rates of unemployment, especially among the young people; (ii) poor access to transport and communication infrastructure.; and (iii) exposure and vulnerability to the impacts of climate change. The target regions include the following departments: Borgou, Alibori, Atacora, Donga and Collines, and include the areas of: Malanville-Karimama, Alibori Sud, Borgou Nord-2KP, Atacora Ouest, Zou (Djidja) and northern parts of Borgou Sud, Donga – Collines. The 3.4 million inhabitants in the project areas represent around 30 percent of the 11 million inhabitants in Benin. Smallholder farmers in this region represent a target group of about 1.87 million inhabitants for Component 1 (i.e. around 55 percent[27] of the 3.4 million inhabitants in the Northern part of the country that are still not covered by a wireless network), and about 770,000 inhabitants in the Northern Region for Components 2 and 3, of which about 210,000 represent smallholder farmers and about 560,000 workers associated with the four value chains selected (indirect and direct jobs). These numbers include 103,000 women farmers and 290,000 women workers.

60. **The project aims to tackle gaps between men and women throughout project design.** Project activities have been designed based on findings of the SCD and CPF, which validates the targeting of women smallholder farmers. The value chains selected are ones in which female farmers are highly involved (40 percent): especially shea butter (nearly 100 percent) and vegetables (more than 60 percent). Through increased access to digital solutions for women, this project aims to improve access to information, productive assets and inputs, and financial services. Because the SCD analysis revealed that literacy rates are lower among the poorer quantiles and women, basic literacy and numeracy skills have been added for women. Also, special attention has been made to target female-headed households which the SCD and CPF identified as among the most vulnerable workers in agriculture due to restricted access to additional farm labor, among other reasons.

    - **Analysis.** The SCD and CPF emphasize the need for high productivity jobs in agriculture for poor households and vulnerable groups, particularly women in this context. Digital connectivity and services have the potential to alleviate many of the barriers faced by women, including access to information and financial services. In addition, connectivity, in combination with training from the project could help to address challenges related to illiteracy and poverty. Cultural norms could also start to shift due to increased access to

[27] Assuming 45% penetration in Northern regions (GSMA Mobile Economy Sub-Sharan Africa 2017 report)

information. Gender gaps in access to mobile and broadband services and financial inclusion are high as previously noted. According to the FAO (2011), if rural women in developing countries had the same access to productive resources as men, the yields on their farms would increase by 20-30 percent. Mobile technologies may lead to price optimization in Benin as evidence from Jensen (2007) in India who found that IT innovations improved market performance and also increased household welfare. The cost of inaction is high and the economic and social case to support digital gender equality is clear.

- **Actions.** Based on interviews with stakeholders in Benin and best practices (notably the 2018 World Bank "*Engendering ICT Toolkit*"), the project is expected to reduce the digital and financial gender gaps, enhance women's voice and agency, and improve economic outcomes for women through specific activities based on women's needs, including:

  (i) Closing the digital gap

  a. Increasing the number of women smallholder farmers and female-headed households that will be able to access both mobile services (voice and SMS) and the internet, including providing affordable services for female-headed households;

  b. Disaggregated data collection and capacity-building programs for decision makers focused on measuring and bridging the digital gender gap;

  c. Digital literacy trainings that are amenable to women's circumstances (accessibility, timing, availability of female intermediaries etc);

  d. Targeted awareness of ICTs towards women in local communities and women-led producer organizations. ICTs can enable these cooperatives to have better access to price information, facilitate better logistical planning to reduce the spoilages of produce, and improve their capacity to organize and advocate for the needs of women smallholders, overall.

  (ii) Increasing access to financial services

  a. Digitization of women's informal savings groups and tontines (women represent 62 percent of users), helping to provide a safe and private location for women to store their money;

  b. Support access to financial services through mobile money, with a focus on not only access but usage for women smallholders;

  c. Support the training of women agents for digital finance as a pathway to increase access and usage for women smallholders;

  d. Targeted support for financial literacy trainings for women and employment of women to deliver these.

  (iii) Increasing access to information, productive inputs and time-saving solutions

  a. Establish women-led producer organizations and support for the formalisation of cooperatives including female-headed households. These organizations could provide a venue for women smallholders to access information, productive inputs, like fertilizer and time-saving solutions and technologies to help improve their productivity;

b. Support for digital solutions that deliver new information and services relevant to the four value chains where women predominate, taking into account their needs. Female representatives from each of the four value chains will be involved in the design and judging of App Challenges, and all solutions will be tested and iterated directly with the women in the target areas.

(iv) Access to markets

a. Rehabilitation of rural roads in areas that will have a high impact on women smallholder farmers to improve their access to markets and decrease loss of produce due to logistical inefficiencies;

b. Support for digital solutions that provide transport-related information to improve logistics and reduce loss of produce;

c. Implementation of citizen feedback applications with a key focus on ensuring the voice and perspective of women beneficiaries are meaningfully considered.

- **In addition to activities described in the sections above, the project is exploring the potential to implement additional gender-targeted interventions with the support of the Africa Gender Innovation Lab (GIL).** If implemented, they would address issues such as:

(i) Representation**:** The project could explore how participation and program impact varies according to the gender of the extension agent featured in the e-extension videos, picture-based extension services and other materials. Diversifying types of trainings could for example be a way to establish evidence on what works, for different types of beneficiaries (age, education, marital status). The project could also promote in-person female role models as leaders and internet users within communities. There is potential to link women farmers through digital platforms to connect different cooperatives of women in Benin or in the region to each other over space. This could allow them to share information and lessons learned about agricultural methods in real time and market information that could link producers with buyers, as well as form and strengthen linkages amongst female farmers.

(ii) Factors of success: Through the collection of demographic information at the baseline, this project offers the possibility to build an evidence base of what kind(s) of women benefit from project interventions. With a focus on female-headed households, there is a possibility to look at factors that affect this subgroup as compared to male-headed households, and the dynamics at play in the household in terms of economic empowerment and its effect on bargaining power, decision-making and gender-based violence (GBV).

(iii) Norms and trust: There is a unique opportunity to see the effect mobile technology and digital skills development has when women farmers leapfrog from a cash-based economy in communities without internet access to e-commerce. Studies could demonstrate how digital processes over-lay or over-write existing norm structures of trust between farmers and customers engaged in financial transactions.

(iv) Labor: Digital applications of the project could target female farmers' labor constraints, such as childcare responsibilities or distance from home to work. Such digital applications could also help them identify workers and coordinate labor hiring

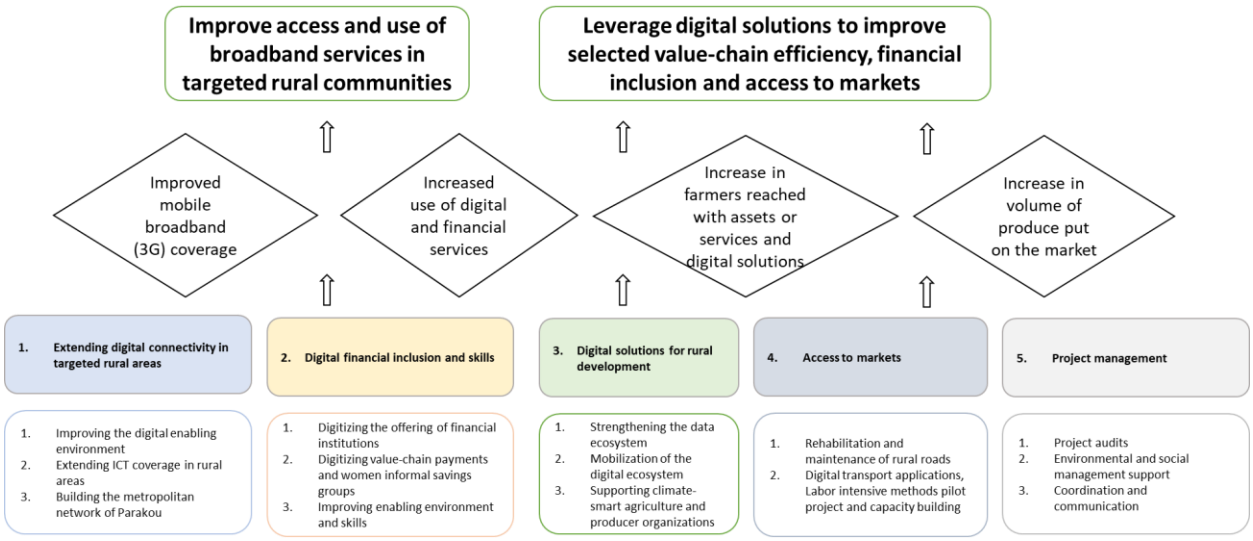
and payment. The digital services could also allow women to rent labor-saving technology by connecting them with owners of tractors or other agricultural machinery used to increase productivity.

- **Monitoring and evaluation.** The Monitoring & Evaluation (M&E) Results Framework will monitor the project's gender impact with disaggregated indicators. The project will conduct randomized controlled trials (RCTs) on technological adoption and innovation for women who are head of the household compared to those who live in male-headed households, and impact evaluations to assess the impact of one or more sub-intervention on women's income.

61. **The project will focus on four proposed value-chains: Rice, Maize, Shea (*karité*), Vegetables (*maraîchage*),** identified by the MAEP as priorities. The regional areas and four value chains have been selected as the main targets for the project because: (i) these crops and products are predominant in the northern regions of Benin; (ii) the crops are the basic sources of livelihood for the majority of the population who are engaged in agriculture, and about 40 percent of farmers in these value chains are women according to MAEP statistics; and (iii) they have low levels of productivity as compared to their full potential and what could be achieved. These criteria characterize the reality in the northern part of Benin, which represents the area of the country characterized in census data from 2012 by high levels of food insecurity and a high proportion of vulnerable groups, such as female-headed households, as well as significant potential for long-term sustainable agricultural development. See Annex 4 for maps of agricultural zones. The strengthening of Benin's agricultural value chains is a major priority outlined in the CPF, especially upgrading within short value chains such as shea or rice which are managed by women.

62. The targeting criteria for Component 4 are based on: (i) cost-benefit analysis of candidate links for rehabilitation; (ii) assessment of basic accessibility to critical rural roads in the areas with limited access to local markets; (iii) targeting of agricultural high production zones and the poorest rural communities on the basis of available poverty data or studies; and (iv) road surveys, a process that will be carried out with a participative approach at the community level.

D. Results Chain and Theory of Change



E. Rationale for Bank Involvement and Role of Partners

63. **The World Bank is uniquely positioned to support digital rural transformation in Benin**. The World Bank has significant experience implementing digital initiatives in the agriculture sector globally (including the Côte d'Ivoire e-Agriculture project (P160418)). Additionally, the World Bank has over a decade of experience supporting infrastructure projects through PPPs, bringing the necessary public funds to expand infrastructure in under-served areas. It is well positioned to provide integrated solutions by mobilizing teams across multiple sectors (digital infrastructure, finance, agriculture, transport and logistics, digital ecosystem, jobs).

64. **This project is complementary to the Development Policy Financing under preparation for Benin, which includes a pillar on 'Digital Economy Development'.** This pillar includes prior actions aiming to guarantee the quality of digital services by providers, stimulate competition in the ICT sector, promote the use of digital platforms for e-government services, and encourage the emergence of digital entrepreneurs through a regulatory framework for startups.

65. **The World Bank is collaborating with various donor partners to ensure the complementarity with other initiatives in the digital agriculture sector.** This operation is coordinated with a project funded by the AFD. The World Bank and the AFD have prepared the two projects in parallel to combine their efforts in rural development and best complement the on-going digital agriculture initiatives in Benin. At the sub-regional level and in Benin, there are a variety of donors with a longstanding interest in digital agriculture, including the Belgian Technical Cooperation and the African Development Bank. Both have been consulted during project preparation. The World Bank will collaborate with private (MNOs, Agri-businesses, merchants) and financial sector entities (banks, MFIs and Fintech firms) to improve access to digital services and ensure sustainability of the scheme.

F. Lessons Learned and Reflected in the Project Design

66. **Optimizing the use of public funds: infrastructure investment through MFD.** The project design draws from lessons learned over the past decade through the World Bank's experience in telecom infrastructure. The use of the MFD approach and Public-Private Partnerships has been at the core of the World Bank ICT portfolio. Through RCIP (P111432) and WARCIP (P116273), World Bank-funded projects have tried to maximize the contribution of the private sector to allocate the scarce public resources such as IDA to activities that will not be financed by private investors: infrastructure in areas where there is a clear market failure, public goods (hot spot internet access in a village, or in a school). The Madagascar RCIP project (P118213) served as a good example for investment in passive infrastructure, through a "reversed auction" mechanism, and financing of the installation of hundreds of towers in white zones.

67. **Incentivizing private investments: removing regulatory bottlenecks.** The design of Component 1 is partly based on the World Bank experience in Romania. The Government of Romania had commissioned a study on the most adequate PPP approach per village across the country to minimize the use of public funds. The purpose was to identify the regulatory and legal bottlenecks that were hindering private investments by local operators. Though the MFD Approach Tier 2, Component 1 will first identify such bottlenecks in the new legal and regulatory framework in Benin, and tailor the proposed PPP schemes to the economic and demographic profile of the targeted communities.

68. **Ensuring ownership: identifying the demand for digital services.** One of the key lessons learned from the multitude of e-agriculture initiatives launched in West Africa is that off-the-shelf solutions imposed on the users rarely last beyond the pilot phase. There are several reasons for this: (a) off-the-shelf solutions rarely consider local constraints faced by the end users (e.g. language, literacy, connectivity, electricity, cultural norms). The beneficiaries generally stop using it at the end of the pilot phase; (b) ready-to-use digital solutions rarely respond to the specific needs of the targeted population. The beneficiaries use the service during the pilot phase but abandon it once the pilot is over. As a result, there is no uptake of the demand which never reaches the critical mass of users necessary to make the service financially viable; and (c) pilots often propose the new digital service for free without a proper business plan to ensure sustainability beyond the pilot. Consequently, Components 2 and 3 are designed to ensure local demand is understood and targeted in the development of digital solutions beyond prototyping. They will include, for example, awareness and trainings as well as piloting of solutions with the target audiences.

69. **Ensuring ownership: leveraging local talents, networks and knowledge.** As mentioned above, the design of Component 3 draws lessons from many e-agriculture initiatives launched in the past few years. Most of them failed after a year because the users, mostly farmers and producers, were not convinced of their efficiency. When exchanging with farmers in Benin who participated in previous e-agriculture pilots, the issue of adoption was the main factor of failure. The proposed solutions may have worked somewhere else, but the design and development were rarely adapted to the local demand and norms. Component 3 of the proposed project will rely most entirely on local talents and start-ups to design and develop solutions based on farmers' demands. Through a series of workshops throughout the implementation, representatives of farmers and producers will meet with local developers to define their specific needs. Solutions will be tested and developed using existing networks. Extension services that use women's social networks have been seen to be successful. In the literature, Kondyllis and Mueller (2012) find that selecting female volunteer farm advisors directly within the community increased the use of agricultural techniques by both female and males in the community.

70. **Financial inclusion: using an ecosystem approach to ensure use of services.** Component 2 integrates lessons learned from studies and initiatives on digitizing payments in agricultural value chains conducted by the World Bank Group and other donors in other African countries, and on access to digital financial services beyond payments for the rural population. An ecosystem approach is crucial for sustainable development of digital financial services. According to several McKinsey studies, digital financial services require some key elements, including: (a) a favorable legal and regulatory environment; (b) a favorable environment with a broad set of merchants and businesses that accept digital payments to reduce the need to withdraw cash; (c) a favorable legal and regulatory environment, and improvement of digital literacy and awareness; (d) development of digital platforms; and (e) developing an offering of digital financial products people would prefer compared to existing alternatives. Once a digital infrastructure is in place, it needs to be supported by a sustainable business environment that includes banks and other financial institutions, as well as telecoms companies, handset manufacturers, fintech companies, and other businesses such as retailers. Partnering with mobile operators to improve affordability of the mobile payments is key to expanding outreach of digital financial services especially in low income countries.

71. **Digital financial inclusion: provide relevant digital terminals and building literacy and trust.** Other challenges including low rates of literacy and financial literacy among rural clients, and limited trust in digital services must be tackled through financial education and strong consumer protection to prevent digital products from creating financial exclusion rather than inclusion especially among women and rural populations. Limited trust in MNOs due to the quality of the connectivity, lack of interoperability between

mobile money operators, and lack of confidence in consumer protection regimes can strongly prevent adoption of digital financial services. It is therefore important to have MNO involved as much as possible in reassuring the clients and involved in the design of consumer protection policies and committed to allow interoperability. It is also crucial to improve the awareness of digital products and services, ensuring that clients understand the value of these, how they work, and can tangibly improve their lives.

72. While digital financial services create enormous opportunities for economic growth and better resilience of populations, it brings multiple risks. These risks include issues related to cyber-security, supervision and monitoring of Anti Money Laundering/Counter Terrorism Financing and other related operational risks. This project will be informed by the IMF-World Bank Bali Fintech Agenda, whereby the WBG and IMF stressed the need for adequate preparation and cross agency coordination by national authorities, including through strengthening of institutional capacity, building up knowledge, improving communication with stakeholders, and expanding consumer education.

73. **Complementarity with related initiatives.** The project will benefit from strong alignment with existing projects. This project will complement the Agricultural Productivity and Diversification Project (PADA) initiative (P115886) for Benin in restoring and improving the productivity and the value addition for selected value chains in the recipient's territory and connecting agricultural products to both domestic and international markets. The implementation of this component will contribute highly to the PADA Component 3, which aims at developing/rehabilitating irrigation and market infrastructures. Components 2 and 3 will also complement the Agricultural Competitiveness and Export Diversification Project (P168132) currently being developed. It will also supplement the Government's national road rehabilitation program and be aligned with its digital agriculture strategy.

74. **The implementation of the activities to address GBV risks, including sexual exploitation and abuse (SEA) risks, draws heavily on prior projects and international experience**. Activities, ranging from prevention to support to survivors of any GBV incidents, will be based on the approach recommended by the "Good Practice Note on Addressing Gender-Based Violence in Investment Project Financing involving Major Civil Works" issued by the World bank in September 2018.

III. IMPLEMENTATION

A. Institutional and Implementation Arrangements

75. **The project will be implemented by MENC, in coordination with the MAEP and the MEF.** The PIU will be anchored at the MENC. A focal unit will be designated at the MEF to oversee Component 2 of the project under the coordination of the PIU. Similarly, a technical focal unit will be designated at the MAEP to oversee the implementation of Component 3 under the coordination of the PIU. Component 4 will be coordinated by the *Direction du Genie Rural* (Department of Rural Works, under the MAEP). See Annex 1 for additional details.

76. The Coordination team is familiar with project management and has extensive experience with other donor funded programs. A full assessment of both ministries implementing units has been carried out to ensure they have the appropriate capacity strengthening for project execution and fiduciary management.

77. The focal unit under the MEF will help coordinate the implementation of Component 2, ensure coherence with the Government's work on financial sector and financial inclusion and compliance with the regional central bank's regulation. It will ensure that at all times measures are in place to safeguard the financial system through monitoring, assessing, and mitigating the risks of criminal misuse of digital financial services, and anti-money laundering and financing of terrorism (AML/CFT). It will also ensure coherence with other donors' interventions in the digital and financial inclusion space.

78. **A Steering Committee will be established to oversee project implementation and provide strategic guidance to the PIU.** The Steering Committee includes representatives of all ministries involved in the project. The Chair of the Committee is the MENC, and the Vice-Chair is the MAEP. The Steering Committee will be supported at the regional level by Regional Advisory Groups (*Groupes Consultatifs Régionaux*) composed of representatives of the Agriculture Development Agencies (*Agences Territoriale de Développement Agricole - ATDA*), the local Prefectures, and the regional umbrella organizations of the selected value chains as well as relevant departments within the MENC.

B. Results Monitoring and Evaluation Arrangements

79. **Progress toward the achievement of the overall PDO will be measured based on the PDO-level and intermediate results indicators**. The Monitoring and Evaluation (M&E) system will be used to collect relevant, gender-disaggregated data and information pertaining to measuring results, including project outcomes and quality of project execution. The World Bank team will conduct an annual evaluation to review the progress against results indicators, based on data supplied by the PIU. The PIU will be responsible for developing a detailed M&E plan, specifying standard protocols and guidelines for data collection and use for the duration of the project, and will organize trainings for relevant stakeholders in the M&E plan. Progress reports will be closely reviewed by the multi-sectoral steering committees set up in Benin and comprising all public and private stakeholders. The PIU will provide quarterly monitoring tables and progress reports on all PDO- and intermediate-level results indicators as well as any additional indicators specified in the M&E plan to the World Bank during routine implementation-support missions (see also Annex 2 for a detailed review of the M&E aspects).

C. Sustainability

80. **The MFD approach will ensure the financial and economic viability of the investments in white and gray zones.** The purpose of the MFD approach proposed in Component 1 is to optimize the use of public funding to make the investment commercially viable in the long term. By increasing demand, Components 2 and 3 will reinforce the commercial viability of the infrastructure.

81. **The development of digital agriculture services will also be based on their sustainability**. Among all the criteria used to select the proposed services and platforms, sustainability will be one of the key aspects. Over the past decade, many e-agriculture pilots and initiatives have been launched with limited impact and very low viability. Component 3 of the proposed project will provide customized training to the users, build the viability of the service in the initial design, and ensure ownership by involving the end user in the design of the service. Experience learned in the PADA and other projects funded by the World Bank has contributed to (i) better alignment of project interventions with beneficiaries' needs; (ii) ensuring a good coordination of the different interventions between partners; and (iii) establishing a consultation

and harmonization framework for key stakeholders in project area. This arrangement will eventually enable sustainability of activities in the long term.

82. **The project is promising for small producers and beneficiary populations**. Improved rural access roads will greatly facilitate market accessibility and evacuation of agricultural products. They also allow for a reduction in duration in travel times and transport costs bringing efficiency in the value chain. From the experience of the Cote d'Ivoire Agriculture Sector Support Project (*Projet d'Appui au Secteur Agricole de Côte d'Ivoire* - PSAC P119308), an important gain in job creation has been achieved through the creation of local and sub-regional SMEs. The PSAC has allowed the beneficiaries (smallholders in targeted regions) to obtain more regular revenues, reassuring and attracting new service providers and SMEs. In return, these SMEs have created job opportunities for young men and women in rural areas. The typology of the proposed road infrastructure works is very similar to works financed under World Bank infrastructure projects, notably the e-Agriculture project in Cote d'Ivoire (P160418), which attracts national small and medium enterprises and creates jobs for the vulnerable population. The involvement of key stakeholders and their engagement and their appropriation of implemented infrastructure will enhance their capacities in road maintenance management.

83. **The maintenance scheme for all infrastructure, particularly rural roads, aims at fostering environmentally and socially responsible strategies based on low costs and participatory approaches.** In terms of governance and accountability, the project will be improving transparency and enhancing access to information disclosure through stakeholder surveys and forums for feedback, civil society participation, and collaboration with the private sector. The participatory approach favored in Component 4, and the emphasis on local ownership through the active participation of the local populations in the works and the proposed road maintenance schemes will contribute strongly to the durability of the infrastructure. This will help ensure adequate future maintenance. The maintenance work plan financed annually by the National Road Maintenance Fund should include some of the roads rehabilitated under the project. Finally, to address the issue of low financial or technical capacity of smallholders and farmers to support road rehabilitation activities, the project will (i) support the MAEP in implementing Component 4 through a delegated management contract (*Maîtrise d'Ouvrage Déléguée* - MOD) to be signed with the PIU; and (ii) involve the private sector (smallholders, road users, etc) and the local administrative services and rural communities in the management of the road maintenance.

84. **The capacity of producers will be enhanced in environment and social management safeguards implementation**. This will help them for future projects and prevent or minimize negative environmental and social impacts resulting from project activities.

85. **Climate change and disaster risk screening.** The project was screened for short and long-term climate change and disaster risks as well as climate change adaptation co-benefits. To enhance resilience of the project to impacts of climate change and natural disasters, the project will adopt a resilience strategy based on reducing the risk of catastrophic failure. The rehabilitation and maintenance of roads will ensure an all-weather/season practicability and an adequate level of service for the roads in the project area. The design approach will help to avoid any negative impact and provide high levels of road protection while the materials and design standards will emphasize reducing the risk of flooding and destruction of housing and facilities. Furthermore, the project will also implement a climate and natural hazards monitoring, early warning and incidence response system.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

A.1 Technical

86. **Component 1 –** The technical design of Component 1 builds on lessons learned and best practices of similar projects that have been implemented in other countries[28], as well as the recent 2018 report on "Innovative Business Models for expanding Fiber-Optic Networks and Closing the Access Gaps" sponsored by The Digital Development Partnership of the Digital Development Global Practice. The infrastructure component is designed around four core principles (evidence of market failure, general interest, public capital funds limited to the minimum necessary, and open access PPPs). The bidding specifications will be technology neutral to allow as many operators as possible to participate in the bid and will not have a technology-based bias that could favor one operator over the others[29]. The bidding will request only minimum specifications, such as minimum internet speed, number of locations to be covered, size of population to be covered, and standard telecommunications services to be delivered such as voice and messaging services. The private operators will be able to select the design of their choice, which could include, among others: (i) passive telecom towers to facilitate the deployment of active mobile antennas by mobile network operators; (ii) a fully active Radio Access Network deployed by a mobile network operator, who provides a local roaming access to other mobile network operators; (iii) low-cost 'microsite' alternative deployed by third-parties for rural areas targeted by the project who then sell their services to mobile network operators; and (iv) other types of wireless access such as satellite access. The technical design is consistent with international best practice. The design of the project is based on a model of competitive, private-sector delivery wherever possible. Lastly, the deployment of digital infrastructure will take into account access to energy and will propose alternative solutions such as solar if the power grid is not available. This is fully consistent with international experience which shows that this is a more cost-effective way of delivering ICT services than the Government becoming directly involved in service delivery itself.

87. **Components 2 and 3 –** Components 2 and 3 will face the challenge of keeping up with the rapid advances in information technology tools and applications – whose costs are declining and functionality and efficiency increasing especially in the consumer space. These developments are largely driven by the private sector. Since the project would rely on private sector providers through partnerships or contracts, it will ensure that technology neutral solutions and technical specifications are prioritized, allowing for flexibility, scalability and adaptation to the local conditions. This will minimize the risk of technological obsolescence. Hardware and software standards that are incorporated into information network design and communication will follow internationally-accepted standards, such as: distributed computing

[28] Nicaragua Rural Telecom (P089989), Madagascar Regional Communications Infrastructure Program (P094103), Tanzania Regional Communications Infrastructure Program (P111432), Uganda Energy for Rural Transformation Project (P069996), and Papua New Guinea 3G Network Upgrade (P107782).

[29] The project will nevertheless focus mostly on wireless network access. As in most other Sub-Saharan African countries, the wired network is lagging well behind the wireless infrastructure in the delivery of telecom and ICT services in Côte d'Ivoire. Wireless networks, especially mobile telecommunications networks, are thus the most relevant technology to ensure access to digital services in rural areas. Another wireless technology worth considering is satellite broadband, even though it may not provide the reliability and bandwidth of a mobile network.

environment and Open Software. Emphasis will be placed on close monitoring of the contract implementation for compliance with the terms and conditions of the bidding documents and contracts. With regards to the development of digital services, the proposed digital solutions will necessarily meet identified user needs, have been well tested, and lessons learnt from failures and successes have been incorporated in the design of each of the proposed activities. Efforts will be made to design appropriate digital solutions to provide location specific advisory services to a large number of farmers, and women in particular.

88. **Component 4:** The proposed investments for this component will not entail major technical difficulties. The technical standard for the basic access roads is set at a level sufficient to ensure basic, minimum road accessibility, which is defined as accessible by motorized traffic throughout the year with interruptions less than three hours per event and cumulatively less than one week per year. The total linear to be maintained is 3000 km (a linear of 600 km equivalent will be maintained each year). Improvement of basic access links will be performed by small-scale contractors using labor-intensive methods to the extent feasible and by SMEs for more specialized works. Rehabilitation/improvement of key rural roads will involve improvements to existing surfaces, structures, and drainage systems. Works will be performed through conventional contracting and will follow the applicable national standards. Supervision of works, including implementation of environmental mitigation plans will be provided for all works under the component through the hiring of experienced consulting firms.

A.2 Economic & Financial (see Annex 3 for detailed analysis)

89. **Component 1 is viable financially and economically.** The results for the project *without* public capital support are: (i) the financial rate of return (FRR) (C – without capital) is 8 percent; (ii) the break-even point occurs in 14 years; and (iii) the Net Present Value (NPV) is US$ -9.3 million (with a discount rate of 10 percent). These results show that although FRR (C) is positive, telecommunication operators would not invest in this project alone because it would not provide the minimum rate of return that private mobile operator companies usually expect (around 12 to 16 percent depending on the socio-economic context). Therefore, public financing is needed to make the project possible.

90. The results for the project *with* public capital support are: (i) the FRR (K – with capital) is 15 percent; (ii) the break-even point occurs in 11 years; and (iii) the NPV is US$20.5 million (with a discount rate of 8 percent). These results show that the project becomes acceptable for private operators; moreover, the fact that the FRR on national capital FRR (K) is in the lower range of the expected rate of return for standard mobile telecommunications projects and that the break-even point occurs in the long-term (11 years) show that the public capital support is not over-proportionate.

91. It needs to be noted here that although last-mile operators were consulted in advance, there is a certain level of uncertainty with regards to the final level of revenues that will be generated by the infrastructure. This is acknowledged in the design of the project, which requires the inclusion of a claw-back mechanism into the PPP contract that would apply in case revenues are higher than originally foreseen.

92. Because of the lack of socio-economic data at the local level, the economic analysis is limited to two direct measurable effects, namely the extra fiscal revenue earned by the Government thanks to the project and the local salaries paid to local staff to ensure the maintenance and security of staff. The extra fiscal revenue is limited to the Value Added Tax at an 18 percent rate, and the local salaries are evaluated by considering a full-time equivalent staff for each site, paid at the minimum legal wage of US$70 per month. These two direct revenues amount to a total cumulative value of US$84.9 million, which is in line with the

public capital support of around US$40 million provided by the project for financing digital infrastructures in targeted rural areas.

93. **Component 2 will bring significant benefits.** Financial inclusion, and associated financial planning for farmers, would help boost micro, small and medium enterprises as well as entrepreneurs, which could take people out of poverty and potentially create new jobs. In the long term, the benefits of digital finance go far beyond expanding access, driving down costs, and increasing the convenience of transactions. A digital-payment network is part of the basic infrastructure of an economy that enables individuals and businesses to transact with one another seamlessly. It also can underpin a broader and more innovative array of business activities. Over the medium to longer term, digital financial services can enable development of e-commerce and give access to more business economic opportunities.

94. **Component 3 would yield high financial and economic returns, but these are hard to quantify.** Based on the experience of similar projects using the latest advances in digital tools and applications to improve efficiency at all stages of the agricultural value chain, the proposed activities of the digital services for the sustainable agricultural development component would yield high financial and economic returns. It would also bring several benefits, with the reduction in gender inequality, empowerment of women, development of skilled agricultural extension and advisors, localized content, promoting digital literacy, promoting startups in various aspects of digital applications in agriculture, peer to peer knowledge exchange, collaboration between institutions involved in the agricultural sector, etc. However, due to the lack of available agricultural data, the financial and economic returns – as well as the overall benefits – cannot be easily quantified.

95. The project would enhance the capacity of the MAEP and other relevant government institutions at the national and local levels in all aspects of the “data to decision making value chain” for the targeted agricultural products. Skills of the staff would be enhanced in the use of a wide range of digital tools and applications for data collection and decision-making.

96. The project’s bottom-up approach is expected to result in the development of high-quality content (defined as data, information and knowledge) which is most useful and locally relevant to address the needs of the farmers. The project would further disaggregate mobile subscriptions by income, gender, etc., to get a better understanding of the main problems being faced by smallholders at every stage of the value chain of the focus agricultural products - who is using the content, how to make it more relevant for users and help in providing practical solutions which the farmer can adopt.

97. Data for carrying out a detailed economic and financial analysis, (such as crops, farm budgets, with and without project conditions, estimates of incremental production, incomes, savings in time and increases in efficiency in all stages of the agricultural value chain, current and projected financial and economic prices of inputs and outputs, detailed investment and operating costs, etc.) are in the process of being collected. Evaluations of e-agricultural services which have been carried out in developed and developing countries demonstrate that investments made in these activities yield high economic and financial returns. These are provided in Annex 5.

98. **Component 4 – Rehabilitation and maintenance of the rural access roads have a positive economic and social rationale.** Rehabilitation and maintenance increase the level of connectivity and social cohesion. By increasing the level of service, this program will: (i) boost means of transport; and (ii) permit easy movement of persons and goods by allowing a reduction in the trip duration and transport costs. These impacts will bring efficiency in the value chain. In addition, from the experience of other projects, and notably PADA, the populations have easier access to basic social services. Benefits expected from

extended basic road access include enhanced access to markets, health, education and information, improved year-round connectivity and lower transport costs. An important gain in local job creation will be created for the benefit of young men and women in rural areas notably in the project intervention areas. In addition, the rehabilitated roads will reduce transport costs, freight rates, vehicle operating costs, and travel times, facilitating the expansion of agriculture, trade, and access to markets. The lack of accessible rural roads identified in the project areas contribute to farmers losing large quantities of their perishable products. By improving access roads, the program will contribute to increasing the production and income as well as food security for people in project targeted areas.

99. The economic cost and benefits will be assessed for each stretch of road included under the project as part of the selection process. While an economic analysis cannot be carried out at this stage, the traditionally used indicators (NPV) and internal rate of return (IRR) will be used in the prioritized selection strategy of the rehabilitation and maintenance rural roads program. The usual range of IRR for rural roads is between 15 and 20 percent and will be calculated with the Road Economic Decision (RED) methodology developed by the Sub-Saharan Africa Transport Policy (SSATP) Program for low volume roads. The financial profitability of the project will be determined using indicators of investment returns including NPV and economic rate of return (ERR) as well as analysis of the risks that could be involved. The methodology will be based on cost-benefit analysis with a discount rate of 12 or other appropriate rate.

B. Fiduciary

(i) Financial Management

100. **A Financial Management (FM) assessment was conducted on the FM arrangements project**. The project will be implemented by a PIU to be established under the oversight of a steering committee chaired by the MENC. The PIU will be responsible for coordinating the day-to-day implementation of the project, including financial management, organizational aspects and monitoring and evaluation. The FM assessment conducted in February 2018 to ensure that the PIU has the minimum requirements to manage the project funds revealed some weaknesses. These include (i) lack of familiarity with IDA procedures for reporting, disbursement arrangements, and auditing; (ii) lack of qualified financial management staff; and (iii) lack of financial management tools: accounting software, manuals of accounting procedures and financial management. The FM assessment was carried out in accordance with the FM Manual for World Bank Investment Project Financing Operations that became effective on March 1, 2010 but was issued (retrofitted) on February 10, 2017. The conclusion of the assessment is that the following actions must be implemented to enable the PIU to take on the new project: (i) build a Financial Management team within the PIU which will be staffed with a qualified and experienced Financial Management Expert, an Accountant, and an Internal Auditor under terms of reference acceptable to IDA; (ii) establish a credible and effective Internal Audit function; (iii) develop a comprehensive Administrative, Accounting and Financial Manual of procedures, as part of the PIM (Project Implementation Manual) in form and substance acceptable to the World Bank; (iv) purchase a multi-project and multi-site financial and accounting management software in a manner satisfactory to the World Bank; (v) recruit an independent external auditor in compliance with Terms of Reference acceptable to IDA, and (vi) roll out a training plan which includes, inter-alia, training on IDA disbursement procedures, and training on IDA financial reporting arrangements.

(ii) Procurement

101. The Borrower will carry out procurement for the proposed project in accordance with the World Bank's "Procurement Regulations for IPF Borrowers" (Procurement Regulations) dated July 2016 and revised in November 2017 and August 2018 under the "New Procurement Framework" (NPF), and the "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated July 1, 2016, and other provisions stipulated in the Financing Agreement.

102. Procurement shall be carried out by the PIU. All procuring entities as well as bidders, and service providers, i.e. suppliers, contractors and consultants shall observe the highest standard of ethics during the procurement and execution of contracts financed under the project in accordance with paragraph 3.32 and Annex IV of the Procurement Regulations.

103. The Borrower (with assistance from the WB) prepared the Project Procurement Strategy for Development (PPSD) which describes how procurement activities will support project operations for the achievement of project development objectives and deliver Value for Money (VfM). The procurement strategy is linked to the project implementation strategy ensuring proper sequencing of the activities. It considers institutional arrangements for procurement; roles and responsibilities; thresholds, procurement methods, and prior review, and the requirements for carrying out procurement. It also includes a detailed assessment and description of state government capacity for carrying out procurement and managing contract implementation, within an acceptable governance structure and accountability framework. Other issues considered includes the behaviors, trends and capabilities of the market (i.e. Market Analysis) to respond to the procurement plan. A detailed procurement description and institutional arrangements can be found in Annex 1, Implementation Arrangements.

C. Safeguards

104. The project was rated as a Category B, because potential adverse impacts associated with such activities are site-specific, moderate and reversible. No potential significant and irreversible adverse impact, direct or indirect, is expected to occur from project activities either during the construction or operation phase. The project triggers three safeguards policies: OP/BP 4.01" Environmental Assessment"; OP/BP 4.11 "Physical Cultural Resources" and OP/BP 4.12 "Involuntary Resettlement". To prepare for addressing the potential negative impacts, the Government has developed two appropriate safeguards instruments: An Environmental and Social Management Framework (ESMF) and a Resettlement Policy Framework (RPF). The ESMF outlines an environmental and social screening process for the activities. It also includes: Guidelines for an Environmental and Social Impact Assessment (ESIA); Environmental Guidelines for Contractors as well as sub-contractors; and a summary of the World Bank's safeguard policies. It also contains chapters to address Physical Cultural Resources matters. That means guidance and guidelines have been included in the ESMF to this end.

(i) Environmental Safeguards

105. Activities under the project are expected to provide environmental benefits to the people in the project area. These benefits include improvement of surveillance of environmental conditions and monitoring of agriculture and livestock, existence of a reference system for all interventions in the field of hydro-agricultural improvements at national level, contributing to the sustainability and profitability of hydro-agricultural improvements, anticipating decision-making by stakeholders or the Government. The

negative impacts could include loss of plant species, production of solid waste, risks of erosion and pollution of soils, water and air, risks of work and traffic accidents, noise nuisance, etc.

106. The ESMF has been prepared, in full compliance with national legal and regulatory framework and World Bank safeguard policies, including a broad consultation framework involving all relevant stakeholder groups, both public and private, as well as civil society. After consultations, it has been disclosed within the country on May 16, 2019 and at the World Bank website on May 16, 2019. A GRM will be set up to allow stakeholders and interested parties to bring up any concerns regarding the project to the PIU with the aim of finding a solution.

107. Safeguards documents include guidelines on Occupational, Health and Safety (EHS/OHS) and clearly mention that the company's Environmental and Social Management Plan (Works-ESMP) must be approved by the PIU and their partners prior to the commencement of works.

108. The bidding documents and the contracts for the main contractors as well as the sub-contractors must also include sections related to EHS/OHS. With respect to potential labor influx, the project will establish guidance and rules for contractors to enhance the ESMPs and workers contracts will include measures for managing the potential impacts of such an outside workforce on the local community. Specific details will be prepared during the investment activities for contractors who will bring in workers and operators from outside the area, and these are likely to be housed in work camps during construction.

(ii) Social Safeguards

109. The project aims to have overall positive social impacts especially for communities in the target areas and mainly for farmers, including small and middle producers of staple food producers, of which many are women. The project will use an inclusive approach to leverage local talents, to provide and develop solutions tailored to the needs of local users. This approach will allow the consideration of user concerns by regularly adapting solutions to users' needs and building capacities and ensuring the durability of the actions.

110. To ensure that the safeguard instruments prepared in line with policies triggered by the project are implemented properly, the PIU will hire an Environmental Safeguards Specialist and a Social Specialist. The Environmental Safeguards Specialist must have additional experience in EHS/OHS, and the Social Specialist with experiences in social risk management such as involuntary resettlement, GBV, social inclusion and any labor related risk. Both specialists will be fully in charge of all aspects of environmental and social safeguards aspects and will regularly monitor all safeguard requirements. More specifically, the two specialists, the whole PIU, the implementing agencies as well as the other stakeholders will ensure that children are not employed in civil works as labor force. World Bank implementing support missions will also include environmental and social safeguards specialists to ensure that all safeguard issues are addressed properly, in a timely manner.

111. The extension of ICT coverage in rural areas and the rehabilitation of rural roads under the project will involve land acquisitions that would lead to loss of land and/or property, loss or disruption of sources of income or livelihood, restriction to natural resources access for individuals or groups of persons. Given the fact that the exact locations of investment are not yet known, an RPF will be developed as a due diligence measure to mitigate potential negatives risks and impacts of the involuntary resettlement operations. The RPF has been reviewed, consulted upon and disclosed within the country on May 16, 2019 and on the World Bank's website on May 16, 2019. The RPF will serve as a guide to the preparation and

implementation of eventual Resettlement Action Plans (RAP) that will also be reviewed, consulted upon and disclosed prior to the commencement of any civil works.

112. The RPF sets out the policies, principles, institutional arrangements, likely categories of affected people, eligibility criteria and categories, compensation matrixes and rates, methods of valuing affected assets, community participation and information dissemination, GRM and effective monitoring and evaluation, etc. The PIU will be staffed with a Social Specialist to ensure the effectiveness of the implementation of the advocated measures of the RPF.

(iii) Gender

113. This project implements several aspects of the World Bank's Engendering ICT Toolkit and aims to ensure greater digital inclusion of women and help close the gender gap in access to, adoption and use of ICT tools that can reduce the gender gap in Benin. A gender analysis was conducted during project preparation and informed the design of this project and the targeting of female-headed households. The activities under this project consider women's different situations and needs.

114. It is also paramount that efforts to close the digital gender divide must be carefully designed in partnership with the local community, so as not to worsen gender power dynamics. There have been many unintended consequences for women when technology has been introduced, which have caused grievous harm. This project will take every effort to avoid such situations.

115. **Gender-based Violence (GBV).** The overall GBV risk is rated low for the proposed project based on the World Bank's GBV risk assessment tool[30]. The main GBV risk will likely be from an influx of labor in the context of the project's Component 4 – rural road maintenance activities – combined with widespread poverty in the region that can create additional pressures on communities and households and lead to conditions that can induce GBV. National contractors' presence and capacity in northern Benin is insufficient for the type of road works that will be funded by the project (rehabilitation and maintenance of access rural roads). Some contracts may involve labor influx through the contracting of firms coming from other regions and or through the hiring of workers that are not from the project areas. To mitigate the GBV risks associated with labor influx under the project, the project will follow the World Bank's recommendations highlighted in the "Good Practice Note For Addressing Gender Based Violence in IPF involving Major Civil Works" (September 2018)[31] and the "Labor Influx Guidance Note" (December 2016).[32] The approach followed to mitigate GBV/SEA risks will include: (a) the review of risks for the project areas and availability of prevention and support GBV services as needed; (b) the hiring of a specialized NGO to provide additional support services for GBV prevention and referral of survivors – this may include sensitizing project area communities about GBV risks, prevention and services available; (c) addressing GBV/SEA risks through the procurement process with the adoption of codes of conduct by any

[30] A tool for task teams to assess the risk of GBV, particularly SEA, has been developed by the World Bank and can be found online. The tool helps tasks teams understand the issues and risks of GBV in the project areas. It takes into consideration both project-specific details, such as labor influx levels, as well as the country context where the project takes place—such as situations of conflict. Through 25 questions, 12 to be answered by the task team and 13 that are prepopulated, the tool draws on information to give each project a risk 'score' based on the responses to the questions.
[31] http://pubdocs.worldbank.org/en/399881538336159607/Good-Practice-Note-Addressing-Gender-Based-Violence.pdf
[32] http://pubdocs.worldbank.org/en/497851495202591233/Managing-Risk-of-Adverse-impact-from-project-labor-influx.pdf

contractor working on the project – this will mean that all road works' contracts under the project will include contractual clauses that specify the adoption of codes of conduct for any worker on the project. The code of conducts will be translated in all relevant languages and will be displayed in the contractor's main facilities; (d) the requirement that the contractor, the supervision consultant, and the PMU will each have social safeguards specialists with terms of reference including proactive actions to minimize negative social impacts, particularly GBV; and (e) the setting up of a monitoring framework in coordination with the communities and the specialized GBV NGO in order to monitor GBV/SEA incidents and to ensure access to services by survivors. This will require adapting the project's grievance redress mechanism specifically to respect confidentiality of GBV survivors in coordination with local relevant service providers (psychosocial, medical and judicial services). The overall proposed approach includes activities that go beyond what is required by the World Bank's Good Practice Note for a project with a low GBV risk defined by the application of the World Bank's GBV risk assessment tool.

(v) Grievance Redress Mechanisms (GRM)

116. 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 complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB 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 World 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.

117. **GRM and beneficiary feedback.** A variety of tools such as web-based surveys or text-based surveys can be used to collect feedback on general or specific services from beneficiaries, or even metrics to measure their well-being. In addition, the use of mobile phones by producers has been successfully tested to effectively collect information on service delivery, especially in the rural areas. A dashboard will be created to visualize the results for decision makers (i.e. MENC and MAEP), for effective decisions and actions, and the public. A GBV specific GRM will be established for the project to ensure confidentiality of any GBV survivor and referral to appropriate services. The specialized GBV NGO hired for the project will help establish the GBV GRM in coordination with the PIU and in alignment with the GRM for the overall project. Early in project implementation, the project will identify a local NGO, which will be mobilized as an entry point to the GRM, will help address potential grievance from survivors of GBV in a confidential manner, and will refer survivors to relevant service providers.

V. KEY RISKS

118. **The overall risk is rated substantial, due to the innovative cross-sectoral approach**. Benin has made significant progress economically and politically over the last decade, with a relatively stable macro-

economic context. The country and macro-economic contexts present moderate risks. However, this project will be implemented within the framework of the cross-sectoral *Programme d'Actions du Gouvernment* (PAG) of the Government of Benin, at the nexus of its Digital and Agriculture Strategies. This project is fully aligned with government priorities and this is expected to mitigate risks of political turnover, cross-sectoral implementation, and ownership.

119. **The Political and Governance risk is rated Substantial. Although governance is a priority of the current government, recent events in Northern Benin could thwart Government's efforts.** After President Patrice Talon's election, political transfer of power occurred without incident. Despite these positive outcomes, a growing body of reporting suggests violent extremist groups are present in some of the West African state's more remote areas. Recent sociocultural and security developments in the northern part of the country have created conditions more conducive to extremist activity, that could directly affect the implementation of the project, as well as the recent Government's efforts to improve the governance of the digital sector.

120. **The risk for Technical Design of Project or Program is rated Substantial. It presents several substantial risks**: risk to PPP and risk due to the cross-sectoral aspect of this project. The risk to PPP is mainly due to the uncertainties of the demand in the regions targeted by the project: low population density and disposable income. This may undermine the appetite of private investors. In addition, this project will be coordinated by two Ministries (MENC and MAEP), and will involve new implementation schemes such as the organization of "app challenge" to create content for the project beneficiaries, but will not strongly involve the Ministry of Economy and Finance. This design may affect the project implementation in the short term and create some coordination issues. To mitigate these risks, the project has carried out extensive dialogue with potential private investors and private operators during the preparation. Existing institutions such as the ARCEP, the ABSU-CEP, ADN (Benin's national agency for digital development), and the ASSI (Benin's information services and systems agency) have supported informed decisions on the selection of communities targeted by the project. In parallel, Ministries (MENC and MAEP) and MEF are involved to ensure strong ownership and better coordination. Finally, the extensive experience of the World Bank in the organization of app challenges across Africa provides useful lessons and tools.

121. **Acceptance and adoption of the digital services by the smallholder farmers – especially the illiterate – can pose a project risk throughout the project implementation period**. This risk will be minimized through continuous public awareness of both the positive and negative effects of technology applications - using various forms of communication media, regular training of beneficiaries, participatory needs assessments and developing mechanisms for local ownership of content and new types of community owned business models for the development and delivery of e- services by trusted knowledge providers. It will also be mitigated by the use of local networks for diffusion of services, the facilitation of participatory and iterative approaches to development of solutions, and outreach and training programs to improve digital, financial and numeracy skills.

122. **The project faces substantial risks related to Institutional Capacity for Implementation and Sustainability.** The MENC has little experience in managing donor-funded projects, and none in managing World Bank funded operation. In addition, this project, due to its innovative features and design, also faces risks to development outcomes (sustainability). In order to mitigate these risks, the project will be implemented by the MENC in close collaboration with the MAEP, which has extensive experience in World Bank operations. In addition, during the preparation phase, the MENC has received training in fiduciary aspects and project management. Regarding sustainability, the project is designed to establish a permanent innovation platform on which the local startups and the digital ecosystem in general will be

able to build and develop their services. All services developed under the project will be tailored and provided under a commercial scheme proposed by the developers, including the recovery of user fees.

123. **The Fiduciary risk is rated substantial taking into account the country context and the nature of the project activities as well as the World Bank's minimum requirements under World Bank Policy and Directive – IPF which describes the overall FM World Bank policies and procedures**. The proposed risk mitigation measures will strengthen the internal control environment and maintain the continuous timeliness and reliability of information produced by the PIU and an adequate segregation of duties**.** These mitigation measures have been incorporated into the design of the project's FM arrangements. The proposed financial management arrangements including the mitigation measures for this project are considered adequate to meet the World Bank's minimum financial management requirements under the World Bank Policy and Directive – IPF.

124. **Social and Environmental risk.** Section IV.C above details the potential social and environmental impacts and risks. Most environment-related risks are due to infrastructure construction (Components 1 and 3). Some social risks are linked to the strongly gender-focused aspects of this project. Section VI describes the monitoring framework this project will be implemented within, to mitigate some risks of exclusion based on gender. There is also potential for GBV resulting from labor influx (Component 3). To mitigate these risks, an ESMF and RPF have been prepared. Strong mechanisms to ensure a satisfactory implementation of resettlement compensation and specific measures to prevent and respond to GBV will be put in place. Furthermore, the bidding documents and contracts will include specific clauses that will require contractors and supervising consultants to demonstrate capacity to implement mitigating measures in line with the World Bank "Good Practice Note For Addressing Gender Based Violence in IPF involving Major Civil Works " (September 2018) (including, signing of codes of conduct with all employees, robust grievance redress mechanism (GRM) systems, and working with a specialized NGO to provide additional support services for GBV prevention and referral of survivors).

125. **Other-Security risk is rated Substantial.** The project implementation areas are in the North of Benin, with a complex operating environment given the expanding insecurity from the Sahel area. The security situation will be regularly monitored. Should the need arise, the project will rely on enhanced monitoring and evaluation approaches as currently implemented by the Mali Reconstruction and Economic Recovery Project (P144442).

VI. RESULTS FRAMEWORK AND MONITORING

Results Framework
COUNTRY: Benin
Digital Rural Transformation Project

Project Development Objective(s)

To improve access to broadband services in targeted rural communities and promote the use of digital solutions to improve efficiency of selected value-chains, financial inclusion and access to markets.

Project Development Objective Indicators

Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
Increase access and use of broadband services in rural communities				
Mobile broadband (3G and above) penetration rates (DE4A Moonshot indicator) (Percentage)		15.00	20.00	25.00
Leverage digital solutions to improve value-chain efficiency, financial inclusion, access to markets				
Population with a mobile money account (Percentage)		18.00	25.00	36.00
Population with a mobile money account - Female (Percentage)		11.70	18.00	25.00
Farmers reached with agricultural assets or services (CRI, Number)		0.00	1,000,000.00	1,600,000.00

Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
Farmers reached with agricultural assets or services - Female (CRI, Number)		0.00	600,000.00	1,000,000.00
Farmers reached with agricultural assets or services through women-led producer organizations (Number)		0.00	200,000.00	400,000.00
Beneficiaries using digital solutions supported by the project (Percentage)		0.00	40.00	70.00
Beneficiaries using digital solutions supported by the project through women-led producer organizations (Percentage)		0.00	40.00	70.00
Increase in volume of produce put on the market by beneficiaries (Percentage)		0.00	18.00	30.00
Increase in volume of produce put on the market by beneficiaries - Female (Percentage)		0.00	18.00	30.00
Beneficiaries that feel project investments reflected their needs (Percentage)		0.00	65.00	80.00
Beneficiaries that feel project investments reflected their needs - Female (Percentage)		0.00	65.00	80.00

Intermediate Results Indicators by Components

Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
Component 1 - Extending connectivity in rural areas				

Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
People using social media (Facebook) (Number)		850,000.00	1,200,000.00	1,700,000.00
People using social media (Facebook) - Female (Number)		255,000.00	400,000.00	600,000.00
Public officials trained on ICT policy and regulatory environment (Number)		0.00	70.00	100.00
Component 2 - Digital financial inclusion and skills				
Previously unbanked informal women's savings groups using digital financial services (Number)		0.00	45.00	100.00
Made or received digital payments in last year (DE4A Moonshot indicator) (Percentage)		28.00	30.00	35.00
Made or received digital payments in the last year - Female (Percentage)		19.00	23.00	30.00
Active mobile money accounts (Number)		2,210,000.00	2,500,000.00	3,000,000.00
Agriculture cooperatives / businesses accepting digital payments (Number)		36.00	50.00	72.00
Agriculture payments made via digital channels (DE4A Moonshot) (Percentage)		9.43	11.00	15.00
Beneficiaries reached with trainings (Number)		0.00	40,000.00	100,000.00
Beneficiaries reached with trainings - Female (Number)		0.00	40,000.00	70,000.00
Component 3 - Digital solutions for rural development				
Newly established women-led producer organizations (Number)		0.00	35.00	100.00
Farmers adopting improved agricultural technology (CRI, Number)		0.00	400,000.00	700,000.00
Farmers adopting improved agricultural technology - Female (CRI, Number)		0.00	250,000.00	500,000.00
Farmers adopting improved agricultural technology through women-led producer		0.00	150,000.00	300,000.00

Indicator Name	DLI	Baseline	Intermediate Targets	End Target
			1	
organizations (Number)				
Public officials trained in digital skills (Number)		0.00	500.00	1,000.00
Public officials trained in digital skills - Female (Number)		0.00	250.00	500.00
Students trained (Number)		0.00	500.00	1,000.00
Students trained - Female (Number)		0.00	250.00	500.00
Public grievances captured by GRM responded to in less than 24h (Percentage)		0.00	60.00	70.00
Component 4 - Access to markets				
Roads rehablitated (CRI, Kilometers)		0.00	200.00	600.00
Roads rehabilitated - rural (CRI, Kilometers)		0.00	200.00	600.00
Roads maintained (Kilometers)		0.00	1,000.00	2,400.00
Roads maintained - rural (Kilometers)		0.00	1,000.00	2,400.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Mobile broadband (3G and above) penetration rates (DE4A Moonshot indicator)	Percentage of the targeted population using broadband services (i.e. 3G+ or fixed internet for more than 1Mo/s)	Twice a year	Mobile operators and ISPs. If not available, ARCEP will be the	Data sent directly by the operators/ISP and/or ARCEP reports	PIU

			alternative source of information		
Population with a mobile money account	This indicator measures the percentage of project beneficiaries who have a mobile money account in the targeted regions.	Yearly	BCEAO & PIU	Survey	BCEAO & PIU
Population with a mobile money account - Female					
Farmers reached with agricultural assets or services	This indicator measures the number of farmers who were provided with agricultural assets or services as a result of World Bank project support. "Agriculture" or "Agricultural" includes: crops, livestock, capture fisheries, aquaculture, agroforestry, timber, and non-timber forest products. Assets include property, biological assets, and farm and processing equipment. Biological assets may include animal agriculture breeds (e.g., livestock, fisheries) and genetic material of livestock, crops, trees, and	Twice a year	Farmers and producers targeted by the project will report to the PIU and the applications/digital service developers for feedback	Direct reporting through mobile (e.g. SMS, voice, email, etc).	PIU

	shrubs (including fiber and fuel crops). Services include research, extension, training, education, ICTs, inputs (e.g., fertilizers, pesticides, labor), production-related services (e.g., soil testing, animal health/veterinary services), phyto-sanitary and food safety services, agricultural marketing support services (e.g., price monitoring, export promotion), access to farm and post-harvest machinery and storage facilities, employment, irrigation and drainage, and finance. Farmers are people engaged in agricultural activities or members of an agriculture-related business (disaggregated by men and women) targeted by the project.				
Farmers reached with agricultural assets or services - Female					
Farmers reached with agricultural assets or services through women-led producer organizations					

Beneficiaries using digital solutions supported by the project	This indicator measures the percentage of people targeted by the project who use and adopt (long term) the applications and digital tools developed through components 2 and 3.	Twice a year		The developers will monitor the usage of their applications and will report the figures to the PIU. In addition, the users will be able to send feedback (beneficiary feedback) to the PIU directly, which will serve as an alternative measure of adoption of digital tools. Finally, these numbers will be confirmed and validated through an Annual survey among the project beneficiaries.	PIU and the developers
Beneficiaries using digital solutions supported by the project through women-led producer organizations					
Increase in volume of produce put on the market by beneficiaries	The increase in volume of products brought to local and regional markets by farmers from the targeted project zones and in the selected value chains.	Twice a year		Survey	PIU & MAEP
Increase in volume of produce put on the market by beneficiaries - Female					
Beneficiaries that feel project investments reflected their needs	This indicator is a "citizen feedback" indicator measuring the level of	Every 6 months.	Project beneficiaries through the	Mostly through mobile. Surveys will be undertaken in the	PIU

	satisfaction (beneficiary perception) of the communities targeted by the project.		GRM system.	course of project implementation.	
Beneficiaries that feel project investments reflected their needs - Female					

Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
People using social media (Facebook)	An estimate of the size of Facebook audience	Yearly	Facebook Audience Insights	Based on how many people were shown ads on Facebook apps and services in the past 30 days	PIU & MENC
People using social media (Facebook) - Female					
Public officials trained on ICT policy and regulatory environment		Yearly	PIU	Survey	PIU
Previously unbanked informal women's savings groups using digital financial services		Yearly	PIU	Survey	PIU & MEF
Made or received digital payments in last year (DE4A Moonshot indicator)	This indicator measures the percentage of project beneficiaries who have received or made at least one payment through mobile money services or	Twice a year	Global Findex (every three years). Project beneficiaries will be encouraged to	Direct reporting through mobile and Findex survey	PIU and local financial institutions

	digital platforms in the past 12 months.		inform the PIU through the available mechanisms on the level of digital financial services activities.		
Made or received digital payments in the last year - Female					
Active mobile money accounts		Twice a year	BCAO	Provided by mobile operators	MoF & PIU
Agriculture cooperatives / businesses accepting digital payments	Agricultural cooperatives, including tontines and other women's informal savings groups, using digital payments.	Yearly	PIU	Survey	MoF & PIU
Agriculture payments made via digital channels (DE4A Moonshot)	Received payments for agricultural products: through a mobile phone (% payment recipients, age 15+)	Every 3 years	Global Findex	Survey	MoF & PIU
Beneficiaries reached with trainings	The number of beneficiaries reached with digital literacy, financial literacy or financial application trainings.	Yearly	PIU	Survey	PIU
Beneficiaries reached with trainings - Female					

Newly established women-led producer organizations		Twice a year	PIU	Project progress report	PIU
Farmers adopting improved agricultural technology	The household irrigation systems will be used for supplementary irrigation of rained agriculture, for diversification of production or for the transformation from a primarily subsidence agriculture towards the production of one or two marketable products, depending on the regional conditions and depending on the farmers' interests. Technical assistance will introduce good agricultural practices adjusted to each situation. These are, among other, the use of organic fertilizer, certified seeds, diversification and shifting cultivation and will be identified during project implementation. The indicator evaluates if at least one good agricultural practice transferred during technical assistance is being adopted by the	Yearly	PIU	Survey	PIU

	farmer. Municipal staff using their site visits will evaluate use of agricultural practices or improved agricultural technology. One year after the completion of the first systems, an independent evaluation will confirm monitoring results of the municipal staff. If needed, an additional independent evaluation will be realized during mid-term review.				
Farmers adopting improved agricultural technology - Female					
Farmers adopting improved agricultural technology through women-led producer organizations					
Public officials trained in digital skills		Yearly	PIU	Survey	PIU
Public officials trained in digital skills - Female					
Students trained		Yearly	PIU	Survey	PIU
Students trained - Female					
Public grievances captured by GRM responded to in less than 24h	The percentage of public grievances that are responded to within 24 hours of being received via the GRM.	Quarterly	GRM	GRM	PIU

Roads rehablitated		Four times a year	PIU	Project progress reports	MAEP & PIU
Roads rehabilitated - rural					
Roads maintained	The cumulative length of roads maintained	Four times a year	PIU	Project progress reports	MAEP & PIU
Roads maintained - rural					

ANNEX 1: Implementation Arrangements and Support Plan

COUNTRY : Benin
Benin Digital Solutions for Sustainable Development

Project Institutional and Implementation Arrangements

1. **The project will be implemented by the MENC, in close collaboration with the MAEP and the MEF.** The activities in Component 1 will be under the direct supervision of the MENC. Most of the activities falling under Component 2 will be under the supervision of the MENC and the MEF; much of Component 3 will be under the supervision of the MENC and the MAEP; and Component 4 will be under the supervision of the MAEP. The coordination of the whole project will be anchored at the MENC under the Minister's Cabinet.
2. The PIU will comprise a Coordinator (MENC), a Monitoring and Evaluation Specialist, a Safeguard Specialist, a Communications Specialist, and the fiduciary team (a Procurement Specialist, a Financial Management Specialist, and an Accountant). A senior agriculture/rural development specialist, a senior digital transformation specialist and a senior financial sector specialist will be appointed within the PIU. Other staff will be appointed on ad-hoc basis, depending of the mix of skills needed. The fiduciary team will also comprise staff from the MENC, who will be trained as required (see below). By integrating existing staff from the MENC, the project will build MENC capacity to manage large projects.
3. **This project will be under the oversight of a steering committee chaired by the MENC**. The Steering Committee includes representatives of all ministries involved in the project. The Chair of the Committee is the MENC, and the Vice-Chair is the MAEP. The Steering Committee will be supported at the regional level by Regional Advisory Groups (*Groupes Consultatifs Régionaux*) composed of representatives of the ATDA, the local Prefectures, and the regional umbrella organizations of the selected value chains as well as relevant departments within the MENC.

Financial Management, Disbursements and Procurement

4. **A Financial Management (FM) assessment was conducted on the FM arrangements for the project**. The PIU will be responsible for coordinating the day-to-day implementation of the project, including financial management, organizational aspects and monitoring and evaluation. The FM assessment conducted in February 2018 to ensure that the PIU has the minimum requirements to manage the project funds revealed some weaknesses. These include (i) lack of familiarity with IDA procedures for reporting, disbursement arrangements, and auditing; (ii) lack of qualified financial management staff; and (iii) lack of financial management tools: accounting software, manuals of accounting procedures and financial management. The FM assessment was carried out in accordance with the FM Manual for World Bank Investment Project Financing Operations that became effective on March 1, 2010 but was issued (retrofitted) on February 10, 2017. The conclusion of the assessment is that the following actions must be implemented to enable the PIU to take on the new project: (i) build a Financial Management team within the PIU which will be staffed with a qualified and experienced Financial Management Expert, an Accountant, and an Internal Auditor under terms of reference acceptable to IDA; (ii) establish a credible

and effective Internal Audit function; (iii) develop a comprehensive Administrative, Accounting and Financial Manual of procedures, as part of the PIM (Project Implementation Manual) in form and substance acceptable to the World Bank; (iv) purchase a multi-project and multi-site financial and accounting management software in a manner satisfactory to the World Bank; (v) recruit an independent external auditor in compliance with Terms of Reference acceptable to IDA; and (vi) roll out a training plan which includes, inter-alia, training on IDA disbursement procedures, and training on IDA financial reporting arrangements.

5. **Budgeting Arrangements**: The PIU's FM unit in close collaboration with other involved technical units will prepare the Annual Work Plan and Budget (AWPB) for implementing project activities considering the project's objectives. The work plan and budgets will identify the activities to be undertaken and the role of respective parties in implementation and will provide detailed information on the amount allocated per activity showing unit costs and quantities. The AWPB will be submitted to the project steering committee for approval, and thereafter to IDA for no objection not later than 30 November of the year preceding the year the work plan should be implemented. The budgeting system under the PIU will build on lessons learned. The budgetary discussions will begin at least six months before the fiscal year of implementation and will consider the procurement plan as the starting point. Once the budget is approved, it will be integrated in the computerized accounting system to serve as a basis for a budget execution monthly follow-up, based on variance analysis.

6. **Accounting policies and procedures**: The PIU will prepare a PIM with adequate FM arrangements that are acceptable to the World Bank latest one month after effectiveness. The accounting systems, policies, and administrative and financial procedures (Manual of Procedures) will be documented in the PIM.

7. **Accounting staff**: The PIU will retain staffing resources that are adequate for the level of project operations and activities and are sufficient to maintain accounting records relating to project financed transactions, and to prepare the project's financial reports. The FM function will be carried out by a team composed of: (i) a qualified and experienced FM expert in charge of the supervision of all the project's FM activities; and (ii) a qualified and experienced Accountant. This staff will be recruited through a competitive process in compliance with the World Bank's Procurement Regulations. The team will have the overall FM responsibility over budgeting, accounting, financial reporting, flow of funds, internal control, and auditing. The FM staff will have their capacity reinforced over the project implementation through the rolling out of the training plan that includes training on IDA disbursement procedures and financial reporting arrangements, among others.

8. **Accounting information systems software**: The PIU will purchase an accounting software with multi-project, multi-site, and multi-donor features, and customized to generate its financial reports. The installation of the software must be completed within three months after project's effectiveness.

9. **Accounting standards**: The PIU will use SYSCOHADA accounting standards which is commonly used amongst West African Francophone countries. Accounting procedures will be documented in the PIM.

10. **Internal controls**. The internal control policies and procedures will be documented in the Administrative, Accounting and Financial Manual of procedures to be included in the PIM which will be prepared and agreed by the World Bank within one month after project effectiveness. The PIM will document the financial management and disbursement arrangements including internal controls, budget process, assets safeguards, and clarify roles and responsibilities of all the stakeholders.

11. **Internal audit**. An Internal Audit Unit will be established within the PIU and will implement the Project's internal audit annual work-program with special attention to operations costs, including per diems and other soft expenditures, to ensure they are used in an economical manner and for the purposes intended. This internal audit unit needs to ensure that the audits are done semi-annually using a risk based approach. These semi-annual internal audit reports need to be submitted to the World Bank within 45 days after the end of the semi-annual period. In line with the Benin Use of Country System (UCS) Report, the project's internal control system could be strengthened by establishing a close collaboration between the General Inspectorate of Finance *(Inspection Générale des Finances,* IGF) and the project's internal audit unit for conducting periodical internal audit review on the project activities.

12. **Governance and Anti-corruption arrangements**. To enhance transparency and accountability, the PIU will have to deal with fraud and anti–corruption in accordance with the World Bank Anti-Corruption Guidelines referred to in the Financing Agreement.

13. **Designated Account**. The PIU will open a Designated Account (DA)[33] at the Central Bank of West African States (Banque Centrale des Etats de l'Afrique de l'Ouest - BCEAO). The funds will be released to an Operational Account to be opened in a reputable commercial bank. The Operational Account will be managed by the PIU. Cash withdrawal transactions from the Operational Account will be authorized respectively by the Project Coordinator and the Project's FM Specialist. The account will be set up to fund eligible expenditures based on the approved annual activity plans. The DA's ceiling, for approximately four months of expenditures, has been determined.

14. **Financial Reporting Arrangements.** The PIU will prepare quarterly un-audited Interim Financial Reports (IFRs) in form and content satisfactory to the World Bank, which will reflect operations of the Designated Account and will be submitted to the World Bank within 45 days after the end of the reporting period. The formats and contents of the IFR have been agreed during negotiations. The quarterly IFR will include the following information:

    - Statement of Sources and Uses of Funds;
    - Statement of Uses of Funds by Project Activity/Component.
    - Designated Account Activity Statement and explanation notes to the IFR.

15. **External Audit Arrangements.** An external independent and qualified private sector auditor will be recruited to carry out the audit of the project's financial statements under the supervision of the supreme audit institution. Therefore, the annual audits will be conducted based on ToR agreed with the supreme audit institution and that are satisfactory to the World Bank. The Auditor will express an opinion on the Annual Financial Statements and perform his audit in compliance with International Standards on Auditing issued by IFAC. The auditor will be required to prepare a Management Letter detailing observations and comments and providing recommendations for improvements in the accounting system and the internal control environment. The audit report on the annual project financial statements and activities of the DA will be submitted to IDA within six months after the end of each project fiscal year.

[33] Advances to the DA are currently not possible due to the lapsed loan situation but once this is resolved a new disbursement letter will be issued to formalize the eligibility of the Designated Account for this project.

Table 1.1 – Financial management action plan

Issue	Remedial action recommended	Responsible entity	Completion	Effectiveness conditions
Staffing	Recruit a Financial Management team comprising (i) a qualified and experienced Financial Expert; (ii) a qualified and experienced Accountant; (iii) a qualified and experienced internal auditor	PIU	Three months after effectiveness	N
Information system accounting software	Set up a "multi-project" computerized accounting system to fit project needs and generate useful information and financial statements	PIU	Three months after effectiveness	N
Financial reporting: IFR	Format, content, and frequency of the IFR were discussed during project negotiation	PIU	During the negotiation	N
Administrative, Accounting and Financial Manual of procedures	Develop an Administrative, Accounting and Financial Manual of procedures (as part of the PIM) that also includes detailed procedures describing the system to pay recurrent expenditures with specific sections on anti-corruption aspects.	PIU	One month after effectiveness	N
Internal audit	Recruit a qualified and experienced internal auditor who will have to submit semi-annual internal audit reports to the World Bank within 45 days after the end of the audit period.	PIU	Three months after effectiveness	
External financial auditing	Appoint an external auditor acceptable to IDA	PIU	Six months after effectiveness	N

16. **Financial covenants.** Financial covenants are dated covenants (see Data Sheet) as stated in the Financing Agreement Schedule 2, Section I.A and Section III on FM, Financial Reports and Audits and Section 4.09 of the General Conditions and the Disbursement and Financial Information Letter (DFIL).

17. **Implementation Support Plan.** FM implementation support missions will be carried out twice a year based on the Substantial FM residual risk rating. Implementation Support will also include desk reviews such as the review of the IFRs and audit reports. In-depth reviews and forensic reviews may be done when and where deemed necessary. The FM implementation support will be an integrated part of the project's implementation reviews.

18. **Disbursements will be carried out in accordance with the Disbursement Guidelines for Investment Project Financing dated February 2017**. The Autonomous Amortization Fund (*Caisse Autonome d'Amortissement - CAA*) is the assigned representative of the Recipient for the mobilization of IDA funds.

Withdrawal application requests will be prepared by the project's FM Specialist signed by a designated signatory or signatories (the signature authorization letter is signed by the Minister of Finance), and sent to the World Bank for processing. This procedure applies to all World Bank-financed projects in Benin. The project will submit applications using the electronic delivery tool, "e-Disbursements", available at the World Bank's Client Connection website/web-based portal. The Authorized Signatory Letter signed by the GoB will include authorization for the designated signatories to receive Secure Identification Credentials (SIDC) from the World Bank for delivering such applications by electronic means.

19. **Disbursements under the project will be transaction-based**. In addition to making advances to the DA (see paragraph 13 above), other disbursement methods (reimbursement, direct payment and special commitment) will be available for use under the project. Further instructions on the withdrawal of proceeds will be outlined in the DFIL and details on the operation of the DA will be provided in the revised DFIL and the Project Administrative, Accounting and Financial Manual of procedures (as part of the PIM) once the lapsed loan has been cleared.

20. The table below specifies the categories of eligible expenditures to be financed out of the proceeds of the Credit, the amounts under each category, and the percentage of expenditures to be financed for eligible expenditures in each category.

Table 1.2 – Expenditure categories

Category	Amount of the Financing Allocated (expressed in EUR)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Goods, works, non-consulting services, consulting services, Operating Costs and Training for the Project, except Part 1.2(iv)-(vi)	52,600,000	100%
(2) Goods, works, Subsidies, non-consulting services, and consulting services for Part 1.2(iv)-(vi)	33,000,000	100%
(3) Sub-Grants for Part 2 of the Project	1,800,000	100%
(4) Refund of Preparation Advance	1,800,000	Amount payable pursuant to Section 2.07 (a) of the General Conditions
TOTAL AMOUNT	89,200,000	

21. The Borrower will carry out procurement under the proposed project in accordance with the World Bank's "Procurement Regulations for IPF Borrowers" (Procurement Regulations) dated July 2016 and revised in November 2017 and August 2018 under the NPF, and the "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants", dated July 1, 2016, other provisions stipulated in the Financing Agreement.

22. All procuring entities as well as bidders, and service providers, i.e. suppliers, contractors and consultants shall observe the highest standard of ethics during the procurement and execution of contracts financed under the project in accordance with paragraph 3.32 and Annex IV of the Procurement Regulations.

23. The Borrower shall prepare and submit to the World Bank a General Procurement Notice (GPN) and the World Bank will arrange for publication of the GPN in the United Nations Development Business (UNDB) online and on the World Bank's external website. The Borrower may also publish it in at least one national newspaper.

24. The Borrower shall publish the Specific Procurement Notices (SPN) for all goods, works, non-consulting services, and the Requests for Expressions of Interest (REOIs) on their free-access websites, if available, and in at least one newspaper of national circulation in the Borrower's country, and in the official gazette. For open international procurement selection of consultants using an international shortlist, the Borrower shall also publish the SPN in UNDB online and, if possible, in an international newspaper of wide circulation; and the World Bank arranges for the simultaneous publication of the SPN on its external website.

25. The project design will provide a window to enable the Borrower to carry out Advance Contracting and Retroactive Financing in accordance with Section V (5.1 & 5.2) of the Procurement Regulations for IPF Borrowers. The retroactive financing will be allowed up to 20 percent of the credit covering the expenditures incurred by the project, not more than 12 months before the date of the signing of the Financing Agreement.

26. Procurement shall be carried out by the PIU that will be established under the oversight of the MENC.

27. The MENC should establish a Procurement Commission that will be chaired by the nominated Person in charge of Procurement. The Person in charge of Procurement will also designate his Secretary who will serve as a secretary to the Commission. The documents (BD, RfP, BER) elaborated by PIU will be submitted for the decision of the procurement control commission of the MENC or to the decisions of the National Procurement Control Directorate (*Direction Nationale de Contrôle des Marchés Publics* under the Ministry of Economy and Finance depending of the competency on the procurement control threshold. The person in charge of procurement, the procurement commission and the procurement control commission will be established in accordance with articles 10 to 17 of the new procurement code No 2017-04 dated of October 19, 2017.

28. *Project Procurement Strategy for Development*: As part of the preparation of the project, The Borrower (with assistance from the WB) prepared the Project Procurement Strategy for Development (PPSD) which describes how procurement activities will support project operations for the achievement of project development objectives and deliver Value for Money (VfM). The procurement strategy is linked to the project implementation strategy ensuring proper sequencing of the activities. It considers institutional arrangements for procurement; roles and responsibilities; thresholds, procurement methods, and prior review, and the requirements for carrying out procurement. It also includes a detailed assessment and description of state government capacity for carrying out procurement and managing contract implementation, within an acceptable governance structure and accountability framework. Other issues considered includes the behaviors, trends and capabilities of the market to respond to the procurement plan.

29. The recruitment of civil servants as individual consultants or as part of the team of consulting firms will abide by the provisions of paragraph 3.23 (d) of the Procurement Regulations.

30. *Procurement Plan*: The Borrower prepared a detailed 18-month procurement plan, which was agreed on by the Government and the World Bank prior to negotiations. The Procurement Plan will be updated in agreement with the World Bank Team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

31. The scope of procurement is described in the Project Procurement Strategy for Development and the Procurement Plan agreed by the World Bank and summarized below.

32. The procurement activities that are critical for the success of this operation will consist for most of the contracts of:

    a. **Works:** These mainly concern the rehabilitation and maintenance of rural roads. Although knowledge exists at the local level, the use of external expertise may be needed in some cases, given the unfortunate experiences of the past in some markets. This external expertise will mainly focus on ensuring that local contractors commit to: the availability of experts; the mobilization of public works equipment; the involvement of SMEs in the organization and management of construction sites; the respect of the deadlines of execution of the works; the quality of the implementation of the works.

    b. **Consulting services:** Although they represent only 10 percent of the total amount of the project contracts, they will play an important role in the success of the project. As a result: (i) good pre-selection of consultants for the establishment of short lists; (ii) accurate wording of the terms of reference; (iii) the proper evaluation of the technical proposals; and (iv) a good appreciation of the reports that will be delivered by the consultants is extremely important. The support of the identified technical teams will be important here and measures will have to be taken to ensure their effective participation when called upon.

    c. **Acquisitions of goods:** Goods will be mostly locally procured; digital equipment and materials; cars; equipment, furniture and office supplies, etc. which are in fact current supplies distributed by many local suppliers who may respond on the basis of procedures open at national level in relation to the estimated amounts and the size of the contracts involved.

    d. **Training, Workshops, Study Tours, and Conferences**: Workshops, Seminars and Conferences. Training activities would comprise workshops and training, based on individual needs, as well as group requirements, on-the-job training, and hiring consultants for developing training materials and conducting training. Selection of consultants for training services follows the requirements for selection of consultants above. All training and workshop activities (other than consulting services) would be carried out on the basis of approved Annual Work Plans / Training Plans that would identify the general framework of training activities for the year, including: (i) the type of training or workshop; (ii) the personnel to be trained; (iii) the institutions which would conduct the training and reason for selection of this particular institution; (iv) the justification for the training, how it would lead to effective performance and implementation of the project and or sector; (v) the duration of the proposed training; and (vi) the cost estimate of the training. A report by the trainee(s), including completion certificate/diploma upon completion of training, shall be provided to the Project Coordinator and will be kept as parts of the records, and will be shared with the World Bank if required. A detailed training and workshop plan outlining the nature of the training/workshop, number of trainees/participants, duration, staff months,

timing and estimated cost will be submitted to IDA for review and approval prior to initiating the process. The selection methods will derive from the activity requirement, schedule and circumstance. After the training, the beneficiaries will be requested to submit a brief report indicating what skills have been acquired and how these skills will contribute to enhance their performance and contribute to the attainment of the project objective.

33. **Operational Costs:** Operational costs financed by the project means the incremental expenses incurred by the Project as necessary for the required purpose, based on the Annual Work Plans and Budgets as approved by the Association, on account of: Project implementation, management, and monitoring and evaluation; office space rental; computers; utilities; supplies; equipment maintenance; bank charges; vehicle operation, maintenance, and insurance; communications and public awareness-related media expenses; travel and supervision; salaries, bonuses and incentives of contractual and temporary staff; but excluding those of members of Benin's civil service. Such services' needs will be procured using the procurement procedures specified in the PIM accepted and approved by the World Bank.

34. **Procurement Manual**: Procurement arrangements, roles and responsibilities, methods and requirements for carrying out procurement shall be elaborated in detail in the Procurement Manual which will be a section of the PIM. The PIM shall be prepared by the Borrower and agreed with the World Bank not later than one month after the effective date. The PIM is also a disbursement condition.

35. **Procurement methods**: The Borrower will use the procurement methods and market approach in accordance with the Procurement Regulations.

36. Open National Market Approach is a competitive bidding procedure normally used for public procurement in the country of the Borrower and may be used to procure goods, works, or non-consultant services provided it meets the requirements of paragraphs 5.3 to 5.6 of the Procurement Regulations.

37. The thresholds for particular market approaches and procurement methods are indicated in the below table. The thresholds for the World Bank's prior review requirements are also provided in the table below:

Table 1.3 Thresholds for Procurement Methods, and Prior Review

No	Expenditure Category	Contract (C) Value Threshold* [eq. USD]	Procurement Method	Contracts Subject to Prior Review / [eq. US$]
1	Works	C ≥ 10,000,000	Open Competition International Market Approach and Direct Contracting	≥ 10,000,000
		200,000 < C < 10,000,000	Open Competition National Market Approach	None .
		C ≤ 200,000	RfQ	None
2	Goods, IT and non-consulting services	C ≥ 1,000,000	Open Competition International Market Approach and Direct Contracting	≥ 2,000,000
		100,000 < C < 1,000,000	Open Competition National Market Approach	None
		C ≤ 100,000	RfQ	None

No	Expenditure Category	Contract (C) Value Threshold* [eq. USD]	Procurement Method	Contracts Subject to Prior Review / [eq. US$]
3	National shortlist for selection of consultant firms	C < 100,000	for Consulting Services	None
		C ≤ 300,000	for Engineering and Construction Supervision	None
4	International shortlist for selection of consultant firms	C ≥ 100,000	for Consulting Services	≥ 1,000,000
		C > 300,000	for Engineering and Construction Supervision	≥ 1,000,000
5	Selection of Individual consultants	All Values	All Approaches	≥ 300,000
6	Direct contracting	All Values		As agreed in the Procurement Plan
7	Training, Workshops, Study Tours	All Values	Based on approved Annual Work Plan & Budgets (AWPB)	Annual Work Plan & Budgets (AWPB)

Note: The thresholds in the above Table are for the purposes of the initial procurement plan for the first 18 months. The thresholds will be revised periodically based on re-assessment of risks. All contracts not subject to prior review will be post-reviewed.

38. **Procurement Risk Rating**: The project procurement risk prior to the mitigation measures is "Substantial". The risk can be reduced to a residual rating of "Moderate" upon consideration of successful implementation of the mitigation measures.

39. The risks and mitigation measures are provided in the table below.

Table 1.4 Procurement Risk Assessment and Mitigation Action Plan

Procurement Risk	Mitigation measure	Responsibility and Deadline	Risk level Initial/residual
Benin			**Substantial/Moderate**
MENC			
Lack of capacity	• Recruit a procurement specialist • Update the procurement manual to integrate the new project	MENC Within three months after signing of the Financial Agreement Within one month after signing of the Financial Agreement	Substantial

Non-designation of the person in charge of procurement and non-establishment of the procurement commission and the procurement control commission	• Nominate the person in charge of procurement and establish the procurement control commission with accordance articles 10 to 17 of the new procurement code No 2017-04 dated of October 19, 2017	MENC Within three months after signing of the Financial Agreement	Substantial
Weak capacity of the procurement specialist, the procurement commission, the procurement control commission, the National procurement control directorate in NPF procedures	• Capacity building will be provided by the World Bank on NPF procurement.	MENC and WB During project implementation	Moderate
Delay in developing Terms of Reference (TORs)	• Invite beneficiaries to submit a draft TOR for the registration of the activity in the PTA; • Anticipate soliciting from the World Bank TOR templates upon approval of the PTA; • Use consultants to develop TORs in case of lack of in-house expertise.	MENC During project implementation	Moderate
Long delay of the procurement process	• Put in place a mechanism for monitoring the execution of the different phases of the procurement process • To sensitize the actors, the organs and authorities involved in the procurement process to the respect of the regulatory deadlines of the procurement Code	PRMP MENC	High

Monitoring and Evaluation

40. **M&E Plan**. The PIU will be responsible for developing a detailed M&E plan. This M&E plan will include all project indicators, including all indicators listed in this document as well as any additional indicators deemed necessary to effectively monitor implementation; identify data sources and data collection protocols for all indicators; detail logistical arrangements for data collection; and explain communication needs related to M&E, especially to project stakeholders (rural communities, value-chains, cooperatives, CSAs, ATDAs, etc) and beneficiaries.

41. **M&E arrangements**. Existing M&E arrangements of the PIU will be evaluated and capacity gaps addressed. It is expected that the PIU will likely need to reinforce their M&E capacity, for example by recruiting or training technical personnel or making improvements to their respective management

information systems (MIS) to better manage project data. The M&E evaluation will identify all such capacity gaps and propose a costed plan for addressing them, including a detailed timeline. The M&E evaluation should be available prior to credit effectiveness to allow sufficient time to address the identified capacity gaps through project investments before the main project activities begin.

42. **The PIU will be primarily responsible for collecting the data needed to measure implementation progress, as specified in the project's results framework**. The PIU will obtain all of the relevant data needed from the data sources identified in the M&E plan to calculate the different required indicators from relevant project stakeholders as necessary. For any data sources that are not under the PIUs' purview, the PIU will be responsible for identifying a focal point and to detail a data-sharing plan between institutions in compliance with international good practice on data privacy as well as any applicable local laws. These inter-institutional arrangements should be detailed in the M&E plan. The PIU will be responsible for data collection, consolidation, analysis, and evaluation. The PIU will submit an M&E quarterly report to the World Bank as well as to the Steering Committee that will include an updated country-level Results Framework and corresponding Action Table listing corrective actions to be implemented with deadlines and persons responsible clearly identified.

43. **Results indicators**. Progress toward the achievement of the PDO will be measured based on the PDO-level and intermediate results indicators as part of the project's results framework (see Section VII). The M&E systems will be used to collect relevant data and information pertaining to measuring results, including project outcomes and quality of project execution. The PIU will be responsible for carrying out the main M&E functions. The PIU will be responsible for developing a detailed M&E plan, specifying standard protocols and guidelines for data collection and use for the duration of the project, and will organize trainings for relevant stakeholders in the M&E plan. Progress reports will be closely reviewed by the multi-sectoral steering committee set up including all public and private project stakeholders. The PIU will provide quarterly monitoring tables and progress reports on all PDO- and intermediate-level results indicators as well as any additional indicators specified in the project's M&E plan to the World Bank during routine implementation-support missions.

44. **Success assessment and corrective actions**. The success of this operation will be measured against the target values of the PDO indicators. During implementation, the PIU will be able to measure whether implementation is on track or not by benchmarking against yearly targets. If project execution underperforms against these yearly indicators, the PIU must propose a list of corrective actions. To the extent possible, the M&E system will use geographical data and reports will include updated maps available online.

45. **Direct beneficiaries**. The views of direct beneficiaries will be brought into the M&E process. Periodically, the PIU will ensure that the views of direct project beneficiaries, including local communities and individuals (those receiving new services), have been accounted for in the project M&E. The M&E plan should detail how and at what intervals the views of both groups will be assessed. Data sources may include consultations conducted as part of project citizen engagement, data from the GRM, as well as separate data-collection efforts as necessary.

46. **Implementation support missions** will be conducted at least twice per year. Missions will be based on the latest quarterly implementation and financial monitoring reports prepared and submitted by the PIU. Missions will allow the World Bank team to perform evaluations of implementation progress and provide technical support to the PIU and any other implementing institutions. Additional implementation support will be provided by field-based World Bank staff in between formal missions.

Time	Focus	Skills Needed	Location	Number of Trips per year	Resource Estimate (Staff Weeks) per year
First 12 months	Project management, coordination, and supervision	TTL, Co-TTL	One based in Abidjan, one in Lome	3 each	20
	FM experience, knowledge of World Bank FM norms, and training	FM Specialist	Based in Cotonou	0	6
	Procurement experience, World Bank procurement norms knowledge, and training	Procurement Specialist	Based in Cotonou	0	6
	Social Safeguards supervision and monitoring, training as needed	Environmental Safeguards Specialist	Based in Abidjan	2	6
	Environmental Safeguards supervision and monitoring, training as needed	Social Safeguards Specialist	Based in Ouagadougou	2	6
	Technical implementation support and monitoring	Financial Inclusion Specialist	Based in Washington	1	4
		GBV Specialist	Based in Washington	1	4
12–72 months	Project management, supervision, and coordination	TTL and Co-TTL	Based in Abidjan and Lomé	2	24
	FM (FM reviews and supervision, training, and monitoring)	FM Specialist	Based in Cotonou	0	4
	Procurement management (reviews and supervision, training as needed)	Procurement Specialist	Based in Cotonou	0	4
	Social supervision and monitoring, training as needed	Social Safeguards Specialist	Based in Ouagadougou	2	8
	Environmental safeguards, supervision and monitoring, training as needed	Environmental Safeguards Specialist	Based in Abidjan	2	8
	Technical implementation	Rural Road Specialist -	Based in	2	8

	support and monitoring	consultant	Dakar		
		Financial Inclusion Specialist	Based in Washington	2	8
		Digital Development Specialist	Based in Washington	1	8

47. A **mid-term review** will be conducted within 30 months of credit effectiveness. The purpose of this review will be to assess progress and make recommendations, if necessary, for any changes in the PDO, the content of the components, resource allocation, and performance indicators.

48. At **project closing**, the PIU will prepare a completion report documenting the project's achievements and results and drawing lessons for future interventions. The completion report will be based in part on the project's technical, economic, social, and environmental impact survey studies, as well as an assessment of beneficiaries' (both functional users and individuals) satisfaction. An Implementation Completion Report will be prepared for the project at closing.

ANNEX 2: Detailed Project Description

1. **The project focuses on the development of the following broad areas:**

- Upgrading of digital infrastructure and equipment;
- Modernizing the agricultural information systems;
- Development of digital applications and services for agriculture;
- Enabling legal and institutional framework;
- Comprehensive capacity development program;
- Expanding the digital talent pool and building users' skills;
- Access to digital financial services; and
- Rehabilitation and maintenance of rural roads.

2. **The target regions** are located in the five Northern departments of Benin : Borgou, Alibori, Atacora, Donga and Collines, and include the areas of: Malanville-Karimama, Alibori Sud, Borgou Nord-2KP, Atacora Ouest, Zou (Djidja), and northern parts of Borgou Sud, Donga – Collines.

3. **The target value chains,** identified by the MAEP as priorities, are: Rice, Maize, Shea (*karité*), Vegetables (*maraichage*).

Component 1 Digital Infrastructure: extending digital connectivity in targeted rural areas (US$45 million equivalent)

4. Rural areas represent a challenge for mobile coverage in Benin, since the private mobile network operators deem these areas as not profitable enough. Two key factors contribute to the non-profitability of these rural areas for private operators: (i) on the supply side, increased cost of deploying and maintaining sites in rural areas, especially with the higher cost to haul equipment (poor trackway access), lack of reliable electricity grid, higher cost to connect the mobile site to the core network ("backhauling"), and the need to keep a decentralized maintenance team. Compared to urban areas, the cost is also increased in case of difficult terrain such as mountains and forests, with a higher proportion of obstacles and natural clutter, meaning a greater density of sites can be needed to cover an area appropriately (when setting aside capacity considerations); and (ii) on the demand-side, reduced economic benefits due to reduced purchasing power of rural households compared to urban households, and due to reduced population density (i.e. for a given coverage radius mobile antennas cover less inhabitants in rural areas compared to urban areas as rural households are more disseminated). Because the demand-side is dependent on macro socio-economic factors, the proposed project will have limited leverage on this matter. The proposed project will thus focus on the supply-side to extend connectivity in rural areas by: (Sub-component 1.1) improving the ICT enabling environment; and (Sub-component 1.2) supporting the extension of ICT coverage in rural areas targeted by the project by applying climate vulnerability criteria and using open access PPP arrangements.

5. Because this component implies the subsidy of an ICT infrastructure, the identification of target areas (where the infrastructure will be deployed) and project design (how they will be deployed) will comply with a set of criteria in line with international best practices and the MFD Approach:

- **Criteria of market failure (for target areas) –** The project will ensure that targeted areas are suffering from a market failure, i.e. that operators neither cover the targeted area nor intend

to do so in the medium term (even with the enhancement of the legal and regulatory framework or with a new round of private investments to increase coverage);

- **Criteria of general interest (for target areas) –** The project will target areas that best support the achievement of the overarching twin goals of shared prosperity and poverty elimination. To support the shared prosperity goal, the project will focus on areas where the deployed infrastructure will have the maximum economic impact covering: (i) households; (ii) public administrations; (iii) businesses; and (iv) transport axis. To support the poverty elimination goal, the project will focus on areas with an above-average poverty rate. Overall, the project will strike a balance between targeting areas with the maximum economic impact, and the areas with the poorest and most vulnerable population.
- **Criteria of synergy with World Bank and other donors' projects (for target areas) –** The project will, as much as possible, focus on areas where it can effectively complement and build on efforts from other World Bank projects. The target areas should also support projects launched by other donors.
- **Criteria of public fund limited to the minimum necessary (for target areas and project design) –** The target areas should have the enabling infrastructure to reduce deployment costs (i.e. electrical network, transport axis to convey equipment, and fiber backbone to connect the RAN to the Core Network). The project design will ensure the best 'value for money' usage of public funds with the implementation of a Public Private Partnership through a competitive tender process that will select the 'most economically advantageous offer' measured by *inter alia*: (i) achieved geographical coverage; (ii) quality and sustainability of the technological approach; (iii) impact of the proposed solution on competition; and (iv) final bid price. It should be clear from the outset that the 'most economically advantageous offer' will not be solely based on final bid price to select the lowest bid. Rather, price and indicators measuring the different quality aspects of the offer will be considered.
- **Criteria of "Climate Vulnerability" for project design –** The project will ensure that the digital infrastructure and services are delivered to those rural areas that have a high degree of susceptibility to climate variation. With high availability of digital services, the vulnerable population in the rural areas will be able to receive the climate-related applications and services with least amount of disruption and thus will be better prepared for adaptation.
- **Criteria of 'wholesale open access' (for project design) –** The infrastructure will provide effective wholesale access by offering access to install active equipment under fair and non-discriminatory conditions to all mobile operators in Benin who request it. Effective wholesale access to the subsidized infrastructure should be offered for a period of at least several years A potential later change in ownership, management or operation of the subsidized infrastructure does not release the access obligations. Finally, the price setting for wholesale services supplied over the subsidized infrastructure will not be at the discretion of the entity operating the infrastructure. Rather, the prices to be charged will be aligned with respective wholesale prices in Benin and based on the pricing principles set by the ARCEP (National Regulatory Agency) and on benchmarks.

6. **(Sub-component 1.1) Improving the digital enabling environment: (US$2 million) –** This sub-component will consist of a series of technical assistance to strengthen capacity of key stakeholders (i.e. ICT Ministry

MENC, the Regulatory Authority ARCEP, the universal service agency ABSU-CEP) in defining, enhancing, and enforcing an enabling environment conducive to providing ICT coverage in rural areas.

- **Activity 1.1.1. Technical assistance to perform a diagnostic of the legal bottlenecks to increase private ICT investments –** This technical assistance will provide a legal and regulatory due diligence to identify and alleviate the legal and regulatory bottlenecks for the extension of ICT services in rural areas. It will focus on *inter alia*: (i) the extension and fostering of the general authorization regime for the electronic communications sector; (ii) the technological neutrality of telecom licenses; (iii) the opening and functioning of telecom wholesale markets, especially the national backbone and backhaul capacity wholesale market and the Tower Companies wholesale market; (iv) the possibility for third-parties to deploy Radio Access Network (RAN) low-cost alternative and open-source platforms for rural areas, and sell their technology and services to mobile network incumbents (whose supply chains may be closely tied to large equipment suppliers and may face regulatory constraints on spectrum usage); (v) the regulatory incentives for passive network-sharing (e.g. opening up a passive telecom tower to host several active masts from different mobile operators) and active network-sharing (e.g. with the provision of local roaming at the wholesale level); (vi) the increase in service competition with the possibility for all telecom actors – including Internet Service Providers – in providing voice services (e.g. Voice over IP VoIP); (vii) the review of the definition and enforcement of coverage obligations in the context of rural areas, including the opportunity to consider local roaming provisioning in the achievement of coverage obligations; and (viii) the opportunity to adopt a regulation to relax the regime for the installation of telecommunications infrastructures in targeted rural areas.
- **Activity 1.1.2. Technical assistance to review and improve the institutional framework –** This technical assistance will review the role and responsibilities as well as the decision-making process especially between the MENC and the universal service agency (ABSUT-CEP) for achieving ICT coverage in rural areas.
- **Activity 1.1.3. Technical assistance to elaborate a strategy to increase the supply of alternative national fiber optic networks from non-telecom network operators –** The increase in bandwidth capacity supply with fiber optics in rural areas is one of the factors that leads to the reduction of infrastructure deployment cost for telecom operators. These national backbone fiber optics networks are usually deployed by private or public telecom actors for their own use and for national capacity resell on the wholesale market. However, other non-telecom network operators also deploy fiber for their own use (e.g. electricity company deploying fiber to monitor its grid network). The technical assistance will focus on defining an alternative national fiber optic network strategy to increase the supply on the capacity wholesale market for telecom operators.
- **Activity 1.1.4. Technical assistance to increase the regulator ARCEP's capacity in defining, monitoring and enforcing mobile operators' coverage obligations –** Defining, monitoring and enforcing mobile operators' coverage obligations is one of the key objectives of the sectoral regulatory agency ARCEP. Coverage obligations are meant to create incentives for operators to start commercially viable operations in less attractive markets. The technical assistance will provide a diagnostic of the existing coverage obligations and of the capacities of the ARCEP in monitoring and enforcing them, and will provide recommendations on how coverage

obligations definition, monitoring, and enforcement could be enhanced to further increase the coverage of mobile networks in rural areas.

- **Activity 1.1.5. Technical assistance for the MENC to monitor the take-up of ICT services in rural areas –**The various technical assistance interventions above are focused on supply-side measures to promote the supply of mobile broadband networks and services in rural areas – especially the areas targeted by the project. This technical assistance will facilitate the use of mobile broadband and the access of digital services and content by the largest number of citizens and rural smallholders possible. The technical assistance will assess the need to demonstrate the benefits of digital services and content for the targeted beneficiaries and help create more demand for digital services and content. It will assess the barriers to ICT adoption with a specific focus on language literacy (currently a vast amount of the information and content online is in text-based form, making it difficult for someone without basic language literacy to take full advantage of being online) and digital literacy (the ability to effectively and critically navigate, evaluate, and create information using a range of digital devices and technologies). Finally, it will assist the MENC in elaborating its Digital Adoption Strategy to identify the key measures to ensure that every citizen has the opportunities, skills and knowledge to use online services (e.g. supporting ICT training and education, both in schools and for adults; setting up public access points providing information on the use of digital services for people who are disadvantaged due to geography, weak economic conditions, or a low level of digital skills).
- **Activity 1.1.6. Technical assistance for preparatory studies (PPA) –** This activity includes all preparatory studies and consultancies included in the PPA (around US$1 million) for the preparation of Component 1 implementation. It includes, inter alia, the development of the Operational Report on the subsidy model for the digital infrastructure (Sub-component 1.2), economic and demographic assessment of the targeted zones, and the technical assessment of the proposed infrastructure projects.
- **Activity 1.1.7. Capacity building and training for public officials from MENC, MAEP, ARCEP, ABSU-CEP** to support the abovementioned activities include strategies to adopt climate-friendly digital infrastructure such as energy-efficient and green Data Centers, Rural Telecenters, etc. This activity will also provide training and education that will highlight climate change-related aspects of designing and providing digital infrastructure and services to rural areas. This would be delivered through a comprehensive program of ongoing training locally and internationally, delivered by reputed training providers (about US$1 million).

7. **(Sub-component 1.2) Supporting the extension of ICT coverage in targeted rural areas using Open Access PfPPP arrangements (US$40 million)** – Sub-component 1.2 will consist of a series of technical assistance activities and financial support to increase the extension of ICT coverage in rural areas targeted by the project.

- **Activity 1.2.1. Technical Assistance to map the ICT availability in the country, and more specifically in the targeted rural areas –** The ICT mapping technical assistance will focus on gathering data related to the deployment of ICT services in the targeted areas and presenting them in a friendly manner to policy makers. It will focus on:

  (i) **infrastructure-mapping and service-mapping,** with the current status of the ICT infrastructure itself (i.e. mobile sites, power electricity availability, trackway access,

backhauling availability) and the service availability (i.e. 2G and 3G availability, bandwidth, retail prices). The mapping will include the climate change dimension by highlighting those pockets in the project areas that are highly susceptible to climate changes in future. This activity will consult with Operators and MENC on best options for the provisioning of rural electricity as part of connectivity solutions and also explore synergies with other related projects from the Energy sector;

(ii) **demand-mapping,** with the demand typology and quantification for ICT services (voice, SMS, data) to address end-users needs (e.g. rural smallholders and local public administrations) and deliver e-Agriculture services in a satisfactory manner;

(iii) **investment-mapping,** with the existing and potentially planned investments in ICT infrastructure by the private and public sector (e.g. fiber backbone extension).

- **Activity 1.2.2. Technical assistance to segment targeted rural areas in different profitability categories for the private sector and identify the appropriate regulatory and financial incentives –** Given international evidence of the success of the private competition in delivering ICT services, the proposed project aims to achieve the goals of extending rural coverage whilst also seeking to minimize distortion of a competitive market. Ensuring competitive neutrality is important to enhance economic efficiency and benefit consumers. The proposed project will assist the Government in structuring an MFD approach to define what market mechanisms can deliver in a certain time frame in terms of ICT coverage for the targeted rural areas. Based on the ICT mapping exercise, the targeted rural areas will be categorized as one of the following four types:

  (i) **Areas which will be covered by commercial financing (no market failure) –** These are "niche" urban and suburban areas in the targeted rural areas (e.g. *chef-lieu de Préfecture*) of relatively high demand where mobile operators would be expected to compete and make a reasonable profit.

  (ii) **Areas which will be covered with upstream regulatory reforms (weak market failure) –** These are areas that need regulatory reforms and incentives to reduce deployment costs. They are usually characterized by a lack of demand to support multiple national operators each rolling out their own networks independently (e.g. in the event of multiple operators rolling out, at least one would make a loss). Therefore, in these areas, operators may lack a clear business case for deciding to roll out independently. This lack of certainty may result in no operators rolling out, and the area remaining uncovered. However, the level of demand may be sufficiently high to support at least one network without public funding. This means that by engaging in some form of network-sharing, operators could remove the risk and uncertainty of rolling out independently and jointly cover the area instead. The coverage of these areas will be ensured thanks to the output of the technical assistance in Sub-component 1.1.

  (iii) **Areas which will be covered with public and concessional resources for risk instruments and credit enhancements (moderate market failure) –** Even with some network-sharing scheme incentives, there will remain areas where operators will be reluctant to jointly engage in extending their network coverage due to the commercial risks and low profitability**.** IFC may envisage partnering with potential investors, using the new Private Sector Window (PSW) IDA Facility to go beyond its standard market/risks frameworks

(stage 3 of the MFD Approach). IFC involvement in the proposed project is not guaranteed, however the IFC team holds regular meetings with the Client to determine the best approach.

(iv) **Areas which will be covered with public funds supporting Open Access PPP projects (strong market failure) –** These are areas with the highest deployment costs and the lowest levels of demand. In these areas, "least-cost" capital subsidies will be competitively awarded through an Output-Based Aid tender process to private operators in order to extend the coverage of ICT infrastructure on an open access basis (i.e. a wholesale, transparent, non-discriminatory, fair, and effective access for all market players).

- **Activity 1.2.3. Technical assistance to elaborate an "Operation Manual" for use of public funds supporting open access PPP projects in rural areas –** An "Operation Manual" is being prepared with Preparatory Project Advanced (PPA) funds and will be reviewed and refined before any disbursement occurs for open access PPP projects (i.e. the award of "least-cost" capital subsidies through a competitive "reversed auction" tender process to private operators in order to extend digital connectivity in targeted areas which are commercially not viable). The Manual will describe the Open Access PPP Project's major transaction cycles and fund flow processes, authorization procedures for transactions, financial and accounting policies for the Open Access PPP Project, budgeting procedures, financial forecasting procedures, procurement and contract administration monitoring procedures, and auditing arrangements including:

    (i) the prioritization of the targeted rural areas with due consideration given to potential climate vulnerabilities;

    (ii) the access services offered (in particular voice, SMS, and internet);

    (iii) the infrastructures that will be financed to provide the expected services in the rural areas concerned, with the technical architecture and specifications;

    (iv) the terms of the open access PPP arrangement, including the contributions from the public and private parties and the governance mechanisms to ensure compliance with the contract (e.g. claw back mechanism);

    (v) the contract award mechanism, including the structuring of the contracts[34], eligibility rules for bidders, and eligibility and evaluation rules for submitted projects (not only amount of public funds requested but also population and geographical coverage, services delivered and speeds, guarantees of quality of service, compliance with open access principles, commitments made by other private actors to access the deployed infrastructure via the wholesale market, etc.);

    (vi) public communication of results; and

[34] E.g. a single contract for all targeted areas or several tenders to allocate funds for providing coverage in different predefined geographic areas.

(vii) effective implementation and monitoring of the contracts with the financing of the private entity.

- **Activity 1.2.4. Technical assistance to review and strengthen the "Operation Manual" –** The review and strengthening of the Open Access PPP Project Operation Manual will leverage on the Open Access PPP Strategy (cf. below) to fine-tune the implementation rules with the revised investment plans from the mobile operators.
- **Activity 1.2.5. Technical assistance to elaborate an "Open Access PPP Strategy" for use of public funds for supporting digital access infrastructure deployment in rural areas –** The Government will enable open access[35] wireless network rollout in rural areas targeted by the project with moderate to strong market failure (cf. above) by providing the awards of "least-cost" capital subsidies through a competitive "reversed auction" tender process to private operators. The technical assistance will guide the action of the Government by defining the short-list of key features of the PPP projects to be supported by public funds for the targeted areas.

  (i) **The key characteristics of the competitive "reversed auction" tender process to award "least-cost" capital subsidies to private operator.** In this investment gap funding mode, the public authority contracts with a private sector partner who finances, designs, builds, owns and operates the wireless network access infrastructure on an open access basis. A capital subsidy is provided to the private sector operator through grants which are paid during deployment or through the operational life of the contract.

  (ii) **The type of wireless network access infrastructure to be supported by the public funds,** which can consist of: passive telecom towers to facilitate the deployment of active mobile antennas by mobile network operators; a fully active Radio Access Network deployed by a mobile network operator, who provides a local roaming access to other mobile network operators; low-cost 'microsite' alternative deployed by third-parties for rural areas targeted by the project who then sell their services to mobile network operators; other types of wireless access such as satellite access.

  (iii) **The governance model,** to ensure that Benin sets up and implements a future-proofed and cost-effective governance mechanism for any contract(s) awarded for the digital infrastructure to ensure that the open access principle is fully enforced. The governance model will detail which public entity will closely monitor the contract(s) with its open access obligations, and will cover complementary aspects with regard to: (i) legal considerations; (ii) how any decision-making process might work over the duration of the contract, taking into account possible changes to the contract(s); (iii) the monitoring, investigative and sanctioning arrangements in place for the monitoring authority over the duration of the contract(s), with potential claw-back

[35] As a reminder, the open access principle characterizes a private infrastructure subsidized by public funds whereby the private operator provides a wholesale, transparent, non-discriminatory, fair, and effective access to the subsidized infrastructure for all market players.

mechanisms of the public funds; and (iv) how the awarded contract can be future proofed to minimize the risk of disputes and possible appeals mechanism(s) in case of disputes (e.g. revisions and amendments to the contract requested by the private or public party, dispute between private telecom operators related to the wholesale market).

- **Activity 1.2.6. Financing digital infrastructures in targeted rural areas (around US$27.00 million) –** Once all the technical assistance of this sub-component will be achieved, this activity will accelerate the provision of ICT services in rural areas. World Bank support for this activity will establish and institute a competitive and transparent process to involve the private sector in providing wireless network access infrastructure in targeted rural areas of Benin. It will focus on supply side interventions through a competitive award of public funds through a "least cost subsidy auction", by selecting the most economically advantageous offer (i.e. a combination of a reverse tender process favoring the bidder asking for the lowest amount of public funds and a standard tender process favoring the bidder achieving the best output) to private actors that will be responsible for installing, operating, and maintaining the wireless network access infrastructure on an Open Access basis.
- **Activity 1.2.7. Connecting the *Agences Territoriales de Développement Agricole* and the *Centres de Services Agricoles*** This activity will finance, when not covered under 1.2.6., the expansion of broadband coverage to CSA and ATDA in the zones targeted by the project. CSAs and ATDAs are at the center of MAEP's strategy for the development of agriculture across the country. CSAs can play a key role in the delivery of services and the training of project beneficiaries in financial and digital skills (see Component 2 below).

8. **(Sub-component 1.3) Building the metropolitan network of Parakou (US$3 million) -** This sub-component will finance the metropolitan fiber optic loop in the city of Parakou. The design and construction of the metropolitan network (Wide Area Network - WAN) will respond to future climate impacts and risks by incorporating resilience and redundancy. The city of Parakou is the second largest city in the country and, although not meeting the rural community "criteria", is located within the northern half of the country, at the nexus of the zones targeted by the project. This infrastructure will be managed through a PPP. The project will finance this new infrastructure through a competitive "reversed auction" tender process to award "least-cost" capital subsidies to private operators. This subcomponent will first finance all technical, social, and environmental studies required for this type of work. Local authorities will be closely involved in both the preparation and implementation of this sub-component.

Component 2: Digital financial inclusion and skills: increasing the use of digital financial services in targeted rural communities (US$16 million equivalent)

9. The objective of this component is to promote digital and financial inclusion in rural areas. The proposed activities under this component will focus on supporting transformation of financial institutions operating in rural areas to develop digital finance solutions and build partnerships with mobile money providers. In parallel, the project will catalyze uptake of digital payments by supporting the digitalization of the agriculture value chains and the digitalization of women informal savings groups, and build a digital ecosystem in rural areas and build the necessary digital and financial skills of the targeted population. Financial education and planning were identified as needs through qualitative interviews with women's cooperatives in the communes of Tangueta, Cobly, and Materi in the Atacora region.

10. The choice of promoting the adoption of digital financial services is grounded on the following considerations: (a) the recent progress in mobile money adoption with an increase of active mobile money account by 396 percent in two years (2015-2017) reaching 31 percent of the adult population (BCEAO 2017) and boosted by the deployment in Benin of UNCDF program MM4P since 2015 which aims to promote digital financial services adoption in the country and has supported a diverse set of digital finance initiatives and innovations; b) access to connectivity in rural areas, which the project will promote through Component 1, makes it possible to quickly take advantage of the availability of mobile money solutions and other technological platforms that can have an immediate impact on financial inclusion and the improvement of living conditions of beneficiary populations; (c) the strong commitment of financial institutions, in particular microfinance institutions, to adopt digital finance solutions like the MFI ALIDé[36] which has opened the floor by interfacing its platform with MTN mobile money platform, and the strategic plan of the national association of MFIs (APSFD-Bénin) to support its members in developing digital finance solution; and (d) the strong commitment of the Government of Benin to the development of the digital economy and ongoing initiatives for digitizing payments government-to-person and person-to-government (G2P and P2G) in particular of small amounts but reaching a large segment of the population.

11. **The principles underlying the design of this component** are based on international best practices, and the G20 Policy Guide on "Digitization and informality: Harnessing digital financial inclusion for individuals and MSMEs in the informal economy" endorsed in August 2018 by the Global Partnership for Financial Inclusion (GPFI) and its Implementing Partners including the World Bank. To increase access and the use of financial services by individuals and MSMEs in the informal economy, the G20 Policy Guide has defined four critical enablers:

    a) **Digital on-boarding through a unique and legal identity.** This issue will not be directly addressed by the project but the West Africa Identification for Development (ID4D) Regional Project (WURI P161329).

    b) **Digital payments infrastructure**. Improving the payments infrastructure could dramatically boost financial inclusion and economic opportunities through increased use of formal payment services.

    c) **Use of alternative data for credit reporting**. Among others, key policy recommendations aim to improve the availability and accuracy of information in particular by identifying the main categories of alternative data and promoting the use of digital platforms to address the limited footprints of MSME transactions.

    d) **Financial consumer protection, financial literacy, and data protection**. Digitization can create opportunities to develop financial literacy, competencies, confidence and experience with finance. Digital technology can increase opportunities for fruitful interactions between financial services providers and consumers through digital interfaces while ensuring consumer and data protection.

12. **Sub-component 2.1 – Digitizing the offering of financial institutions (US$4 million).** The objective of this sub-component is to increase the outreach of financial institutions in rural areas through the use of digital

[36] ALIDé, the Association for the Struggle for the Promotion of Developmental Initiatives, is a Benin microfinance institution founded on January 14th, 2006, following the institutionalization of the Credit Saving Program of the French Development Initiative (ID) NGO.

financial solutions and thus increase their contribution to financial inclusion of the rural population. Most financial institutions including microfinance institutions such Sian'Son, FECECAM, CPEC or PEPCO Bethesda, a few banks and La Poste have a presence in the geographic zone targeted by the project, but are generally limited to urban or semi-urban cities due to the high costs of operationalization of brick and mortar branches in rural areas and limited infrastructure (communication, road, electricity etc.). The project will support financial institutions in the development of digital solutions by partnering with mobile money providers, who have a large agent network estimated to be more than 28 000 active agents in 2017 (BCEAO).

- **Activity 2.1.1. Assessment and upgrade of information systems of financial institutions.** Most financial institutions, in particular small and medium MFIs and those which are not part of an international group, lack a robust, open and centralized MIS that is a precondition for further interfacing with external platforms, and specifically mobile money platforms, and real time registration of operations. As the first step toward the development of a digital finance solution is to upgrade these MIS, the project will support the assessment of MIS and an organizational audit of up to 10 financial institutions. Then, these institutions will be supported through grants for the upgrade of their respective MIS including all security aspects in perspective of interfacing with other platforms. Several options will be analyzed including a common shared version of a new MIS if appropriate. The assessment and upgrade work will be performed by specialized firms recruited through a competitive process, as well as the selection of a new common MIS if appropriate.
- **Activity 2.1.2. Interfacing information systems with mobile money platforms.** Different options of interfacing will be explored to determine the best option, including business model considerations, which will be the most efficient and affordable for the end customers (bilateral connection, use of an aggregator or any other solution available in the market). Once a new or upgraded MIS is in place for the selected financial institutions, the development of digital finance solutions will require additional developments for interfacing MIS with mobile money providers platforms. The link between mobile account and traditional bank or MFI account will bring convenience to customers by overcoming the barrier of distance and will facilitate access to broader financial services. It will allow customers of the financial institutions to move money from their mobile money accounts to their accounts at financial institutions in both ways business-to-world and world-to-business (B2W/W2B) for the purpose of savings or access to loan disbursed and loan reimbursements, transfer between accounts and to consult the balance of its account remotely. This will allow Mobile money customers to have access to broader financial services such as savings and credit. Experience in multiple countries including Kenya, Côte d'Ivoire, and even in Benin with the partnership between MTN and MFI ALIDE, have demonstrated that by partnering with MNOs, financial institutions can have a great impact on expansion of financial services.
- **Activity 2.1.3. Technical assistance for the development of digital financial services.** In order to maximize the chance of success of the introduction by the selected financial institutions of digital finance solutions, the project will provide technical assistance to these institutions throughout the process. In addition, technical assistance will also be provided for the development of financial services adapted to the needs of the targeted economic actors in the four value chains, specifically women, which will be delivered digitally. Technical assistance will also be offered in marketing/ adjusting existing financial services to women, to

ensure they resonate with local norms and context. Introducing alternative delivery channel (ADC) of financial services requires being attentive to change management within the financial institution and risks. The new services and innovations need to be incorporated in the broad business functions of the institution. The changes in processes, the risk underlying the changes in channel features, the adaptation of reporting lines and the fixing of targets and incentives scheme represent critical factors to the ADC success. This TA will also build capacities of the selected financial institutions to create digital financial products (digital credit, and savings).

13. **Sub-component 2.2 – Digitizing value chain payments and women's informal saving groups (US$6 million).** The project will support the digitization of payments for the four value chains selected. Payments in these value chains, are very important but remain in most part in cash despite the high risks of fraud, security, lack of transparency. The project will therefore support the digitalization of the payments within some of these value chains. Interviews across the sector show that there might be some opportunities of digitalization, but this will need to be better assessed during the project implementation. These opportunities include (i) relatively well-organized agriculture organizations with cooperatives, communal unions and for some products an interprofessional organization bringing together all the stakeholders (producers, processors and traders), and (ii) opportunity to leverage on the support to be provided in Component 3 to better organize the value chains.

- **Activity 2.2.1. The digitization of the value chain payments.** The project will finance (a) a deep assessment of the four value chains, and (b) acquisition of digital payment equipment by associations, groups, and MSMEs operating in the selected value chains. The selection of these actors will be based on the following criteria: volume, frequency and circuit of payments, linkages with other groups or players in the value chains. The selection of the value chains will be done based on thorough assessment of opportunities to digitize the value chains and interest of the value chains actors in digital finance.

- **Activity 2.2.2 The digitization of traditional women saving groups ("*tontines*").** Under this activity**,** the project will support (i) an assessment of the opportunities to introduce a risk based know your customer (KYC) approach and tiered KYC with lower identification requirements for women affiliated to saving groups; (ii) the creation of apps or technologies that could mirror the processes and features of saving groups; and (iii) the creation of new financial products for women groups where digital payments could be bundled with commitment savings, and / or insurance products, together with financial education. This will be done with the selected financial institutions in sub-component 2 and insurance companies and MNO.

14. **Sub-component 2.3 – Creating an enabling environment for digital financial services and skills (US$6 million).** The adoption and usage of digital services, in particular mobile money services, are highly correlated with the existence of an enabling legal and regulatory environment, the opportunities to use mobile money and the level of awareness and capabilities for digital finance. To contribute to building the digital ecosystem, the project will support four main activities:

- **Activity 2.3.1. Review of the institutional, legal and regulatory framework.** Benin has recently modernized its legal and regulatory framework with the adoption of the *Code du Numérique* (law n°2017-20), promulgated in April 2018. The *Code* covers key legal and regulatory aspects that govern electronic communications and digital financial services, in

particular electronic proof, e-identification and e-signature, trusted service providers, e-commerce, e-contract, personal data protection and treatment, cyber criminality and security. Decrees for the application of the laws have been prepared while some have already been adopted. Technical assistance will be provided to check the completeness of the institutional, legal and regulatory framework as it relates to the development of digital solutions (e.g. electronic signatures, use of drones, sensors, data privacy). It will also review the decrees to ensure that they take into account adequately all the essential aspects related to digital finance, and propose, if necessary, amendments or new decrees. The review will also ensure that the national regulatory framework to regulate the use of electronic payments for the payments received or done by the public administrations (P2G/G2P) is in place as well national provisions for adequately protect users of electronic payments and digital finance.

- **Activity 2.3.2. Catalyze the acceptance of mobile payments.** Building the digital financial ecosystem will require the creation of more opportunities for the rural populations to use the e-money they receive, and improve the protection of the consumer. The project will therefore finance (i) the preparation of studies on the costs of mobile money transactions, analysis of rural merchants to understand what incentives could motivate these merchants to easily accept digital payments, best cost options to facilitate adoption of mobile money in the rural areas, assess best ways to improve the protection of the consumer and propose solutions; (ii) provide merchants in areas targeted by the project vouchers to finance the acquisition of up to 70 percent of the payment device. Priority will be given to women merchants and to merchants in areas where the agriculture value chains have the highest number of actors.
- **Activity 2.3.3 Improve consumer protection**. The successful and large-scale adoption of technology would be facilitated by an enabling policy framework regardless of the market if trust and consumer protection is strengthened. The project will therefore finance (a) preparation of policies on consumer protection to ensure that issues related to the protection of funds from risk of loss, customer services, transparency of terms and conditions for digital finance are sufficiently covered, (b) provide technical assistance to the agency in charge of consumer protection, and (c) provide technical assistance to MNO and FIs to implement the selected options for consumer protection and communicate these to their clients.
- **Activity 2.3.4 Digital and financial skills.** To address the limited skills and capabilities for digital financial services, the project will: (i) support campaigns of awareness on digital finance in the rural areas where the selected value chains have the highest level of actors; (ii) finance the development of basic digital apps or other interventions on financial and digital literacy and numeracy using voices and images; (iii) identify champions within the rural value chains and women's associations in rural areas and provide training to them so that they can train other people even after project closing; (iv) train merchants in rural areas. This will include training on the newly introduced digital solutions by this project. Trainings will be delivered through the CSAs and/or through mobile training units in the target areas.

Component 3 Digital solutions for rural development (US$10 million equivalent)

15. The project will aim to promote use of digital solutions – principally as they relate to e-Agriculture - in rural areas. An assessment of structural challenges faced by agricultural producers along specific value chains in the targeted areas will be conducted to tailor project activities to meet their needs. This

component may augment and scale-up the delivery of agriculture- related digital services from extension (technical advice), to training, knowledge sharing, tools rental, etc. Public institutions in rural areas are also critical to agriculture development and sustainability. However, these institutions often face under-financing, lack of technical support, and low levels of human capital. Under this component, the potential of digital solutions in helping the Government provide better public services to the agriculture sector will also be assessed. This component will be aligned with the implementation of a new Agricultural strategy around the *Centres de Services Agricoles* (Agriculture Service Centers). Each Center will provide services and technical advice/training specific to the type of agricultural products that are grown in the Center's region. The activities will also help improve data, information and knowledge services management in planning, design, implementation, and delivery of agricultural services to stakeholders in agriculture value chains – especially smallholders and women – through using appropriate digital tools and applications, including data-driven agronomy, location-based services, Internet of Things (IoT), etc.

16. **During preparation, close support will be sought from the World Bank**'s **Community of Practice on Digital Agriculture in designing the adequate tools for digital agricultural advisory services –** The project will also build on achievements of prior World Bank operations, such as the West Africa Agriculture Productivity Program (WAAPP – P094084), wherever possible. It will build on WAAPP's achievements and experience in technology diffusion in the design of e-agriculture extension programs. It will build synergies with other ongoing donors supported programs in the targeted areas in order to complement efforts in agriculture and rural development in the targeted areas. For instance, the ongoing AFD-funded *Fonds Compétitif pour l'Innovation Agricole* is promoting new financing mechanisms for sustained innovations in agriculture. The project will seek to capitalize on such innovations for improved agriculture productivity through further adaptation and dissemination in project areas.

17. **Guiding principle for designing the activities in Component 3** – The principles underlying the design of this component are based on international best practices and have been considered as one of the main action lines of The World Summit on the Information Society (WSIS) implementation process focusing on e-agriculture. The following six action points for e-agriculture beyond 2015 were endorsed during the WSIS+10 high-level events in 2014:

    - Foster the development and implementation of national e-agriculture strategies focusing on providing reliable and affordable connectivity and integrating ICTs in rural development to support food security and eradication of hunger;
    - Foster collaboration and knowledge sharing in agriculture through electronic communities of practice, including the establishment of e-agriculture communities, to showcase and promote models, methodologies, good practices and the adoption of Open Access and interoperability standards for effective and equitable use of ICTs for sustainable agriculture and rural development;
    - Promote the creation and adaptation of content to local conditions in local languages from reliable and trusted sources, ensuring equitable and timely access to agricultural knowledge by resource-poor men and women farmers, foresters and fisher-persons in rural areas;
    - Foster digital literacy of institutions and communities in rural areas taking into consideration local needs and constraints by providing appropriate learning opportunities for all which will enhance individual and collective decision-making skills for increasing productivity;

- Promote the use of ICTs to reinforce the resilience and capacity of states, communities and individuals to mitigate and adapt to natural and man-made disasters, food chain challenges, socio-economic and other crises, conflicts and transboundary threats, diseases, and environmental damages; and
- Promote PPPs in cooperation with relevant Civil Service Organizations (CSOs), Non-Governmental Organizations, (NGOs), cooperatives, farmer organizations, academia, research institutions in the agricultural sector (which also includes forestry and fisheries) for inclusive, efficient, affordable and sustainable digital services and initiatives in agriculture and rural development which will promote the wide scale use of ICT and foster sustainable agri-business models and development.

18. **Sub-component 3.1. Strengthening the data ecosystem (US$3 million) –** Data is a valuable and necessary input to any digital solution. This subcomponent will identify and address bottlenecks in the data ecosystem. It also includes the digital registration of farmers, which will be critical to carrying out the needs assessment, ensuring they receive services, and creating the baseline for collecting data to inform monitoring and evaluation of the project.

- **Activity 3.1.1. Institutional landscape of agricultural "data to decision-making" value chain.** Technical assistance will be provided to: (i) identify the various institutions in the public, private, academic and non-governmental sector at the national and targeted districts level who are involved in the data value chain in the agricultural sector, including environment and climate-related data; (ii) create a data inventory and describe the current status of the types of data being collected and their availability, accessibility of agricultural data, methods used to collect, validate, process, analyze, use, store, secure and disseminate the data, and the uses of data for decision-making; (iii) carry out an overview of digital tools and applications used at every stage of the data value chain; (iv) assess skills of staff, training programs for staff on all aspects of the data value chain; and (v) carry out an overview of the organization, governance, linkages between various organizations, contractual arrangements for data, information and knowledge sharing and exchange; and (vi) provide recommendations for improving the data value chain. This activity will also provide capacity development for the MENC and the MAEP at the national and targeted districts level and provide appropriate training in relevant digital tools and applications needed for modernizing the agricultural departments (such as design of agricultural and environmental databases, maintenance, management, remote sensing, GIS, big data analytics, machine learning, and other areas for possible funding by the project). Special attention will be paid to the collection and analysis of gender-disaggregated data.
- **Activity 3.1.2. Review of policies, law and regulations related to agricultural data collection, management, and dissemination.** This activity will review the current status of policies, laws, and regulations to enable the development of reliable, relevant and timely dissemination of agricultural data for use by both government and external stakeholders. This activity will identify gaps in existing legislation and make recommendations for the revision of laws and regulations, placing emphasis on principles of open and non-discriminatory access. It will also provide technical assistance to: (i) review the current strategy and action plan for the development, dissemination and use of data to promote data-driven agronomy, including environment and gender data; (ii) assess their timeliness and relevance to designing

development programs and policies for the selected value chains; (iii) provide recommendations for improvement; and (iv) support the implementation of the updated strategy and action plan. The expected output will be an updated strategy and action plan for data to decision-making to design, monitor and evaluate development programs and policies.

- **Activity 3.1.3 Digital registration of farmers.** The project will identify farmers who are engaged in agricultural production of the selected commodities in the targeted project areas and fund the establishment of this registry. This registration process provides an effective means to collect benchmarking data, deliver training, information, services and marketing support to smallholder farmers. This includes helping service providers deliver real-time agriculture and climate information and early-warning services to affected farmers. This activity involves targeting, enrollment, organization into producer organizations and registering producers and producer organizations digitally. The project will facilitate the formation or consolidation of farmer groups into more formal structures, if desired by group members.

19. **Subcomponent 3.2. Mobilization of the digital ecosystem (US$6 million).** Benin's innovation ecosystem offers immense potential for job creation and spurring digital entrepreneurship at both low and high skill levels. This subcomponent includes a needs assessment of target beneficiaries of digital solutions, a review of existing digital services, and support to Benin's digital ecosystem including higher education institutions and incubators.

    - **Activity 3.2.1. Needs assessment.** This technical assistance activity will carry out a detailed assessment of the digital, information and knowledge needs of producers and a wide range of sector actors (for example, staff involved in both policy making and operations in the agricultural sector at all levels of the Ministry – from Central to regional and local levels, subsistence and commercial farmers, farm organizations, CSAs, public and private institutions involved in the agricultural sector, agro-industries, universities, research institutes, consumers, etc.). Special attention will be paid to identifying the needs and constraints of women producers. A variety of participatory processes directly involving the various end-users will be used to define and prioritize their data, information and knowledge needs, demand and nature of information, local problems, constraints, and the expectations of the various users from the communication system. This activity will also identify locally relevant climate change impacts and will help focus capacity building to equip farmers with the knowledge and practical skills to become more resilient to these impacts.

    - **Activity 3.2.2. Study of existing e- services for agriculture.** This activity includes: (i) carrying out a detailed review and assessment to identify e-agriculture applications, including climate-smart e-agriculture solutions, which have been tested and proved successful in Benin and other relevant countries; (ii) identifying other digital services which are useful to the subsistence farmers to increase crop productivity and incomes, improve market linkages and value chains, and respond to climate changes in real-time through climate information services; (iii) reviewing and assessment of the use of current digital services for improving agricultural productivity and incomes being used in Benin – their strengths and weaknesses; (iv) developing recommendations for how suitable apps or other digital interventions could be adapted and/or scaled up to provide digital services to small-scale farmers; and (v)

identifying opportunities for the design and development of new applications using mobile phones and other devices and prepare proposals for possible funding by the project.

- **Activity 3.2.3 Services and training delivery through the CSAs and ATDAs**. The MAEP plans to introduce CSAs from 2020, housed in the seven regional agricultural development centers (PDAs), to provide close support to farmers. These centers will require a high-speed internet connection (activity 1.2.7 included in Component 1). They will need to be equipped with tools, which may include drones and sensors. These centers will be important for the iteration of new services, and the piloting and deployment of products in protected settings (the development of digital services is characterized by greater iteration mechanisms than in more traditional sectors.) In addition, CSAs and ATDAs can be the entry points for digital literacy and financial inclusion (see Component 2). A targeted public education campaign, and behavioral change communication will help the small farmers and producer organizations become aware of the resources provided by the CSAs and ATDAs. The project will seek young farmers interested in the subject, who will agree to act as focal points ("digital referents"). These referents will themselves be trained, then the project will entrust them with training modules for their communities, for the four crops concerned. These modules will cover the basics of digital literacy, digital applications, and use of digital tools. These referents will also relay user feedback to request improvements to the proposed tools. If the opening of these centers is delayed, producer organizations will be selectively targeted, and the project will finance mobile training units in the target regions to deliver trainings and raise awareness.
- **Activity 3.2.4. Digital ecosystem support.** This activity will support Benin's technology hubs and universities to help increase their innovative outputs, expand operations, including the development of new digitally enabled services, local content, and scaling up of emerging innovations. Support includes equipment for prototypes and trainings for entrepreneurs. The activity will primarily encourage local software developer communities, universities, and digital entrepreneurs to showcase their skills relevant to the development of digital solutions to challenges faced by the agricultural sector. The activity will support App Challenges and other events to stimulate digital tools. This includes: (i) Design and organization of App Challenges to develop or enhance digital solutions that provide local content to improve rural livelihoods; (ii) Technical assistance and financial support to scale up and mainstream relevant digital solutions that emerges from App Challenges; and (iii) Initiatives to engage women entrepreneurs to participate in digital innovative programs that aim to improve the rural economy of Benin**.** The intent of organizing these is to: (a) encourage women smallholding farmers and entrepreneurs to participate in the events, and (b) to harness and scale-up the outcomes of the challenges to develop innovative applications to provide farmer community easy access to agricultural digital services and market information. The App Challenges will challenge participants to innovate and come up with solutions using content and data from relevant sources that have the potential to either add value to existing applications in the marketplace or offer completely new and digital approaches to solving traditional problems. Criteria for the challenges will include their levels of climate resilience and sustainability. The project will emphasize support for greater female participation in the Challenges by incentivizing women students, farmers, and entrepreneurs to associate and collaborate during all stages from the ideation to the prototyping and testing processes. This is expected to result in (i) use of digital solutions to improve rural livelihood; (ii) increase digital

awareness; (iii) mobilization of local digital champions, start-ups, entrepreneurial farmers, and university students to associate and collaborate to develop innovative solutions; and (iv) systematically capture lessons learned with a view to replicating the ecosystem in other sectors. The Challenges will be in areas determined by the needs assessment. For example, a service need has already been identified: the management of agricultural machinery and equipment. Beninese agriculture has a low rate of mechanization; however, existing tools are not always used to their maximum. It would be possible to set up an application to publish offers of available equipment, negotiate agreements, and pay online. The operation of such a platform could be financed by commissions on the transactions carried out. This activity will also finance training on IT skills for about 1000 recent and nearly graduated students of Benin's higher education institutions to increase the talent pool in the country to design and develop digital tools and services. Support will also be provided to incubators and tech hubs to enable the winners of the App Challenges to take these solutions from ideation to prototyping in the target regions and roll out and provide them with coaching and advice on business model development, marketing, etc.

20. **Sub-component 3.3 – Climate-smart agriculture and producer organizations (US$1 million).** This sub-component aims to support the development of climate-smart digital solutions and provide capacity in climate smart production management. It builds on the activities in subcomponents 2.3, 3.2 and 4.2.

- **Activity 3.3.1 Develop and implement applications that support climate smart agriculture.** This activity will finance the development and adaptation of applications that will enable smallholder farmers to receive climate information relevant to the selected value chains in real time.
- **Activity 3.3.2 Strengthen existing community radios to disseminate relevant information to beneficiaries –** Provide assistance to enhance existing community radio stations in the project areas to enable smallholder farmers to exchange information and knowledge, discuss topics of mutual interest and obtain daily updates on climate, markets, new technologies, etc.
- **Activity 3.3.3 Build Capacity of small holders on climate-smart agricultural practices.** This activity will aim to build capacity of smallholder farmers on climate-smart agricultural production and management, for example landscape management using digital solutions and using mobile based climate information systems. These will be done through the delivery of training, inputs and marketing support, with a focus on women farmers to help them become more resilient to climate impacts.

Component 4 Access to markets (US$20 million equivalent)

21. This component will tackle the problems of access to markets for small-scale farmers in project targeted areas and reduce the vulnerability of the serviced population during flooding and landslides season. Interventions of the rural accessibility component are essential to improve the collection of agricultural commodities, as well as provide access to marketing infrastructure and to areas with high potential for increased agricultural production. The high level of service provided by the roads is expected to attract more means of transport, thus improving person and goods displacement and a decrease of transport cost on these roads for smallholder farmers, especially women. This component will finance (i) the technical feasibility studies, environmental and social assessments and works related to the rehabilitation and the maintenance of rural roads over a period of four years; and (ii) the pilot of road maintenance through labor intensive methods and capacity building. The total maintained linear of rural road will be

about 3,000 km (600 km/year). The materials and design standards for road rehabilitation emphasize reducing the risk of flooding and associated destruction of housing and facilities. The project will also implement a climate and natural hazards monitoring, early warning and incidence response system. Significant experience on this strategy was gathered through the Agricultural Productivity and Diversification Project (PADA - P115886) and other infrastructure projects funded by the World Bank.

22. The proposed works will be performed through conventional contracting and will follow the applicable national standards. Supervision of works, including implementation of environmental mitigation plans will be provided for all works under the component through the hiring of experienced consulting firms. The improvement of basic access links will be performed by small-scale contractors using labor-intensive methods to the extent feasible and by small and medium enterprises (SMEs) for more specialized works.

23. (**Sub-component 4.1) Rehabilitation and maintenance of rural roads (US$19 million)**. This subcomponent will finance the technical studies, social and environmental studies, and works related to the rehabilitation of about 600 km of rural roads and the maintenance of about 2,400 km of rural roads over a period of four years in the targeted regions. The studies will be carried out by specialized firms under the supervision of the Ministry of Infrastructure and the MAEP. Rehabilitation/improvement of key rural roads will involve improvements to existing surfaces, structures, and drainage systems. To enhance the resilience of the project to impacts of climate change and natural disasters, the rehabilitation and maintenance of roads will include improvements in the drainage structures to ensure all-weather/season practicability based on the spots improvements approach and an adequate level of service for the project area road. The drainage works will be designed in a technically sustainable manner to avoid any negative impact and provide high levels of protection. Furthermore, the project will adopt a resilience strategy based on reducing the risk of catastrophic failure, such as using submersible roads where needed. The typology of the proposed road infrastructure works is very similar to works financed under the PADA that attracts national SMEs and creates jobs for the vulnerable population. It will focus on critical rural roads allowing access to targeted production zones and markets in the areas of Malanville-Karimama, Alibori Sud, Borgou Nord-2KP, Atacora Ouest, Zou (Djijda) and northern parts of Borgou Sud Donga – Collines.

24. (**Sub-component 4.2) Digital Transport Applications, LiM Pilot , and capacity-building (US$1 million**). This sub-component consists of (i) developing digital applications for the Benin Road Asset Management team and RC to help maintain the rural roads; (ii) implementing a rural roads maintenance pilot project through labor intensive methods; and (iii) strengthening the capacity of MAEP staff and rural communities in the area of general contracting and the maintenance of rural roads. This sub-component will develop GIS-enabled applications for geomapping of rural networks, measurement and analysis of the Road Roughness Index and Rural Accessibility Index, and management of public grievances through a smartphone-enabled Citizen Engagement System. These digital applications will be integrated into the Road Asset Management System to help the RC with the maintenance of rural roads. For works under the pilot project through labor intensive methods, selected rural communities in the project target areas will be involved in the planning and implementation of works at a level commensurate with their capacity. While acknowledging that their participation is currently strongly limited by capacity constraints, the project will promote a greater but gradual participation of rural communities in road maintenance planning, management, and supervision.

25. This capacity building aims to strengthen (i) the basic institutional and technical capacity of local rural communities to assume responsibilities for rural road maintenance, and (ii) the technical capacity of MAEP and staff from the Benin road asset management unit to enable them to provide technical assistance to

RC in the planning, implementation and supervision of routine maintenance, assessment of climate vulnerabilities and mitigation measures. It will include, inter alia, the following activities:

- Raising awareness of local communities on the importance and benefits of planned, preventive maintenance of rural roads.
- Consultative processes for the development of inter-community cooperation for maintenance of important roads that serve several RC.
- Methods of organizing and implementing labor-based routine and recurrent road maintenance, including contracting with individuals for routine maintenance; and contracting with a group of local people to carry out the routine maintenance of a road.
- Training to RC in the planning, implementation, and supervision of road maintenance. The RC team will also be trained in the use of Applications for measurement and analysis of the Road Roughness Index and Rural Accessibility Index, and management of public grievances through a smartphone-enabled Citizen Engagement System.
- Technical aspects of preventive maintenance work using labor-based methods and dissemination of educational tools.
- Training of trainers for MAEP staff in project planning, coordination and supervision of rural roads including environmental, climate and social assessments, gender aspects, etc.
- Trainings to local communities, in particular women and youth groups in RCs from project area of intervention, in the area of routine maintenance and basic road engineering skills in order to enable them to undertake routine maintenance works under the pilot initiative and to promote their involvement in future routine maintenance works.
- Trainings to local communities for understanding and assessing climate vulnerabilities of rural roads and steps to mitigate the impacts.
- Assistance to RCs in assembling their maintenance proposals in view of eligibility to access funds from the National Road Maintenance Fund.

26. Trainings will either be delivered in collaboration with the ‘’Centre de Formation en Transport et Travaux Publics (CFTTP)’’ and the Direction Générale des Infrastructures at the Ministry of Infrastructure and Transport of Benin. Also, the project will establish a collaboration framework with FERA in support of technical assistance activities.

27. **Component 5 Project implementation (US$9 million**)– This Component will support the setting up of a dedicated PIU and will also cover training, office equipment, operating costs, audits and communications as well as M&E, environmental and social studies, redress mechanisms, their implementation and/or the monitoring of their implementation.

28. **(Sub-component 5.1) Project Management, Communications, and Audit (US$6 million)** – Sub-component 4.1 will consist of a series of technical assistance activities to strengthen the project management capacity of the MENC, manage all communications activities around the project (internal communication with stakeholders and beneficiaries, as well as promotion through the media). This subcomponent will also finance all activities related to quality control, GRM, internal and external audit.

29. **(Sub-component 5.2) Preparatory Activities (US$2 million)** – Sub-component 4.2 is financed by the PPA consists of a series of technical studies (Operations Manual for the infrastructure, Implementation Manual, Prioritization of targeted zones, Base values for indicators, etc) that are pre-requisites for the implementation of large investments such as the digital infrastructure. Preparatory activities also include workshops, involving all stakeholders (direct beneficiaries, local governments, all Ministries involved, and the local digital ecosystem) to ensure full ownership and jumpstart the project once the credit is effective.

30. **(Sub-component 5.3) Learning and capacity building (US$1 million)** – Sub-component 5.3 will consist of a series of technical assistance activities to strengthen the project management capacity of the MENC and the MEAP. This project fosters innovation and this subcomponent will also finance study tours to countries where e-agriculture services have been successfully developed, adopted, and become sustainable.

ANNEX 3: Economic and Financial Analysis

Component 1

1. The scope of the connectivity activity in Component 1 (i.e. extending digital connectivity to targeted rural areas) involves the construction of a digital infrastructure in the rural parts of Benin to cover the targeted villages. According to the regulator ARCEP, there are around 1.87 million inhabitants in the targeted regions that are not covered by a wireless network. The construction of the digital infrastructure will allow for an important expansion in the provision of mobile telephony services and mobile broadband services to citizens and smallholders.

2. The financial and economic analysis of the project is based on the incremental approach. All cash flows are stated in constant US$. The reference period is set equal to the standard lifecycle period for a digital infrastructure (i.e. 20 years) and thus no residual value is considered at the end of the reference period.

3. Critical assumptions are based on previous RAN infrastructure investment projects supported by the World Bank or other donors (European Investment Bank) as well as industry standards. Critical assumptions are set as follow:

    - On the supply-side (cost). To ensure the coverage of the offline population in the northern region (approximately 1.87 million inhabitants), the project foresee the deployment of 380 fully operational sites, each site covering around 2,500 inhabitants on average and costing US$200,000 for installation and commissioning (CAPEX). The RAN infrastructure will consist of both passive and active components. The passive components include land acquisition and preparation, structure deployment (50-metre lattice tower), shelters, and power solution with solar panels or generators; active components include 2G/3G-ready active equipment, and backhaul to connect to the core network infrastructure, including installation and commissioning. The operation expenditures (OPEX) are evaluated as a percentage of the CAPEX and represent 18 percent of the cumulated CAPEX. OPEX include land and structure maintenance and site security with decentralized and local staff, backhaul fees, power generator or solar panel maintenance and use of deep-cycle batteries.
    - On the demand-side (revenues). The penetration rate of mobile services (unique subscriber penetration rate) is assumed to reach 35 percent of current offline population within 10 years (due to the low purchasing power of the rural population the unique subscriber penetration rate will remain lower than the national average which currently stands at 45 percent). Mobile consumers will generate a blended monthly net ARPU of US$4. The net ARPU includes all revenues collected from the end-user (mobile phone device, voice, SMS, data and value-added services) as well as net incoming wholesale revenues (i.e. interconnection revenues minus interconnection costs).

4. The results for the project *without* public capital support are: (i) the financial rate of return FRR (C) is 8 percent; (ii) the break-even point occurs in 14 years; and (iii) the Net Present Value (NPV) is US$ -9.3 million (with a discount rate of 10 percent). These results show that although FRR (C) is positive, telecommunication operators would not invest in this project alone because it would not provide the minimum rate of return that private mobile operator companies usually expect (around 12 to 16 percent depending on the socio-economic context). Therefore, public financing is needed to make the project possible.

5. The results for the project *with* public capital support are: (i) the FRR (K) is 15 percent; (ii) the break-even point occurs in 11 years; and (iii) the NPV is US$20.5 million (with a discount rate of 8 percent). These results show that the project becomes acceptable for private operators; moreover, the fact that the FRR on national capital FRR (K) is in the lower range of the expected rate of return for standard mobile telecommunications projects and that the break-even point occurs in the long-term (11 years) show that the public capital support is not over-proportionate.

6. It needs to be noted here that although last-mile operators were consulted in advance, there is a certain level of uncertainty with regards to the final level of revenues that will be generated by the infrastructure. This is acknowledged in the design of the project, which requires the inclusion of a claw-back mechanism into the PPP contract that would apply in case revenues are higher than originally foreseen.

7. The economic literature suggests that a large number of socioeconomic benefits are associated with increasing broadband coverage. Examples of benefits that are usually identified are: saving on time and travel cost by performing administrative and business activities online, increasing mobile banking and micropayment usage, reducing the opportunity cost of providing goods and services via Internet, equity, ubiquity, improved competition, cost savings for the public sector, etc. In particular, an increased use of e-commerce and e-banking services, especially in rural disadvantaged areas, is seen as a main driver towards economic growth and reduction of territorial disparities and social exclusion. The availability of a digital connectivity infrastructure is also a key element to improve the attractiveness and competitiveness of an area and its overall competitive edge and can help in reversing the trend of relocation of economic activity and depopulation.

8. The economic analysis can be performed on a macroeconomic level (estimate the local GDP growth generated by additional mobile and broadband users) or a microeconomic level (such as household consumer surplus or time and cost savings derived from the use of online services). However, the economic analysis cannot be performed by using these methods due to: (i) the coverage expansion areas (white zones) being scattered rather than consisting in one single administrative area; and (ii) a lack of local data for the target areas (such as local GDP and local travel time and cost).

9. Because of the lack of socio-economic data at the local level, the economic analysis is limited to two direct measurable effects, namely the extra fiscal revenue earned by the Government thanks to the project and the local salaries paid to local staff to ensure the maintenance and security of staff. The extra fiscal revenue is limited to the VAT at an 18 percent rate, and the local salaries are evaluated by considering a full-time equivalent staff for each site, paid at the minimum legal wage of US$70 per month. These two direct revenues amount to a total cumulated value of US$84.9 million, which is in line with the public capital support of US$40.3 million provided by the project for financing digital infrastructures in targeted rural areas.

Table 3.1 – Financial cash flows and financial performance indicators of the project

Income statement and FRR	Unit	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20
Market assumptions																					
Cumulated number of sites deployed	#	60	120	200	280	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380
CAPEX - Cost of deploying a site	k$	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
OPEX - Cost of O&M as % of Capex	%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%
Population covered by site	#	2,500	2,550	2,601	2,653	2,706	2,760	2,815	2,872	2,929	2,988	3,047	3,108	3,171	3,234	3,299	3,365	3,432	3,501	3,571	3,642
Mobile penetration (target areas, mid-yr)	% pop.	5%	9%	14%	18%	23%	27%	32%	36%	41%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%
Blended monthly net ARPU	$/mo.	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5	$ 5
Cost																					
Annual number of sites deployed	#	60	60	80	80	100	-	-	-	-	-	-	-	-	-	-	-	-	-		-
Annual CAPEX (initial investment)	m$	$ 12.0	$ 12.0	$ 16.0	$ 16.0	$ 20.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Cumulated CAPEX	m$	$ 12.0	$ 24.0	$ 40.0	$ 56.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0	$ 76.0
Annual OPEX	m$	$ 2.2	$ 4.3	$ 7.2	$ 10.1	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7
Total annual cost	m$	$ 14.2	$ 16.3	$ 23.2	$ 26.1	$ 33.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7	$ 13.7
Income																					
Population covered	k pop.	150	306	520	743	1,028	1,049	1,070	1,091	1,113	1,135	1,158	1,181	1,205	1,229	1,254	1,279	1,304	1,330	1,357	1,384
Subscriber base (mid-yr)	k pop.	7	28	70	134	231	283	337	393	451	511	521	532	542	553	564	575	587	599	611	623
Subcriber income	m$/yr.	$ 0.4	$ 1.5	$ 3.8	$ 7.2	$ 12.5	$ 15.3	$ 18.2	$ 21.2	$ 24.3	$ 27.6	$ 28.1	$ 28.7	$ 29.3	$ 29.9	$ 30.5	$ 31.1	$ 31.7	$ 32.3	$ 33.0	$ 33.6
Financial Rate of Return without public capital (C)																					
CAPEX without public capital	m$	$ (12.0)	$ (12.0)	$ (16.0)	$ (16.0)	$ (20.0)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
OPEX	m$	$ (2.2)	$ (4.3)	$ (7.2)	$ (10.1)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)
Revenues	m$	$ 0.4	$ 1.5	$ 3.8	$ 7.2	$ 12.5	$ 15.3	$ 18.2	$ 21.2	$ 24.3	$ 27.6	$ 28.1	$ 28.7	$ 29.3	$ 29.9	$ 30.5	$ 31.1	$ 31.7	$ 32.3	$ 33.0	$ 33.6
Free cash flow (FCF)	m$	$ (13.8)	$ (14.8)	$ (19.4)	$ (18.9)	$ (21.2)	$ 1.6	$ 4.5	$ 7.5	$ 10.7	$ 13.9	$ 14.5	$ 15.0	$ 15.6	$ 16.2	$ 16.8	$ 17.4	$ 18.0	$ 18.6	$ 19.3	$ 20.0
Cumulated FCF	m$	$ (13.8)	$ (28.6)	$ (48.0)	$ (66.9)	$ (88.1)	$ (86.5)	$ (82.0)	$ (74.4)	$ (63.8)	$ (49.8)	$ (35.4)	$ (20.4)	$ (4.8)	$ 11.4	$ 28.2	$ 45.6	$ 63.6	$ 82.2	$ 101.5	$ 121.5

FRR (C)	**8%**	(20 yrs)	**Break Even Point (Payback period in years)**	**14**	**NPV 10%**	**$ (9.3)**

Financial Rate of Return with Public Capital (K)																					
Public capital	m$	$ 6.4	$ 6.4	$ 8.5	$ 8.5	$ 10.6	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Private CAPEX after public capital	m$	$ (5.6)	$ (5.6)	$ (7.5)	$ (7.5)	$ (9.4)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
OPEX	m$	$ (2.2)	$ (4.3)	$ (7.2)	$ (10.1)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)	$ (13.7)
Revenues	m$	$ 0.4	$ 1.5	$ 3.8	$ 7.2	$ 12.5	$ 15.3	$ 18.2	$ 21.2	$ 24.3	$ 27.6	$ 28.1	$ 28.7	$ 29.3	$ 29.9	$ 30.5	$ 31.1	$ 31.7	$ 32.3	$ 33.0	$ 33.6
Free cash flow	m$	$ (7.4)	$ (8.5)	$ (10.9)	$ (10.4)	$ (10.6)	$ 1.6	$ 4.5	$ 7.5	$ 10.7	$ 13.9	$ 14.5	$ 15.0	$ 15.6	$ 16.2	$ 16.8	$ 17.4	$ 18.0	$ 18.6	$ 19.3	$ 20.0
Cumulated FCF	m$	$ (7.4)	$ (15.9)	$ (26.8)	$ (37.2)	$ (47.8)	$ (46.2)	$ (41.7)	$ (34.1)	$ (23.5)	$ (9.6)	$ 4.9	$ 19.9	$ 35.5	$ 51.7	$ 68.5	$ 85.9	$ 103.9	$ 122.5	$ 141.8	$ 161.8

FRR (K)	**15%**	(20 yrs)	**Break Even Point (Payback period in years)**	**11**	**NPV 10%**	**$ 20.5**

Table 3.2 – Sensitivity analysis on supply-side (top) and demand-side (bottom) assumptions for financial performance indicators for the project without public capital support

FRR (C)						
	$ 50	$ 100	$ 150	**$ 200**	$ 250	*Cost of site (k$)*
5%	72%	39%	27%	20%	16%	
10%	66%	34%	23%	16%	11%	
15%	60%	30%	18%	11%	6%	
18%	57%	27%	16%	**8%**	3%	
23%	52%	24%	12%	4%	-3%	
OPEX (as % of CAPEX)						

Break even period (years)						
	$ 50	$ 100	$ 150	**$ 200**	$ 250	*Cost of site (k$)*
5%	5	7	8	9	10	
10%	5	7	9	11	12	
15%	6	8	10	12	15	
18%	6	8	11	**14**	18	
23%	6	9	12	17	21+	
OPEX (as % of CAPEX)						

FRR (C)						
	30%	35%	40%	**45%**	50%	*Penetration (% pop.)*
$ 3.0	N/A	-11%	-6%	-2%	1%	
$ 3.5	-11%	-5%	-1%	2%	5%	
$ 4.0	-6%	-1%	2%	5%	8%	
$ 4.5	-2%	2%	5%	**8%**	11%	
$ 5.0	1%	5%	8%	11%	14%	
ARPU ($)						

Break even period (years)						
	30%	35%	40%	**45%**	50%	*Penetration (% pop.)*
$ 3.0	21+	21+	21+	21+	20	
$ 3.5	21+	21+	21+	19	16	
$ 4.0	21+	21+	18	16	14	
$ 4.5	21+	19	16	**14**	12	
$ 5.0	20	16	14	12	11	
ARPU ($)						

Table 3.3 – Sensitivity analysis on discount-rate factor for NPV of the project without (NPV(C)) and with (NPV(K)) public

NPV (C) at discount rate (US$ m)				
6%	7%	8%	9%	**10%**
$ 18.9	$ 9.9	$ 2.4	$ (4.0)	$ (9.3)

NPV (K) at discount rate (US$ m)				
6%	7%	8%	9%	**10%**
$ 52.3	$ 42.4	$ 33.9	$ 26.7	$ 20.5

Table 3.4 – Calculation of direct economic benefits (VAT and local staff salaries) over the duration of the project

VAT and staff salary calculation	Unit		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Y19	Y20
Revenues	m$	$	0.4	$ 1.5	$ 3.8	$ 7.2	$ 12.5	$ 15.3	$ 18.2	$ 21.2	$ 24.3	$ 27.6	$ 28.1	$ 28.7	$ 29.3	$ 29.9	$ 30.5	$ 31.1	$ 31.7	$ 32.3	$ 33.0	$ 33.6
Cumulated revenues	m$	$	0.4	$ 1.9	$ 5.6	$ 12.9	$ 25.4	$ 40.7	$ 58.8	$ 80.1	$ 104.4	$ 132.0	$ 160.1	$ 188.8	$ 218.1	$ 248.0	$ 278.4	$ 309.5	$ 341.2	$ 373.5	$ 406.5	$ 440.1
VAT	m$	$	0.1	$ 0.3	$ 0.7	$ 1.3	$ 2.2	$ 2.8	$ 3.3	$ 3.8	$ 4.4	$ 5.0	$ 5.1	$ 5.2	$ 5.3	$ 5.4	$ 5.5	$ 5.6	$ 5.7	$ 5.8	$ 5.9	$ 6.1
Cumulated VAT	m$	$	0.1	$ 0.3	$ 1.0	$ 2.3	$ 4.6	$ 7.3	$ 10.6	$ 14.4	$ 18.8	$ 23.8	$ 28.8	$ 34.0	$ 39.3	$ 44.6	$ 50.1	$ 55.7	$ 61.4	$ 67.2	$ 73.2	$ 79.2
Staff full-time equivalent	#		60	120	200	280	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380	380
Local staff salary	m$	$	0.05	$ 0.10	$ 0.17	$ 0.24	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32	$ 0.32
Cumulated local staff salary	m$	$	0.05	$ 0.15	$ 0.32	$ 0.55	$ 0.87	$ 1.19	$ 1.51	$ 1.83	$ 2.15	$ 2.47	$ 2.79	$ 3.11	$ 3.43	$ 3.75	$ 4.07	$ 4.38	$ 4.70	$ 5.02	$ 5.34	$ 5.66

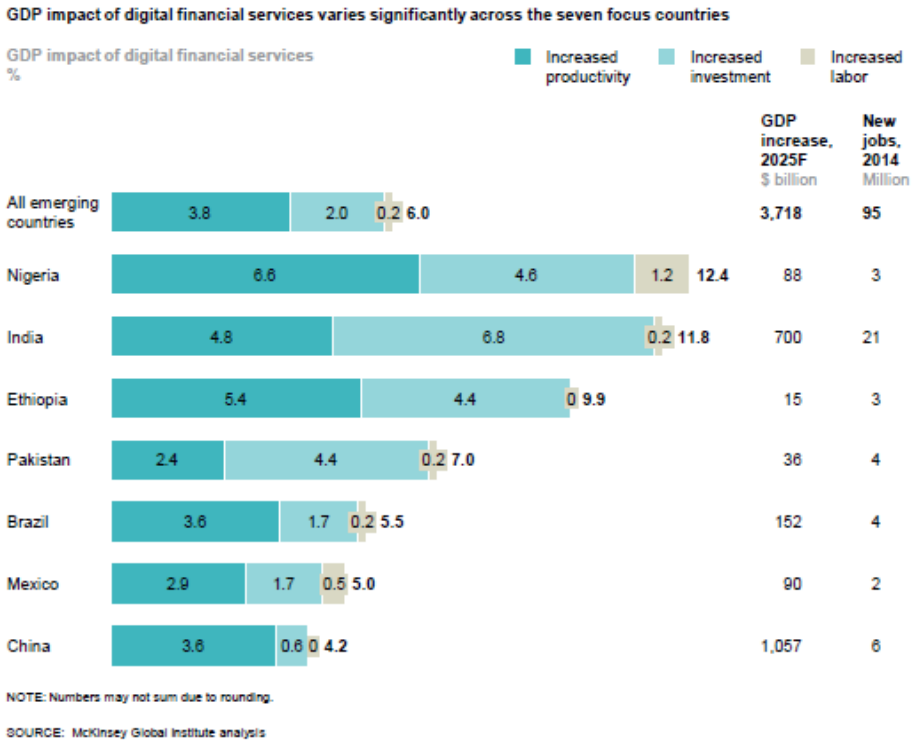
Total cumulated VAT (m$)	**$ 79.2**	(20 yrs)	---------->	**NPV of total cum. VAT (m$, discount rate of 10%)**	**$ 24.8**
Total cumulated Salary (m$)	**$ 5.7**	(20 yrs)	---------->	**NPV of total cum. salaries (m$, discount rate of 10%)**	**$ 2.1**
Total cumulated public capital	**$ 40.3**	(20 yrs)	---------->	**NPV of total cum. public cap. (m$, discount rate of 10**	**$ 29.8**

Component 2

10. Digital financial inclusion could boost the economy by improving women, farmers, and medium enterprises access to economic opportunities. The project will give access to a financial account for the first time to a large part of unbanked populations, and by giving access to a broader range of financial services to those who have already access to basic financial services. Convenience, cost, and the range of financial products available would dramatically improve for all these banked or unbanked populations allowing them to spend more time on and growing their income-generating activities and farms. In Malawi for example, farmers whose income from crop sales was deposited directly into accounts spent 13 percent more on inputs for their future crops and achieved a 21 percent average increase in yields from the following year's harvest in comparison to farmers who received payment in cash. Also, better access to digital financial services will increase competition among financial services providers and force them to provide better quality services to individuals and enterprises or risk losing depositors to rival digital financial services providers. For enterprises (merchants) and farmer cooperatives, traceability of their digital payments could help many of them move progressively from informality to formality and help them access credit.

11. For financial institutions themselves, the digital transformation offers multiple promises including lowering their costs by reducing queuing lines in banking halls, reducing manual paperwork and the need to maintain fewer bank branches[33], therefore improving their level of profitability and performance. Opportunity to offer digital financial services will increase dramatically the outreach of financial institutions, and therefore the depositor base which in turn improves the opportunity to collect new funds that could then be loaned out to individuals as well as businesses.

12. While data to measure economic impact of digital financial inclusion were not collected for the project at this stage, an economic analysis based on Mc Kinsey proprietary equilibrium model shows the huge impact that digital financial services can have on GDP growth and creation of new jobs (see below). According to this economic analysis, one third of the estimated growth related to availability of digital financial services could come from increased investment as individuals and micro- businesses are brought in the formal financial system.



Component 3

13. Based on the experience of similar projects using the latest advances in digital tools and applications to improve efficiency at all stages of the agricultural value chain, the proposed activities of the digital services for sustainable agricultural development component would yield high financial and economic returns. It would also bring several benefits, with the reduction in gender inequality, empowerment of women, development of skilled agricultural extension and advisors, localized content, promoting digital literacy, promoting startups in various aspects of IT applications in agriculture, peer to peer knowledge exchange, collaboration between institutions involved in the agricultural sector, etc. However, due to the lack of available agricultural data, the financial and economic returns – as well as the overall benefits –cannot be easily quantified.

14. The project would enhance the capacity of the MAEP and other relevant government institutions at the national and local levels in all aspects of the "data to decision making value chain" for the targeted agricultural value chains. Skills of the staff would be enhanced in the use of a wide range of digital tools and applications for data collection and decision-making. For example, data collection using mobile phones, interpretation and use of Normalized Difference Vegetation Index (NDVI) images, and satellite weather data. Together, this would help in providing practical recommendations by the agricultural extension and advisory staff to project farmers to address day to day problems during the entire crop cycles resulting in increased efficiency of the use of inputs, productivity and incomes.

15. The project's bottom-up approach is expected to result in the development of high-quality content (defined as data, information and knowledge) which is most useful and locally relevant to address the needs of the farmers. Crowdsourcing techniques where users can call a phone service to get answers for

their specific questions would become a part of a knowledge base, which can then be queried by other users. The project would further disaggregate mobile subscriptions by income, gender, etc., to get a better understanding of the main problems being faced by smallholders at every stage of the selected value chains - who is using the content, how to make it more relevant for users and help in providing practical solutions which the farmer can adopt.

16. Data for carrying out a detailed economic and financial analysis, (such as crops, farm budgets, with and without project conditions, estimates of incremental production, incomes, savings in time and increases in efficiency in all stages of the agricultural value chain, current and projected financial and economic prices of inputs and outputs, detailed investment and operating costs, etc.) are in the process of being collected. Evaluations of e-agricultural services which have been carried out in developed and developing countries demonstrate that investments made in these activities yield high economic and financial returns.

17. Some examples from evaluations of digital agricultural services which have been carried out in developed and developing countries demonstrate that investments made in these activities yield high economic and financial returns. These are provided in Annex 5.

Component 4

18. The lack of accessible rural roads identified in the project areas contribute to farmers losing large quantities of their perishable products. By improving access roads, the program will contribute to increasing the production and income as well as food security for people in project targeted areas. The economic cost and benefits will be assessed for each stretch of road included under the project as part of the selection process.

19. The rehabilitation and maintenance of rural roads will increase the level of connectivity and social cohesion. By increasing the level of service, this program will: (i) boost means of transport; and (ii) permit easy movement of persons and goods by allowing a reduction in the trip duration and transport costs. These impacts will bring efficiency in the value chain for the link ''infrastructure / transport''. In addition, from the experience of the other projects, and notably PADA, the populations have easier access to basic social services. Benefits expected from extended basic road access include enhanced access to markets, health, education and information, improved year-round connectivity and lower transport costs. An important gain in local job creation will be created for the benefit of young men and women in rural areas notably in the project intervention areas. In addition, the rehabilitated roads will reduce transport costs, freight rates, vehicle operating costs, and travel times, facilitating the expansion of agriculture, trade, and access to markets.

20. While an economic and social benefit analysis cannot be carried out at this stage, the traditionally used indicators (NPV and IRR) will be used in the prioritized selection strategy of the rehabilitation and maintenance rural roads program. The usual range of IRR for rural roads is between 15 and 20 percent, and will be calculated with the RED methodology developed by the SSATP for low volume roads. However, the project will provide economic and social benefits, at the level of its the operational components. The financial profitability of the project will be determined using indicators of investment returns including net present value (NPV) and economic rate of return (ERR) as well as analysis of the risks that could be involved. The methodology will be based on cost-benefit analysis with a 12 percent discount or other appropriate rate. The methodologies for economic analysis are adapted for each kind or types of interventions the project could face with:

- *Basic Access*: For basic motorized access where the objective is to assure year-round access through spot improvements, the level of traffic on candidate links are well below 50 vehicles per day (vpd). In such cases, the design of works will be geared toward finding the least-cost solution to arriving at a minimum level of service. A Cost Effectiveness Analysis (CEA) will be performed and will involve a Cost Effectiveness Indicator (CEI) defined as the number of rural population served per unit of cost. The CEI will be used to rank candidate links.
- *Periodic Maintenance/Rehabilitation Program*: Key rural links which cater to access to markets and agricultural areas feature higher volumes of traffic and hence require Cost-Benefit Analysis (CBA) to justify higher levels of investment. For such links, the IRR and NPV at a 10 percent discount rate could be determined on the basis of savings in the Vehicle Operating Costs (VOC) using the Road Economic Decision Model (RED). The economic analysis will include a sensitivity analysis based on the results for base scenarios.

Table 3.5: Summary of rural roads planning activities

Linear Rehabilitated; maintained, or studies per year	Rehabilitation RLTPC (km)	Maintenance works - RLEP (km) for a regular frequency (1 passage per year)		Environment, social and technical studies (Km) *
		Linear of road to be maintained on roads rehabilitated by this project (km)	Linear of road to be maintained on roads rehabilitated by other projects (km)	
Year 0 (2019): Project preparation - Identification of road segments	-	-	-	650
Year 1 (2019-2020)	300	-	-	
Year 2 (2020-2021)	300	300	300	
Year 3 (2021-2022)	0	600	0	
Year 4 (2022-2023)	0	600	0	
Year 5 (2023-2024)	0	600	0	
Total	**600**	**2400**		650

**Planned* to *study of 50 additional kilometers* for prevision

Table 3.6: Details of estimated rural road costs

Unit costs including all taxes (USD)	**Unit costs including all taxes (USD)**	**Total costs including all taxes (USD)**
Technical studies	1040	620,000
Environmental and social studies	620	372,000
Rehabilitation RLTPC	20,660	12, 396,700
Maintenance (RLEP)	2066	4, 028,928
Control of rehabilitation and maintenance works	1,655	991,735
LiM Pilot and digital transport applications	850,000	850,000
Capacity building	150,000	150,000
Convention-MoD Maep (X% of studies, control and works)	500,000	500,000
Other activities and unforeseen costs non- affected		90,637
Total		**20, 000,000**

ANNEX 4: Maps of Agriculture Development Zones

Figure 4.1: Zone 1 - Niger Valley

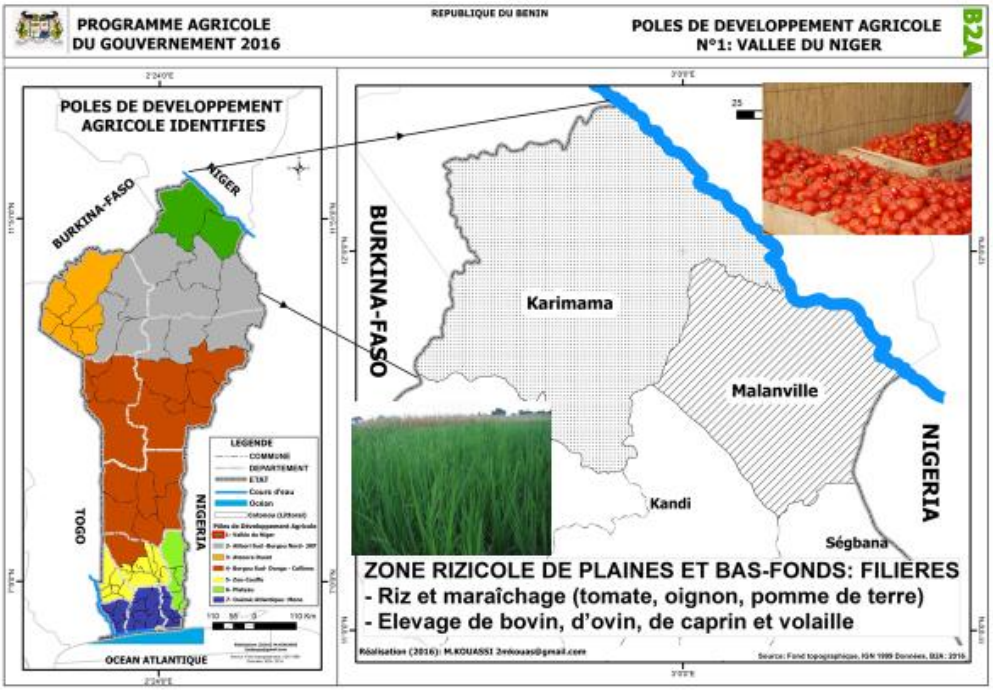


Figure 4.2: Zone 2 - South Alibori, North Borgou and 2KP

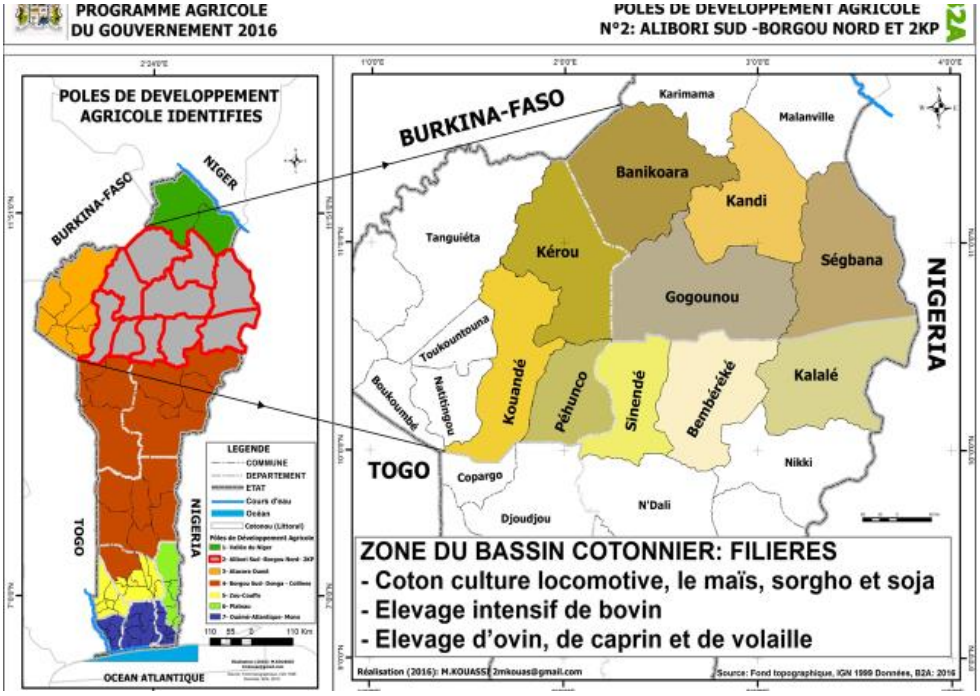


Figure 4.3: Zone 3 - West Atacora

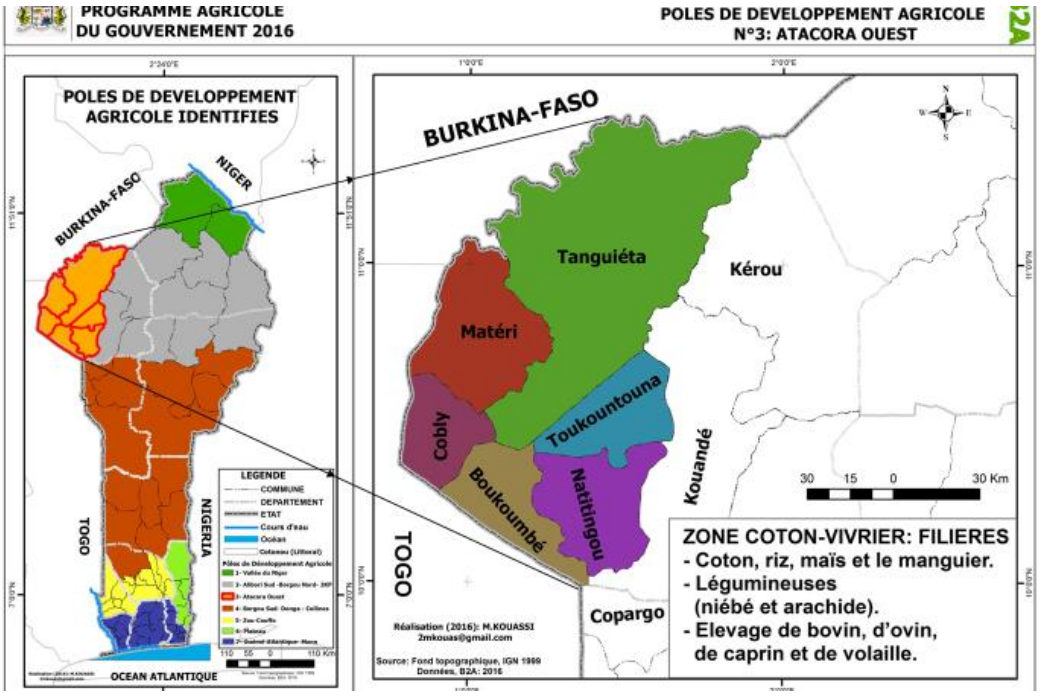
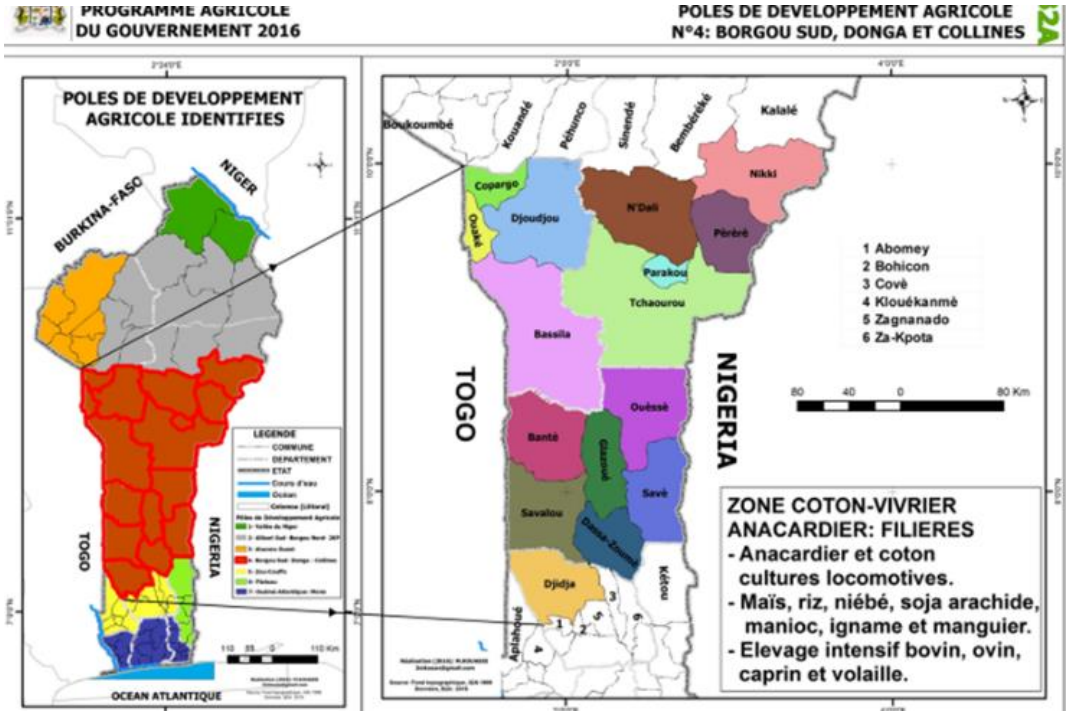


Figure 4.4: Zone 4 - South Borgou, Donga and Collines



ANNEX 5: Examples from Evaluations of E-agricultural Services

1. **Evaluation from developed countries – provision of data based agricultural advisory services**. Digital agricultural services: Accenture USA has developed the Connected Crop Solution as one of the products of its digital agricultural services to address the inefficiencies across the agricultural value chain of various crops. One example[37] which may be relevant to this project in the kind of benefits which can be expected is the application of this IT solution to improve the performance of a large agro-input company and farm performance. The main issue faced by its client – a US$600 million agro-input company was that the field agents it relied on to deliver product information to farmers were not equipped with the right knowledge and expertise to make product recommendations and advice to address the problems faced by farmers growing various crops. The solution was to equip the field agents with the Accenture Connected Crop Solution mobile app linked to its analytics engine. This enabled the company to capture important internal and external farm and weather information in real time and translate it into actionable advice which the field agents could give to farmers. Over the course of the six-month project, the company selected 2,000 farmers to participate and delivered product information and recommendations for raising yields for nearly 30 crops most common among these farmers. This yielded impressive results. At the end of the pilot, the company had generated a 56 percent year-over-year increase in sales and an average 15 percent increase in crop productivity for farmers - of as much as 30 percent for some cash crops. This shows that possibilities exist in this project to obtain similar or better results by equipping the agricultural extension agents and advisors with appropriate IT tools and applications to provide location specific advice based on reliable data from a variety of sources combined with analytical tools to help with decision making at each stage of the value chain of the focus crops, viz. maize, rice, etc. This is expected to result in substantial improvement in the performance of the agricultural extension agents and advisors being supported by this project as well as increasing the efficiency at all stages of the agricultural value chain - for the project's beneficiaries - the small holder farmers – and increase their incomes. This is expected to result in the delivery of appropriate services and content based on what users need which is cost effective. Appropriate evaluation methodologies supported by relevant data on costs and benefits to better estimate the financial and economic returns of the project investments will be developed during implementation of the project. The results from this analysis will be used to make changes as needed in the project activities.

Examples from developing countries:

2. **Ghana and Bangladesh**: An audit was carried out in 2014-2015 by faculty members of the University of California, Davis[38] over a six-month period of E-Soko - a call center based in Ghana, and farmer surveys in Bangladesh of the use of call centers for agricultural services. The major relevant findings for estimating financial and economic benefits were the following : (i) financial sustainability continues to be a major challenge – an area seeking a viable solution; (ii) need to partner with business entities, research institutions and telecommunications companies to reduce and share costs; (iii) engage women in the

[37] Webber, Brandon, Salama, Ben, Barros, Eduardo, Helle, Jennifer, Accenture, Digital Agriculture: Improving Profitability. Digital Agricultural Services, 2017.

[38] McGuire, Erin, Bell, Mark, Crump, Amanda, Agricultural Call Centers – an infrastructure and demand audit, 2015.

design and implementation of the project activities; (iv) preference by famers through voice mechanisms rather than SMS which may be a result of illiteracy among the beneficiaries; and (v) building trust with farmers and advisors is essential for the acceptance and adoption of advice rendered.

3. **Bangladesh**: A study was carried out by faculty members[39] of the Agricultural University, University of Dhaka and Sher E-Bangla agricultural university in Dhaka, Bangladesh to analyze the impact of e-Agriculture on farmers' empowerment using a combination of quantitative and qualitative methods in Bhatbour Block of Dhighi union under Sadar Upazila of Minikganj District. This is one of the large districts in Bangladesh where the Government has been implementing several e-Agriculture related development projects with the assistance of international donors through Department of Agricultural Extension (DAE). Data was collected from 133 e-Agriculture users – the study group and 45 farmers who did not use e-agricultural services who formed the control group. Descriptive statistics, t-test, multiple regressions were used for analysis. The main conclusion of the study was that e-Agriculture had significant impact on the farmers' empowerment. The main recommendations were: (i) E-Agriculture projects need to be scaled up in other parts of the country; and (ii) an integrated approach should be used which includes use of mass media such as print and electronic media to increase public awareness of the e-agricultural services.

4. The above have been provided as illustrative examples of potential returns of investments in e-agriculture services. Regarding the digital services for sustainable agricultural development component of this project, data for carrying out a detailed economic and financial analysis, (such as crop, farm budgets, with and without project conditions, estimates of incremental production, incomes, savings in time and increase in efficiency in all stages of the agricultural value chain, current and projected financial and economic prices of inputs and outputs, detailed investment and operating costs, etc.) are in the process of being collected.

Communication system

5. The project's investments in the establishment of a communication system would contribute to raising awareness of various government policies, reforms, rules and regulations related to the agricultural sector, project activities, etc.; improve transparency through dissemination of the government budgetary allocations to various agricultural programs, obtaining feedback from the project beneficiaries, etc. An example of the potential benefits from the project's investment in community radio is provided below.

6. Community radio[40] in India was first established in Anna University in Tamil Nadu on February 1, 2004 at a cost of about US$24,000[41]. Experience of the oldest community radio station in India demonstrated the power of the use of the most common mass media to empower the less privileged – especially the women. This is detailed in a study conducted by Esther S. Kar which concluded that the radio station played an

[39] Sheikh M. M. Rashid, Muhammad Z. Haque, Md. Rafiquel, Islam Department of Agricultural Extension & Information System, Sher-e-Bangla Agricultural University, Does E-Agriculture Impact Farmers' empowerment in Bangladesh. International Journal of Agricultural Extension, Int. J. Agr. Ext. 04 (01) 2016, 87-94.

[40] UNESCO defines Community radio as a broadcast station that "is operated in the community, for the community, about the community and by the community.www.unesco.org

[41] The community radio consisted of an air-conditioned room (10 ft by 8 ft), equipped with digital, tapeless, transmission ready, audio server, two work stations, 12 channel console multipurpose unit, and an indigenous di-pole antenna and 50 W transmitter.

important role in social, economic, and political empowerment of women. Social empowerment happened through providing knowledge and skill development. Regarding, economic empowerment, community radio was used to learn job skills, how to manage finances, etc. In terms of political empowerment, it raised awareness of the local representatives in the Panchayat, regarding their positions on various issues. The most important aspect of the community radio was it gave voice to the community especially women and the marginalized. The study found that in the case of Anna Radio women's empowerment among the community radio listeners was significant.[42] The project's support for the establishment of the community radio stations in the selected project regions in Benin is expected to yield similar qualitative benefits at low cost.

[42] Esther S. Kar, Indian Institute of Management, Social Impact of Community Radio Stations in India: Enhancing Participatory Development and Women's Empowerment, 2010.