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Report No: PAD1988

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR184.7 MILLION
(US$250 MILLION EQUIVALENT)

TO THE

REPUBLIC OF KENYA

FOR A

KENYA CLIMATE-SMART AGRICULTURE PROJECT

January 13, 2017

Agriculture Global Practice
Africa Region

CURRENCY EQUIVALENTS

Exchange Rate Effective = November 30, 2016

Currency Unit	=	Kenya Shilling (KSh)
KSh 102.04	=	US$1
US$1	=	SDR 0.73868337

FISCAL YEAR
July 1 – June 30

ABBREVIATIONS AND ACRONYMS

AAYI	Area Average Yield Index
AIP	Agricultural Information Platform
AIU	Agriculture Insurance Unit
API	Application Programming Interface
ASAL	Arid and Semi-Arid Land
ASDS	Agricultural Sector Development Strategy
ASU	Agricultural Statistics Unit
AWP&B	Annual Work Plan and Budget
AWSs	Automated Weather Stations
BC	Benefit-cost
CBK	Central Bank of Kenya
CBO	Community-based Organization
CCAFS	Climate Change, Agriculture and Food Security Program
CCEs	Crop Cutting Experiments
CDA	County Departments of Agriculture
CDD	Community-driven Development
CDDC	Community-Driven Development Committee
CDDO	Community Driven Development Organizations
CERIP	Contingent Emergency Response Implementation Plan
CG	Country Governments
CGIAR	Consultative Group on International Agricultural Research
CIAT	International Center for Tropical Agriculture
CIDP	County Integrated Development Plan
CIG	Common Interest Group
CIMMYT	International Center for Maize and Wheat Improvement
CPA	County Project Account
CPCU	County Project Coordination Unit
CPSC	County Project Steering Committee
CQS	Consultants' Qualifications Selection
CRF	County Revenue Fund
CSA	Climate-smart Agriculture
CTD	County Technical Department
DA	Designated Account

DC	Direct contracting
DFZs	Disease Free Zones
EA	Environmental Assessment
EAC	East African Community
EACC	Ethics and Anti-Corruption Committee
EGS	Early Generation Seed
EIRR	Economic Internal Rate of Return
ESMF	Environmental and Social Management Framework
EWS	Early Warning Systems
EX-ACT	Ex-Ante Carbon-Balance Tool (of the United Nations)
FAO	Food and Agriculture Organization of the United Nations
FBO	Farmer-based Organization
FFS	Farmer Field School
FM	Financial Management
GAC	Governance and Anti-Corruption
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoK	Government of Kenya
GRS	Grievance Redress Service
ha	Hectare
HR	Human Resources
HSNP	Hunger Safety Net Program.
IAC	Inspection and Acceptance Committee
ICB	International Competitive Bidding
ICR	Implementation Completion and Results Report
ICRAF	World Agroforestry Centre
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ICT	Information and Communication Technology
IDA	International Development Association
IE	Impact Evaluation
IFC	International Finance Corporation
IFMIS	Integrated Financial Management Information System
IFR	Interim Financial Report
ILRI	International Livestock Research Institute
INDCs	Intended Nationally Determined Contributions
IPs	Indigenous Peoples
IPF	Investment Project Financing
IPMP	Integrated Pest Management Plan
IPPF	Indigenous Peoples Planning Framework
IRM	Immediate Response Mechanism
IS	Implementation Support
IVRs	Interactive Voice Responses
KACCAL	Kenya Adaptation to Climate Change in Arid Lands Project
KALRO	Kenya Agricultural and Livestock Research Organization
KAPAP	Kenya Agricultural Productivity and Agribusiness Project
KAPSLMP	Kenya Agricultural and Sustainable Land Management Project

KCSAP	Kenya Climate-Smart Agriculture Project
KENAFF	Kenya National Farmers Federation
KENAO	Kenya National Audit Office
KEPHIS	Kenya Plant Health Inspectorate Services
KMD	Kenya Meteorological Department
KNBS	Kenya National Bureau of Statistics
LEZs	Livestock Export Zones
LLI	Leadership, Learning and Innovation
M&E	Monitoring and Evaluation
MIGA	Multilateral International Guarantee Agency
MIS	Management Information System
MoALF	Ministry of Agriculture, Livestock, and Fisheries
MSMEs	Micro-small-and-medium Enterprises
NAMA	Nationally Appropriate Mitigation Action
NARIGP	National Agricultural and Rural Inclusive Growth Project
NARS	National Agricultural Research System
NCB	National Competitive Bidding
NCCAP	National Climate Change Action Plan
NCCRS	National Climate Change Response Strategy
NDMA	National Disaster Management Authority
NEDI	Northeastern Development Initiative
NEMA	National Environment Management Authority
NGO	Nongovernmental Organization
NPCU	National Project Coordination Unit
NPSC	National Project Steering Committee
NPV	Net present value
NTAC	National Technical Advisory Committee
O&M	Operation and Maintenance
OP	Operational Policy
OPVs	Open Pollinated Varieties
PA	Project Account
PDO	Project Development Objective
PES	Payment for Ecosystem Services
PICD	Participatory Integrated Community Development
PIM	Project Implementation Manual
PFM	Public Financial Management
PO	Producer Organization
PPD	Public-private Dialogue
PPP	Public-private Partnership
PRS	Population Registration System
R&D	Research and Development
RAP	Resettlement Action Plan
REDD	Reducing Emissions from Deforestation and Forest Degradation
RPF	Resettlement Policy Framework
RPLRP	Regional Pastoral Livelihood Resilience Project
SACCO	Savings and Credit Cooperative

SAIC	Social Accountability and Integrity Committee
SCC	Social Cost of Carbon
SCM	Supply Chain Management
SDA	State Department of Agriculture
SDG	Sustainable Development Goals
SDL	State Department of Livestock
SLM	Sustainable Land Management
SoE	Statement of Expenditure
SORT	Systematic Operations Risk-Rating Tool
SMS	Short Messages
SPs	Service Providers
SPSR	Social Protection Single Registry
SQL	Structured Query Language
STAK	Seed Trade Association of Kenya
TA	Technical Assistance
TCB	Tissue-culture Banana
TIMPS	Agricultural Technologies, Innovations, and Management Practices
ToR	Terms of Reference
UAI	Unit Area of Insurance
UNCBD	Conservation of Biological Diversity
UNCCD	United Nations Conventions on Combating Desertification
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency of International Development
VC	Value Chain
VMG	Vulnerable and Marginalized Groups
VMGF	Vulnerable and Marginalized Group Framework
WFP	World Food Program
WKCDD&FMP	Western Kenya Community Driven Development and Flood Mitigation
WOP	Without Project
WP	With Project
WRUA	Water Resource Users' Associations

Regional Vice President:	Makhtar Diop
Country Director:	Diarietou Gaye
Senior Global Practice Director:	Juergen Voegele
Practice Manager:	Dina Umali-Deiniger
Task Team Leader:	Ladisy Komba Chengula

KENYA
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PAD DATA SHEET

Kenya

Kenya Climate Smart Agriculture Project (P154784)

PROJECT APPRAISAL DOCUMENT

AFRICA

Agriculture Global Practice

Report No.: PAD1988

Basic Information			
Project ID	EA Category	Team Leader(s)	
P154784	B - Partial Assessment	Ladisy Komba Chengula	
Lending Instrument	Fragile and/or Capacity Constraints [ ]		
Investment Project Financing	Financial Intermediaries [ ]		
	Series of Projects [ ]		
Project Implementation Start Date	Project Implementation End Date		
07-Feb-2017	07-Feb-2022		
Expected Effectiveness Date	Expected Closing Date		
08-May-2017	07-Feb-2022		
Joint IFC	Joint Level		
Yes	Complementary or Interdependent project requiring active coordination		
Practice Manager/Manager	Senior Global Practice Director	Country Director	Regional Vice President
Dina Umali-Deininger	Juergen Voegele	Diarietou Gaye	Makhtar Diop

Borrower: The National Treasury	
Responsible Agency: Ministry of Agriculture, Livestock and Fisheries	
Contact: Dr. Richard Lesiyampe	Title: Principal Secretary
Telephone No.: 254-020-271-8870	Email: psagriculture@kilimo.go.ke

Project Financing Data (in USD Million)					
[ ] Loan	[ ] IDA Grant	[ ] Guarantee			
[X] Credit	[ ] Grant	[ ] Other			
Total Project Cost:	279.70	Total Bank Financing:	250.00		
Financing Gap:	0.00				

Financing Source	Amount
BORROWER/RECIPIENT	29.70
International Development Association (IDA)	250.00
Total	279.70

Expected Disbursements (in USD Million)

Fiscal Year	2017	2018	2019	2020	2021	2022	0000	0000	0000	0000
Annual	2.00	50.00	60.00	70.00	50.00	18.00	0.00	0.00	0.00	0.00
Cumulative	2.00	52.00	112.00	182.00	232.00	250.00	0.00	0.00	0.00	0.00

Institutional Data

Practice Area (Lead)

Agriculture

Contributing Practice Areas

Environment & Natural Resources, Finance & Markets, Trade & Competitiveness, Transport & ICT

Proposed Development Objective(s)

To increase agricultural productivity and build resilience to climate change risks in the targeted smallholder farming and pastoral communities in Kenya, and in the event of an Eligible Crisis or Emergency, to provide immediate and effective response.

Components

Component Name	Cost (USD Millions)
Component I: Upscaling Climate Smart Agricultural Practices	163.80
Component 2: Strengthening Climate Smart Agriculture Research and Seed Systems	53.70
Component 3: Supporting Agro-weather, Market, Climate and Advisory Services	32.90
Component 4: Project Coordination and Management	29.30
Component 5: Contingency Emergency Response	0.00

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	Moderate
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	High
7. Environment and Social	Substantial

8. Stakeholders	Moderate
9. Other	
OVERALL	Substantial

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes	[ ]	No	[X]
Does the project require any waivers of Bank policies?	Yes	[ ]	No	[X]
Have these been approved by Bank management?	Yes	[ ]	No	[.]
Is approval for any policy waiver sought from the Board?	Yes	[ ]	No	[X]
Does the project meet the Regional criteria for readiness for implementation?	Yes	[X]	No	[ ]

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

Legal Covenants

Name	**Recurrent**	**Due Date**	**Frequency**
Participation Agreement; Schedule 2, Section I, D, 4.		09-Nov-2018	

Description of Covenant

If by eighteen (18) months after the Effective Date, any Eligible CG has not entered into a Participation Agreement with the Recipient, the Recipient may select an additional County to participate in the Project, using the criteria set forth in Section V of Schedule 2 to Financing Agreement and in the Project Implementation Manual.

Description of Covenant

Name	**Recurrent**	**Due Date**	**Frequency**
Assistant Project Accountants; Schedule 2, Section V, 2.		08-Sep-2017	

Description of Covenant			
The Recipient shall, by no later than four (4) months after the Effective Date, designate assistant accountants for each of the CPCUs under terms of reference satisfactory to the Association and with qualifications satisfactory to the Association.			
Name	**Recurrent**	**Due Date**	**Frequency**
Management Information System; Schedule 2, Section V, 3.		09-Nov-2017	
Description of Covenant			
The Recipient shall establish, by no later than six (6) months after the Effective Date, a management information system database within the NPCU with global positioning system coordinates for tracking Subprojects, satisfactory to the Association.			
Name	**Recurrent**	**Due Date**	**Frequency**
Project Internal Auditors; Schedule 2, Section V, 4.		08-Sep-2017	
Description of Covenant			
The Recipient shall, no later than four (4) months after the Effective Date, designate Project internal auditors at NPCU and each CPCU under terms of reference and with qualifications satisfactory to the Association.			

Conditions		
Source of Fund	**Name**	**Type**
IDA	Withdrawal Condition; Withdrawal Period, Schedule 2, Section IV B 1, (b) i to iv	Disbursement
Description of Condition		
Notwithstanding the provisions of the Part A of this Section, no withdrawal shall be made for: (b) Emergency Expenditures under Category (4), unless and until the Association is satisfied, and has notified the Recipient of its satisfaction, that all of the conditions (b)(i) to (b)(iv) have been met in respect to the said activities.		

Team Composition				
Bank Staff				
Name	**Role**	**Title**	**Specialization**	**Unit**
Ladisy Komba Chengula	Team Leader (ADM Responsible)	Lead Agriculture Economist	Agricultural Economics	GFA07
Joel Buku Munyori	Procurement Specialist (ADM Responsible)	Senior Procurement Specialist	Procurement	GGO01
Leonard Mutuku Matheka	Financial Management Specialist	Senior Financial Management Specialist	Financial Management	GGO31
Ademola Braimoh	Team Member	Senior Natural Resources Mgmt. Spec.	Natural Resources Management	GFA13
Augustine Sangson Langyintuo	Team Member	Senior Private Sector Specialist	Finance	GTCAF
Christine Heumesser	Team Member	Economist	Economics	GFAGE
Edward Felix Dwumfour	Team Member	Senior Environmental Specialist	Natural Resources Management	GEN01
Erick C.M. Fernandes	Team Member	Adviser	Agriculture	GFA04
Gibwa A. Kajubi	Safeguards Specialist	Senior Social Development Specialist	Social Development	GSU07
Irene Nambuye Musebe	Team Member	Agriculture Economist	Agricultural Economics	GFA07
Jean Owino	Team Member	Acting Finance Officer	Finance	WFALA
Jeehye Kim	Team Member	Agricultural Specialist	Agriculture	GFA07
Marie-Claudine Fundi	Team Member	Language Program Assistant	Operations	GFA07
Marjorie Mpundu	Team Member	Senior Counsel	Legal	LEGAM
Nathalie S. Munzberg	Safeguards Advisor	Regional Safeguards Adviser	Safeguards	OPSPF
Pierre Jean Gerber	Team Member	Senior Livestock Specialist	Livestock	GFA12
Regassa Ensermu Namara	Team Member	Senior Water Resources Econ.	Water Resources	GWA08
Sophie Nelly Rabuku	Team Member	Program Assistant	Operations	AFCE2

Stephen Paul D'Alessandro	Team Member	Senior Agriculture Economist	Agricultural Economics	GFAGE
Svetlana Khvostova	Safeguards Specialist	Senior Environmental Specialist	Natural Resources	GEN01
Vikas Choudhary	Team Member	Senior Economist	Economist	GFAGE

Extended Team

Name	Title	Office Phone	Location
Benjamin Kilaka	Social Safeguards Consultant	254202936000	Nairobi
Dahir Warsame	Procurement Consultant	2542936000	Nairobi
James Musinga	Value-Chain Specialist	+39 06 570 55120	Rome
Mark Owuondo	Environmental Safeguards Consultant	2542636000	Nairobi

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
Republic of Kenya	24 County Governments	Marsabit, Isiolo, Tana River, Garissa, Wajir, Mandera, West Pokot, Baringo, Laikipia, Machakos, Nyeri, Tharaka Nithi, Lamu, Taita Taveta, Kajiado, Busia, Siaya, Nyandarua, Bomet, Kericho, Kakamega, Uasin Gishu, Elgeyo Marakwet, and Kisumu.			

I. STRATEGIC CONTEXT

A. Country Context

1. **Kenya's economy—larger and growing faster than previously estimated—is the fifth largest in sub-Saharan Africa after Nigeria, South Africa, Angola, and Sudan**.[1] Kenya is a lower-middle-income country (gross national income per capita was US$1,340 in 2015)[2] with recent economic growth surpassing regional peers and other lower-middle-income countries.[3] The World Bank projects a growth rate of 6.0 percent for 2017 and 6.1 percent for 2018.

2. **Despite an apparent decline in poverty overall, reducing poverty and increasing shared prosperity remain formidable challenges, particularly for rural people**. Poverty fell from 47 percent in 2005/06 to about 39 percent in 2012/13,[4] following solid growth across most economic sectors, some improvement in social safety nets, and migration to urban areas with better (albeit informal) job prospects and health and education services. Yet income improved unevenly, and regional inequality appears to be rising.[5] In arid and semi-arid lands (ASALs), assets are very limited, and agro-climatic shocks undermine livelihoods that rely on livestock and low-productivity agricultural activities. Poverty rates surpass 80 percent in the arid, sparsely populated north and northeast (Turkana, Mandera, and Wajir).[6] Western and coastal areas benefit from better natural resource endowments, but the poor remain prone to insect- and water-borne disease, and agricultural potential in some areas is limited by flood-induced land degradation.

3. **Poor agricultural performance has stymied poverty reduction even as the economy has grown.** Based on the last national household budget survey (2005/06), the vast majority of the poor live in rural areas and sustain themselves through income and consumption from crops and livestock. A projected slowdown in agricultural sector growth to about 3.5 percent per annum over the medium term is expected to reduce rural poverty only very moderately over the same period, after accounting for population growth of 2.7 percent.

4. **In August 2010, Kenya adopted a new Constitution framed to address disparities and historical patterns of marginalization through a two-tiered system of national and county government.** Accordingly, the national government is devolving responsibility for multiple functions to 47 elected county governments, which receive at least 15 percent of national revenues to perform them. County governments now play the primary on-the-ground role in delivering agricultural services (crop and animal husbandry, extension, agricultural marketing, and other services), and the national government retains a policy-making, regulatory, and research role. So far, some counties are delivering their mandated services, while others struggle.

[1] World Bank Group (2014), "Anchoring High Growth: Can Manufacturing Contribute More?" Kenya Economic Update, Edition No. 11, Nairobi.
[2] Kenya remains eligible for International Development Association (IDA) support, because per capita gross national income in 2013 (US$1,180) was below the IDA eligibility cut-off of US$1,215.
[3] In 2010–15 average growth was 5.3 percent in Kenya (4.9 percent in sub-Saharan Africa). Kenya's 2015 growth rate of 5.6 percent surpassed the 5.5 percent average for lower-middle-income countries. Kenya's GDP was estimated at US$63.4 billion in December 2015 (up from US$61.4 billion in 2014), with per capita GDP of US$1,377 (up from US$1,368 in 2014).
[4] Country Partnership Strategy for the Republic of Kenya, FY2014–2018, May 2014.
[5] Based on best estimates, given the lack of a household budget survey more recent than 2005/06.
[6] Country Partnership Strategy FY2014–2018.

B. Sectoral and Institutional Context

5. **Agriculture—the dominant source of employment for roughly half of the nation—is a major force in the economy, with a leading role in poverty reduction and adaptation to climate change.** In 2013, agriculture contributed almost 27 percent of national gross domestic product (GDP).[7] The crop, livestock, and fisheries subsectors contributing approximately 78 percent, 20 percent, and 2 percent to agricultural GDP, respectively (GoK 2013). Agriculture generates most of Kenya's food requirements, 65 percent of merchandise exports, and about 60 percent of foreign exchange earnings. Kenya sacrifices significant income by not adding value to produce—almost 91 percent of agricultural exports are raw or semi-processed. Box 1 describes major socio-economic features of agriculture that underlie the rationale for the proposed project.

Box 1: The importance of climate-smart agriculture for Kenyan livelihoods

Without question, agricultural intensification and diversification are necessary to sustain growth and maintain resilient agricultural livelihoods. About 83 percent of Kenya's land area is in the mainly pastoral ASALs. Only 17 percent of the land, home to 80 percent of the population, has medium- to- high rainfall and suitable for crop production. About 87 percent of farms operate less than 2 hectares; 67 percent operate less than 1 hectare; and a growing number of women bear sole responsibility for the farm. The 20 percent of farmers with the smallest holdings generate 57 percent of their income from farming. At the same time, Kenya's small farms face a potentially untenable future, involving major dislocations, extreme pressure to provide livelihoods for young people, and more frequent and severe food crises provoked by poverty and climate change.

Livestock production provides as much as 90 percent of employment and family income in the ASALs, where vulnerability to drought is acute. The increased incidence of droughts across the ASALs gives communities less time to recover and rebuild assets and resilience. Livestock losses from drought within the most recent decade alone are estimated at more than US$1.08 billion; the drought response costs, as well as ancillary losses related to production assets and future income, are several times higher than in the medium- to- high rainfall areas.

Resource disparities disproportionately affect women, young people, and other vulnerable groups in agriculture and aggravate socio-economic marginalization. Women constitute over 70 percent of the agricultural labor force but hold less than 5 percent of agricultural land titles, † although weak land rights reduce incentives to invest in land and its productivity. Outside agriculture, only 29 percent of formal wage earners are women. Young females are twice as likely to be unemployed as adult females. ‡ Women also have less access to agricultural inputs. Such disparities make individuals more vulnerable and deprive them of a stable income.

More than 40 percent of Kenyans lack sufficient food every day. More than 60 percent of households buy more maize (the national staple) than they produce. At any given time, at least 10 million Kenyans are estimated to suffer from chronic food insecurity and poor nutrition; the number in need of food aid almost doubles following natural disasters such as drought. Children in rural areas and from poorer households are more likely to be malnourished.††

† Country Partnership Strategy FY2014–2018.

‡ Country Partnership Strategy FY2014–2018.

†† Thirty-five percent of children under five will have permanent physical and mental limitations because of stunting; see KNBS (2010), "Kenya Demographic and Health Survey 2008-09," p. 141.

6. **Overall, the performance of Kenyan agriculture has been highly volatile; negative growth occurred in nine years between 1980 and 2012**. Agricultural growth revived over 2005–2012 with annual growth rates of 4.27 percent,[8] largely owing to growth in fresh fruits and vegetables and, to a lesser extent, maize and dairy. Most other commodities, including tea,

[7] Agriculture's contribution to GDP showed an upward trend to 29.3 percent in 2013, with a decline (to 27.3 percent) in 2014 (World Bank 2014; Trade Economics 2014). The decline in 2014 resulted from poor long and short rains.

[8] Excluding the anomalous years of 2008 and 2009; 2.4 percent if they are included.

coffee, livestock, sugar, and oilseeds, experienced sluggish growth despite their potential. Increased volatility in agricultural growth rates has had debilitating impacts on rural household incomes and employment, urban and rural food security, poverty reduction, and the country's overall economic growth. Growth in real gross value-added in agriculture decelerated in 2013 to 2.9 percent from a revised growth of 4.2 percent in 2012.

7. **The principal source of volatility in Kenyan agriculture is extreme weather events, which are increasing in frequency and intensity with climate change.**[9] From 1981 to 2011, Kenya suffered from drought once every three years on average. Drought was widespread in 13 of those 31 years and extreme in 3, diverting resources to emergency food relief and poverty reduction, and affecting growth in agricultural and national GDP. The Center for Global Development ranks Kenya 13th out of 233 countries for "direct risks" from "extreme weather" and 71st of 233 for "overall vulnerability" to climate change (after adjusting for coping ability).

8. **Virtually all (98 percent) agriculture in Kenya is rain-fed and extremely vulnerable to increasing temperatures and droughts.**[10] Average annual temperatures rose by 1°C between 1960 and 2003 and by 1.5°C in the country's drier regions.[11] Projections to 2030 show mean annual temperature in Kenya increasing again by 1.0–1.5°C. By significantly affecting water availability and soil quality, rising temperatures will worsen the effects of more frequent and intense drought. Changes in rainfall patterns and temperatures can alter growing seasons and the spectrum of agricultural activities that can be sustained. Most global climate models project severe and adverse consequences for crops and livestock, especially for the most food-insecure regions. Studies in Kenya find that by 2030, under a business-as-usual scenario, climate change will reduce yields of staple crops (maize by 12 percent, rice by 23 percent, wheat by 13 percent)[12] as well as prospects for cropland to sustain maize and wheat production.[13] Depending on the region and type of production system, water scarcity will result in less productive pastures, lower dairy yields, and higher risks that crop and livestock diseases will spread.[14]

9. **Meeting this challenge will require investments in building resilience to near-term shocks and in adapting to long-term climate change.** In this context, climate-smart agriculture (CSA) offers an appropriate strategic framework for responding to and reducing the adverse effects of climate change. FAO defines CSA "as an approach that helps to guide actions needed to transform and reorient agricultural systems to effectively support development and ensure food security in a changing climate. CSA aims to achieve three outcomes (triple-wins): (i) sustainably increasing agricultural productivity and incomes; (ii) adapting and building resilience to climate change; and (iii) reducing and/or removing greenhouse gas (GHG) emissions, where possible."

[9] Producers in mixed crop-livestock systems anticipated major droughts once every 10 years, but droughts now arrive every three-four years. Similarly, pastoralists—for whom drought is the overwhelming risk—observe that the rains now last two-three months rather than 3 full months.

[10] See FICCF (Finance Innovation and Climate Change Fund) (2014), "A Review of Climate-smart Agriculture Initiatives in Non-ASAL Areas of Kenya," Ministry of Environment and Natural Resources (MENR), Nairobi.

[11] See Osumba, J., and J. Rioux (2014) "Scoping Study of Climate-smart Agriculture in Kenya: Smallholder Integrated Crop-livestock Farming Systems," FAO, Rome.

[12] FICCF (2014).

[13] Kenya Agricultural and Livestock Research Organization (KALRO) (2014), "Food Crops Research Program," Nairobi.

[14] See Porter, J.R., L. Xie, A.J. Challinor, K. Cochrane, S.M. Howden, M.M. Iqbal, D.B. Lowbell, and M. I. Travasso (2014), "Food Security and Food Production Systems," in *Climate Change 2014: Impacts, Adaptation, and Vulnerability, Part A,* Cambridge University Press, New York, pp. 502, 511.

10. **Agriculture is the largest source of GHG emissions in Kenya, contributing about 58.6 percent to total emissions.**[15] The agricultural sector is also a key driver of deforestation and land degradation.[16] Agricultural emissions are likely to increase from 20 $MtCO_2e$ in 2010 to 27 $MtCO_2e$ in 2030, largely driven by livestock methane emissions, which account for 96.2 percent of agricultural emissions.[17]

11. **Agriculture must reduce its GHG emissions and become part of the solution to tackle climate change.** The sector plays an important role in sequestering carbon in soil and trees on farms.[18] Through improved soil management techniques, agriculture has the biophysical potential to offset and sequester about 20 percent of annual emissions.[19] Restoring carbon to the soil will not only sequester carbon from the atmosphere but boost pasture and crop productivity, increase water retention (and drought resilience), return land to production (reducing pressure on biodiversity and forests), and raise incomes (benefiting the rural poor). Kenya's livestock GHG emission intensities (GHGs emitted per unit of product) are among the world's highest, and rising demand for livestock products could gravely amplify them. Increasing livestock productivity (for example, through improved forages and adequate year-round feed resources) would reduce GHG emissions per unit of product while increasing incomes and protecting pastoralists' asset base.

12. **Kenya's wide spectrum of CSA policies, strategies, and plans will help to achieve the triple-wins**. The 2010 National Climate Change Response Strategy (NCCRS) provides a framework for integrating climate change into development priorities. The 2012 National Climate Change Action Plan (NCCAP)[20] operationalizes the NCCRS and emphasizes a low-carbon, climate-resilient development pathway for the economy that is critical for achieving the Sustainable Development Goal (SDG) of combating climate change and its impacts (SDG13).[21] The NCCAP sets out the Kenya Nationally Appropriate Mitigation Actions (NAMAs) pathway for six sectors: energy, transport, industry, agriculture, forestry, and waste management. Emissions from the forestry and agriculture sectors were analyzed under the NAMA process. Kenya is currently preparing a dairy NAMA with support from CCAFS and FAO. The NCCAP priority interventions include forest restoration on degraded lands; REDD+;[22] agroforestry;

[15] Contributions of other sectors to national GHG emissions are: energy (25.3 percent), industry (3.2 percent) and waste management (1.2 percent). See WRI (World Resources Institute) (2014), "CAIT—Country Greenhouse Gas Emissions Data," http://www.wri.org/resources/data-sets/cait-country-greenhouse-gas-emissions-data/.

[16] GoK (Government of Kenya) (2012), "The National Climate Change Action Plan (NCCAP), 2013 – 2017," MENR, Nairobi.

[17] See Osumba and Rioux (2014); estimate derived from NCCAP, based on UNFCCC figures. According to the NCCAP, agriculture is responsible for 20 $MtCO_2e$ in 2010 and land-use change and forestry (LUCF) is responsible for 19.6 percent.

[18] The NCCAP suggests that 4 $MtCO_2e$ of the 6 $MtCO_2e$ agricultural mitigation potential in 2030 could be from agroforestry interventions.

[19] See Smith, P., D. Martino, Z. Cai, D. Gwary, H. Janzen, P. Kumar, B. McCarl, S. Ogle, F. O'Mara, C. Rice, B. Scholes, O. Sirotenko, M. Howden, T. McAllister, G. Pan, V. Romanenkov, U. Schneider, S. Towprayoon, M. Wattenbach, and J. Smith (2008), "Greenhouse Gas Mitigation in Agriculture," *Phil. Trans. R. Soc. B* 363(1492): 789–813.

[20] According to NCCAP, the objective is to strengthen resilience via adaptation approaches to enable farmers to increase and/or sustain productivity in the face of climate change. Lowering carbon emissions, where feasible, is a secondary objective. NCCAP calls for increased investments in proven adaptation technologies such as agroforestry, conservation agriculture, integrated soil fertility management, drought-tolerant crops, water harvesting, drip irrigation, grazing management, fodder banks, and improved breeding.

[21] Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

[22] The United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD) was launched in 2008 and builds on the convening role and technical expertise of FAO, the United Nations Development Programme (UNDP), and the United Nations Environment Programme (UNEP). The UN-REDD Programme supports nationally led REDD+ processes and promotes the informed and meaningful involvement of all

increasing tree cover to 10 percent of total land area; conservation tillage; limiting use of fire in cropland; rangeland management; improved cook stoves; biogas; and management of agricultural wastes.

13. **The Kenya Climate Change Act (2016) is now in place.** Kenya also has a Climate-Smart Agriculture Program (CSAP 2015–2030) that envisions "a climate resilient and low carbon growth sustainable agriculture that ensures food security and contributes to national development goals in line with Kenya Vision 2030." Kenya's National Policy on Climate Finance (2015) seeks to position Kenya to better access climate finance through a variety of mechanisms. With support from the World Bank, the International Center for Tropical Agriculture (CIAT) developed a Kenya CSA Country Profile (2015). The profile assesses CSA nationally (including practices that deliver higher productivity, improve resilience, and reduce emissions) along with the required institutional, policy, and finance interventions. CIAT is now helping Kenya develop county-level CSA risk profiles.

C. Higher Level Objectives to which the Project Contributes

14. **The proposed Kenya Climate-Smart Agriculture Project (KCSAP) contributes to a range of higher-level objectives.** It can help Kenya meet rising food demand and attain the SDGs of ending poverty (SDG1), ending hunger (SDG2), and combating climate change and its impacts (SDG13), and it also contributes to the Government of Kenya's (GoK's) Vision 2030 development strategy, launched in 2008. Vision 2030 reiterates the importance of transforming smallholder subsistence agriculture into a modern, innovative, commercially oriented sector. In line with Vision 2030, the Agricultural Sector Development Strategy 2010–2020 (ASDS) seeks average agricultural sector growth of 7 percent per year between 2010 and 2015 and emphasizes the transformation of smallholder agriculture. With respect to adaptation to climate change, ASDS prioritizes investments in weather information systems, research on drought-tolerant varieties, soil and water conservation, water harvesting, and integrated pest management. For livestock, ASDS prioritizes improved management of grazing systems, biogas, livestock diversification, and improved breeding. KCSAP is closely aligned with the World Bank Group Kenya Country Partnership Strategy FY 2014–2018 (approved by the Board of Executive Director in 2014, Report Number 87024) and its goals of eliminating extreme poverty and boosting shared prosperity by 2030, as well as the Africa Climate Business Plan: Accelerating Climate Resilience and Low-Carbon Development.

15. **Kenya is active in the international and regional dialogue on mainstreaming climate change into agricultural policies, plans, and actions.** The country is a signatory to the United Nations Conventions on Combating Desertification (UNCCD), Framework Convention on Climate Change (UNFCCC), and the Conservation of Biological Diversity (UNCBD). In July 2015, Kenya declared its Intended Nationally Determined Contributions (INDCs) to UNFCCC: by 2030, Kenya seeks to abate its total GHG emissions by 30 percent relative to the business-as-usual scenario of 143 $MtCO_2e$. Kenya estimates that US$40 billion would be required to finance the adaptation and mitigation interventions across six key sectors until 2030.[23] Kenya is also implementing the Comprehensive Africa Agriculture Development Programme[24] Framework

stakeholders, including indigenous peoples and other forest-dependent communities, in national and international REDD+ implementation.

[23] MENR (Ministry of Environment and Natural Resources) (2015), "Intended Nationally Determined Contributions," www4.unfccc.int/submissions/INDC/Published%20Documents?Kenya?1?kenya_INDC_20150723.pdf; accessed October 2015.

[24] Targeting transformative agricultural GDP growth through priority investments.

(2010) and the East African Community Climate Change Policy, which emphasize sustainable land and water management for improved agricultural productivity through research and dissemination of technologies, in addition reductions in agricultural GHG emissions.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

16. The proposed project development objective is ***"to increase agricultural productivity and build resilience to climate change risks in the targeted smallholder farming and pastoral communities in Kenya, and in the event of an Eligible Crisis or Emergency, to provide immediate and effective response."*** In light of this objective, the utility of CSA lies in: (i) its explicit integration of the triple-wins (productivity, adaptation, and mitigation) with planning, implementation, and monitoring, which are often done in isolation; and (ii) improving the understanding of expected outcomes of context-specific CSA investments on different beneficiaries over time. KCSAP will focus on increasing agricultural productivity and enhancing resilience to impacts of climate change; reductions in GHG emissions will be a co-benefit.[25]

B. Project Beneficiaries

17. The direct beneficiaries[26] of the project are estimated at about 521,500 households of smallholder farmers, agro-pastoralists, and pastoralists. Approximately 163,350 households organized in about 4,950 Common Interest Groups (CIGs) and 18,150 households in 1,100 Vulnerable and Marginalized Groups (VMGs)[27] will benefit from community CSA microprojects. About 240,000 and 100,000 households will benefit from the county-level and public-private partnership (PPP) investments (subprojects), respectively. More than 600 micro-small-and-medium enterprises (MSMEs) will also benefit directly from project interventions. These beneficiaries will come from 24 participating counties, selected using the agreed criteria, in which top priority is assigned to counties with higher: (i) vulnerability to climate change and extreme weather events (ASAL counties being the most adversely impacted by droughts); (ii) volatility in agricultural production and presence of fragile ecosystems (natural resources are highly degraded in ASALs); and (iii) poverty indices (poverty incidence and poverty rates—ASALs have the highest poverty rates).[28] The 21 counties supported under the National Agricultural and Rural Inclusive Growth Project (NARIGP) and the urban counties of Nairobi and Mombasa were excluded.

18. Based on those criteria, the following counties will participate in the project: **Arid Areas** (Marsabit, Isiolo, Tana River, Garissa, Wajir, and Mandera); **Semi-Arid Areas** (West Pokot, Baringo, Laikipia, Machakos, Nyeri, Tharaka Nithi, Lamu, Taita Taveta, and Kajiado); and **Medium-to-High Rainfall Areas** (Busia, Siaya, Nyandarua, Bomet, Kericho, Kakamega, Uasin Gishu, Elgeyo Marakwet, and Kisumu).

[25] "More than 800 million people living in countries with per capita GDP below US$4,000 are responsible for only 1 percent of global CO_2 emissions. For them, investment in CSA should place a relatively higher weight on productivity growth and resilience building" (World Bank, 2015, *Poverty and Climate Change*, Washington, DC, pp. 24–27).
[26] A "direct beneficiary" is a farming household of roughly 5–8 members, which translates into 3,515,000–5,624,000 individuals.
[27] Defined as people who meet World Bank criteria for "marginalization" and GoK criteria for "marginalized" and "minority" communities. They can include youths, indigenous people, elderly women and men, widows/orphans, the differently-abled, recovering substance abusers, and people living with HIV/AIDS.
[28] An additional criterion is the availability of County Climate Risk Profiles (CCRPs).

19. In addition to the direct beneficiaries from the participating counties, staff of the national and county government (including ward-level) departments and semi-autonomous government agencies (KALRO, KMD, KEPHIS, NEMA) will benefit indirectly from KCSAP through the technical and institutional capacity-building interventions.

C. PDO Level Results Indicators

20. Achievement of the proposed PDO will be measured using the following three outcome indicators: (i) **Direct project beneficiaries** (number), share of which female (percent); (ii) **Productivity Indicator—**Increase in productivity of selected agricultural commodities supported by the project (percent); and (iii) **Resilience Indicator—**Targeted beneficiaries (organized in CIGs/VMGs) who have adopted at least one of the technologies, innovations and management practices (TIMPs) promoted by the project (number), share of which female (percent). The project outcome (PDO level) and intermediate (output level) indicators are presented in the Results Framework (Annex 1).

III. PROJECT DESCRIPTION

A. Project Components

(i) The Context

21. The KCSAP focuses primarily on: (i) improving water/soil management, especially within smallholder maize systems in the marginal rainfall zones—specifically, in smallholder mixed crop-livestock, crop-livestock-tree (agro-silvo-pastoral) production systems and in crop-forest (agro-forestry) production systems; (ii) promoting sustainable, community-driven rangeland management and improved access to quality livestock services in ASALs—specifically, in pastoral/extensive livestock production systems; (iii) supporting the generation and dissemination of improved agricultural TIMPs and building sustainable seed systems; and (iv) enhancing access to quality agro-weather, climate, advisory, and market information services among farmers/herders for improved decision making.

(ii) Key Design Principles

22. The design of KCSAP is informed by seven main principles: (i) prioritization of promising TIMPs; (ii) scaling up promising TIMPs; (iii) a Value Chain (VC) approach; (iv) gender sensitivity; (v) nutrition informed; (vi) collaboration with other World Bank Group Agencies; and (vii) a phased approach to implementation. These principles are discussed in detail in Annex 2.

(iii) The Components

23. The proposed project has five components, summarized here and detailed in Annex 2.

Component 1: Upscaling Climate-Smart Agricultural Practices (US$163.8 million equivalent, of which IDA US$150.0 million equivalent)

24. This component will finance interventions that promote and facilitate the adoption of TIMPs to achieve the CSA triple-wins of increased productivity, enhanced resilience (adaptation), and reduced GHG emissions (mitigation) per unit of output (as co-benefits). Its three subcomponents build institutional capacity and strengthen service delivery, support

investments in smallholder agro-pastoral production systems,[29] and support investments in pastoral extensive production systems.[30]

Subcomponent 1.1: Building Institutional Capacity and Strengthening Service Delivery (IDA US$24.0 million equivalent)

25. This subcomponent will build institutional capacity at the county, ward, and community levels to plan, implement, manage, and monitor ward/county subprojects and community microprojects in all 24 counties. More specifically, it will finance project interventions related to: (i) strengthening the capacity of counties and wards to deliver agricultural services; (ii) supporting CSA planning and prioritization at county and ward levels; (iii) contracting private advisory service providers to facilitate mobilization of community institutions and assist in Micro-project planning and implementation; and (iv) facilitating community institutions.

Subcomponent 1.2: Supporting Investments in Smallholder Agro-pastoral Production Systems (US$70.3 million equivalent, of which IDA US$63.0 million equivalent)

26. This subcomponent will finance CSA investments in the form of community microprojects, identified through participatory processes, to help beneficiaries achieve the triple-wins of increased productivity, enhanced resilience, and reduced GHG emissions in the 17 project counties[31] located in semi-arid and medium-to-high-potential (non-ASAL) areas. Specifically, this subcomponent will support CSA investments aimed at: (i) improving water and soil management (active microclimate management); (ii) promoting livelihoods and crop diversification, including drought-tolerant crops, stall-fed intensive dairy production, and agro-forestry systems; and (iii) improving small-scale farmer-managed irrigation schemes for crop and pasture/fodder development/production. Matching grants will be provided through three windows: (i) community-level investments to finance microprojects (Agro-Pastoral Micro-projects); (ii) county-level investments to finance relatively larger subprojects that benefit multiple wards or communities (Agro-Pastoral Subprojects); and (iii) productive alliance investments through PPPs with producers (PPP Subprojects). Beneficiaries must contribute at least 10 percent of the cost of their microprojects. County-level investments will attract a contribution of at least 20 percent of the cost of their subprojects. The recipient of the productive alliance grants will contribute at least 50 percent of the cost of the proposed investments.

Subcomponent 1.3: Supporting Investments in Pastoral Production Systems (US$69.5 million equivalent, of which IDA is US$63.0 million equivalent)

27. This subcomponent will support operationalization of the North-Eastern Development Initiative (NEDI)[32] and will cover seven of the eight NEDI counties: Marsabit, Isiolo, Tana River, Garissa, Wajir, Mandera, and Lamu. This subcomponent will help beneficiaries achieve the triple-wins through interventions aimed at: (i) increasing productivity of livestock systems, animal health, and herd management and off-take rates; (ii) promoting integrated soil fertility and sustainable land management (SLM) practices based on crop-livestock integration (for

[29] Most prevalent in areas with average annual rainfall of 750–1,000 mm (medium rainfall zones or semi-arid areas).
[30] Most common in areas with average annual rainfall of 200–750 mm (low rainfall zones or arid areas).
[31] Semi-Arid Counties (West Pokot, Baringo, Laikipia, Machakos, Nyeri, Tharaka Nithi, Taita Taveta and Kajiado); and Non-ASAL Counties (Busia, Siaya, Nyandarua, Bomet, Kericho, Kakamega, Uasin Gishu, Elgeyo Marakwet, and Kisumu).
[32] NEDI is the government's special program to develop infrastructure (water, transport, off-grid energy) and agriculture (especially the livestock subsector) in marginalized counties of northern and northeastern Kenya. Turkana is a NEDI county but is not included because it is supported through NARIGP and the Regional Pastoral and Livelihood Resilient Project (RPLRP).

example, manure management, use of crop residues as feed) and modern inputs; (iii) supporting market access (for example, through livestock corridors, watering points, quarantines, and animal markets); and (iv) developing infrastructure for value addition such as abattoirs. The project will offer matching grants under two windows: (i) community-level investments to CIGs, VMGs, and producer organizations (POs) to finance community microprojects (Pastoral Micro-Projects); and (ii) county-level investments to finance relatively larger subprojects covering several wards and/or cross-county (Pastoral Subprojects). Beneficiary pastoralists will be required to contribute at least 10 percent of the cost of their microprojects, while county governments will contribute at least 20 percent of the cost of their subprojects.

Component 2: Strengthening Climate-Smart Agricultural Research and Seed Systems (US$53.7 million equivalent, of which IDA US$50.0 million equivalent)

28. This component will support the development, validation, and adoption of context-specific CSA TIMPS to target beneficiaries under Components 1 and 3 and also develop sustainable seed production and distribution systems. It will strengthen the technical and institutional capacity of the Kenya Agricultural and Livestock Research Organization (KALRO) to deliver on its mandate under the Kenya Agricultural and Livestock Research Organization Act (2013) and the capacity of GRIFTU Pastoral Training Institute to deliver training. Its three subcomponents support CSA research and innovations, build competitive and sustainable seed systems, and strengthen technical and institutional capacity to coordinate and deliver research and seed system outputs.

Subcomponent 2.1: Supporting Climate-Smart Agricultural Research and Innovations (US$30.9 million equivalent, of which IDA US$28.9 million equivalent)

29. This subcomponent will finance the development, validation, and dissemination of context-specific TIMPS that deliver CSA triple-wins. TIMPs will be developed and validated through demand-driven adaptive research approaches; and made available for scaling up and dissemination under Components 1 and 3, respectively. More specifically, this subcomponent will finance collaborative research programs to develop and promote TIMPs related to five thematic areas: (i) climate-smart crops; (ii) climate-smart livestock and aquaculture; (iii) socio-economic research on CSA TIMPs; (iv) land, water, and agroforestry; and (v) sustainable bio-energy, including the charcoal VC. Results will be achieved by: (i) identifying and prioritizing TIMPS at the county level; (ii) preparing technical training materials and modules to facilitate dissemination and adoption of context-specific CSA TIMPs; (iii) providing technical training on CSA TIMPs to county technical departments and private service providers; (iv) using on-farm trials and other adaptive research approaches to validate CSA TIMPS at the county and community level; and (v) developing new CSA TIMPS based on gaps identified by target beneficiaries in the 24 counties.

Subcomponent 2.2: Building Competitive and Sustainable Seed Systems (US$16.0 million equivalent, of which IDA US$14.3 million equivalent)

30. This subcomponent will finance crop, livestock, and aquaculture breeding programs; and promote private sector and community involvement in producing and distributing commercial seed. KCSAP will work with the Kenya Plant Health Inspectorate Services (KEPHIS), the Kenya Animal Genetic Resource Center, KALRO, CGIAR centers, universities, and others in the national agricultural research system (NARS) to develop and strengthen commercially driven

seed multiplication and distribution systems. More specifically, this subcomponent will finance interventions across six thematic areas: (i) producing and maintaining early generation seed and promoting improved seed, especially of high-value traditional crops; (ii) strengthening seed, breed, and fingerling production systems; (iii) developing and strengthening alternative delivery systems for high-value traditional seed and open pollinated varieties (OPVs); (iv) catalyzing the growth of competitive seed retail networks; (v) developing and advocating a conducive legal, regulatory, and institutional framework for seeds, breeds, and fingerlings; and (vi) supporting national public-private dialogue (PPD) platforms on seeds, breeds, and fingerlings.

Subcomponent 2.3: Strengthening Technical and Institutional Capacity (IDA US$6.8 million equivalent)

31. This subcomponent will strengthen the NARS's technical and institutional capacity to deliver CSA TIMPs, and it will also support development of sustainable seed, breeding stock, and fingerling delivery systems in Kenya. Under technical capacity strengthening it will finance: (i) development and implementation of a NARS coordination framework, including the strengthening of knowledge management systems; (ii) professional development training (11 PhDs and 20 MScs), short-term technical training, and staff retooling; (iii) hiring interns in specialized areas to support the existing scientific staff at KALRO; and (iv) CSA curriculum development for agricultural universities and colleges. Under institutional capacity building it will finance the refurbishment and/or upgrading of facilities and infrastructure (for example, communication equipment, animal experimental structures, refurbished seed stores, procurement of small seed processing plants, fish fingerling production structures, laboratory equipment, value addition equipment, motor vehicles, and farm machinery) at selected research institutes/centers strategically located in ASALs and the GRIFTU Pastoral Training Institute.

Component 3: Supporting Agro-weather, Market, Climate, and Advisory Services (US$32.9 million equivalent, of which IDA US$30.0 million equivalent)

32. This component will finance the development of agro-weather forecasting and marketing information system and their dissemination tools through three subcomponents: improving agro-meteorological forecasting and monitoring; using big data to develop a climate-smart, agro-weather and market information system and advisories; and building institutional and technical capacity for agro-meteorological observation and forecasting, agricultural statistics collection and analyses, and market advisory services. By translating climate information into actionable knowledge, agro-weather tools will improve producers' long-term capacity for adopting CSA TIMPs, managing weather shocks and climate risks, and sustaining agricultural production under changing climatic conditions.

Subcomponent 3.1: Improving Agro-meteorological Forecasting and Monitoring (US$16.5 million equivalent, of which IDA US$15.0 million equivalent)

33. This subcomponent will finance urgently needed investments to: (i) enhance agro-weather and climate information services; (ii) build core capacity for agro-weather observation and forecasting; and (iii) develop the long-term ability to operate and maintain agro-weather and climate information services. More specifically, this subcomponent will: (i) map existing publicly and privately operated automated weather stations (AWSs) (including agro-meteorological, hydrological, and rain gauge stations) to assess their functionalities for improvement; (ii) establish agro-meteorological centers in participating counties to improve

drought and flood forecasts; (iii) install new automated agro-weather stations to complement existing infrastructure; and (iv) develop the Early Warning System (EWS) at the Kenya Meteorological Department (KMD), and upgrade the existing EWS at the National Disaster Management Authority (NDMA).

Subcomponent 3.2: Developing Integrated Weather and Market Information System (US$11.4 million equivalent, of which IDA US$10.0 million equivalent)

34. This subcomponent will finance activities related to: (i) developing 'big data' for CSA; (ii) strengthening the Market Information Systems; and (iii) delivering integrated weather and market advisory services using information and communication technology (ICT) and existing agricultural extension networks. Big data based on crop/pasture-weather analytics will help farmers decide what, when, where, and how to plant. Support to big data for CSA will involve financing activities related to: (i) segmenting and registering VC stakeholders; (ii) establishing homogenous production zones to support a location-specific information system and advisories; (iii) collecting agricultural statistics; (iv) appointing the Normalized Difference Vegetation Index (NDVI) agent; and (v) setting-up infrastructure for 'big data' analytics. Strengthening the Market Information System will involve financing the data capture on outputs (agriculture, livestock, and fisheries), inputs, storage, transport, and matching producers and buyers. Delivering the integrated weather and market advisory services will require financing of three main activities: (i) extending the current agro-weather platform and tool at KALRO to include livestock, additional crops, and VCs; (ii) improving the existing ICT infrastructure and systems at KALRO to effectively deliver data and information services; and (iii) establishing governance and management structures for knowledge, which will ensure security, privacy, and ownership of data and information.

Subcomponent 3.3: Building Technical and Institutional and Capacity (IDA US$5.0 million equivalent)

35. This subcomponent will build the institutional and technical capacity of national and eligible county governments to deliver on their Component 3 mandates. The main beneficiaries of this capacity building will be the semi-autonomous agencies (KMD, KALRO) and the Agricultural Statistics Unit (ASU) and Agriculture Insurance Unit (AIU) within the Ministry of Agriculture, Livestock, and Fisheries (MoALF). The main areas for capacity building include sensitizing stakeholders on CSA concepts and climate change risks, a capacity needs assessment, short- and long-term training, and the provision of IT equipment and operation and maintenance (O&M) budgets. Competitive long-term training will be supported for about six PhDs and 30 MScs in the areas of climate change science and modeling, disaster risk management, agro-meteorology, computer science, agricultural statistics, and business information systems.

Component 4: Project Coordination and Management (US$29.3 million equivalent, of which IDA US$20.0 million equivalent)

36. This component will finance activities related to national and county-level project coordination and management, including developing annual work plans and budgets (AWP&Bs), fiduciary aspects (financial management and procurement), human resource (HR) management, safeguards compliance monitoring, development and implementation of a Management Information System (MIS) and ICT-based platforms, monitoring and evaluation (M&E) and

impact evaluation (IE) studies, and a communication strategy and citizen engagement. All decision-making bodies will include both men and women.

Subcomponent 4.1: Project Coordination (US$24.8 million equivalent, of which IDA US$15.5 million equivalent)

37. This subcomponent will finance the costs of the National Project Coordination Unit (NPCU) and County Project Coordination Units (CPCUs), including salaries of the contract staff and O&M costs (such as office space rental charges, vehicle fuel and spare parts, office equipment and furniture, tools, and internal and external audits, among others). It will also finance the costs of project supervision and oversight provided by the National Project Steering Committee (NPSC), National Technical Advisory Committee (NTAC), and County Project Steering Committees (CPSCs), along with any other project administration expenses.

Subcomponent 4.2: Monitoring & Evaluation and Impact Evaluation (IDA US$4.5 million equivalent)

38. This subcomponent will finance a web-based M&E system to collect and process information at the national, county, and community levels and verify the inputs, outputs, effects, and eventually the impacts of project activities over time. Aside from supporting routine M&E functions (data collection, analysis, and reporting), this subcomponent will finance the baseline, mid-point, and end of project impact evaluations; conduct thematic studies (quantitative, qualitative, and quality of implementation processes) on demand; and support development and operation of the ICT-based Agricultural Information Platform IAIP) serving four main functions: (i) access to information; (ii) multi-directional flow of information; (iii) market linkages; and (iv) M&E. The latter will be harmonized with continental and global efforts (such as the Global Alliance for CSA and the Alliance for CSA in Africa) to build robust, harmonized evidence on the impacts of CSA TIMPs supported by the project to achieve CSA triple-wins.

Component 5: Contingency Emergency Response (US$0 million from IDA)

39. This zero-cost component will finance eligible expenditures under the Immediate Response Mechanism (IRM) in case of natural or man-made crises or disasters, severe economic shocks, or other crises and emergencies in Kenya. This contingency facility can be triggered through formal declaration of a national emergency by the government authority and upon a formal request from GoK to the World Bank through the National Treasury. In such cases, funds from other project components will be reallocated to finance emergency response expenditures to meet agricultural crises and emergency needs. The emergency response would include mitigation, recovery, and reconstruction following crises and disasters, such as severe droughts, floods, disease outbreaks, and landslides, among others. Implementation of this subcomponent will follow a detailed Contingent Emergency Response Implementation Plan (CERIP) satisfactory to the World Bank that will be prepared as the case may be for each Eligible Crisis of Emergency.

B. Project Financing

40. The total project cost is estimated at US$279.7 million equivalent, of which the International Development Association (IDA) will finance US$250 million under an Investment Project Financing (IPF) instrument. The estimated project cost (Table 2) takes into account GoK

counterpart funds (US$15.9 million equivalent), county governments (US$8.3 million), and beneficiary contributions (US$5.5 million equivalent) for a total of US$29.7 million equivalent. The project will be implemented over a period of five years.

Table 2: Estimated Project Cost and Financing

Project Component	Project Costs (US$ million)	IDA Financing (US$ million)	% IDA Financing	Co-financing (US$ million)
1. Upscaling Climate-smart agricultural Practices	163.80	150.00	92%	13.80
2. Strengthening CSA Research and Seed Systems	53.70	50.00	93%	3.70
3. Supporting Climate, Agro-weather, Market Information and Advisory Services	32.90	30.00	91%	2.90
4. Project coordination and Management	29.30	20.00	68%	9.30
5. Contingency Emergency Response	0.00			
Total Costs	**279.70**	**250.00**	**90%**	**29.70**

C. Lessons Learned and Reflected in the Project Design

41. In designing the project, the World Bank and GoK teams drew on lessons from an extensive range of national and global projects and initiatives. The major lessons are described briefly here.

(i) National experience

42. The World Bank has supported a number of community-led agricultural development projects and institutional platforms that have benefitted rural populations in Kenya. It has also worked to strengthen the knowledge base and the government's capacity for developing the agricultural sector. Knowledge and learning from these experiences will be useful for implementing community-driven CSA investments under KCSAP.

43. ***Western Kenya Community Driven Development and Flood Mitigation Project (WKCDD&FMP, P074106).*** The Participatory Integrated Community Development (PICD) tool used in this project takes time, and there are no shortcuts, but it has proven very powerful for community-driven development (CDD). Experience with WKCDD&FMP also shows that microprojects—particularly if managed individually, by women, or VMGs—perform better than group enterprises. Beneficiaries tend to invest income generated from microprojects into other income-generating activities (including livelihood diversification) with higher returns. The grievance redress system for handling complaints in WKCDD&FMP was very effective in resolving conflict, and the Social Accountability and Integrity Committees (SAICs) enhanced transparency among community groups. Another lesson was that innovative ways of attracting young people to activities related to agricultural production needed further exploration.

44. To a large extent, KCSAP design incorporates these lessons. The PICD process will last six to nine months so that communities participate fully in selecting CSA TIMPs for their priority VCs and in planning microprojects. KCSAP will support interventions among VMGs, including women- and youth-only groups. The project will encourage women to invest their proceeds in microprojects (off-farm and value-adding initiatives, for example) to generate higher income and/or diversify livelihoods (reducing exposure to risks posed by climate change and variability). KCSAP incorporates complaint-handling and grievance redress mechanisms and

social audits for greater transparency in microproject selection, implementation, and equitable sharing of benefits.

45. ***Kenya Agricultural Productivity and Agribusiness Project (KAPAP, P109683).*** Experience with KAPAP indicated that the quality of service providers (SPs) varied for several reasons: there was no standard approach/methodology for providing technical, business, and financial advisory services to CIGs and POs; no quality control and assurance mechanisms were in place for evaluating SPs' performance; and SPs' technical capacity/skills mix could not respond to the wide range of VC and PO demands. Other lessons highlight the benefits of using local lead farmers in providing extension services to enhance peer-to-peer learning, and of using ICT and mass media to reach stakeholders beyond target groups.

46. Based on those observations, KCSAP will adopt standard training modules (to be developed under NARIGP) for each of the priority VCs, business and financial advisory services for POs, fiduciary (community financial and procurement) management, and environmental and social safeguards (use of checklists to avoid doing harm), among others. Technical departments of MoALF will provide quality assurance of the standard training modules prior to their use. Staff of the selected SPs will undergo mandatory training on these standard modules prior to building the capacity of CIGs, VMGs, POs, and PPPs under Component 1. The capacity of county technical departments (CTDs) will be enhanced by training and facilitation of O&M to enable them to provide oversight and quality assurance of contracted SPs. The terms of reference (ToRs) for SPs will include the requirement that they form consortia comprising a skills mix ranging from production (along priority VCs) to value addition (particularly though POs) and marketing, as well as business and financial advisory services. KCSAP will adopt the use of farmer field schools (FFSs) and lead farmers for disseminating CSA TIMPs to beneficiaries. KCSAP will take full advantage of Kenya's high mobile phone density (approximately 83 percent of the population is estimated to have mobile phone access) and successful platforms to design an ICT-based Agricultural Information Platform (for collecting and disseminating information, technologies, and agro-weather and market information, and for county networking and learning) that is scalable and viable in the long term.

(ii) Global experience

47. A unique strength of the World Bank is that lessons from its rich regional and global knowledge, experience, and networks can complement GoK's design and implementation of multi-sectoral, community-led, and market-driven approaches. Examples follow.

48. ***Producer organizations and market linkages.*** The key lesson[33] for KCSAP is that significant investment in POs and PPPs to build linkages with markets enables significant increases in agricultural productivity and income. Investments should include access to extension/advisory services, financial services, technologies, and markets. KCSAP also draws on lessons from the Rural Productive Partnerships projects financed by the World Bank and successfully implemented in Latin America. Productive Partnerships create favorable conditions and incentives for buyers and smallholders to establish mutually beneficial relationships by ensuring that farmers consistently produce a particular quality and reliable supply of a good (or agricultural commodity). Thus smallholders overcome market barriers and gain stability by

[33] The project has drawn lessons from the Irrigated Agriculture Modernization and Water-Bodies Restoration and Management Project (P090768) in Tamil Nadu and the Madhya Pradesh Rural Livelihoods Project financed by the World Bank in India.

receiving consistent and higher prices for their goods, while buyers benefit from a consistent supply of goods of a particular quality that meets their demands.

49. ***Buy-in from subnational governments.*** Brazil and Mexico[34] have an intensive focus on buy-in from all levels of government and departments related to their projects. Extensive team-building measures to define roles and responsibilities of national and subnational governments reduced task redundancy and administrative costs. Each department knew its duties, expected outputs, and respective budgetary allocations. This demarcation was instrumental in decreasing conflicts between national and subnational governments, as well as their departments. KCSAP will use a similar approach to ensure ownership and buy-in from county governments.

50. ***Use of ICT.*** The expanding role of ICT in producing and disseminating knowledge offers innovative opportunities for a variety of stakeholders in priority VCs to interact and influence agricultural development processes. Countries like Brazil and Mexico leverage ICT to reach farming communities in unprecedented ways in tasks ranging from supporting knowledge campaigns to processing data, making payments, monitoring compliance, tracking beneficiaries, and incorporating user feedback. KCSAP has incorporated these ICT innovations into its design.

51. ***Open data initiatives.*** To ensure the maximum impact and sustainability of data collection and ICT systems, non-personal (or non-confidential) data will be published online as open data. Global experience shows that making data available in this way entails very low additional costs and enables it to be used by other actors in business and civil society in innovative ways for economic benefit, job creation, transparency, government efficiency, and increased citizen engagement in public service standards.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

52. KCSAP will be implemented in a phased approach in which KCSAP will be fully operational in at least five counties by the end of year 1, and the remaining counties will join as their capacities are strengthened, reaching 15 by year 2 and all 24 by year 3. Implementation will involve a three-tiered institutional arrangement (national, county, and community). At the national level, the National Treasury will represent the Government of the Republic of Kenya ("the Borrower") and MoALF will be the main implementing agency. Within MoALF, the project will be anchored in the State Department of Agriculture (SDA). At the county (second-tier) level, the county governments will be the executing agencies. At the community (third-tier) level, beneficiaries will implement community-led CSA interventions. The three-tiered arrangement should reduce the approval layers, speed decision making (enabling more efficient project implementation), and to the extent possible use the constitutionally mandated governance structures at the national and county levels. For details see Annex 3.

B. Results Monitoring and Evaluation

53. KCSAP will be underpinned by a solid monitoring, learning, and evaluation system that supports evidence-based decision-making and reinforces the culture of results-based project

[34] Oportunidades/Progresa (Mexico) targets poverty by providing conditional cash transfers to families in exchange for regular school attendance, health clinic visits, and nutritional support; Bolsa Familia (Brazil) provides conditional cash transfers to fight and reduce poverty by giving preference to female-headed households through so-called Citizen Cards, which operate like a debit card and are issued by the Caixa Econômica Federal, a government-owned savings bank.

M&E. A web-based M&E and MIS system will monitor activities, processes, inputs, and outputs to track achievements against targets, emphasizing real-time monitoring. Rigorous, quantitative impact evaluations will be undertaken to measure the final outcome (transformational impacts) at the mid-term review and end of the project. For details, see Annexes 1 and 3.

C. Sustainability

54. Generally speaking, the potential for sustainability will increase if the project succeeds in strengthening counties' and communities' technical and business skills and capacity to plan, implement, and manage interventions to diversify benefit flows. Global and national experience shows that when producers form POs and Savings and Credit Cooperatives (SACCOs) and improve market access, they take up higher value-adding activities, capitalize on other growth opportunities in the rural economy, generate additional cash that enables them to seek advisory services, and forge links to the private sector. Stronger farmer networks (POs, PPPs, SACCOs) developed under KCSAP will enable CIGs and VMGs to buy inputs at more reasonable prices, access output markets, and obtain credit to sustain their investments. KCSAP will require participating counties to undertake cost-benefit analysis of all county-level investments and be responsible for future O&M. The latter will be financed from Country Government (CG) budgets and through user fees/charges levied on community irrigation schemes, dipping facilities, and watering points. Initially the project will meet the cost of short messages (SMS) to users of agro-weather, climate, and advisory services; over time, the SMS cost will be met from subscriptions. Similarly, users of the Market Information System will pay subscriptions for information received. KMD will pay for the O&M of the meteorological and hydrological data collection.

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

55. The overall risk to achieving the PDO is ***SUBSTANTIAL***. The key risks and challenges include: (i) current inadequate capacity of the CGs to deliver on their mandate in agricultural services; (ii) continued vulnerability to production and price shocks in the agricultural sector, with weather shocks and climate change remaining a serious threat to agricultural production; (iii) sustainability of the outcomes of KCSAP beyond the project period, given the limited county-level capacity for delivering agricultural services; and (iv) inherent weaknesses in fiduciary management at the CG level.

56. ***Political and governance—SUBSTANTIAL.*** Kenya will hold the next general elections in August 2017. The political campaign period is likely to begin in the last quarter of FY2017, about when KCSAP becomes effective. There is a significant risk that KCSAP can be used as an election tool and that key policy decisions and strategic directions relating to project implementation could change after the elections. The current challenges of devolution and tension between the national and county governments relating to devolved sectors (which include agriculture, water, environment, urban, and health) could also be exacerbated in the wake of a political transition. To mitigate this risk, the project design ensures that county governments are represented at the national-level project implementation arrangements. The Chair of Agricultural Committee in the Council of Governors, the Coordinator of Intergovernmental Secretariat for Agricultural Sector, and two Governors will be members of the NPSC. Similarly, the Chair of the ITWG responsible for Projects/Programs and the Chair and Secretary of County Executive

Committee Agricultural Caucus will be members of the NTAC. In addition, KCSAP is developing a comprehensive communication strategy that will provide accurate information to the public on the project design, including its objectives, targeted beneficiaries, and roles and responsibilities of national, county, and community institutions in implementing the project.

57. ***Institutional capacity for implementation and sustainability—SUBSTANTIAL.*** This risk is substantial largely due to the limited capacity of the relatively new CGs (particularly in the northern and northeastern counties) to deliver agricultural services, including public advisory services, animal health and disease surveillance and control/veterinary services. To mitigate this risk, KCSAP will undertake a Capacity Needs Assessment to identify staffing levels and skills gaps at the county level. The staffing gap will be filled either through secondment from MoALF to counties or recruitment from the market. The skills gap will be addressed by training and capacity-building activities before and during project implementation. A systematic process of learning and exposure visits to India, Indonesia, Mexico, and Brazil will be put in place for senior county government officials.

58. ***Fiduciary—HIGH.*** This rating is based on the recent in-depth financial management review conducted for KAPAP and KAPSLMP, the CDD-type operations implemented by MoALF, and procurement capacity assessment at the national, county, and community levels. Some of the fiduciary issues identified include: (i) the breakdown of internal financial management controls; (ii) procurement-related irregularities; (iii) unsupported and/or insufficiently documented expenditures; (iv) weak management oversight; and (v) lack of effective M&E systems by the NPCU. To mitigate this risk, training on fiduciary aspects (World Bank Guidelines on FM and Procurement) will be conducted prior to project effectiveness and during project implementation. Further, a detailed action plan on how to address the above weaknesses has been developed to improve fiduciary compliance.

59. ***Environmental and social—SUBSTANTIAL.*** This rating is given despite the fact that KCSAP is an environmental Category B - Partial Assessment. This classification means that KCSAP interventions are likely to have negative environmental and social impacts, which are small in scale, site-specific, and largely reversible. With regard to social safeguards, the project includes counties with IPs and other VMGs. The needs of IPs and VMGs must be handled carefully to avoid numerous complaints that can delay project implementation. Given that the nature of the proposed interventions and the design and location of specific microprojects are not known ex ante, the project has adopted a framework approach to managing safeguards, comprising an ESMF for environmental assessment, a VGMF for IPs, and the RPF for involuntary resettlement.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

60. The economic and financial analysis follows World Bank guidelines and reflects evidence from similar projects in Kenya. Annex 5 presents the detailed results. Briefly, the economic analysis evaluates the project's benefits and costs to the national economy over a period of 20 years with a discount rate of 6 percent. The economic analysis aggregates net incremental benefits from adopting CSA TIMPs (valued in economic terms) and monetized environmental benefits expected to accrue from reduced GHG emissions and increased carbon sequestration (see Annex 6). The economic analysis uses investment and recurrent costs of

US$253 million[35] from year 1 to 5, and recurrent costs of US$2.5 million (approximately 10 percent) from year 6 to year 20. The resulting economic net present value (NPV) is about US$304 million, and the economic internal rate of return (EIRR) is 16.7 percent. Sensitivity analyses demonstrate that the project can absorb substantial negative impacts and still generate an EIRR above the opportunity cost of capital; the analysis thus supports the public investment decision.

61. The financial analysis, comparing "with project" and "without project" scenarios at the farm level to estimate the viability of adopting CSA TIMPs for 11 commodities, shows positive incremental net benefits for adopting CSA TIMPs. The timeframe is 20 years, with a discount rate of 12 percent (reflecting Kenya's average commercial lending rate). Net present values of the net incremental benefits range fromUS$403 for millet to US$12,413 for honey. Benefit-cost ratios range from 1.40 for cassava-bean intercropping to 5.56 for honey. Across all commodities, the lowest switching value is –28 for the reduced benefits and 29 percent for increased costs, which indicates the relative robustness of the results.

B. Technical

Greenhouse Gas Accounting

62. The World Bank uses the Ex-Ante Carbon-Balance Tool (EX-ACT) to estimate the impact of agricultural investment lending on GHG emissions and carbon sequestration. EX-ACT is a land-based appraisal system for assessing a project's net carbon balance—the net balance of tons of CO_2 equivalent (tCO_2-eq) of GHGs that were emitted or carbon sequestered as a result of project interventions—compared to a "without project" scenario. For KCSAP, the estimated area to be brought under CSA interventions is 264,000 hectares (ha), and an estimated 742,500 animals will receive improved feeding and animal health services. Assuming that 60 percent of project farmers adopt at least one CSA TIMP, the net carbon balance over a period of 20 years is estimated to be –2,276,150 tCO_2e (approximately –113,807 tCO_2e per year). At a conservative carbon price (US$10/t), the value of the reduced GHG emissions under KCSAP is about US$22.76 million.

Financial Management

63. **Financial management assessment.** The purpose of the assessment was to determine whether the financial management (FM) arrangements in place ensure that financial resources reach the implementing and executing agencies and ultimate project beneficiaries in the shortest time possible, are used to finance the intended activities, are accounted for properly, and auditing arrangements are acceptable. At the national level, MoALF has adequate experience and capacity in dealing with World Bank-financed projects, including KAPAP, Kenya Adaptation to Climate Change in Arid Lands Project (KACCAL), and Kenya Agricultural and Sustainable Land Management Project (KAPSLMP). The challenges include long delays in moving funds from Designated Accounts (DAs) to Project Accounts (PAs) and weak records management. At the county level, internal controls, reporting, and oversight mechanisms are inadequate but will be strengthened during the project implementation. Additional risk mitigation measures are detailed in the financial management section of Annex 3.

[35] Excludes cost for Component 4 – Project Coordination and Management.

64. **Flow of funds arrangements.** The project will adopt the Statement of Expenditure (SoE) method of disbursement. The flow of funds will consist of two DAs (DA-1 for county activities and DA-2 for national activities) opened by the National Treasury at the Central Bank of Kenya (CBK) or another financial institution acceptable to the World Bank/IDA, and denominated in US dollars; in addition, MoALF will open a PA in Kenya shillings in the CBK or financial institution acceptable to the World Bank/IDA, from which project payments will be made. County Project Accounts (CPAs) will be opened by each participating county at CBK or in financial institutions acceptable to the World Bank/IDA, and MoALF will trigger transfers of funds from DA-1 through the County Revenue Fund (CRF) to the CPAs. Beneficiary/community bank accounts will be opened at commercial banks acceptable to the World Bank/IDA; funds will be disbursed from the CPAs at CBK or in financial institutions acceptable to IDA, directly to the community accounts at commercial banks. The CRF accounts will be replenished from DA-1, and the PA from DA-2. GoK (MoALF, the National Treasury, and the CGs) will establish a reporting and accountability mechanism to ensure that funds disbursed to counties are accurately accounted for and reported on a timely basis. The agreed mechanism shall be documented in the Financial Management Manual (FMM) and Participation Agreements signed between MoALF and the CGs.

C. Procurement

65. **Procurement assessment.** MoALF (the main implementing agency) has experience of implementing World Bank-funded projects, but procurement capacity at the county and community levels is inadequate. KCSAP will endeavor to build procurement capacity during implementation through secondment or recruitment of qualified and experienced procurement staff from the labor market. In addition, TA, short-term, and hands-on training will be provided to strengthen procurement capacity at all levels. Additional risk mitigation measures are detailed in the procurement section of Annex 3.

66. **Procurement arrangements.** Procurement will be carried out in accordance with the World Bank's "Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers, published by the World Bank in January 2011, revised July 2014; and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers" dated January 2011. The NPCU will be responsible for procurements under Components 2, 3, and part of Component 4; the CPCUs will spearhead execution of procurement under Component 1 and part of Component 4. At the community level, the Community-Driven Development Organizations (CDDOs) will guide beneficiaries in procurement. Annex 3, Table A3.3 summarizes thresholds for procurement and prior review. Further, the "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants," dated October 15, 2006 and revised January 2011, shall apply.

D. Environmental and Social Safeguards

1. The project is classified as environmental category B - Partial Assessment, given that no significant and/or irreversible adverse environmental impacts are anticipated. Three environmental safeguards are triggered—Environmental Assessment (OP 4.01), Physical Cultural Resources (OP 4.11), and Pest Management (OP 4.09)—and two social safeguards—Involuntary Resettlement (OP 4.12) and Indigenous Peoples Policy (OP 4.10). Details on

expected adverse impacts and mitigation measures for each of these safeguard policies are provided in Annex 3. The GoK has prepared an Environmental and Social Management Framework (ESMF) for guiding implementation of the Environmental Assessment (OP 4.01), Physical Cultural Resources (OP 4.11), and Pest Management (OP 4.09). It has also prepared a Resettlement Policy Framework (RPF) and the Vulnerable and Marginalized Groups Framework (VMGF) for guiding implementation of the Involuntary Resettlement (OP 4.12) and Indigenous Peoples Policy (OP 4.10), respectively. The ESMF, RPF, and VMGF were publicly disclosed in-country on the MoALF Website[36] on November 11, 2016 and at the World Bank InfoShop in Washington DC on November 14, 2016.

E. World Bank Grievance Redress

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

[36] The safeguards documents for the KCSAP can be downloaded from the links below: http://www.kilimo.go.ke/index.php/media-center/downloads/ and http://www.kapp.go.ke/projects/kcsap/frameworks.html.

Annex 1: Results Framework and Monitoring

Country: Kenya

Project Name: Kenya Climate Smart Agriculture Project (P154784)

Results Framework

Project Development Objectives

PDO Statement

To increase agricultural productivity and build resilience to climate change risks in the targeted smallholder farming and pastoral communities in Kenya, and in the event of an Eligible Crisis or Emergency, to provide immediate and effective response.

These results are at	**Project Level**

Project Development Objective Indicators

		Cumulative Target Values									
Indicator Name	**Baseline**	**YR1**	**YR2**	**YR3**	**YR4**	**YR5**	**YR6**	**YR7**	**YR8**	**YR9**	**End Target**
Direct project beneficiaries (Number) - (Core)	0.00	9,075.00	8,8450.00	278,900.00	487,500.00	521,500.00					521,500.00
CIGs (Number - Sub-Type: Breakdown)	0.00	8,168.00	49,005.00	98,010.00	163,350.00	163,350.00					163,350.00
VMGs (Number - Sub-Type: Breakdown)	0.00	908.00	5,445.00	10,890.00	18,150.00	18,150.00					18,150.00
County Investment (Number - Sub-Type: Breakdown)	0.00	0.00	24,000.00	120,000.00	216,000.00	240,000.00					240,000.00
PPP (Number - Sub-Type: Breakdown)	0.00	0.00	10,000.00	50,000.00	90,000.00	100,000.00					100,000.00
Share of which	0.00	30.00	30.00	40.00	45.00	45.00					45.00

female (Percentage - Sub-Type: Supplemental) - (Core)											
Increase in productivity of selected agricultural commodities supported by the project (Percentage)	0.00	0.00	2.00	5.00	15.00	20.00					20.00
Sorghum (Kg/ha)	1,000.00	0.00	1,002.00	1,005.00	1,150.00	1,200.00					1,200.00
Millet (Kg/ha)	900.00	0.00	901.80	904.50	1,035.00	1,080.00					1,080.00
Cassava (Kg/ha)	5,000.00	0.00	5,010.00	5,025.00	5,750.00	6,000.00					6,000.00
Dairy (liters of milk /female/lactation period)	1,500.00		1,503.00	1,507.50	1,725.00	1,800.00					1,800.00
Aquaculture (ton/ha)	1,200.00	0.00	1,202.40	1,206.00	1,380.00	1,440.00					1,440.00
Targeted beneficiaries (in CIGs/VMGs) who have adopted at least one TIMP promoted by the project (Number)	0.00	0.00	5,445.00	32,670.00	72,600.00	108,900.00					108,900.00
Share of which female (Percentage - Sub-Type: Supplemental)	0.00	30.00	30.00	40.00	45.00	45.00					45.00
Client-days of training provided on TIMPs (Number)	0.00	45,375.00	272,250.00	544,500.00	907,500.00	907,500.00					907,500.00
Share of which female (Percentage - Sub-Type: Supplemental)	0.00	30.00	30.00	40.00	45.00	45.00					45.00
Beneficiaries	30.00			70.00		70.00					70.00

satisfied with relevance, timeliness and effectiveness of TIMP advisory services received (disaggregated by gender) (Percentage)											
Grants approved for CIGs, VMGs, PPPs and counties (Number)	0.00	303.00	1,828.00	3,693.00	6,164.00	6,177.00					6,177.00
CIGs (Number - Sub-Type: Supplemental)	0.00	248.00	1,485.00	2,970.00	4,950.00	4,950.00					4,950.00
VMGs (Number - Sub-Type: Breakdown)	0.00	55.00	330.00	660.00	1,100.00	1,100.00					1,100.00
Counties (Number - Sub-Type: Breakdown)	0.00	0.00	9.00	43.00	78.00	87.00					87.00
PPPs (Number - Sub-Type: Breakdown)	0.00	0.00	4.00	20.00	36.00	40.00					40.00
Of which successfully completed (Percentage - Sub-Type: Supplemental)	0.00	0.00	0.00	30.00	70.00	100.00					100.00
Productive assets brought under TIMPs as a result of the project											
Total land area (Hectare - Sub-Type: Supplemental)	0.00	0.00	0.00	180,000.00	420,000.00	600,000.00					600,000.00
Head of livestock (Number - Sub-Type: Supplemental)	0.00	45,000,000.00	45,000,000.00	54,000,000.00	56,250,000.00	58,500,000.00					58,500,000.00

Reduced net GHG emissions per unit (kilogram) of product produced for selected agricultural commodities: (Percentage)				-10.00		-15.00					-15.00
Sorghum (kg CO2e/kg - Sub-Type: Breakdown)	0.89			0.80		0.76					0.76
Millet (kg CO2e/kg - Sub-Type: Breakdown)	0.99			0.89		0.84					0.84
Cassava (kg CO2e/kg - Sub-Type: Breakdown)	0.18			0.16		0.15					0.15
Dairy (kg CO2e/kg - Sub-Type: Breakdown)	176.00			158.40		149.60					149.60
TIMPs tested through on-farm trials (Number)	0.00	24.00	96.00	216.00	312.00	360.00					360.00
Share of which validated (Percentage - Sub-Type: Supplemental)	0.00	0.00	2.00	10.00	15.00	25.00					25.00
Farmers participating in on-farm TIMP trials (Number)	0.00	96.00	384.00	864.00	1,248.00	1,440.00					1,440.00
Share of which female (Percentage - Sub-Type: Supplemental)	0.00	30.00	30.00	40.00	45.00	45.00					45.00
Seed production units receiving technical Assistance/support via the project (Number)											
Credit-guarantee	0.00	0.00	12.00	24.00	48.00	60.00					60.00

scheme (Number - Sub-Type: Breakdown)											
Technical assistance for seed retailers and community -based organizations (CBOs) (Number - Sub-Type: Breakdown)	0.00	120.00	120.00	360.00	480.00	480.00					480.00
Revolving fund for community based seed production units (Number - Sub-Type: Breakdown)	0.00	24.00	48.00	72.00	96.00	96.00					96.00
Increased production of climate-smart agriculture inputs by seed and breed stock producers supported by the project (Metric-ton)											
Early generation seed (Metric ton - Sub-Type: Supplemental)	0.00	15.00	20.00	26.00	35.00	45.00					45.00
Certified seed (Metric ton - Sub-Type: Supplemental)	0.00	45.00	90.00	120.00	150.00	210.00					210.00
Livestock parent stocks (Heads - Sub-Type: Supplemental)	0.00	120.00	270.00	570.00	1,020.00	1,320.00					1,320.00
Post-graduate degree and short-term technical training completed (Number)											
PhDs (Number - Sub-Type: Breakdown)	0.00	0.00	0.00	0.00	8.00	13.00					13.00
Share of which	0.00	0.00	0.00	0.00	40.00	40.00					40.00

completed by female (Percentage - Sub-Type: Supplemental)											
MScs (Number - Sub-Type: Breakdown)	0.00	0.00	0.00	28.00	42.00	42.00					42.00
Share of which completed by female (Percentage - Sub-Type: Supplemental)	0.00	0.00	0.00	50.00	50.00	50.00					50.00
Short-term training (Number - Sub-Type: Breakdown)	0.00	145.00	295.00	440.00	575.00	580.00					580.00
Share of which completed by female (Percentage - Sub-Type: Supplemental)	0.00	30.00	30.00	30.00	30.00	30.00					30.00
New and refurbished agro- automated weather stations and hydro - meteorological facilities (Number)	0.00	48.00	150.00	198.00	198.00	198.00					198.00
Users receiving integrated agro-weather information and market information services (Number)	0.00	720,000.00	1,200,000.00	2,400,000.00	3,600,000.00	4,800,000.00					4,800,000.00
Share of which female (Percentage - Sub-Type: Supplemental)	0.00	30.00	35.00	40.00	50.00	50.00					50.00
Satisfactory quarterly project interim financial and monitoring reports submitted within 45 days of end of the previous period	0.00	50.00	60.00	75.00	100.00	100.00					100.00

(Percentage)											
Grievances registered related to delivery of project benefits addressed (Percentage) - (Core)	0.00	30.00	50.00	60.00	80.00	100.00					100.00

Indicator Description

Project Development Objective Indicators				
Indicator Name	**Description (indicator definition etc.)**	**Frequency**	**Data Source / Methodology**	**Responsibility for Data Collection**
Direct project beneficiaries (number), of which female (percentage).	This is a World Bank Core Sector Indicator and measures the number of farmers and pastoralists who benefit from grants and services provided under Component 1. It captures beneficiaries that are members of CIGs, VMGs, or PPPs, including POs, and thus recipients of grants, as well as beneficiaries that benefit from landscape-level investments implemented by counties. Beneficiaries in CIGs and VMGs can be part of PPPs and benefit from county-level investments. To avoid double-counting, beneficiaries are identified by a unique ID number. Thus, those beneficiaries that benefit from PPP and county-level investment indicate beneficiaries that are reached in addition to those beneficiaries already captured through CIG and VMG investment.	Annual	Survey, annual reports from CIGs submitted through MIS	CPCUs
Increase in productivity of selected agricultural commodities supported by the project (percentage).	The indicator measures percentage changes in crop or livestock yields for commodities identified as CSA priority commodities in targeted counties. It measures yield increase from target beneficiaries who are adopting TIMPs promoted by the project, thus demonstrating progress toward achieving the PDO—increasing productivity. Typically, yield represents the average amount of produce obtained per unit of crop area, per tree, or livestock unit for a specific timeframe, such as a year.	Annual	Survey, annual reports from CIGs submitted through MIS	CPCUs
Targeted beneficiaries (in CIGs/VMGs) who have adopted at least one TIMP promoted by the project (number), of which female (percentage).	Beneficiaries in CIGs engaging in climate-smart agriculture activities receive advisory services on primary production technologies, innovations, and management practices (TIMPs) (e.g., improved inputs such as seeds, planting materials, and breeds, animal husbandry and agronomic practices) to improve productivity and achieve resilience.[37] The indicator measures an improvement in practices	Annual	Survey, CIG annual reports submitted through MIS	NPCU/ CPCUs

[37] While there are several definition of resilience, one way to define it is provided by Rockefeller foundation (2009) as "The capacity of an individual, community, or institution to dynamically and effectively respond to shifting climate circumstances while continuing to function at an acceptable level."

	compared to existing or traditional methods. The adopted TIMPs are climate-smart and expected to increases beneficiaries' capacity to better respond to climate change and variability while still functioning at an acceptable level, thus achieving resilience. The indicator relates to the Core Sector Indicator: "Clients who have adopted an improved agricultural technology promoted by the project (number), disaggregated by men and women."			
Intermediate Results Indicators				
Indicator Name	**Description (indicator definition etc.)**	**Frequency**	**Data Source / Methodology**	**Responsibility for Data Collection**
Client-days of training provided on TIMPs (number), share of which female (percentage).	Promotion of TIMPs in the project will be supported by contracted advisory service providers, as well as by ward and county-level technical staff. This indicator measures the advisory services in TIMPs provided to beneficiaries in CIGs and VMGs. For dissemination of the TIMPs, the project promotes an FFS and lead farmer approach, where training takes place at least 5 days (40 hours) per year. The training will be conducted in the course of implementation of the approved microprojects. This indicator is aligned to the Core Sector Indicator "Client days of training provided (Number)" but offers a specification on the training subject. The indicator measures the number of clients who completed training multiplied by the duration of training expressed in days, and thereof the share of client-days of training completed by female beneficiaries.	Annual	Survey, Annual reports from CIGs submitted through MIS	CPCUs
Beneficiaries satisfied with relevance, timeliness, and effectiveness of TIMP advisory services received (percentage, disaggregated by gender).	The project will contract advisory service providers to support CIGs, producer organizations, and cooperatives to adopt CSA practices and value chain interventions. The responsiveness to these CIGs' and VMGs' changing needs is a key aspect of resilience. The indicator measures the share of CIG and VMGs members who are satisfied with the relevance, timeliness, and effectiveness of the advisory services received. This indicator is aligned to the Core Sector Indicator "Targeted clients satisfied with agricultural services (percentage)".	Baseline, mid-term, end of project	Survey	CPCUs
Grants approved for CIGs,	The project will support investments through	Annual	Annual reports from CIGs	CPCUs

VMGs, PPPs, and counties (number), of which successfully completed (percentage). - CIGs - VMGs - Counties - PPPs	different windows: at the community level for CIGs and VMGs; a window for PPPs with producers; and a window for county-level investment (Subcomponent 1.2) and county and cross-county investments (Subcomponent 1.3) to support resilience building at county and regional level. Capacities to identify and plan these investments to the standards required by the project are a key indicator of stakeholders' collective capacities to plan CSA and TIMP interventions. The indicator monitors the number of microprojects that have been approved. The indicator also monitors the share of microprojects that have been assessed by the CPCU as successfully completed. The indicator is disaggregated by the intervention window.		submitted through MIS; progress reports / MIS	
Productive assets brought under TIMPs as a result of the project. - Total land area (ha) - Head of livestock (number)	This indicator measures the core productive assets of agricultural and pastoral households to which TIMPs are applied. It also captures assets brought under TIMPs through county investment. For agricultural and pastoral systems, the total land area (ha) on which at least one TIMP has been applied relates to the Core Sector Indicator "Land area where sustainable land management practices have been adopted as a result of the project (ha)." In pastoral systems and livestock components in mixed farming systems, some CSA practices identified in the list of eligible TIMPs (e.g., vaccination, improved herd management) can be applied to livestock without reference to a specified land area. The sub-indicator "head of livestock" tracks progress toward climate resilient management of livestock, which are also a core household asset.	Annual	Annual progress reports / MIS; annual reports from CIGs submitted through MIS	CPCUs
Reduced net GHG emissions per unit (Kilogram) of product produced for selected agricultural commodities (percentage).	This indicator measures the climate impact (net GHG emissions, including soil carbon sequestration) of agricultural commodity production. Since total production will increase, the indicator measures change in the intensity of GHG emissions per unit of agricultural product. GHGs are converted to CO_2 equivalent using standard global warming potential values. For selected crop commodities in the prioritized value chains, the indicator measures a percentage reduction in net GHG emissions (i.e., GHG emission minus	Baseline, mid-term, end of project	Survey of commodities, GHG intensity will be calculated using the cool farm tool and GLEAM-I (livestock)	NPCU/ CPCUs

	sequestered carbon in tCO_2e) per unit of product (i.e., $kgCO_2e$/kg crop or livestock product output). For crop commodities, quantification of GHG intensity will be performed using the Cool Farm Tool. For livestock products, quantification will be performed using GLEAM-i. Quantification will be undertaken at project start, mid-term, and terminal evaluation, using dedicated surveys to parameterize these models together with activity data from the MIS.			
TIMPs tested through on-farm trials (number), share of which validated (percentage).	A large number of TIMPs have previously been identified in Kenya, but mostly on the basis of trials in a limited number of field sites. A key activity promoted by the project is validation of known TIMPs in a wider range of agro-ecological conditions to support promotion of TIMPs in suitable areas. The indicator measures the number of TIMPs which are tested through on-farm trials for validation and the share of which being validated.	Annual	Progress reports / MIS	NPCU
Farmers participating in on-farm TIMP trials (number), share of which female (percentage).	To improve farmer access to appropriate TIMPs and improve awareness and understanding of optimal adoption and use, the project aims at promoting participatory approaches and on-farm trials, to ensure the development, validation, and promotion of best-fit TIMPs.	Annual	Progress reports / MIS	NPCU
Seed production units receiving technical assistance/support via (number): - Credit-guarantee scheme - Technical Assistance for seed retailers and community-based organizations - Revolving fund for community-based seed production units.	Seed and breed production units will be supported through credit guarantee scheme, Technical Assistance for (e.g.) business development and market linkages and revolving funds. This indicator tracks the number of units receiving support through different project mechanisms.	Annual	Progress reports / MIS	NPCU
Increased production of climate-smart agricultural inputs by seed and breed stock producers supported by the project: - Early generation seed (tons) - Certified seed (tons)	This indicator measures the volume of increased output of seed and breeding stock from seed/breed production enterprises supported by the project.	Annual	Progress reports / MIS	NPCU

- Livestock parent stocks (heads)				
Post-graduate degree and short-term technical trainings completed (number), share of which completed by women (percentage): - PhD - MSc - Short-course	*Subcomponent 2.3:* Individual research skills is a core capacity for the NARS. This indicator measures the number of post-graduate level courses completed by individuals supported by the project (PhDs and MScs) as well as the number of short-term technical training courses completed by research staff to support upgrading technical skills of NARS institution staff, including field and laboratory technicians. *Subcomponent 3.3:* The technical capacity will be built for the national institutions/agencies (KMD, KALRO, AIU, ASU) and county government staff to enable them to deliver on their Component 3 mandates. This indicator measures the number of post-graduate and short-term courses completed, and share of which were completed by women.	Annual	Progress reports / MIS	NPCU
New and refurbished agro-, automated weather stations and hydro-meteorological facilities (number).	Physical infrastructure for collection and reporting of meteorological data is a key capacity required by the Kenya Meteorological Service to support provision of agro-meteorological services. The indicator measures the number of observation facilities (stations, centers) refurbished or newly installed with support of the project. It is used to measure progress toward completion of the project's planned investments in physical infrastructure for agro-meteorological observation.	Annual	Progress reports / MIS	NPCU
Users receiving integrated agro-weather information services and market information services (number), share of which female (percentage).	Access to agro-weather information services and to market information services can support preparedness and planning. The indicator measures the number of farmers receiving integrated agro-weather information services as well as market information services supported by the project, including those delivered by ICT and other media. Data will be collected on the number of registered SMS-based service users; unique hits or downloads on internet-based services; and number of phone calls to call center based services.	Annual	Integrated weather and market information system	NPCU
Satisfactory quarterly project	This indicator monitors the timely submission of	Quarterly	Progress reports / MIS	NPCU/

interim financial and monitoring reports submitted within 45 days of end of the previous period (percentage).	satisfactory management reports to GoK and the World Bank.			CPCU
Grievances registered related to delivery of project benefits that are actually addressed (percentage).	This Core Sector Indicator measures the transparency and accountability mechanisms established by the project so that the target beneficiaries have trust in the processes and are willing to participate and feel that their grievances are attended to promptly. Thus the project monitoring system should provide information on the number of complaints received against the number actually resolved.	Annual	Supervision missions and Annual report	NPCU/ CPCU

Annex 2: Detailed Project Description

Kenya Climate-Smart Agriculture Project (P154784)

The Context

1. Kenya has three main agricultural production systems. The **smallholder mixed crop-livestock system** is found in areas that receive an average annual rainfall of more than 1,000 mm (high-rainfall zones or non-ASAL areas), spreading from central Kenya through the central Rift Valley to western Kenya and the coastal strip. This system focuses primarily on maize and dairy production with or without the integration of cash crops such as coffee, tea, and horticultural crops. The **crop-livestock-tree production (agro-silvo-pastoral) system** is most prevalent in areas that receive an average annual rainfall of 750–1,000 mm (medium rainfall zones or semi-arid areas). This system focuses on the integration of livestock and crops, soil and water conservation, and the production of drought-tolerant and early maturing crops. In some areas, irrigation schemes have been set up to enhance crop production. The **pastoral/extensive livestock production system**[38] is most common in areas where average annual rainfall is 200–750 mm (low-rainfall zones or arid areas), stretching from northern and northeastern Kenya to the southern areas bordering Tanzania. Livestock production, mainly of beef animals and small ruminants, is the major enterprise for small-scale producers, but some large ranches are also found.

2. The KCSAP focuses primarily on: (i) improving water/soil management, especially within smallholder maize systems in the marginal rainfall zones—specifically in smallholder mixed crop-livestock, crop-livestock-tree (agro-silvo-pastoral), and crop-forest (agro-forestry) production systems; (ii) promoting sustainable, community-driven rangeland management and improved access to quality livestock services in ASALs (specifically in pastoral/extensive livestock production systems); (iii) supporting the generation and dissemination of improved agricultural TIMPs and building sustainable seed systems; and (iv) enhancing access to quality agro-weather, climate, advisory, and market information services among farmers, agro-pastoralists and pastoralists/herders for improved decision-making.

Key Design Principles

3. The KCSAP design is informed by seven main principles:

(i) **Prioritization of promising TIMPs:** CSA is very context specific. What constitutes CSA in one place is not necessarily CSA in another place, creating the need to use a CDD approach and participatory processes to prioritize the technologies that are most promising for specific agro-ecological zones and that provide the best value for money. The project will use the CCAFS-CIAT CSA Prioritization Framework. This approach uses a series of activities to filter a long list of possible CSA options into a set of practices and services best suited for an area.[39]

[38] In this case, trees are still a part of the system, providing firewood, fodder, and shade; contributing to soil fertility; providing material for boma construction, and contributing in other ways. As Kenya proceeds to determine its restoration target for moving toward meeting the Bonn Challenge, trees and improved grazing lands will make an important contribution, as well as CSA and pastoralism.

[39] CCAFS is the Climate Change, Agriculture, and Food Security program of the CGIAR. The framework includes: (i) linking management practices and services to areas of interest and evaluating them based on indicators of the three CSA outcomes—productivity, resilience, and reduced GHG emissions; (ii) economic analyses to quantify costs and benefits of selected practices;

(ii) **Scaling-up promising TIMPs: World** Bank and other donor-funded projects in Kenya, such as KACCAL and KAPSLMP, have used participatory processes and a CDD approach to pilot a number of adaptation and mitigation TIMPs, including financing options such as the Payment for Ecosystem Services (PES). While a good starting point is to assess existing TIMPs and determine what is needed to scale up their use, new technologies will also be developed under KCSAP to achieve the CSA triple-wins.

(iii) **Value chain approach**:[40] An approach that focuses on developing priority agricultural, livestock, and fisheries commodities in the respective counties through interventions covering production, value addition, and links to markets will be taken. This approach will look at supply chains, delivery channels, and enabling environment issues to identify and address bottlenecks and leverage points in the value chains. Innovation platforms and methodologies, such as LINK[41] developed by CIAT, provide approaches for developing innovative business models based on a value chain approach and linking smallholder farmers to markets.

(iv) **Gender and youth sensitivity:** Gender affects individuals' and families' exposure to risk and their access to and control of resources (finance, land, technology, and services), and younger individuals may also suffer from poor access to critical agricultural resources. As CSA practices may have undesired effects on relative workloads, assets, access to crop residues, food and nutrition security, and access to mechanization and extension among men, women, and youths, KCSAP will look at interventions through a gender lens to ensure that the project, to the extent possible, benefits women and youth. Livelihood diversification interventions (for example, animal husbandry, beekeeping, and adding value to animal products) will be specially geared toward female participants. Special care will be taken to ensure that interventions help to reduce drudgery and the time burden on females. The Gender and Inclusion Action Plan is described in detail in Annex 7.

(v) **Nutrition informed:** Rather than merely ensuring that beneficiaries can secure sufficient calories, the proposed project is designed to explicitly favor interventions and leverage activities that have direct and indirect links with improving nutritional outcomes (for example, fruit and vegetable production to diversify diets and nutrients) among project beneficiaries, particularly women and children under the age of five.

(vi) **Collaboration with other World Bank Group Agencies:** The VC development approach will require close collaboration with IFC and the Multilateral International Guarantee Agency (MIGA), which have greater roles to play in agricultural value addition and linking smallholder farmers to input, output, and financial markets (ICF) and

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and (iii) participatory workshops where stakeholders prioritize existing and promising CSA practices/services linked with specific regions and production systems, while also identifying barriers to adoption.

[40] The project will explore linkages among value chains that can improve synergies among outcomes. For example, ICRAF's recent work on linkages between the livestock value chain, fuelwood, and tree foods in the ASALs is of interest in several ASAL counties.

[41] The LINK methodology is a participatory guide to business models that connect smallholders to markets. Its four main components are: (1) a *value chain map* to understand the macro context of markets and the businesses that link rural producers with buyers; (2) a *business model canvas* to provide a more detailed understanding of each business that links rural producers with buyers; (3) *new business model principles* to determine whether each business that links rural producers with buyers is truly inclusive; and (4) a *prototype cycle* to continuously improve the inclusivity of every business that links rural producers with buyers. See https://ciat.cgiar.org/featured_products/link-methodology-version-2-0.

abating political risk for local and international private investors (MIGA). For instance, IFC could provide loans to local private firms investing in value addition while MIGA does the political risk guarantee to foreign direct investors.

(vii) **Complementarity with other interventions:** This design principle ensures synergies and alignment with other World Bank-funded projects, such as: (i) NARIGP; (ii) the Kenya Devolution Support Project; (iii) the Kenya Rural Roads Project; (iv) the Kenya Youth Employment Project; (v) the Regional Pastoral Livelihood Resilience Project (RPLRP); and (vi) the proposed NEDI Program.

(viii) **Phased implementation approach**. This approach includes using readiness indicators to identify participating counties to be covered by the project each year. Indicators include: (i) previous experience in implementing CDD microprojects or having undergone the PICD process and developed Community Development Plans and microproject proposals; (ii) integration of KCSAP county interventions and community microprojects in County Integrated Development Plans (CIDPs); (iii) willingness to co-finance the proposed county-level interventions; and (iv) established project implementation arrangements, including county project steering and technical committees, as well as functional county project coordination units. It is envisaged that KCSAP will be fully operational in at least 5 counties by the end of year 1. The remaining counties will join as their capacities are strengthened to meet the readiness indicators, reaching 15 by year 2 and all 24 by year 3.

Project Components

4. The project will have five components, detailed in the sections that follow: (i) Upscaling Climate-Smart Agricultural Practices; (ii) Strengthening Climate-Smart Agricultural Research and Seed Systems; (iii) Supporting Agro-weather, Market, Climate, and Advisory Services; (iv) Coordination and Management; and (v) Contingency Emergency Response.

Component 1: Upscaling Climate-Smart Agricultural Practices (US$163.8 million equivalent, of which IDA US$150 million equivalent)

5. This component will finance interventions that promote and facilitate the adoption of TIMPs to achieve the CSA triple-wins: increased productivity, enhanced resilience (adaptation), and reduced GHG emissions (mitigation) per unit of output, as co-benefits. The TIMPs could include sustainable landscape management, water management, animal health, crop-livestock-tree integration, rural energy, market access, and livelihood diversification. This component will have three subcomponents: (i) building institutional capacity and strengthening service delivery; (ii) supporting investments in smallholder agro-pastoral production systems; and (iii) supporting investments in pastoral extensive production systems.

6. The prerequisites for adopting TIMPs include: (i) the TIMPs should be relevant to the specific context of individual farmers; (ii) the benefits from adopting TIMPs should far outweigh the cost involved; (iii) the TIMPs and advisory services should be available for 2–3 seasons; (iv) the availability of investment financing for TIMPs; (v) favorable markets for commodities produced; and (vi) peer-to-peer learning.

Subcomponent 1.1: Building Institutional Capacity and Strengthening Service Delivery (IDA US$24.0 million equivalent)

7. This subcomponent will finance activities to build institutional capacity at the county, ward, and community levels to plan, implement, manage, and monitor county/ward subprojects and community microprojects in all selected 24 counties.[42] To avoid spreading resources too thinly and to maximize the impact of project interventions, each county will select four to six wards in up to three subcounties to participate in the project. The criteria for ward selection will include: (i) poverty level of ward; (ii) vulnerability to climate risks; (iii) presence of priority value chains; (iv) geographic proximity and contiguity of wards; (v) absence of similar initiatives to avoid duplication; and (vi) presence of ward-level technical department officials. More specifically, this subcomponent will finance: (i) strengthening the capacity of county and ward to deliver agricultural services; (ii) supporting CSA planning and prioritization at county and ward levels; (iii) contracting private advisory service providers; and (iv) facilitating community institutions.

8. **Strengthening the capacity of county and ward to deliver agricultural services.** The project will provide financial support to the County Technical Department (CTD)[43] to enable it to provide the requisite agricultural services, quality assurance, and oversight of service providers (SPs). This financial support will include: (i) building technical capacity of CTD staff through short- and long-term training as well as exposure visits; (ii) providing equipment to county- and ward-level technical staff (for example, motor vehicles, motorcycles, veterinary and laboratory equipment, IT and office equipment); (iii) providing budget for O&M of offices, equipment, and supervision (field visits); and (iv) training ward-level public extension staff in the delivery of agricultural advisory services.

9. The project will build the capacity of the county and ward technical departments in the following key areas: (i) understanding CSA concepts, assessing TIMPS, and designing CSA investment plans; (ii) mainstreaming the country CSA investment plan into CIDPs and monitoring and evaluating their implementation; (iii) planning and providing agricultural extension and business advisory services; (iv) providing animal health services, including disease surveillance and vaccination campaigns; (v) integrating Community Development Plans into county planning and budgeting processes (specifically in mainstreaming CDD microprojects into county budgeting systems); (vi) identifying and including VMGs in county agricultural development programs; and (vii) planning, designing, and implementing relevant rural infrastructure to enhance access to market by CIGs.

10. Capacity building is expected to take the form of targeted training (through workshops, exchange visits, and publications, for example) and field-based learning (through site visits, demonstration plots, and pilots, for example) provided by competent national institutions, among others. Capacity building efforts will emphasize both learning-by-doing and technical/methodological and field practical (hands-on) training. The project will ensure that capacity building under this subcomponent is coordinated and harmonized with the National Capacity Building Framework and other current donor initiatives. While the NPCU will play a key role in providing the training, KCSAP will also use the services of consultants; of academic

[42] Arid Counties (Marsabit, Isiolo, Tana River, Garissa, Wajir and Mandera); Semi-Arid Counties (West Pokot, Baringo, Laikipia, Machakos, Nyeri, Tharaka Nithi, Lamu, Taita Taveta and Kajiado); and Non-ASAL Counties (Busia, Siaya, Nyandarua, Bomet, Kericho, Kakamega, Uasin Gishu, Elgeyo Marakwet, and Kisumu).

[43] Includes county departments responsible for agriculture, livestock, fisheries, environment and natural resources, water and irrigation, youth and women's affairs, cooperatives, and industrialization. Training and capacity building will also cover the leadership (executive) as well as important committees responsible for policy and oversight of agricultural development in the counties.

and research institutions such as the Kenya School of Government, Kenya Institute of Management, agricultural universities, and KALRO; as well as of specialized agencies like the National Environment Management Authority (NEMA) and KEPHIS.

11. The proposed project will also use standardized training modules developed under NARIGP for training staff of the county technical departments. They will include modules for the PICD[44] process, VC analysis and development, fiduciary management (including community procurement and financial management), environmental and social safeguards monitoring (use of checklists and development of environmental management plans where applicable), and agri-business and financial services, among others. Staff of the selected SPs will undergo mandatory training on these modules prior to using them to build the capacity of CIGs, VMGs, and POs.

12. **Supporting CSA planning and prioritization at the county and ward level.** A recent study[45] provides evidence on successful TIMPs piloted in Kenya that can help the country achieve CSA triple-wins. The proposed project will support the 24 participating counties to undertake a detailed county-level CSA planning and prioritization exercise, based on the following criteria for selecting which TIMPs to scale up: (i) *integration*—instead of a single intervention, an integrated package of interventions is needed; (ii) *context specific*—the package needs to be designed with the localized context of individual project sites in mind (such as the agro-climate, farming system, existing management practices, institutional environment, and local capacity, among others); and (iii) *demand-driven*—responding to the demands of beneficiary communities is critical for increasing the adoption of TIMPs. Eight of the twenty-four participating counties were supported by KACCAL to develop county CRPs; the remaining sixteen project counties will complete their CRPs before project effectiveness. The CRPs will serve as a basis for preparing the County CSA investment plans. Submission of these planning and prioritization documents is a prerequisite for accessing investment funds under Subcomponents 1.2 and 1.3 by the county governments.

13. The preparation of county-level CSA investment plans will involve the following steps: (i) analysis of natural resource endowments, farming systems, location-specific climatic risks, and areas of acute vulnerability for the agricultural sector; (ii) analysis of priority intervention areas and relevant investments for each county or cross-county; (iii) identification of priority VCs to focus project efforts; (iv) selection of priority subcounties and wards for concerted action; (v) identification of potential county-level investments needed for climate resilience; and (vi) county needs assessment to identify technical assistance (TA) requirements. Detailed County CSA investment plans will provide prioritized short-term (1–3 years) and medium-term (4–8 years) interventions. To ensure consistency across counties, the Guidelines for planning and preparing County CSA investment plan will be included in the Project Implementation Manual (PIM).

14. It is expected that the agricultural sector departments (agriculture, livestock and fisheries) in the counties will take the lead in developing the CRPs and in planning and prioritizing CSA

[44] The process combines different participatory methodologies for starting and sustaining community conversations and supporting communities in expressing and prioritizing their development needs, developing community action plans, and designing, implementing, and monitoring their own microprojects.

[45] See S. Chesterman and C. Neely (eds.) (2015), "Evidence and Policy Implications of Climate-smart Agriculture in Kenya," CCAFS Working Paper No. 90, CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Copenhagen (available at www.ccafs.cgiar.org).

investments, albeit with TA from MoALF and qualified consultants.[46] As part of the planning and prioritizing process, input from all stakeholders at the county level will be incorporated through consultation and validation workshops. This planning process will form the framework for developing CSA investment proposals at the county level. Each county already has an integrated development plan (CIDP), which includes agricultural sector development priorities. The counties will be supported to integrate their CSA investment plans into existing and future CIDPs to ensure county ownership and enhance sustainability.

15. **Contracting private advisory service providers.** KCSAP will use an updated and customized Contracted Extension Service Delivery Model & Value Chain Development model developed under KAPAP. The model entails: (i) implementing a pluralistic, participatory, demand-driven, market-oriented, professional, decentralized, and innovative system; (ii) harmonizing sector-wide extension services; (iii) promoting PPPs for competitive, demand-driven extension service delivery; and (iv) improving farmers' access to technical and market information through the use of ICT. The project will finance the contracting of private service providers (SPs), including non-governmental organizations (NGOs). The range of services to be provided by SPs will include: (i) facilitating communities to form CIGs and VMGs; to plan, implement, manage, and monitor their community CSA investments (microprojects for adoption of CSA TIMPs); to federate into POs; and to participate in PPPs via production alliances, through participatory approaches; (ii) providing technical advisory services (for example, advice on good agronomic and livestock practices, value addition, and post-harvest technologies) to CIG, VMG, and PO members participating in various priority VCs; (iii) linking smallholder agro-pastoralists and pastoralists to input, output, and financial markets; (iv) providing financial and business advisory services; and (v) facilitating peer-to-peer learning among farmers.

16. Consortiums of SPs with the right mix of skills to respond to demands along the VCs—from production to market—will be selected through a competitive process. The SPs will use FFS[47] and lead farmer approaches to provide advisory services. SPs will be paid on the basis of achieved milestones agreed with CIGs, VMGs, and POs. In this way, communities will be empowered to demand quality services from SPs. Under Component 4, the project will recruit a qualified and experienced procurement specialist who will be responsible for among others: (i) training CTD staff to build their procurement and contract management capacity, including oversight and monitoring of SPs' activities; (ii) developing VC-specific, performance-based ToRs (encompassing activities ranging from the PICD process to VC analysis and development) for SPs; and (iii) compiling a database of SPs accredited to deliver the different services required in the various counties. A U-Report[48] type of short message service (SMS) or interactive voice response (IVR) ICT application will be used to receive direct feedback on the performance of

[46] With facilitation from CIAT through funding provided under KACCAL, 8 of the 24 counties have already prepared CRPs. For consistency, the remaining 16 counties are expected to follow a similar process to prepare CRPs.

[47] FFSs bring groups of farmers together to engage in hands-on, field-based learning over a season/production cycle. Each field school consists of this basic learning cycle, which is a time-bound activity, with a beginning and an end. For crop-based FFSs, activities will cover the cycle from "seed to seed." The emphasis of the basic learning cycle is to strengthen farmers' skills and knowledge for critical analysis and for testing and validating new practices to make informed decisions on field management. The new practices are often based on information generated by research (in other words, they are science-based practices). The learning process in the FFS reinforces understanding of complex ecological relations in the field. Through group dynamics exercises and discussions, the FFS helps to create a basic understanding of how groups function, and the FFS includes activities that encourage participants to become a more cohesive group, to engage in critical analysis and evaluation, and plan for further action once the basic learning cycle is completed.

[48] U-Report is a social messaging tool allowing anyone from any community to respond to polls, report issues, and work as positive agents of change on behalf of people in their community.

SPs from farmers. This platform will also be used to handle complaints and grievances. The sample SP contracts are provided in the PIM.

17. **Facilitating community institutions.** With facilitation from the SPs, and through the PICD process, Community-Driven Development Committees (CDDCs) will be formed in each participating village. The CDDC—comprising elected community leaders (chair, secretary, treasurer, and board members)—will be the basic institution and primary entry point for KCSAP initiatives. Led by CDDCs, the target communities will be mobilized by SPs under the PICD process to form CIGs and VMGs (comprising 20–30 members who pay membership and annual fees) along their priority VCs (out of the menu of VCs prioritized at the county level); prepare Community Development Plans; and plan, implement, manage, and monitor their community CSA investments (microprojects for adoption of CSA TIMPs). The SPs will identify VMG members through participatory targeting approaches. SPs will facilitate CIGs and VMGs to federate into POs with sufficient volumes of produce and economies of scale to improve their access to production technologies, markets, and financial services as well as to add value to their products. Further, the SPs will build the capacity of CDDCs, CIGs, VMGs, and POs to plan, implement, and monitor VC-specific microprojects; to manage the fiduciary aspects of their operations (community procurement and financial management); comply with safeguards (using environmental and social safeguards checklists) and implement grievance handling mechanisms; and develop business management skills (related to enterprise planning, value addition, access to markets and rural finance). KCSAP will build on Kenya's rich experience in promoting CDD approaches gained through implementing the WKCDD&FMP, KAPAP, KAPSLMP, and the East African Agricultural Productivity Program to facilitate community institutions. The PICD manual developed for WKCDD&FMP will be updated and customized for use by KCSAP.

Subcomponent 1.2: Supporting Investments in Smallholder Agro-pastoral Production Systems (US$69.8 million equivalent, of which IDA US$63.0 million equivalent)

18. This subcomponent will finance CSA investments identified during the CSA planning and prioritization process which will help beneficiaries achieve the triple-wins of increased productivity, enhanced resilience (adaptation), and reduced GHG emissions per unit of output and increased carbon sequestration (mitigation) in mixed crop-livestock-tree production systems (agro-silvo-pastoral systems). The subcomponent will finance CSA investments in 17 counties in 2 agro-ecological zones: (i) Semi-Arid Counties (West Pokot, Baringo, Laikipia, Machakos, Nyeri, Tharaka Nithi, Taita Taveta, and Kajiado) and (ii) Non-ASAL Counties (Busia, Siaya, Nyandarua, Bomet, Kericho, Kakamega, Uasin Gishu, Elgeyo Marakwet, and Kisumu).

19. This subcomponent will finance CSA investments focusing on: (i) improving water and soil management; (ii) promoting livelihood and crop diversification; (iii) constructing and rehabilitating small-scale farmer-managed irrigation schemes; (iv) producing and conserving pasture and fodder crops; and (v) supporting market linkages, value addition, and post-harvest management. The CSA investments will be financed under three windows: (i) *Community Investments*—support to CIGs and VMGs for implementing TIMPs; (ii) *County Investments*—support to county governments to implement CSA interventions that provide public goods and are ward-specific or span several wards; and (iii) *PPPs*—support to private firms and POs to promote production alliances in priority VCs. KCSAP will ensure that investments financed under these windows are consistent with the respective county CSA Plans which have been incorporated in the County Annual Plans and CIDPs. Table A2.1 provides examples of potential

TIMPs for scaling up CSA under different grant windows. Table A2.2 provides a summary of different grant windows under Component 1.

20. The mechanism for providing matching grants to CIGs, VMGs, POs and SACCOs to implement microprojects will be outlined in the PIM and Community Grant Manual (CGM). Microprojects will be selected on a competitive basis and approved by CPSC, based on the recommendations of CPCU.

Window I: Community-level Investments (IDA US$28.0 million)

21. This window will provide matching grants to enable existing and newly formed CIGs to invest in community CSA microprojects. With support from SPs, CIGs will prepare microproject proposals and submit them to CPCUs for approval. Each proposal received from the CIGs shall have three investment windows: (i) implementation of CSA TIMPs (70 percent); (ii) livelihood diversification (20 percent); and (iii) mainstreaming nutrition (10 percent). Once their proposals are approved, CIGs will receive matching grants ranging from US$7,000 to US$10,000 equivalent to implement their community CSA microprojects. Approximately 90 percent (US$25.2 million equivalent) of Window I resources will be used to finance CIG microprojects. To enhance ownership of community CSA microprojects, CIG members will be required to contribute at least 10 percent of the costs of their microprojects either in cash or kind. To increase access to rural finance and enhance the sustainability of CSA microprojects, CIGs will be encouraged to form Savings and Loan (S&L) groups that will be facilitated by SPs to federate into SACCOs. The project will provide matching grants of up to 50 percent of members' total savings to boost SACCOs' capital. These intermediary financial institutions will ultimately be linked by SPs to microfinance institutions and commercial banks.

22. **Support to vulnerable and marginalized groups.** KCSAP will finance CSA microprojects exclusively targeting VMGs.[49] The objective is to empower VMG members and elevate their productive capacity and economic status, so that they fully participate in VCs, POs, and SACCOs. As noted, VMG members will be determined with the help of SPs through participatory targeting methodologies during the PICD process. Criteria to identify vulnerable and marginalized individuals will include land ownership, asset ownership/perceived value, number of meals per day, number of dependents, female-/child-headed households, and advanced age, among others. With support from SPs, VMGs will prepare microproject proposals and submit them to CPCU for approval. Each proposal received from the VMGs shall have three investment windows: (i) implementation of CSA TIMPs (60 percent);[50] (ii) livelihood diversification (30 percent); and (iii) mainstreaming nutrition (10 percent). Grants ranging from US$3,000 to US$5,000 will be provided to each VMG depending on the selected and approved microproject. Approximately 10 percent (US$2.8 million equivalent) of the total grants under Window I will be allocated for support to VMGs. VMG members will not be required to contribute toward the costs of their approved CSA microprojects.

Window II: County-level Investments (IDA US$30.0 million)

[49] Defined as people who meet the World Bank's criteria for "marginalization" and the GoK's criteria for "marginalized" and "minority" communities. These individuals can include youths, indigenous people, elderly women and men, widows/orphans, the differently-abled, recovering substance abusers, and people living with HIV/AIDS.

[50] It is assumed that the VMGs are also resource poor—for example, they do not own land and/or livestock. Therefore, the larger proportion of their matching grants will go toward interventions for diversifying their livelihoods.

23. This window will finance county-level CSA subprojects that are either ward-specific or cut across multiple wards and that strategically important to the county or multiple counties. The subprojects will be consistent with the county CSA plans which are incorporated in the counties' respective annual plans (CAPs) and CIDPs. County-level investments will include sustainable land management (demarcation and restoration of livestock migration routes and common grazing lands; watershed management/rehabilitation); water management (dredging waterways, building reservoirs, installing boreholes, and constructing and rehabilitating small, farmer-managed irrigation schemes); animal health (infrastructure for disease surveillance and vaccination, holding grounds, and quarantine yards); crop-livestock integration (crop and pasture seed multiplication, breed multiplication); and marketing infrastructure (rehabilitation of slaughterhouses and market centers, rural roads, and milk cooling centers).

24. The CTDs will prepare detailed CSA subproject proposals based on the county CSA plan. The cost of each county-level CSA subproject could range from US$200,000 to US$1,000,000. At an average county-level subproject cost of US$500,000, a total of 60 subprojects are expected to be financed under this window in 17 counties (an average of four subprojects per county). Each county will be eligible to submit multiple CSA subprojects to the CPCU, up to a maximum of US$3 million per county over the life of the project. The county governments will be required to contribute at least 20 percent of the costs of their county subproject in cash or kind. The CPCUs will submit the competitive county CSA subprojects through the NPCU for approval by NTAC. The approved county subprojects will be presented to NPSC by the NPCU for information and records. County-level subprojects are expected to be completed within two years of approval.

Window III: PPPs with Producers (IDA US$5.0 million)

25. This window will pilot the "4P" productive alliance model (PPPs with producers) by providing competitive matching grants to private firms (for-profit companies) and registered POs and their federations to support VC development and link CIGs and VMGs to markets. The Kenya National Farmers Federation (KENAFF) will play a critical role in organizing productive alliances, supporting the POs to federate into commodity-based farmer organizations, and linking them to markets.

26. ***Supporting private firms.*** The project will provide competitive matching grants for upgrading VCs (to a maximum of US$200,000 per grant)[51] to local private firms in the 24 participating counties. These 4P matching grants will create favorable conditions and incentives for buyers and smallholders to establish mutually beneficial relationships by ensuring that farmers consistently produce a particular quality and reliable supply of a good or commodity. In this way, smallholders will be able to overcome market barriers and gain stability by receiving more consistent and higher prices for their goods (agricultural commodities), while buyers will benefit from a consistent supply of goods of a particular quality that meets their demands. It is envisaged that about 10 private firms will benefit from this support. The 4P matching grants will also be used to leverage the private capital necessary for eliminating bottlenecks in the priority VCs. The private firms are expected to contribute at least 50 percent of the costs of their business plans. It is envisaged that 4P matching grants will be used to finance, among other things,

[51] Grants are expected to range from as little as US$10,000 for MSEs such as equipment fabricators to a maximum of US$200,000 for medium and large-scale enterprises involved in processing or produce aggregation and storage.

improvements in input supply, technology development, post production and storage facilities, value addition and processing, and market development.

27. ***Supporting Producer Organizations***. The project will provide enterprise development matching grants of up to a maximum of US$100,000 to POs for financing value addition activities. The POs will integrate CIG and VMG members into input, output, and service markets along their priority VCs in the 24 participating counties. POs will comprise inter-community cooperatives, pastoralists' associations, or other forms of market-oriented enterprises (including companies), primarily formed by federated CIGs and VMGs in agro-pastoralist and pastoralist production systems. Each CIG and VMG joining a PO will pay membership and annual fees, as detailed in the PIM. Eligible POs will submit their business plans to the CPCUs for approval. It is estimated that up to 30 POs will benefit from this arrangement. Supported POs will be required to contribute at least 10 percent of the total cost of their investment proposals in cash or in kind. Details on implementing enterprise development activities are provided in the PIM and CGM.

Subcomponent 1.3: Supporting Investments in Pastoral Production Systems (US$69.5 million equivalent, of which IDA is US$63.0 million equivalent)

28. This subcomponent will support the operationalization of the Northeastern Development Initiative (NEDI) and will cover seven of the eight NEDI[52] counties: Marsabit, Isiolo, Tana River, Garissa, Wajir, Mandera, and Lamu. The CSA investments under this subcomponent will be financed under two windows: (i) *Community Investments*—support to CIGs and VMGs to implement CSA practices and (ii) *County Investments*—support to county governments to implement CSA interventions that provide public goods and span several wards or cross-county areas. Investments financed under these two windows will be consistent with the respective county CSA plans which have been incorporated in the CAP and CIDPs.

Window I: Supporting Community Investments in Pastoral Systems (IDA US$25.0 million)

29. This window will provide matching grants for the existing and newly formed CIGs to invest in community CSA microprojects in extensive/pastoral production systems. With support from SPs, CIGs will prepare microproject proposals and submit them to CPCUs for approval. Each proposal received from the CIGs will have three investment windows: (i) implementation of CSA TIMPs (70 percent); (ii) livelihood diversification (20 percent); and (iii) mainstreaming nutrition (10 percent). Typical interventions supported through CSA microprojects will include forage production, storage, and marketing; small-scale fattening operations; water resource development (water pans, sand dams, water harvesting, tubewells, or boreholes); community rangeland management; community pasture production and storage; and livelihood diversification (poultry, beekeeping, value addition of livestock products).

30. Once approved, CIGs and VMGs will receive matching grants ranging from US$7,000 to US$10,000 to implement and manage their community CSA microprojects, while allowing each member to derive private benefits. To enhance ownership of community CSA microprojects,

[52] NEDI is a special GoK program aimed at supporting infrastructure (water, transport, and off-grid energy) and agricultural development, especially development of the livestock subsector in marginalized counties of northeastern Kenya, based on the recently completed needs assessment and investment plan. Although Turkana is one of the NEDI counties, it is not included under KCSAP because it is supported by NARIGP and RPLRP. One of the county selection criteria was that counties that are under NARIGP should not be included under KCSAP.

CIG members will be required to contribute at least 10 percent of the costs of their CSA microprojects either in cash or kind. To increase access to rural finance and enhance the sustainability of project interventions, CIGs will be encouraged to form S&L groups that will be facilitate by SPs to federate into SACCOs. The project will provide matching grants of up to 50 percent of members' total savings to boost SACCOs' capital. These intermediary financial institutions will ultimately be linked to microfinance institutions and commercial banks.

31. **Support to vulnerable and marginalized groups.** The project will also finance CSA microprojects exclusively targeting VMGs. The objective is to empower VMG members and elevate their productive capacity and economic status so that they fully participate in VCs, POs, and SACCOs. VMG members will be determined with the help of SPs through participatory targeting methodologies during the PICD process. Criteria to identify vulnerable and marginalized individuals will include land ownership, asset ownership/perceived value, number of meals per day, number of dependents, female-/child-headed households, and advanced age, among others. With support from SPs, VMGs will prepare microproject proposals and submit them to the CPCU for approval. Each proposal received from the VMGs will have three investment windows: (i) implementation of CSA TIMPs (60 percent); (ii) livelihood diversification (30 percent); and (iii) mainstreaming nutrition (10 percent). Grants ranging from US$3,000 to US$5,000 will be provided to each VMG depending on the selected and approved microproject. Approximately 10 percent (US$2.5 million equivalent) of the total grants under Window I will be allocated for support to VMGs. VMG members will not be required to contribute toward the costs of their approved CSA microprojects.

32. The mechanism for providing matching grants to CIGs, VMGs, POs, and SACCOs to implement microprojects are outlined in the PIM and CGM. Microprojects will be selected on a competitive basis, based on the recommendations of the CPCU, and approved by the CPSC.

Window II: Supporting County- and Cross-County Investments (IDA US$38.5 million)

33. This window will finance selected CSA interventions under the priority livestock subsector investments identified by the Needs Assessment and Investment Plan for NEDI counties. Each county will prepare and submit subprojects for improving productivity and value addition in the extensive pastoral production systems. According to the needs assessment report, the NEDI priority investments include: (i) rehabilitating and equipping selected abattoirs; (ii) developing disease-free zones; and (iii) supporting breeding programs and animal feed production. Detailed investment proposals will be developed by CTDs. County governments will be required to contribute at least 20 percent of the total cost of the subprojects. The proposed subprojects will be consistent with the county CSA plan, which is incorporated in the CAP and CIDP.

34. **Supporting the rehabilitation and equipping of selected abattoirs**: The lack of functional abattoirs has been identified as a major bottleneck for pastoralists' access to local and national markets for meat products. The GoK and county governments are financing the construction of several abattoirs in the seven NEDI counties. These structures are at different stages of development. KCSAP will prioritize: (i) the upgrading of existing facilities and (ii) equipping two abattoirs strategically located in the primary livestock markets (Wajir and Marsabit) and two others in the secondary markets (Isiolo and Garissa). The maximum project financing would be US$2 million per county. Projects will be selected on the basis of the following criteria: (i) abattoirs located in local primary or secondary livestock markets and with

potential for accessing export markets; (ii) demonstrated financial viability (based on cost-benefit analysis) of the investment; (iii) abattoirs are adequately connected to utilities (water, energy) and transport networks; (iv) abattoirs have bankable business plans for PPP operations and maintenance; (v) abattoirs are located in areas with a large animal population or where livestock marketing routes converge; and (vi) abattoirs are located in areas earmarked as future disease-free zones.

35. The upgrading will focus on investments that can improve waste management (such as waste flow separation, bio-digester), energy and water use efficiency, as well as hygiene (such as a clean water supply, *ante mortem* and *post mortem* inspection areas, overhead carcass transport rails, dressing cradles and hoists to get carcass dressing off of the floor, and materials and equipment for improving hygiene and bio-security). The project will also finance the development of complementary infrastructure to operate abattoirs efficiently, such as holding/fattening/resting grounds, reception stockyards, waste/effluent management ponds, and infrastructure to process by-products such as skins and hides.

36. Each of these investments will be accompanied by training programs designed to change the way traders, slaughterhouse management, slaughtermen, meat inspectors, and transporters deal with waste management, energy and water use efficiency, bio-security, and meat hygiene and food safety. Each upgraded and equipped abattoir will be subjected to regular inspection to ensure that hygiene standards and safe operational procedures are being maintained.

37. **Supporting the development of disease-free zones.** The project will explore possibilities of establishing animal Disease Free Zones (DFZs)/Livestock Export Zones (LEZs) in Lamu, Tana-River, Isiolo, Wajir, Marsabit, and Mandera Counties. Initially, support will include feasibility studies and the development of business plans for economically viable investments. Actual investments in DFZs/LEZs will be considered only for counties that develop bankable PPP business plans that include clear links to local and export markets. These holding areas will be strategically sited with regard to current stock routes, some of which are based along the Lamu Port and Southern Sudan–Ethiopia Transport corridor. DFZs/LEZs will be established based on the concept that livestock targeted for local and export trade that are produced in disease-infected areas can first be subjected to a disease-cleansing process at the production areas. Thereafter, they can be isolated in secured holding grounds to be treated and cleansed of diseases that are a high priority for the livestock trade. The animals screened through these internal holding grounds will eventually be transported to the coastal export certification stations in Kurawa, Buchuma, or Miritini. Animals held at these export certification zones (export quarantine stations) are quarantined for a period acceptable to a trading partner (21–30 days, for instance) while being screened to confirm that they are free from specific diseases in compliance with international livestock movement guidelines and import certification requirements. Following certification, the animals will be transported through an agreed transport protocol to the ports for shipment to the destination markets.

38. More specifically, to facilitate the movement of livestock from DFZs/LEZs to destination markets, the project will finance the development of livestock corridors by providing strategically located holding grounds/yards, quarantine areas, water supply, pasture, fodder, feedlots, and demarcated stock routes. The proposed project will also finance animal health infrastructure, including upgrading of county (and national/referral) veterinary laboratories; and disease surveillance and vaccination programs—for instance, for Peste des Petits Ruminants, Foot and Mouth Disease, Contagious Bovine Pleuropneumonia, Contagious Caprine

Pleuropneumonia, Rift Valley Fever, and Newcastle Disease. Given the "public bad" nature of animal diseases and the need for cross-county interventions (such as the development of stock routes/livestock corridors), this activity, if found financially feasible, will be coordinated at the national level by the Department of Veterinary Services, MoALF. The maximum project financing for DFZ/LEZ activities will be US$3 million equivalent per county.

39. **Supporting breeding programs and animal feed production.** The project will finance the introduction of heat-tolerant animal breeds in the NEDI counties to increase the resilience of the animals and thus of pastoral livelihoods. New, improved, and heat-tolerant animal breeds will be multiplied in county and ward farms/ranches, in conjunction with Subcomponent 2.2 activities. Breeding programs for camels and small ruminants (sheep and goats) are critical for sustaining livelihoods in these drylands. The project will also finance the production and distribution of drought-tolerant feed crops. This effort will involve sharing innovations and knowledge on feed production and conservation (feed banks/hay sheds) in county and ward model farms for use by pastoralists during droughts or the dry season. PPP arrangements will be promoted to encourage investment in irrigated fodder/pasture seed and fodder/pasture production (also storage and marketing) along the rivers in Tana River, Isiolo, Wajir, Mandera and Garissa Counties. Support will include the provision of machinery and equipment for fodder/pasture production—examples include tractors, mowers, compactors, pelleters, balers, pulverizers, and mixers—and the construction of hay sheds and marketplaces. Training of farm staff (managers, machine operators, and field officers, for example) and the development of PPP business plans will also be supported under the project.

40. The CTDs will prepare subproject proposals and submit them to the CPSC. Individual subprojects may range from US$200,000 to US$500,000, and counties can submit multiple subprojects up to a maximum of US$1 million. The CPSC will submit the subproject proposals to the NPCU for vetting, prior to approval by NTAC. NPCU will report to the NPSC on the number and cost of the approved county-level subprojects. Priority will be given to subproject proposals submitted by two or more counties to address joint resource management and supply chain issues that cut across a number of counties. Examples include the maintenance of cattle corridors for facilitating livestock mobility, or watershed/catchment management for sustainable soil and water management. Such inter-county subprojects proposals can receive grants of up to US$3 million.

41. The list of potential activities in Table A2.1 is indicative, not exhaustive. Beyond the examples given in the table, the PCUs will consider all activities that could contribute to the triple outcomes of CSA and meet the eligibility criterion described in the PIM. Activities will be selected for their demonstrated effectiveness, and attention will be paid to the institutional implementation framework, in view of the project's objective to scale up successful practices. As indicated, to be eligible for support, the integrated subprojects must include a combination of activities that together deliver on CSA's triple outcomes.

Table A2.1: Examples of Potential TIMPs for Scaling up CSA under Different Grant Windows

Type of TIMPS	Agro-pastoral Production Systems		Pastoral production System	
	Window I (CIG/VMG)	**Window II (County)**	**Window I (CIG/VMG)**	**Window II (County)**
Sustainable Landscape Management	- Conservation agriculture - Crop rotation and diversification - Use of drought-resistant/tolerant crops - Forage production, storage, and marketing - Small scale fattening operation - Small-scale, farmer-managed irrigation - Compost production plant (household waste management) - Windbreaks, hedgerows, enhanced clearing, live-hedge establishment - Promotion of non-timber forest products - Creating agro-forestry parks - Nursery (village or individual) - Promoting alternative domestic energy/reducing wood energy utilization	- Demarcation and restoration of livestock migration routes and common grazing land - Rangeland management and restoration (e.g., eradication of invasive species, reseeding)	- Forage production, storage, and marketing - Small scale fattening operation	- Demarcation and restoration of livestock migration routes and common grazing land - Supporting breeding programs (heat- and drought-tolerant livestock breed) - Feed and water buffer improvement, fodder banks - Promoting dry season grazing - Rangeland management
Water Management	- Development/rehabilitation of small-scale irrigation schemes - Promotion of water and energy conservation technologies for water lifting (possibly solar, treadle, and energy-efficient pumps) - Promotion of water conservation technologies for water distribution (drip irrigation and California system)	- Water pans/sand dams - Cattle dips - Dredging of waterways - Development of ponds - Rehabilitation of small and medium-size irrigation schemes	- Development of ponds	- Dredging of waterways - Development of ponds, boreholes, water pans, sand dams, etc.
Animal Health		- Infrastructure for vaccination and support		- Infrastructure for vaccination and support

Type of TIMPS	Agro-pastoral Production Systems		Pastoral production System	
	Window I (CIG/VMG)	Window II (County)	Window I (CIG/VMG)	Window II (County)
		to livestock services - Cattle dips		to livestock services - Cattle dips - Disease surveillance, vaccination, quarantine - Support for development of disease-free zones
Crop-livestock Integration	- Crop residue chopping, storage material, and facilities - Manure storage - Feed storage facility	- Feed/input shop		
Energy	- Promoting Biogas, renewable energy and energy efficiency in agricultural operations			
Market Access	- Sale yards	- Market infrastructure upgrade and market linkages - Collecting sheds/aggregation and market centers - Rural roads - Market infrastructure development		- Upgrading of abattoir facilities - Market infrastructure upgrade - Rural roads
Livelihood Diversification	- Fisheries - Beekeeping - Small scale irrigation along the river - Value addition of livestock and crop products - Crop diversification - Off-farm employment		- Poultry - Beekeeping - Value addition of livestock and crop products - Off-farm employment	

Table A2.2: Summary of Grant Windows under Component 1

Description	Agro-pastoral system			Pastoral System	
	Window I (CIGs/VMGs)	**Window II (County)**	**Window III (PPP)**	**Window I (CIGs/VMGs)**	**Window II (County and inter-county)**
Total budget (US$)	30 million	30 million	5 million	25 million	40 million
Size range	CIGs:US$7,000 –10,000, VMGs: US$3,000–5,000	US$200,000–1,000,000	POs: US$100,000 Private Sector: US$200,000	CIGs US$7000–10,000, VMGs: US$3,000–5,000	US$200,000–2,000,000
Grant recipient	CIGs and VMGs	County technical department	Producer Organizations Private Companies		County technical department
Approving authority	CPCU	NTAC	NTAC	CPCU	NTAC
Matching contribution	10% contribution from CIG members (in cash or kind)	20% contribution from county government (in cash)	50% contribution from private companies and POs	10% contribution from CIG members (in cash or kind	20% contribution from county government (in cash)
Indicative number of beneficiaries per grant	20–30 farmers	> 500 farmers	> 500 farmers	20–30 herders and farmers	> 500 herders and farmers

Component 2: Strengthening Climate-Smart Agricultural Research and Seed Systems (US$53.7 million equivalent, of which IDA US$50.0 million equivalent)

42. This component will finance demand-driven and competitive collaborative CSA research and development (R&D), and the development of sustainable seed systems. The demand-driven approach will oblige the NARS to develop, test, validate, and deliver context-specific CSA TIMPs required by Components 1 and 3. To help Kenya develop sustainable seed systems the project will support private enterprises (such as seed companies, agro-input dealers, and livestock and aquaculture breeders) and community-based organizations to scale up the multiplication and distribution of seed and breeds to farming and pastoral communities.

43. Investments in R&D and market-driven seed distribution systems will better equip farmers and livestock keepers with timely access to affordable seed and planting materials for crops, trees, and forages (grasses, legumes, fodder, and shrubs) of appropriate quality. The investments will also ensure the availability of livestock breeds and aquaculture species that respond to specific needs (namely, that are high yielding, early maturing, and drought and heat tolerant) and that will mitigate the risks associated with climate change. This component will have three subcomponents: (i) Supporting Climate-Smart Agricultural Research and Innovations; (ii) Building Competitive and Sustainable Seed Systems; and (iii) Strengthening Technical and Institutional Capacity.

Subcomponent 2.1: Supporting Climate-Smart Agricultural Research and Innovations (US$30.9 million equivalent, of which IDA US$28.9 million equivalent)

44. This subcomponent will finance activities aimed at strengthening the capacity of the NARS to develop, test, and disseminate context-specific TIMPs that deliver CSA triple-wins. Specifically, the subcomponent will finance R&D activities related to five thematic areas: (i) climate-smart crops; (ii) climate-smart livestock and aquaculture; (iii) socio-economic research on CSA; (iv) land, water, and agroforestry; and (v) sustainable bio-energy.[53] The R&D will be informed largely by priorities set under Components 1 and 3. Existing TIMPs and those to be developed and validated under this subcomponent will be disseminated and scaled up under Components 1 and 3. The R&D activities will be sequenced as follows: (i) identifying and prioritizing TIMPs at the county level; (ii) developing technical training materials and modules on CSA TIMPs; (iii) delivering technical training on CSA TIMPs to CTDs and SPs; (iv) conducting adaptive research to validate CSA TIMPs at the county and community level; and (v) developing new CSA TIMPs based on identified gaps.

45. ***Climate-smart Crops.*** To improve farmers' access to TIMPs for CSA, the project will finance the following activities: (i) conducting a location-specific mapping of germplasm-related needs for improved targeting; (ii) developing, validating, and promoting best-fit germplasm technologies at the farmer level through participatory approaches and on-farm trials; (iii) strengthening surveillance of plant pests, weeds, and diseases, and promoting climate-smart TIMPS related to crop health; (iv) enhancing the acquisition, characterization, conservation and utilization of germplasm to support CSA; and (v) developing, validating, and optimizing post-harvest technologies to meet quality and food safety standards and minimize post-harvest losses.

46. ***Climate-smart Livestock and Aquaculture.*** The project will finance the generation, adaptation, and delivery of context-specific, climate-smart TIMPs for livestock production and aquaculture. The development and dissemination of these TIMPs will be achieved through the following activities: (i) testing and adapting forage varieties tolerant to both biotic and abiotic stresses resulting from climate change; (ii) conserving and upgrading local livestock and aquaculture genetic resources, matching different livestock/aquaculture genetic resources to the environment to enhance their productivity and adaptation to climatic variability; (iii) formulating rations using fortified feeds, and promoting feed safety; (iv) promoting TIMPs that increase honey productivity and improve bee ecosystem management; (v) fine-tuning TIMPs for crop-livestock-aquaculture integration for more efficient nutrient cycling, water use, and feed production; (vi) reviewing existing systems of disease and pest surveillance with a view to strengthening the development, validation, and promotion of appropriate control measures for priority/emerging livestock/aquaculture diseases; (vii) evaluating and supporting uptake of aquaculture systems that increase productivity, reduce disease losses, and integrate sustainable water and land use practices; (viii) developing and promoting TIMPs for fish-crop integration; and (ix) promoting post-harvest conservation, value addition, and storage of forages, crop residues, and livestock and fish products.

47. ***Socio-economic Research.*** The project will finance socio-economic studies to improve the understanding of opportunities and constraints related to adoption of climate-smart TIMPs. Specifically, the studies will include ex ante cost-benefit analyses of the various TIMPs and

[53] ICRAF has done some work on sustainable bio-energy; see http://www.worldagroforestry.org/news/new-icraf-policy-brief-developing-sustainable-tree-based-bioenergy-systems-subsaharan-africa.

sectoral policies to understand the binding social, cultural, economic, and policy constraints to adoption of CSA TIMPs by farmers, agro-pastoralist and pastoralists. The studies will also focus on assessing the acceptability, profitability, and sustainability of CSA TIMPs; policy, institutional, and regulatory frameworks for agribusiness development; stakeholders' involvement; access to TIMPs and the requisite input, output, and rural finance markets; and social inclusion (marginalized groups). At the same time, the studies will identify and address gaps in M&E and the data management system. Researchers and other stakeholders will use the findings of these studies to develop and promote client-focused, client-friendly CSA TIMPs (varieties, breeds, management practices, machinery and equipment) and policies.

48. The socio-economic studies to be financed will be sequenced as follow: (i) undertake baseline studies of various CSA technologies (climate-smart natural resource management, crop, livestock, and aquaculture TIMPs) in these thematic areas; (ii) ex ante analyses to provide strategic socio-economic support during the participatory R&D and delivery of CSA TIMPs for crops, livestock, aquaculture, and natural resource management; (iii) market research to provide market information for development of CSA TIMPs; (iv) policy research and advocacy by producing policy briefs and convening policy workshops/forums; and (v) establishment and maintenance of an M&E system for CSA TIMPs related to crops, livestock, and natural resource management research, and the development of seed systems.

49. ***Sustainable Land, Water, and Agroforestry.*** As an overarching approach to restoring and maintaining soil productivity in smallholder farming systems, the project will finance R&D on integrated soil fertility management, involving the combined use of organic and mineral resources, resilient germplasm, and nutrient cycling and conservation (agroforestry systems are one example). More specifically, the project will finance R&D in the following cross-cutting activities: (i) identification of grassroots institutions for strengthening collective action to scale up SLM practices in 24 counties; (ii) assessment and promotion of land and water TIMPs (including integrated soil fertility management approaches) in selected ASAL counties; (iii) development and assessment of strategies for the rehabilitation of arid and semi-arid rangelands; (iv) development and promotion of simple mechanization technologies (such as rippers and planters) for CSA in target counties; (v) introduction and evaluation of agroforestry tree species suitable for soil health restoration and livestock feed in selected ASAL counties; (vi) assessment of rangeland species dynamics (including invasive species) in response to climate variability and management practices and development of appropriate interventions; and (vii) determination of the carbon sequestration capacity of grassland, planted forages, and crops and their effects on climate variables.

50. ***Sustainable Bio-energy.*** The project will finance R&D of low-cost, environmentally friendly options for energy, including: (i) identifying and validating the existing types and prototypes of simple low-cost bio-digesters, and promoting the most appropriate innovations; (ii) developing and promoting efficient technologies for the conversion of agricultural waste into useful forms of energy; (iii) introducing, evaluating, and promoting improved kilns and *jikos* for the production and use of charcoal to reduce biomass consumption; and (iv) developing VCs that produce biofuel/biodiesel and other sources of renewable energy, including charcoal.

Subcomponent 2.2: Building Competitive and Sustainable Seed[54] Systems (US$16.0 million equivalent, of which IDA US$14.3 million equivalent)

51. The project will finance the development of breeding programs for crops, livestock, and aquaculture; and the involvement of private sector and communities in the production and distribution of commercial seed.[55] It will also finance community-based seed systems—CBOs, farmer-based organizations (FBOs), and NGOs—and emerging seed companies that are keen to establish seed production and distribution retail networks of climate-smart varieties and breeds. The project will work with the Kenya Plant Health Inspectorate Services (KEPHIS), the Kenya Animal Genetic Resource Center, KALRO, KMFRI, KIRDI, CGIAR centers (such as CIMMYT, ILRI, ICRAF, CIAT, and ICRISAT), universities, and other NARS members to develop and strengthen commercially driven seed multiplication and distribution systems.

52. Specifically, this subcomponent will finance interventions across five thematic areas: (i) producing and maintaining early generation seed and promoting improved seed, especially of high-value traditional crops; (ii) strengthening seed, breed, and fingerling production systems; (iii) developing and strengthening alternative delivery systems for high-value traditional seed and OPVs; (iv) catalyzing growth of competitive seed retail networks; (v) developing and advocating a conducive legal, regulatory, and institutional framework for seeds/breeds/fingerlings; and (vi) supporting national PPD platforms on seed/breeds/fingerlings.

53. ***Producing and maintaining early generation seed and promoting improved seed, especially of high-value traditional crops.*** The project will finance breeders to produce the required quantities of early generation seed (EGS) and livestock/aquaculture parent stock needed by the private sector and CBOs to produce certified seed and improved livestock/aquaculture genetic resources for farmers. The quantities currently produced are inadequate to support robust seed and breed production. More specifically, the project will finance: (i) institutionalization of licensing and germplasm transfer agreements; (ii) development of models for germplasm maintenance; and (iii) development of a grant system to support early generation seed (breeder and basic seed) and livestock breeds; and (iv) promotion of improved seed in particular high-value traditional crops.

54. ***Strengthening seed, breed, and fingerling production systems.*** The project will finance the production of adequate quantities of improved certified seed and livestock breeds from new crop varieties and improved breeds that are released and registered by the national crop variety release committees and livestock breeders associations to meet the demand of the 24 participating counties. Currently, these newly released and registered varieties and breeds are not multiplied by private seed companies and livestock breeders because they lack technical and financial capacity. For that reason, the project will provide financing for the public sector to multiply and supply these genetic resources (including the KALRO Seed Unit) in collaboration with community-based seed production of the quality declared seed. Specifically, the project will finance investments in the production of certified seed and enhancement of seed quality assurance by: (i) undertaking market studies on improved seed and livestock and fish breeds; (ii) identifying and strengthening community-based seed and livestock germplasm production units; (iii) establishing a fellowship program to support training of seed producers and livestock breeders; (iv) providing training in business development skills to owners of fingerling, seed, and

[54] "Seed" is defined broadly to cover crop varieties, animal breeds, and fish species.
[55] Seed includes dry seed (crop and tree), vegetatively propagated planting materials, fish fingerlings and livestock germplasm.

livestock germplasm production units; (v) establishing a credit guarantee scheme to support seed producers, and livestock and fish breeders; and (vi) providing grants to fingerling and seed production units for developing business plans.

55. ***Developing and strengthening alternative delivery systems for high-value traditional seed and OPVs.*** The project will finance the multiplication and distribution of OPVs and vegetatively propagated materials (especially those required in the ASALs) which normally fail to attract private investment because they are largely viewed as "public goods" with weak commercial potential. Project funding will build upon previous investments in community-based seed systems (CBOs, FBOs, and NGOs) and emerging seed companies that attempted to establish production and distribution of seed of climate-smart crop varieties and breeds. Specifically, the project will finance: (i) formation of CIGs for seed production: (ii) capacity building for CIG seed production units; (iii) the establishment of certification mechanisms; and (iv) support for a community-based storage, cleaning, packaging, and selling/distribution system.

56. ***Catalyzing growth of competitive seed retail networks.*** The project will finance the establishment/strengthening of retail networks to market seed, breeds, and fingerlings needed for climate-smart, best-fit, and location-specific TIMPs by: (i) assessing needs of input dealers; (ii) training, certifying, and geo-referencing input dealers; (iii) strengthening linkages between input dealers and crop/livestock input wholesalers; (iv) establishing a credit guarantee scheme to support input dealers; (v) providing institutional support to the Seed Trade Association of Kenya (STAK), Plant Breeders Association of Kenya (PBAK), and the Kenya Livestock Breeders Organization (KLBO); and (vi) providing support to the development of a fisheries mobile information network platform (M-samaki, AMIP) to enhance fingerling production, markets, and other input retail networking in participating counties.

57. ***Developing and advocating a conducive legal, regulatory, and institutional framework for seeds, breeds, and fingerlings.*** The project will finance the review of legal, institutional, and regulatory framework governing the seed/breed industry to allow for wider participation of the private sector, and it will enhance farmers' and pastoralists' access to seeds and breeds. It will also finance interventions related to the harmonization of the seed/breed laws and regulations (to be consistent with East African Community (EAC) protocols) to enhance trade within the EAC region. More specifically, the project will finance: (i) auditing of the existing legal frameworks in the seed sector; (ii) reviewing and advocating for relevant legal frameworks to be consistent with the EAC harmonization protocols; (iii) carrying out stakeholder awareness workshops on relevant legal frameworks; (iv) carrying out a survey on the quality of seeds and breeds in the target counties; and (v) strengthening the seed quality assurance system to meet international standards.

58. ***Supporting national Public-Private Dialogue (PPD) platforms on seed, breeds, and fingerlings***. The project will finance national PPD platforms on seed, fish, and livestock breeds by: (i) identifying relevant stakeholders to form PPDs; (ii) facilitating the formation of the PPD platforms; and (iii) facilitating regular meetings of the platforms. Crop, livestock, and fish breeding in Kenya depends heavily on public institutions for producing improved germplasm and is often constrained by technical capacity, a lack of stakeholder participation, and limited funding. Despite having relatively developed seed systems, access to improved varieties of crops and forages remains limited in Kenya. The situation is worse for livestock and fish breeding because the germplasm distribution system is still largely informal. The PPD platforms will bring together the various stakeholders in the seed industry to begin to overcome such obstacles.

Subcomponent 2.3: Strengthening Technical and Institutional Capacity (IDA US$6.8 million equivalent)

59. This subcomponent will finance the interventions aimed at strengthening the capacity of the NARS to undertake context-specific CSA research and the dissemination of TIMPs. It will also finance the implementation of the Kenya Agricultural and Livestock Research Act (2013), which established the KALRO and specialized research institutes. The Act also provides the organizational and administrative framework for agricultural research in Kenya. It defines KALRO's mandate to, inter alia: (i) "promote, streamline, co-ordinate and regulate research in crops and livestock, genetic resources and biotechnology in Kenya; (ii) promote, streamline, co-ordinate and regulate research in crops and animal diseases; and (iii) expedite equitable access to research information, resources and technology and promote the application of research findings and technology in the field of agriculture."

60. The technical capacity of the NARS will be strengthened by financing long-term training (11 PhDs and 20 MScs) in deficient disciplines within the NARS, such as animal and pasture breeding, bee science, value addition, economic analysis, social and gender analysis, policy research, statistical analysis, data management, seed science and business development. In addition, the project will finance the re-tooling of scientists through short courses to enhance their skills in a wide range of topics, including value addition, meat science, seed science, product development, GHG measurement from aquaculture, crop and livestock production systems, measurement of carbon sequestration, and scientific writing. The project will also finance the hiring of a few interns in specialized areas to support the existing research scientists.

61. In terms of institutional capacity building, the project will finance the upgrading/refurbishing of infrastructure of selected institutes/centers that are strategically located in ASALs to facilitate the testing, adaptation, and delivery of context-specific CSA TIMPs; and the GRIFTU Pastoral Training Institute to deliver training to livestock extension staff (animal health and veterinary workers) and pastoral communities. This effort will include animal experimental structures, refurbishment of seed stores, procurement of small seed processing plants, fish fingerling production structures, laboratory equipment, value addition equipment, vehicles, and farm machinery and implements.

Component 3: Supporting Agro-weather, Market, Climate, and Advisory Services (US$32.9 million equivalent, of which IDA US$30.0 million equivalent)

62. To help farmers address the challenges of climate variability and change, and to enhance their resilience amid those challenges, this component will finance the development of agro-weather forecasting and dissemination tools and of marketing information systems. Agro-weather tools will improve the long-term capacity for adopting CSA TIMPs and help to sustain agricultural intensification under changing climatic conditions. This component will have three subcomponents: (i) improving agro-meteorological forecasting and monitoring; (ii) using big data to develop a climate-smart agro-weather and market information system and advisories; and (iii) building institutional and technical capacity for agro-meteorological observation and forecasting, agricultural statistics collection and analyses, and market advisory services.

Subcomponent 3.1: Improving Agro-meteorological Forecasting and Monitoring (US$16.5 million equivalent, of which IDA US$15.0 million equivalent)

63. This subcomponent will finance the following key interventions: (i) mapping existing publicly and privately operated automated weather stations (AWSs)—including agro-meteorological, hydrological, and rain gauge stations; (ii) establishing agro-meteorological and hydro-meteorological centers; (iii) installing new automated agro-weather stations; and (iv) developing and upgrading the Early Warning System (EWS).

64. ***Mapping of existing agro-meteorological and hydrological stations.*** The mapping exercise will aim at assessing the distribution, quantity, and quality of existing public and private agro-meteorological and hydrological AWSs in the 24 participating counties. KMD has installed 102 AWSs country-wide, of which 43 are in the 24 participating counties, but about 70 percent of the AWSs operate below capacity due to changes in technology and inadequate maintenance.

65. ***Establishing agro-meteorological and hydro-meteorological centers.*** Kenya has a total of 13 agro-meteorological centers, but only seven are functional in the 24 participating counties. KCSAP will upgrade and modernize the seven centers under the KMD and establish 13 others (for a total of 20 centers) at KALRO centers located in the project counties. The project will also finance the installation of 17 new hydro-meteorological centers in the participating counties. KCSAP will work with existing GoK and donor initiatives to expand the country's hydro-met network to meet international standards. The expanded hydro-met network, especially the centers located in the Tana River basin, will be critical for improving flood forecasting and management.

66. ***Installing new automated agro-weather stations.*** The project will finance the installation of equipment for scaling down climate models, numerical weather prediction modeling, processing and managing satellite weather data, visualization of the data, and improving weather communication capacity. The solar-powered agro-weather stations will be installed within a radius of 15–20 kilometers. Weather data will be aggregated, processed, and analyzed at the county level and agro-weather advisories communicated to farmers. KCSAP will also finance the purchase of satellite/remote-sensing infrastructure that will complement the coverage of the automated agro-weather network and enhance the capacity for storing raw and analyzed data.

67. ***Developing the Early Warning System.*** The project will finance development of the EWS at KMD to strengthen disaster preparedness and mitigation capabilities. The primary objective of developing the EWS is to improve short-, medium-, and long-range forecasts/monitoring information for various uses, including flood and drought warnings, disaster reduction, and emergency response.

Subcomponent 3.2: Developing Integrated Weather and Market Information System (US$11.4 million equivalent, of which IDA US$10.0 million equivalent)

68. This subcomponent will finance activities related to: (i) developing "big data" for CSA; (ii) strengthening market information systems; and (iii) delivering integrated weather and market advisory services.

69. ***Developing big data for climate-smart agriculture.*** The project will finance big data systems that will help famers, agro-pastoralists, and pastoralists make informed decisions **on what, when, where, and how to produce**.[56] A situation analysis will be conducted to understand data availability and identify strategies for operationalizing big data for CSA.

[56] Scientists at CGIAR centers have applied Big Data tools to reveal impacts of climate variation on crop and forage yields and to recommend strategies against changing climate. For example, CIAT has used big data to help rice farmers in Latin America with site specific recommendations: https://ccafs.cgiar.org/blog/big-data-big-prospects-crunching-data-farmers-climate-adaptation.

Support to big data for CSA will involve: (i) segmenting and registering VC stakeholders; (ii) establishing homogenous production zones; (iii) collecting agricultural statistics; (iv) appointing the Normalized Difference Vegetation Index (NDVI) agent; and (v) setting up infrastructure for big data analytics. A big data with open application programming interface (API) will be established to facilitate non-confidential data sharing and information dissemination.

70. ***Segmenting and registering value chain stakeholders*.** The project will finance the costs of segmenting and registering farmers, agro-pastoralists, pastoralists, and other stakeholders in the 24 participating counties. The registration system will provide two-way communication for collecting data on agricultural production and market information; and for disseminating agro-weather and advisory services to producers. The State Department of Agriculture (SDA) in collaboration with the County Departments of Agriculture (CDA) will undertake the registration of farmers. The registration will include documenting information on farmers' biodata/profile (name, gender, date of birth, family size, national identification, mobile phone numbers), location/physical address, and agricultural production technologies used (such as farm size, types of crops/livestock, type of seeds, inputs/fertilizers used, and other agronomic practices, among others), and production zone.

71. The State Department of Livestock (SDL), in collaboration with County Departments of Livestock, will develop an automated pastoralist registration system and database for all agro-pastoralists/pastoralists in the participating ASAL counties. The project will build on the existing registration system developed by the National Drought Management Authority (NDMA) for implementing the Hunger Safety Net Program (HSNP). The system will be developed in partnership with the Social Protection Secretariat, and the NDMA and will be fully integrated into the Social Protection Single Registry (SPSR) and the Population Registration System (PRS). The registration system will include information/fields on the biodata/profile (name, gender, date of birth, family size, national identification, mobile phone numbers) of each agro-pastoralists/pastoralists, location/physical address, , banking information, details of their livestock holdings (numbers by species and sex, for instance), and the production zone.

72. Once the electronic agro-pastoralists and pastoralists registration system is established, the project will finance: (i) training for livestock extension officers in using the electronic registration system; (ii) registration of all pastoralists and agro-pastoralists in the participating ASAL counties; and (iii) use of poverty/wealth ranking to identify and select the Kenya Livestock Insurance Program (KLIP) beneficiaries from registers in each of the participating ASAL counties. This database will also act as a key resource for planning and implementing location-specific agricultural interventions, including advisory services, animal diseases surveillance and control, vaccination programs, and dissemination of the market information.

73. Other stakeholders to be registered will include agro-dealers, stockists, processors, commodity exchange operators, agriprenuers, innovators, and technical service providers covering crop, agro-pastoral, and pastoral systems. KCSAP will finance the procurement of IT equipment and the hiring and training of about 20 enumerators in using smartphones/tablets to collect data for each participating county.

74. ***Establishing homogenous production zones.*** The project CDA will finance the identification of the Unit Areas of Insurance (UAIs) in the semi-arid participating counties that will be covered by the crop insurance. The SDA has already developed and tested a methodology for identifying UAIs. The latter are geographical areas of relatively homogenous soils and agro-

climatic conditions, in which producers have similar technology and production practices as well as crop yields per acre. The UAIs will partition semi-arid counties on the basis of their agro-climatic conditions and exposure to production risks. The crop insurance program will base its insurance payouts on the Area Average Yield Index (AAYI) measured across each UAI.

75. In partnership with ILRI, the SDL has developed a methodology for identifying homogenous agro-pastoralist and pastoralist production zones in the ASAL counties. The zones are identified using the following criteria: (i) they cover the target area within which resident pastoralists normally graze their herds; (ii) the herding households within the zone experience generally similar levels of stress to their herds for a given level of forage scarcity, and deploy similar herd management and migration rules; and (iii) they are of suitable size and administrative infrastructure. The project will finance the identification of homogeneous agro-pastoralists/pastoralists production zones in all participating ASAL counties that will be covered by the livestock insurance. KLIP will base its insurance payout on the NDVI readings assessed across each production zone.

76. While primarily created for agriculture insurance program, the identified UAIs and production zones will help: (i) improve understanding of agro-climatic suitability of different crops and livestock to inform decisions on which crops or livestock should be promoted under different UAIs and production zones, respectively; (ii) provide customized advisory and extension services to farmers, agro-pastoralists and pastoralists based on their unique UAIs and production zones, and develop protocols for CSA that are specific to the unique UAIs and production zones; and (iii) screen the proposals received from communities to ensure that the envisaged activities minimize weather shocks and climate change risks for the UAIs and production zones, respectively.

77. ***Collecting agricultural statistics.*** The project will finance the collection and digitization of historical agricultural statistics (production area, farm sizes, crop yields and livestock/fisheries productivity), currently available in hard copies in the 24 participating counties and government departments and agencies. Investing in rigorous time-series data and automated methods of capturing and collecting agricultural statistics will have major benefits, including: (i) improved commodity production forecasts; (ii) improved EWS; (iii) better spatial planning and optimum land and crop use; (iv) improved targeting of weather advisory and extension services; and (v) providing information for agricultural insurance. In addition, the project will finance the collection of location-specific agricultural statistics (based on the UAIs and production zones) using the registration systems (farmers, agro-pastoralists, and pastoralists), whereby the crop and livestock/fisheries production data (area, yields, livestock productivity) will be collected directly from producers. During project implementation, registered beneficiaries will record their progress in adopting CSA TIMPs using the ICT feedback mechanisms, which will be used to monitor changes in agricultural productivity and resilience to climate change shocks.

78. The project will also finance the Crop Cutting Experiments (CCEs) to provide data for crop insurance program in the participating semi-arid counties. MoALF has developed a standardized methodology for estimating seasonal average crop yields starting at location and ward levels, subcounty and county, and national levels. MoALF, KALRO, and CDAs will be supported to conduct area yield measurement based on statistically representative samples of farms and fields, from which subplots will be randomly selected at the time of harvest and the crop harvested and weighed. The project will finance yield estimation activities, including: (i) developing a dedicated random sampling framework to determine the number and position of

crop cuts to be carried out per UAI; (ii) mobilizing CCE enumerator teams to conduct in-field crop cutting experiments at the time of harvest in each UAI; (iii) designing an ICT platform for yield data collection, transmittal, and management, to include features for CCE plot identification, real time recording and monitoring, auditing, and data processing; and (iv) developing and implementing an appropriate CCE auditing process, to include in-field checks or verification of submitted results. This approach will help to improve the quality, accuracy, and reliability of agricultural statistics for Kenya by providing randomized sample surveys of actual crop production in a number of locations. In addition, the data can feed into the M&E framework as actual production of specific commodities in certain locations that can be compared with crop yields reported by beneficiaries.

79. ***Appointing the Normalized Difference Vegetation Index (NDVI) agent.*** The project will finance the appointment of a single industry-wide agent for the NDVI, which provides a good indicator of pasture growth and vigor on a near real-time basis for the KLIP. The NDVI agent will be responsible for carrying out the following tasks: (i) downloading and processing remote-sensing data (masking, spatial aggregation, temporal aggregation, anomaly determination, and so on) with the specific processing chain designed for KLIP; (ii) determining seasonal payouts according to KLIP contract features; (iii) providing monthly updates on the seasonal evolution of forage availability; (iv) providing official payout reports at the end of the livestock insurance cover periods; (v) guaranteeing that data are accessible to stakeholders for downloading; and (vi) maintaining a backup for NDVI data to guarantee data continuity in the event of disruptions in the acquisition of satellite data.

80. ***Setting up infrastructure for big data analytics.*** The project will finance the ICT equipment (hardware and software) for performing advanced statistical and data mining/machine learning algorithms. Agricultural time-series data will be combined with weather observations (at daily resolution from agro-meteorological stations/satellite data) and soil and water management factors to: (i) reveal climate and weather patterns; and (ii) detect the limiting factors for agricultural production. Subsequently, this information will be used to generate real-time and site-specific recommendations on crop cultivars, soil preparation, sowing rate and time, fertilization, irrigation, pest and disease control, harvest time, and storage options. In addition, these data could be combined with market information from the Market Information System to provide VC advisory services. A cloud-hosted structured query language (SQL) database will be used for managing and disseminating information. This cloud computing database will be integrated with other data management systems already established at KALRO under KAPAP support.

81. ***Strengthening the existing Market Information System.*** The project will finance interventions aimed at strengthening the automated Market Information System at MoALF, which has four major components: (i) Android mobile application—data capture and transmission; (ii) information database—data storage; (iii) content management system—data management and web views; and (iv) data analysis and modeling—data visualization and search of historical data. The system currently collects wholesale prices from 21 GIS-mapped markets for about 47 agricultural commodities, including grains, roots and tubers, horticultural commodities, and eggs. Data processing is not fully automated, and dissemination is through print and electronic media. In addition, monthly market publications are available on the MoALF website (www.kilimo.go.ke). The project will finance an expansion in the coverage of the current Market Information System to a total of 235 wholesale and retail markets to enable users

to access real-time market information online. Eventually, the system will capture: (i) output market data (quantities) and wholesale, retail, and farm-gate prices for agricultural sector commodities (agriculture, livestock, and fisheries); (ii) input market data (quantities and prices of seed, fertilizers, and chemicals); (iii) storage data (capacity of each facility, quantities stored, and unit costs); (iv) transport cost and availability; and (v) will enable matching of producers and buyers.

82. *Data capture and management*. Data will be captured using a primary input device (smartphone or tablet) and uploaded onto a primary server set up at MoALF with a data recovery server (secondary) at KALRO. Data collected by enumerators from the markets will be submitted to the primary server for processing and dissemination by the market intelligence team at MoALF.

83. *Data analysis and dissemination*. The agricultural time-series data will be visualized as tables, graphs, charts, and maps and shared using ICT systems such as Web portal, SMS, and IVRs. The SMS system will push information to farmers, extension officers, and other stakeholders. It is envisaged that over 100,000 SMS messages will be sent on a monthly basis. During the initial stages of implementation, the project will meet the cost of SMS to users. Over time, the SMS cost will be met from subscriptions. Similarly, users of the Market Information System will pay subscriptions for information received.

84. *Partners of the Market Information System*. The system will include a platform to enhance partnerships and information sharing with other market information service providers. The main partners will include MoALF; Ministry of Industry, Trade, and Cooperatives; Ministry of ICT; East Africa Grain Council; CGs; World Food Programme; Food and Agriculture Organization of the United Nations (FAO); FewsNet, Trademark East Africa; United States Agency of International Development (USAID) Trade and Investment Hub; the AMITSA[57] system of the International Fertilizer Development Corporation; and e-soko and local telecommunication service providers.

85. ***Delivering integrated weather and market advisory services.*** The project will finance the delivery of an integrated weather and market advisory services. Agro-weather data and market information obtained from the databases will be scaled down and packaged into actionable advisory messages for different agro-meteorological zones. Thus the project will finance the following key interventions: (i) extending the current agro-weather platform and tool at KALRO to include a livestock component and additional crop VCs; (ii) improving the existing ICT infrastructure and systems at the host organization (KALRO) to deliver effective data and information management; (iii) establishing knowledge and content processing and management systems that (subject to privacy, confidentiality, security considerations) will ensure the availability of and access to quality data and information for sharing and dissemination.

86. KCSAP will utilize multiple information delivery channels, including SMS and mobile phone applications, web-portal, and knowledge bank systems, as well as transmit information through more conventional channels such as radio, television, bulletins, and print. The IVR systems that render weather conditions into human speech will also be incorporated. The improved access to weather and market advisory services will empower farmers to make

[57] The web- and mobile phone-based AMITSA system utilizes both private and public sector agro-input stakeholders to collect and process market data and disseminate to various stakeholders.

informed decisions on what, when, where, and how to produce; to reduce losses related to climate change risks; and to achieve the triple wins.

Subcomponent 3.3: Building Technical and Institutional Capacity (IDA US$5.0 million equivalent)

87. The project will finance the institutional and technical capacity building for staff of national and county governments to enable them to deliver on their mandates under Component 3. The main areas for support will include sensitizing stakeholders on CSA concepts and climate change risks, a capacity needs assessment, and capacity building.

88. ***Sensitizing stakeholders***. The project will support a series of sensitization workshops during the first three years of its implementation to inform stakeholders about CSA concepts and the risks associated with climate change. The sensitization workshops will be organized for each participating county, focusing on the climate risks identified in their respective County Risk Profiles for their specific agro-ecological zones.

89. ***Needs assessment.*** The project will finance a capacity needs assessment to identify shortfalls in institutional arrangements and gaps in CSA knowledge at the national and county government levels. The detailed needs assessment will be carried out at the MoALF (departments of Agriculture, Livestock, and Fisheries), and key institutions such as KMD, KALRO, and various departments and ministries of county governments.

90. ***Capacity building***. The project will finance the provision of technical short-term and long-term training for staff of MoALF (Departments of Agriculture, Livestock, and Fisheries) and key institutions such as KMD, KALRO, the Agricultural Statistics Unit (ASU), the Agricultural Insurance Unit (AIU), and other semi-autonomous agencies.

91. Short-term training courses (in the form of workshops, classroom training sessions, demonstrations, and backstopping sessions) to be financed will cover CSA concepts, climate change risks, agro-weather forecasts and dissemination, big data analytics (among others, methodologies for estimating increase in agricultural productivity, net carbon sequestration, reduction in soil erosion, increase in vegetation cover, net GHG emissions, meteorological and hydrological modeling, area-based weather forecasting, cloud-based data management, soil and vegetation cover mapping, and operation and maintenance of AWS and EWS); ICT; and tools and methodologies for collecting agricultural production and market data, analysis, and reporting.

92. Long-term training will be financed for about six PhDs and 30 MScs in the areas of climate change science and modeling, disaster risk management, agro-meteorology, computer science, agricultural statistics, and business information systems. In addition, TA will be financed for various agencies in areas of agro-weather, climate, market, and advisory services operations.

93. The project will also finance institutional capacity building for key government departments and agencies. This capacity building will include: (i) restructuring of the institutional arrangements for data collection, analysis, and management (storage, retrieval, and archiving); (ii) strengthening the legal and regulatory frameworks for big data operations; (iii) establishing institutional capacity for business development and Climate Information Services (CIS); and (iv) fostering sustainable PPPs to provide more efficient and market-oriented services through synergies and complementarities.

Component 4: Project Coordination and Management (US$29.3 million equivalent, of which IDA US$20.0 million equivalent)

94. This component will finance activities related to national and county-level project coordination and management, including annual work planning and budgeting; fiduciary aspects (financial management and procurement); human resource (HR) management; safeguards compliance monitoring; development and implementation of an MIS and ICT-based platforms; monitoring and evaluation (M&E) and impact evaluation (IE) studies; and communication strategy and citizen engagement.

Subcomponent 4.1: Project Coordination (US$24.8 million equivalent, of which IDA US$15.5 million equivalent)

95. This subcomponent will finance the costs of the national and county-level project coordination units (NPCU and CPCUs), including salaries of the contract staff and O&M costs, such as office space rental charges, vehicle fuel and spare parts, office equipment, furniture, tools, and internal and external audits, among others. It will also finance the costs of project supervision and oversight provided by NPSC, NTAC, and CPSC, and other project administration expenses.

96. NPCU will be responsible for, among other things, developing national AWP&Bs by consolidating county AWP&Bs; seeking approval from NPSC and incorporating AWP&Bs into MoALF's development budgets; reviewing and vetting county investment proposals for NTAC approval; managing project funds, including disbursing, accounting, and preparing interim financial reports (IFRs) and financial statements for auditing; managing HR, particularly contracted staff; procuring large contracts and managing contracts (such as civil works, goods, and consultants) and project assets (such as vehicles, computers and accessories, office equipment and furniture, among others); supporting NPSC and NTAC by providing secretariat functions; and handling all implementation support missions of the World Bank.

97. Similarly, CPCUs will be responsible for preparing county-level AWP&Bs by consolidating the CDPs and approved ward-level subprojects and community-level microprojects; seeking approval of CPSC; and submitting to NPCU for consolidation into KCSAP budgets; reviewing and vetting ward-level, CIG, VMG, PO, and SACCO investment proposals for CPSC approval; managing county-level project funds, including paying SPs, accounting, and preparing quarterly Interim Financial Reports (IFRs); procuring and managing county-level assets; and supporting CPSC by providing secretariat functions.

Subcomponent 4.2: Monitoring & Evaluation and Impact Evaluation (IDA US$4.5 million equivalent)

98. This subcomponent will finance activities related to routine M&E functions (such as data collection, analysis, and reporting); development of an ICT-based Agricultural Information Platform for sharing information (such as technical or extension advisory services, business and market-oriented, agro-weather information, stakeholder feedback, grievance and complaints, and others); and facilitation of networking across all components. It will also finance the baseline, mid-point, and end-of-project IEs.

99. An ICT-based AIP will include the needs of other components and overall project management by serving four main functions: (i) access to information; (ii) multi-directional flow

of information; (iii) market linkages; and (iv) M&E. These functions will be designed into three interfaces—e-Portal, e-Commerce, and MIS—managed by the main analytical engine. The Platform is intended to provide KCSAP and other stakeholders with the ability to: (i) capture data and information from the project using mobile phones connected to network servers; and (ii) access and upload the data and information collected, and geospatially aggregate data at the community, county, and national levels.

100. The Platform will be used as an instrument for knowledge management and help communities and KCSAP to: (i) have better access to information, knowledge, and technical advice to improve farming practices; (ii) provide feedback on the performance of TIMPs promoted by the project; (iii) find and establish marketing linkages with input suppliers and output purchasers; and (iv) generate periodic reports on HR management, fiduciary management, and M&E for informed decision making. A firm will be contracted by the project to design and establish an Integrated Fiduciary (procurement and financial management) and M&E system capable of tracking the physical implementation and financing at the national and county levels; and which can be integrated with the existing core government systems such as the Integrated Financial Management Information System (IFMIS) and E-promise.

Component 5: Contingency Emergency Response (IDA US$0 million)

101. This zero-cost component will finance eligible expenditures under the Immediate Response Mechanism (IRM) in case of natural or man-made crises or disasters, severe economic shocks, or other crises and emergencies in Kenya. This contingency facility can be triggered through formal declaration of a national emergency by the government authority and upon a formal request from GoK to the World Bank through the National Treasury. In such cases, funds from an unallocated category or other project components will be reallocated to finance emergency response expenditures to meet agricultural crises and emergency needs. The emergency response will include mitigation, recovery, and reconstruction following natural disasters, such as severe droughts, floods, disease outbreaks, and landslides, among others.

102. A detailed Contingent Emergency Response Implementation Plan (CERIP) satisfactory to the World Bank will be prepared as the case may be for each Eligible Crisis of Emergency. Disbursements will be made against a positive list of goods, works, and services required for supporting mitigation, response, recovery, and reconstruction needs. Should it be triggered, all expenditures under this subcomponent will be in accordance with Paragraph 12 of the World Bank OP 10.00 of the Investment Project Financing (IPF). The policy requires all expenditures to be appraised, reviewed, and found acceptable to the World Bank before any disbursement is made. Eligible operating costs will include incremental expenses incurred for efforts arising as a result of the crises or emergencies.

103. Goods, Works, and Services under this subcomponent will be financed based on review of satisfactory supporting documentation presented by GoK, including adherence to appropriate procurement practices in an emergency context. All supporting documents for reimbursement of such expenditures will be verified by the internal auditors of GoK and by the NPCU, certifying that the expenditures were incurred for the intended purpose; and to enable fast recovery following the damage caused by adverse natural or man-made crises or disasters, before the Application is submitted to the World Bank. This verification shall be sent to the World Bank together with the Withdrawal Application.

Annex 3: Implementation Arrangements

Kenya Climate-Smart Agriculture Project (P154784)

Project Institutional and Implementation Arrangements

2. **Implementation of KCSAP will involve a three-tiered institutional arrangement (national, county, and community).** At the national (first-tier) level, the National Treasury will represent the Government of the Republic of Kenya ("the Borrower") and MoALF will be the main implementing agency. Within MoALF, the project will be anchored in the State Department of Agriculture (SDA). At the county (second-tier) level, the county governments will be the executing agencies of the project. At the community (third-tier) level, beneficiaries will implement their community-led CSA interventions. The three-tier institutional arrangement aims to: (i) lessen the approval layers for faster decision-making and consequently more efficient project implementation; and (ii) to the greatest extent possible, utilize the constitutionally mandated governance structures at the national and county levels. Figure A3.1 depicts these institutional arrangements. Detailed roles and responsibilities of national, county, and community institutions are provided in the Project Implementation Manual (PIM).

3. ***National level:*** The National/Project Steering Committee (NPSC) will provide overall project oversight and policy guidance and approve the project's Annual Work Plans and Budgets (AWP&Bs). The NPSC will be co-Chaired by the Cabinet Secretary, MoALF and the Chair of Agricultural Committee in the Council of Governors. NPSC members will include Principal Secretaries (PSs) from the relevant state departments (National Treasury; Agriculture, Livestock, and Fisheries; Environment and Natural Resources; Water and Irrigation; Industrialization and Enterprise Development; and Devolution and Planning), two Governors representing participating counties, Coordinator of Intergovernmental Secretariat for Agricultural Sector, Chief Executive Officers (CEOs) of KENAFF, and the Kenya Private Sector Alliance (KEPSA).

4. The National Technical Advisory Committee (NTAC), comprising (among others) directors of relevant line ministry departments, directors general of the relevant government agencies (KALRO, KEMFRI,[58] NEMA), Chair of Inter-governmental Technical Working Group (ITWG) responsible for Projects/Programs, Chair and Secretary of County Executive Committee Agricultural Caucus, and representatives of KEPHIS, Kenya Association of Manufacturers, and STAK, will be chaired by the Director of Agriculture, MoALF. NTAC will be responsible for providing technical support to overall project implementation and approving the national- and county-level investment and CSA research proposals. The number of members of NTAC attending each meeting will depend on the agenda or technical advice sought by the NPCU.

5. The National Project Coordination Unit (NPCU), to be embedded in the SDA, MoALF, will be responsible for managing day-to-day project implementation. The NPCU, headed by the National Project Coordinator, will also comprise Component Coordinators (Components 1–3), an M&E Officer, Finance Officer/Project Accountant, Procurement Officer, Internal Auditor, Human Resource and Administration Officer, Information and Communication Officer, ICT Officer, Gender Specialist, and Environmental and Social Safeguards Compliance Officer.

[58] Kenya Marine and Fisheries Research Institute.

6. The NPCU staff will be seconded to the project on a full-time basis by the national government.[59] Recruitment of NPCU staff from the labor market will be done only where internal capacity is inadequate; and with approval from the Directorate of Public Service Management in the Ministry of Public Service, Youth, and Gender Affairs. The National Project Coordinator will serve as the secretary to both the NPSC and NTAC. The national government, through NPCU will be responsible for implementing Components 2, 3 and part of Component 4 (namely, project coordination and M&E at the national level).

7. ***County level:*** The County Project Steering Committee (CPSC), to be chaired by the County Executive Committee member for the agricultural sector, will provide project implementation oversight in the respective counties. The CPSC will comprise chief officers of the relevant county ministries and representatives from the private sector and civil society in the respective counties. CPSC will be responsible for approving the project's AWP&Bs at the county level and community microproject proposals. CPSC will also ensure that project activities are incorporated in the respective County Annual Plans (CAPs) and CIDPs.

8. The County Technical Advisory Committee (CTAC) will be chaired by the Director of the agricultural sector in each county. Members of the CTAC will include directors of agriculture, livestock, and fisheries; water and irrigation; environment and natural resources; cooperatives; and meteorology. Other members will include center directors of KALRO, Kenya Forest Service (KFS), and Kenya Wildlife Service (KWS), as well as branch Chair of Chamber of Commerce, county incharge of KENAFF, and representatives of other agricultural projects in the county. The CTAC will be responsible for technical advice and quality assurance at the county level.

9. The CPCUs will be embedded into the respective county government structures—in the agricultural sector. The CPCUs, to be headed by the County Project Coordinators, will be responsible for the day-to-day operations of the project in each county. Each CPCU will comprise the County Project Coordinator, Research-Extension Liaison Officer,[60] Agricultural Statistics Officer, County M&E Assistant, County Finance Assistant/Project Accountant, County Procurement Assistant, and an Internal Auditor. CPCs will serve as the secretary to both the CPSC and CTAC. The county governments through their respective CPCUs will be responsible for implementing Component 1 and part of Component 4 (namely, project coordination and M&E at the county level).

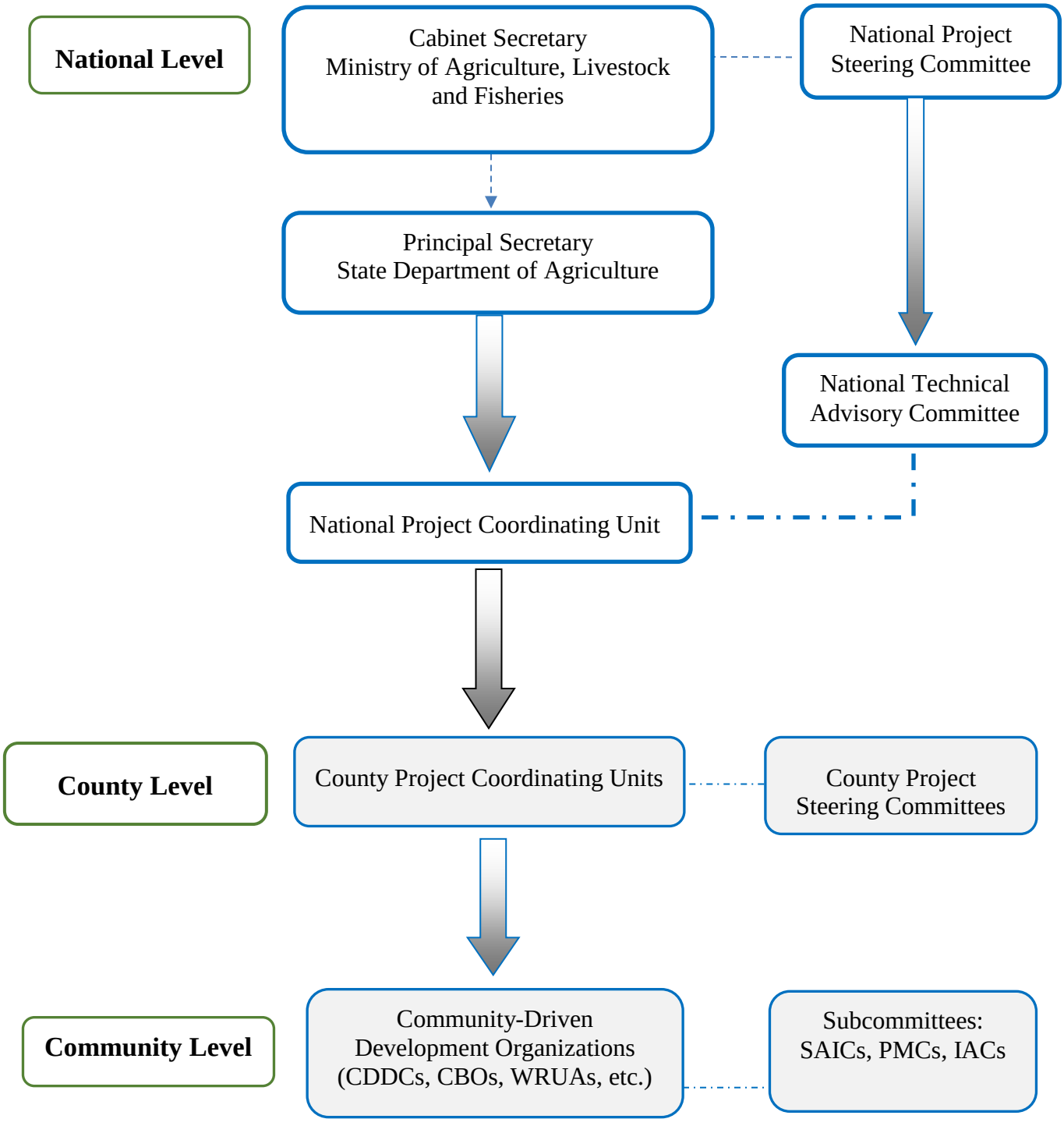
10. CPCU staff will be seconded to the project on a full-time basis by the county governments. Recruitment of CPCU staff from the market will be done only where internal capacity is inadequate, and with approval from NTAC following the recommendation by the County Public Service Boards (CPSBs).

11. ***Community level:*** The Community-Driven Development Organizations (CDDOs) with elected leaders (chair, secretary, treasurer and board members) will represent beneficiaries in the target communities. With facilitation from private service providers (SPs), the CDDOs will be responsible for mobilizing communities into CIGs and VMGs, through participatory approaches. The CDDOs will facilitate the preparation of the prioritized Community Development Plans (CDPs) and community CSA microprojects, as well as their implementation, management of

[59] Since Component 1 will be implemented by county governments, the coordinator will be seconded or recruited by the national government in collaboration with the Council of Governors.
[60] To be seconded by KALRO.

grants (using community-based financial management and procurement), Community Participatory Monitoring (CPM), and reporting.

Figure A3.1: Institutional Arrangements, KCSAP



12. Other community-level groups and subcommittees, including Water Resource Users' Associations (WRUAs), Community Based Organizations (CBOs), Savings and Credit Cooperatives (SACCOs), and Social Accountability and Integrity Committees (SAICs), will also participate in the project.

13. Additional detail on the institutional arrangements for implementing the project, including the ToRs for NPSC, NTAC, NPCU, CPSCs, CTAC, and CPCUs, are provided in the PIM.

Financial Management, Disbursements, and Procurement

Financial Management

14. ***Financial management (FM) assessment.*** The overall financial management risk is HIGH. The FM assessment was carried out in accordance with the Financial Management Manual issued by the Financial Management Sector Board on March 1, 2010. The assessment was undertaken to determine whether the FM arrangements in place satisfy the World Bank's Operation Policy/Bank Procedures (OP/BP) 10.00. The FM arrangements are meant to ensure that: (i) financial resources reach the implementing and executing agencies and ultimate project beneficiaries in the shortest time possible; (ii) resources are used to finance the intended activities with efficiency and economy; (iii) resources are properly accounted for and project results and outcomes are achieved; and (iv) acceptable auditing arrangements are in place. MoALF and participating counties were assessed as having FM strengths and weaknesses. At the national level, MoALF's major FM strength is that it has adequate experience and capacity in dealing with World Bank-financed projects, including KAPAP, KACCAL, and KAPSLMP. Weaknesses included long delays in moving funds from the Designated Account (DA) to the Project Account (PA) and a weak records management system. Other portfolio-level and entity risks include: (i) long in-country delays in moving funds from DAs to Pas; and (ii) limited scope of the annual project audits of CDD-type and other decentralized projects by the Office of the Auditor General (OAG). The scope of OAG's audit does involve a risk-based, on-site review of funds disbursed to spending units outside the NPCU (based in Nairobi). The World Bank, National Treasury, and OAG are engaged in dialogue to resolve these portfolio-level challenges.

15. At the county level, the newly formed County Governments (CGs) have relatively weak FM capacity with inadequate internal controls, reporting, and oversight mechanisms. In addition, performance of the CGs is hampered by the slow flow of funds from the National Treasury to the CGs. Until recently, the framework for transferring conditional grants from National Treasury to the CGs was not in place, but dialogue continues between the National Treasury and Council of Governors regarding the budgeting process and flow of funds arrangements. In the meantime, it has been agreed that IDA funds for implementing county-level activities will be disbursed directly from the DA managed by National Treasury to the County Revenue Fund (CRF) accounts opened and managed by the CGs. At the same time, the World Bank and GoK have agreed on additional fiduciary measures to help manage risks associated with devolved functions and CDD-type projects, including KCSAP. Table A3.1 summarizes the risk assessment at the country, entity, and project levels. Agreed measures to mitigate risks and strengthen fiduciary management (detailed in the FM manual) include:

- **Use GPS mapping for all subprojects and microprojects** with full details of the location, names, and telephone contacts of community officials, as well as details of

contracts, names and telephone numbers of owners of the firms awarded, procurement method used, payments made, and status of work done, among others.

- **Include HR guidelines in the PIM on staff rotation and sanctions for project employees who breach fiduciary protocols.** The PIM will contain HR measures for employees who persistently breach project fiduciary procedures, cause ineligible expenditures, or create loopholes that could be exploited to misappropriate project resources. The sanctions would include GoK separating such staff from the project, and in cases where INT investigations confirms culpability, barring such employees from working on any other World Bank projects.
- **Enable complaints reporting to the World Bank.** On top of the normal complaints reporting to GoK and its agencies, the PIM will include an option for directly reporting to the World Bank Country Office breaches/noncompliance with project guidelines; and to INT in cases of suspected fraud and corruption, in line with the World Bank's Anti-Corruption Guidelines.
- **Provide increased/continuous community awareness and capacity building with enhanced public reporting and complaint handling mechanisms.** The project design includes continuous community awareness and capacity strengthening to ensure proper community ownership and participation, as well the strengthening of the public reporting and complaint handling mechanisms.
- **Increase transparency and strengthen existing social accountability mechanisms,** by including the use of community volunteers (pool Mobile Advisory Teams), setting up community-level integrity committees such as SAICs, and disclosing project information at prominent places within the community, among others.
- **Require detailed transaction review and risk-based, randomized, on-site spot checks as part of the World Bank's FM review** for NPCU, CPCUs, and subprojects and microprojects at the county and community levels, respectively. The reviews will include forensic tests on areas and transactions assessed as high risk.
- **Provide corruption prevention and reporting mechanisms** through the Ethics and Anti-Corruption Committee (EACC) by the use of hotlines, anonymous corruption reporting, integrity assurance officers, and corruption-reporting boxes.
- **Designate a qualified project internal auditor for NPCU and CPCU for each of the** 24 participating counties on the basis of ToRs satisfactory to the World Bank. Their contracts will provide for annual renewal with clearance from the World Bank based on performance appraisal and rotation of staff.
- **Designate a qualified project accountant and a procurement officer for NPCU and assistant accountants and procurement officers for CPCUs of each of the 24 participating counties** on the basis of ToRs satisfactory to the World Bank. Their contracts will provide for annual renewal with clearance from the World Bank based on performance appraisal and rotation of fiduciary staff.
- **Enhance OAG's capacity through fiduciary support in the following three areas: (i) need-based fiduciary training of OAG staff; (ii) payment of project incremental audit costs; and (iii) outsourcing to private audit firms (where necessary).** The ToRs

for the private auditors will be reviewed and cleared by the World Bank, and the selected audit firms will be cleared by the World Bank before the contracts are awarded. The audit contracts will be subject to periodic review and renewal based on performance.

Specific FM Arrangements

16. ***Budgeting arrangements.*** The budgeting arrangements are assessed as being adequate and will continue to be carried out by MoALF and counties in line with existing GoK procedures. The project budget will be based on AWP&Bs submitted by CPCUs to NPSC for approval and inclusion in the MoALF budget. The project AWP&Bs will be consolidated from the AWP&Bs of the national implementing and executing agencies compiled by NPCU and from county-level AWP&Bs received from the 24 CPCUs. This approach is in line with GoK's financial regulations and procedures. KCSAP will be assigned IDA-specific budget codes in IFMIS for both national and county activities using GoK Standard Chart of Accounts (SCoA). These arrangements will form the basis for project disbursement, expenditure, and reporting.

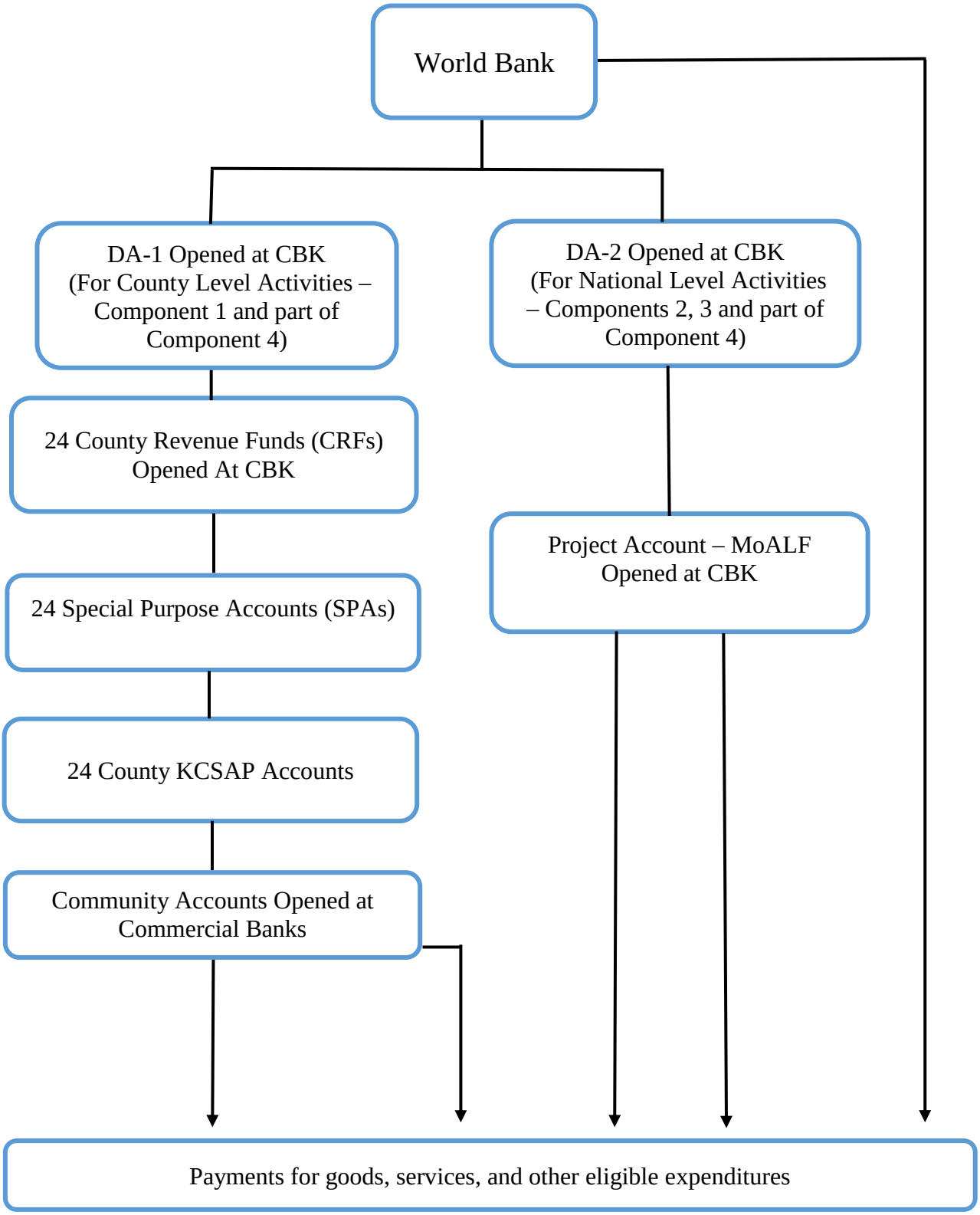
17. ***Flow of funds arrangements.*** The project will adopt the Statement of Expenditure (SoE) method of disbursement. Flow of funds arrangements are summarized in Figure A3.2. The flow of funds will consist of four major elements. First, two DAs—DA-1 for county activities (Components 1 and part of Component 4) and DA-2 for national activities (Component 2, 3 and part of Component 4)—opened by the National Treasury at the Central Bank of Kenya (CBK) or in financial institution acceptable to the World Bank/IDA, and denominated in US dollars. Second, a PA in Kenya shillings opened by MoALF at the CBK or financial institution acceptable to World Bank/IDA, from which the project's payments will be made at the national level. Third, for counties, MoALF will trigger transfer of funds from DA-1 through the CRF accounts to the dedicated County Project Accounts (CPAs), which shall be opened to receive and disburse project proceeds at the county level. The CPAs will be opened by each participating county at the CBK or in financial institutions acceptable to World Bank/IDA. Fourth, beneficiary/community bank accounts will be opened at commercial banks acceptable to World Bank/IDA.

18. For the national activities, KALRO and KMD will each open a separate Kenya shillings Segregated Project Account (SPA) to facilitate receipt of IDA proceeds from the PA managed by MoALF. The mechanism for funds requisitions, accountability, and reporting formats will be provided in the project FMM. For the community-level activities, funds will be disbursed from the CPA at CBK or in financial institutions acceptable to IDA, directly to the Community Accounts (CAs) at commercial banks, once they have met the eligibility criteria. The CRF accounts will be replenished from DA-1, and the PA from DA-2. Each CPCU shall maintain a detailed inventory of all the CAs. NPCU shall maintain a similar inventory of all the DAs, PAs, SPA, CPAs, and CAs under the project. The bank account inventory shall provide details including but not limited to account name, beneficiary name, account number, bank, branch, branch location, signatories and specimen signatures, and account operating mandates.

19. The triggers for the initial deposit/transfer from DA-1 to CRF accounts will include the signing of the Participation Agreements between MoALF and the respective county governments, and approved county AWP&Bs. Subsequent transfers will be based on submitting SoEs. For communities/groups, eligibility criteria will include having in place a community development plan/business plan of POs and an approved microproject. Once

communities/groups have met the eligibility criteria, funds will be disbursed by CGs from their CPAs to the CAs. Detailed funds flow processes and related controls shall be provided in the PIM and FMM.

Figure A3.2: KCSAP Flow of Funds Arrangements



20. ***Accounting and internal control systems.*** Accounting and internal control systems will be in line with GoK and World Bank guidelines, the FM manual, and applicable public financial management (PFM) regulations. Additional controls will be incorporated in the Community Grant Manual (CGM) to cater for Component 1 activities, for which GoK guidelines do not exist.

21. At the national level, MoALF has internal controls involving approval and authorization procedures, adequate segregation of functions, and internal check mechanisms in line with GoK financial regulations and procedures. MoALF has internal auditors seconded from the National Treasury. GoK will designate a project internal auditor at the NPCU to take overall responsibility for the project audit at the national level. Each participating county will designate a county project internal auditor. The internal auditors at the national and the county level shall integrate the project internal audit activities into their AWP&Bs, which shall include periodic field-based travel to specific project sites at the county, ward, and community level. The designation of the project internal auditors will be done on the basis of ToRs satisfactory to the World Bank. MoALF also has an audit committee that functions as an oversight entity on budget execution and on implementation of internal audit recommendations. At the national level, the World Bank reconciliation statements shall be prepared by MoALF's Chief Accountant on a monthly basis and approved by the Head of Accounting Unit or his/her designate. Similarly, at the county level the bank reconciliations for CPAs shall be prepared on a monthly basis.

22. The project will be subjected to an "in-year" risk-based fiduciary review. The project will also be subjected to annual risk-based reviews by the World Bank's FM team. In addition, the OAG will conduct on-site audits of all 24 CPCUs as part of the end-of-year annual statutory audit. Further, the NPSC will be responsible for providing effective oversight over project activities, including compliance with fiduciary requirements. At the county level, payment vouchers initiated by the 24 CPCUs will undergo examination, vote book entry, and accountant authorization under the oversight of the county treasury. The project will maintain a cashbook at each of the 24 CPCUs and ensure monthly bank reconciliation reports are prepared to enhance internal controls. Activities under Component 1 will entail making disbursements to communities with weak internal controls. As part of measures to strengthen accountability at the community level, social accountability measures have been incorporated in the project design, including enhanced community participation, fraud and corruption reporting, public display of approved budget and expenditures of each microproject, participatory M&E, and complaint handling mechanisms.

23. ***Financial reporting.*** The project will submit quarterly IFRs and annual financial statements to the World Bank. The formats of both the quarterly IFRs and annual financial statements have been agreed between the World Bank and MoALF. The annual financial statements will be carried out on the basis of International Public Sector Accounting Standards (IPSAS)–Cash Basis from time to time as prescribed by the Kenya Public Sector Accounting Standards Board (PSASB). Preparation of quarterly IFRs, which will be submitted to the World Bank no later than 45 days after the end of each quarter, will be the responsibility of NPCU in close consultation with the Principal/Chief Accountant, MoALF. To facilitate this process, each county will prepare and submit quarterly IFRs to NPCU within 30 days from the end of the quarter. These will be consolidated by NPCU for submission to the World Bank within 45 days as stipulated above. Since the project will be on SoE method of disbursement, the IFRs will be

used mainly for monitoring and financial reporting rather than as the means of initiating disbursements from IDA.

24. ***External audit arrangements.*** NPCU will prepare annual financial statements which will be submitted for external auditing no later than three months after the end of each financial year. The formats of the annual financial statements have been agreed between the World Bank and MoALF. External auditing will be conducted by OAG and the audit report and management letter will be submitted to the World Bank no later than six months after the end of each financial year.

Table A3.1: Risk Assessment and Mitigation

Type of Risk	Initial Risk Rating	Brief Explanation	Risk Mitigation Measures Incorporated in Project Design	Condition of Effectiveness (Y/N)?	Residual Risk Rating[1]
INHERENT RISK					
Country level	S	This rating is based on the Country Public Financial Management (PFM) environment and considers the overall history of the country's governance environment and corruption concerns. In view of the devolution process, it is critical for the Office of the Auditor General (OAG) to review its operations to be better equipped to provide external audit services at the county level.	A more robust PFM Act 2012 is now in place. PFM reforms are ongoing, including completing the roll-out of the IFMIS to the 47 counties and introducing Electronic Funds Transfer payments via the Government Payment System (G-Pay). The OAG continues to be strengthened, while the Office of Controller of Budget oversee budget execution.	No	S
Entity level	H	MoALF has adequate capacity and experience to implement the World Bank-funded projects and will set up the NPCU and 24 CPCUs at participating counties. The NPCU and the CPCUs will ensure that FM and internal audit staff with adequate qualification and experience are seconded to the units. Governance concerns and potential ineligible expenditures have been raised in other World Bank-funded projects, particularly KAPAP and KAPSLMP, implemented by MoALF.	The Government (MoALF, National Treasury, and the County Governments) will establish a reporting (including necessary timelines) and accountability mechanism to ensure that funds disbursed to the Counties are accurately accounted for and reported on timely basis. The reporting mechanism shall be documented in the Financial Management Manual (FMM) as well as the Participation Agreements (PAs) to be signed between the MoALF and the participating counties. The World Bank in close coordination with the GoK will ensure that the project FM function is executed through dedicated FM staff anchored into the County Treasury department.	No	H

Type of Risk	Initial Risk Rating	Brief Explanation	Risk Mitigation Measures Incorporated in Project Design	Condition of Effectiveness (Y/N)?	Residual Risk Rating[1]
Project level	H	Project design involves payments of community grants with inherent FM risks. Ineffective management oversight and material fiduciary concerns exist.	Fiduciary mechanisms will be enhanced, including establishment of an MIS database which is a dated covenant. Subsequent disbursements to the counties shall be SOE based. Detailed Community Grants Manual (CGM) with requisite FM arrangements to govern the implementation of the project activities at the community level is in place. Frequent Fiduciary training events drawing together project teams at the national and county as well as community (treasurers) level shall be undertaken. The project will sponsor project FM and Internal Audit staff to undertake specific courses.	No a	H
OVERALL	**H**				**H**
CONTROL RISK					
Budgeting	S	Possible delays by some counties in capturing project activities in their budgets. Coordination and timing of GoK budgeting activities/calendar across the three project levels (National, county, and community) may be a challenge. Lack of clarity on assigned roles and responsibilities regarding budgeting, reporting, and accountability.	Increased training and hand-holding capacity-building support, particularly at the county and community levels, will be undertaken.	No	S
Accounting	H	Cases of noncompliance with fiduciary procedures with potential implication to ineligible expenditures are likely to emerge. Weak accounting capacity at the county and community level.	FMM and CGM will routinely be revised to take emerging FM/fiduciary issues into account. National Treasury and counties to designate qualified and experienced project accountants at NPCU and CPCUs. The designation of project accountants shall be based on ToRs agreed with the World Bank. Enhanced social accountability (SAIC) and governance and anti-corruption (GAC) measures incorporated as	No Yes, dated covenant	H

Type of Risk	Initial Risk Rating	Brief Explanation	Risk Mitigation Measures Incorporated in Project Design	Condition of Effectiveness (Y/N)?	Residual Risk Rating[1]
			part of project design.		
Internal controls, management oversight, and risk management	H	Weak internal controls particularly at county and community level.	Detailed internal controls, policies, and procedures to be outlined in the FMM and CGM. National Treasury and counties to designate project internal auditors at NPCU and CPCU. Project work plans to be integrated into the internal audit work plans. Internal Audit reports covering project activities to be shared with the World Bank. Regular audit, implementation support, monitoring, and reporting to be undertaken.	No	H
Funds flow	H	Significant delays in funds flow from DA to the PAs could delay project implementation. Risk of additional disbursement delays to the CRF and subsequently CPA. Slow disbursement of grants from CPA to the CAs.	Project will open and maintain segregated subproject accounts. Direct disbursement of grants to the CAs from the CPAs. Continuous engagement with the MoALF and the Natural Treasury – Resource Mobilization Department to unlock challenges affecting funds flows.	No	S
Financial reporting	H	Challenges of accuracy and completeness of the reports. Risk of financial reporting delays at counties. Challenges in coordination and consolidation of the IFRs from the participating counties.	Annual SoE reviews to be conducted by the World Bank. Monitoring and certification agents to provide quarterly reports to the World Bank. Capacity-building (training) of FM staff at counties. Quarterly Financial Reports to be submitted for review to the World Bank. Automation of the project FM function to be considered.	No	S
Auditing	H	Limited scope of audit, whereby the Kenya National Audit Office was unable to conduct audit of KAPAP funds citing lack of funds.	Project funds will be ring-fenced from other regular GoK funds. Project funding (incremental costs) of OAG, and outsourcing of external audits to private audit firms where necessary.	No	S
OVERALL CONTROL RISK	**H**				**H**
OVERALL PROJECT FM RISK				**High (H)**	

25. **Dated covenants of the project will include:** (i) designation of a project accountant for NPCU and assistant accountants for each of the 24 CPCUs on the basis of ToRs and with qualifications satisfactory to the World Bank by no later than four (4) months after the Effective Date; (ii) designation of project internal auditors at NPCU and each CPCU under ToRs and with qualifications satisfactory to the World Bank by no later than four (4) months after the Effective Date; and (iii) establishment of an MIS database within the NPCU with GPS coordinates for tracking subprojects and microprojects expenditures that is satisfactory to the World Bank by no later than six (6) months after the Effective Date.

26. ***Implementation support.*** Based on the outcome of the FM risk assessment, Table A3.2 summarizes the FM implementation support plan for the KCSAP.

Table A3.2: Proposed Implementation Support Plan

Financial Management Activity	Frequency	FM Output
Desk reviews		
IFR reviews	Quarterly	IFR review report
Audit report review	Annually	Audit review report
Review of other relevant information such as internal control system reports	Continuous as they become available	FM review report
On-site visits		
Review of overall FM system including internal controls	Once every 6 months	FM review report
Monitoring of actions taken on issues highlighted in audit reports, auditor's management letters, internal audit, and other reports	As needed	FM review report
Transaction reviews (if needed)	Annually or as needed	FM review report
Capacity-building support		
FM training sessions	Before launching and thereafter as needed	Training sessions held

Procurement

27. ***Assessment of procurement capacity.*** This assessment was conducted at the national, county, and community levels. Key findings and conclusions are summarized below.

28. At the national level, MoALF, which will be the main implementing agency of KCSAP, has experience of implementing World Bank-funded projects such as KAPAP, KACCAL, and KAPSLMP, including managing procurement activities.

29. At the county level, the procurement capacity is inadequate, mainly due to lack of experience in procurement under the World Bank-funded projects. Common areas of weakness in procurement arrangements at the county level include: (i) inadequate office space for the operations of procurement staff; (ii) no sound procurement filing system or record keeping exist; (iii) lack of exposure to international procurement procedures; and (iv) limited degree of fairness in the competition for public procurement opportunities, particularly for counties that do not have reliable internet connectivity. Other procurement capacity weaknesses noted in counties include: (i) given that most CG procurement staff were recruited from the private sector they

have limited exposure to public procurement operations and procurement under donor-funded projects; and (ii) there is a lack of regular procurement training plans for staff at all levels.

30. To enhance the procurement capacity at the county level, the KSCAP will provide short-term training in World Bank procurement procedures (works, goods, and consultants) before project implementation commences. Subsequent regular procurement clinics will be held to deepen CGs' procurement capacity.

31. At the community level, the procurement capacity is very low. Given the large number of community microprojects, their small size and value, and the fact that they will be scattered across remote areas, the community procurement risk is high. To mitigate the procurement risks at the community level, the following measures have been incorporated in the project design: (i) increase ownership of procurement at community level by involving beneficiaries in the process; (ii) simplify the procurement manual at the community level and ensure that project staff or county officials do not get involved; (iii) conduct any procurement beyond the community level at the county level, using the World Bank Procurement Guidelines; (iv) provide training on World Bank procurement procedures to staff at the county levels before the project starts, so that they build the capacity for community procurement; and (v) engage an agency to carry out a capacity assessment of CIGs/VMGs, assist in building their procurement capacity, and monitor and report on their procurement performance.

32. *Overall Procurement Risk* – HIGH. The overall procurement risk is "High" on account of inherent weaknesses, particularly those associated with inadequate procurement oversight systems at national, county, and community levels. The following additional measures will be implemented to minimize procurement risk: (i) integrating procurement planning as part of the budgeting process and using procurement plans as a management tool for allocating responsibilities, improving accountability, and monitoring procurement performance; (ii) recruiting a qualified and experienced procurement officer at the national level to among other regular functions, effectively monitor contracts and undertake post-procurement evaluations to strengthen systems, enhance performance, and measure improvement; (iii) establishing and maintaining a structured and effective filing and records management system, and allocating adequate and secure office space for filing; (iv) preparing a detailed procurement procedures manual for use at the national, county, and community levels; (v) hiring a firm/agency to conduct annual procurement post-reviews as per ToRs agreed with the World Bank; (vi) using the project website to proactively disclose procurement information; and (vii) hiring a Third Party Quality Assurance/Quality Control Consultant to provide independent assurance of the quality of civil works constructed under the project.

33. ***Institutional arrangements for procurement.*** Procurement will be carried out in accordance with World Bank guidelines, specifically "Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers," dated January 2011 and revised July 2014 (referred to here as the "Procurement Guidelines"); and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers," dated January 2011 and revised July 2014 (referred to here as the "Consultant Guidelines"); and provisions stipulated in the Financing Agreement. KCSAP will also follow "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants," dated October 15, 2006 and revised January 2011. Further, since KCSAP has a CDD component, the project's procurement arrangements for community-based procurement will be in line with the

"Guidance Note for Design and Management of Procurement Responsibilities in Community-Driven Development Projects," dated March 15, 2012. On the basis of these World Bank Guidelines, KCSAP has prepared a detailed Procurement Procedures Manual (PPM) for use at all levels (national, county, and community) of project implementation.

34. ***Institutional arrangements.*** KCSAP will be implemented under a three-tiered institutional arrangement, namely at the national, county, and community levels. At the national level, MoALF will be the main implementing agency. County governments will be the executing agencies at subnational level, while beneficiaries will be responsible for implementing their CSA microproject interventions at the community level.

35. With regard to procurement management, staff with required qualifications and experience will be assigned from the implementing agencies or recruited from the market. With additional TA to strengthen procurement capacity, the institutions can undertake implementation, facilitation, and coordination of the project with reduced risk. At the national level, the NPCU anchored in the SDA of MoALF will be responsible for implementing procurements under Components 2, 3, and part of Component 4 of KCSAP. At the county level, the CPCU to be established within the respective counties' agricultural departments will spearhead execution of procurement activities under Component 1 and part of Component 4. At the community level, the CDDOs with elected leaders (chair, secretary, treasurer, and board members) will assist beneficiaries in procurement activities. An independent firm/agency will be hired to: (i) conduct assessments of the established CIGs, VMGs, POs, and SACCOs; (ii) develop detailed guidelines and simplified procurement procedures; and (iii) develop the social accountability tools and methodologies.

36. ***Procurement at the County Level.*** At the county level, the executive arm consists of a Governor, a Deputy Governor, a County Executive Committee (CEC), a County Secretary, Chief Officers (COs), Directors, and operations staff. Each CEC member is in charge of the overall policy and operational responsibility of a specific portfolio of a department or ministry of the CG. The day-to-day operations of each county department or ministry are led by a CO with the assistance of directors and operations staff. Administratively, the counties have offices at the county headquarters, in subcounties, and wards. Government offices in subcounties and wards are headed by administrators who are assisted by accountants and procurement staff. In the structure of the executive arm of CGs, each department or ministry is responsible for fiduciary management, including FM and procurement. Overall, procurement at county level is managed by the Head of the Procurement Function, who is supported by an operations team of Supply Chain Management (SCM) officers. An SCM officer is attached to each county ministry and 1–2 two subcounties. The minimum qualification for the procurement team is a Diploma in SCM.

37. In most counties, procurement staff are conversant with the Public Procurement & Asset Disposal Act (PPADA, 2015) and have some basic understanding of consolidated annual Procurement Plans. Most of the procurement units are equipped with adequate ICT equipment and internet connectivity. Where reliable internet connectivity is available at county headquarters, the procurement officers have access to the Public Procurement Regulatory Authority (PPRA) website, from which they can download standard bidding documents to initiate and administer procurement processes.

38. In conformity with the PPADA (2015), counties have established a County Procurement Function and an Inspection and Acceptance Committee (IAC). Bid opening and bid evaluation

committees are appointed on an ad hoc basis. Upon the recommendations of the Head of County Procurement Function, the CO awards contracts to successful bidders and signs the contract with them on behalf of the CG.

39. ***Procurement Manual.*** A Procurement Management Manual (PMM) has been prepared in line with World Bank Procurement and Consultant Guidelines. Procurement at the community level will be in accordance with the provisions applicable for Community Participation in Procurement (CPP) as defined in Paragraph 3.19 of the Procurement Guidelines and described in detail in the PMM. These procedures are in line with the "Guidance Note for Design and Management of Procurement Responsibilities in Community-Driven Development Projects," dated March 15, 2012. The PMM includes a chapter on disclosure as provided below, as well as a code of ethics for project procurement staff at the national and CG level.

40. ***Disclosure requirements.*** The project will proactively disclose the following documents on its website: (i) procurement plans and updates; (ii) invitation for bids for goods and works for all international competitive bidding (ICB) and national competitive bidding (NCB) contracts; (iii) requests for expression of interest for selection/hiring of consulting services; (iv) contract awards of goods and works procured following ICB/NCB procedures; (v) list of contracts/purchase orders placed following shopping procedures on a quarterly basis; (vi) shortlists of consultants; (vii) contract awards of all consultancy services; (viii) lists of contracts following direct contracting (DC), consultants' qualifications selection (CQS), or single source selection (SSS) on a quarterly basis; (ix) reports on actions taken on complaints received on a quarterly basis; and (x) the progress of all contracts awarded and payments made on a quarterly basis.

41. The following details will also be published on the World Bank's external website and United Nations Development Business (UNDB): (i) invitation for bids for procurement of goods and works using ICB procedures; (ii) request for expression of interest for consulting services with an estimated cost of more than US$300,000; (iii) contract award details of all procurement of goods and works using ICB procedures; (iv) contract award details of all consultancy services with estimated costs above US$300,000; and (v) list of contracts/purchase orders placed following SSS, CQS, or DC procedures on a quarterly basis.

42. As part of citizen engagement, all civil works will have a notice board displaying contract description, contractor's name, contract amount, and physical and financial progress. The project will create a Procurement MIS to display information on microprojects and procurement carried out by the community (description, quantity, unit rate, and supplier/contractor name and consultants if any hired, including remuneration) at the community level. At the community level, posters and pamphlets will be printed and distributed in simple language to uphold the highest integrity in implementing the microprojects, drawing from similar experiences in other successful CDD-type operations.

43. ***Procurement Plan.*** MoALF developed a Procurement Plan (PP) that provides the basis for procurement during project implementation, which will be available in the project's database and on the World Bank's external website. The PP will be updated annually in agreement with the World Bank or as required to reflect actual project implementation needs and improvements in institutional capacity.

44. *Shortlists comprising entirely national consultants*. Shortlists for consultancy services, engineering, and contracts supervision for contracts estimated to cost US$300,000 or less may be

composed entirely of national consultants in accordance with the provisions of Paragraph 2.7 of the Consultants Guidelines.

45. *Review of procurement decisions.* The PP will set forth those contracts that shall be subject to the World Bank's prior review. All other contracts shall be subject to post-review by the World Bank.

46. *Frequency of procurement supervision.* In addition to the prior review supervision to be carried out by World Bank procurement specialists, the World Bank will conduct annual visits to the field to provide support and carry out post-review of procurement activities.

Table A3.3: Thresholds for Procurement Methods and Prior Review

Expenditure Category	Procurement/ Selection Method	Procurement/ Selection Method Threshold (US$)	World Bank's Review Requirements (US$)
Works	ICB	≥15 m	≥5 m
	NCB	<15 m	≥5 m
	Shopping	<0.2 m	None
	Direct Contracting	All Values	≥0.1 m
Goods	ICB	≥3 m	≥1.5 m
	NCB	<3 m	≥1.5 m
	Framework Agreements	<3 m	≥1.5 m
	Shopping	<0.1 m	None
	Direct Contracting	All Values	≥0.1 m
Non-Consulting Services	ICB	≥3 m	≥1.5 m
	NCB	<3 m	≥1.5 m
	Shopping	<0.1 m	None
	Direct Contracting	All Values	≥0.1 m
Consulting Services (Firms)	QCBS/QBS/least cost selection (LCS)/fixed budget selection (FBS)	All Values	≥0.5 m
	CQS	≥0.3 m	≥0.1 m
	SSS	All Values	≥0.2 m
Individual Consultants	IC	All Values	≥5 m

Governance and Anti-Corruption Measures

47. **Governance risks, including lessons and key measures needed to address risks that have emerged in other projects involving decentralized service delivery (such as CDD-type operations), were incorporated in the design of KCSAP**. A set of governance risk mitigation measures was developed to strengthen overall governance and anti-corruption (GAC) aspects during project implementation. These measures, as presented below, will form part of the project's risk management framework; and will also be detailed in the PIM. These measures include:

- ***Strong emphasis on building financial and procurement management capacity, to include community/public involvement, at each level of the project.*** This measure will

be embedded as part of capacity building of communities (CIGs, VMGs, POs, PPPs, and SACCOs) and counties (e.g., under Subcomponent 1.1). To the extent possible, civil society shall not be engaged in community procurement. To implement this requirement, it will be imperative to deliver training to communities on financial management, procurement, and record-keeping aspects, supplemented by straightforward, easy-to-understand fiduciary manuals that communities can refer to.

- ***Robust MIS*** that: (i) provides up-to-date reports on project finances, activities, and performance across project components and subcomponents; (ii) generates reports comparing performance between counties and communities on key project results versus financing; (iii) geo-maps key project interventions under each component (including name of activity, financing, results, name and contacts of responsible persons); and (iv) keeps a fixed asset register of project assets. The MIS will need to accommodate inputs from different levels of project implementation using easily available technology (such as smartphone forms).

- ***Public disclosure of project information***, including: (i) a communication program that ensures that Kenyans, particularly those in participating counties, are fully aware of the project, its objectives, criteria, activities, finances, information sources (for example, a web-based map), contact persons, and grievance redress mechanisms; (ii) web-based, publicly accessible, updated geo-maps of all project interventions; (iii) public signboards in prominent locations at each level (the village, ward, subcounty, and county, for instance) displaying activities, financing, and location of key microprojects for each component; (iv) all awarded procurement contracts (goods, works, consultants); (v) all project-financed staff listed by name; (vi) uptake points for complaint handling in public information and communications materials; and (vii) annual project reports that are publicly disclosed on the website and in hard copy at project implementation unit sites.

- ***Establishment of a complaint-handling mechanism*** to include a grievance/complaints committee, designation of a focal point officer to coordinate complaints, and establishment of a framework (specifying what types of complaints will be handled by which entities/agencies—for instance, that Fraud & Corruption complaints will be forwarded to EACC. Capacity building of the complaint management system is also required and will be built into performance contracts of responsible parties. Quarterly monitoring reports will be consolidated, reviewed by NPCU, and provided to the Bank.

- ***Suspension of transfers/disbursements.*** To counties and communities that do not comply with record-keeping, reporting, and other governance requirements.

- ***Project implementation support.*** In addition to regular implementation support visits, unannounced visits to project sites at each level will be conducted.

48. Additional GAC measures could include:

- ***Leverage/support for existing preventive GAC initiatives spearheaded by EACC,*** for example:

  (i) Conduct corruption risk assessment and systems audits of various institutions; make various recommendations to the institution on actions to be taken; and require the institution to report back on addressing risks identified within a set timeframe.

(ii) Leverage the existing County Corruption Prevention Advisory Program, whose focus is to advise CGs on mapping out corruption-prone areas in operational systems and procedures; develop strategies and measures to address corruption and unethical practices in operational systems; develop and enforce codes of conduct, anti-corruption policy, and anti-corruption plans; and ensure that participating CGs sign action plans for implementation.

(iii) Use County Anti-Corruption Outreach Programs to educate the public on the dangers of corruption and enlist public support in the fight against corruption and unethical practices.

(iv) Train Integrity Assurance Officers and Corruption Prevention Committees.

(v) Train Community-Based Anti-Corruption Monitors to participate in the fight against corruption and unethical practices.

- ***Increased public awareness within the program of direct reporting on governance issues, including fraud and corruption, to oversight institutions,*** including through the Integrated Complaints Reporting Mechanism, which establishes unified complaint reporting centers for EACC, the Commission on Administrative Justice, National Anti-Corruption Steering Committee, National Cohesion and Integration Commission, Kenya National Commission on Human Rights, and Transparency International (Kenya). Through this platform, EACC's outreach is extended to places where it does not have a physical presence, as cases can be reported through these institutions, which in turn lodge complaints on the platform, which is accessed, managed, and maintained by dedicated EACC staff. Complaints are regularly analyzed, categorized, and referred to appropriate units or other responsible agencies.

Environmental and Social Safeguards

49. The project is assigned environmental **Category B - Partial Assessment**. The proposed project investments in rural infrastructure (such as irrigation, local markets, water conservation structures, livestock holding grounds, boreholes, and so on) and agricultural VCs (such as storage facilities, local-level value addition, limited use of agro-chemicals) are likely to have negative environmental and social impacts that are expected to be small-scale, site-specific, and largely reversible. Table A3.4 summarizes environmental and social safeguards triggered by the project.

Environmental Safeguards

50. The project has triggered three environmental safeguards—Environmental Assessment (OP 4.01), Physical Cultural Resources (OP 4.11), and Pest Management (OP 4.09).

51. ***Environmental Assessment (OP 4.01).*** The area of project investments and the design of microprojects are not known during project preparation, given the project's CDD approach. Therefore, the GoK has prepared an Environmental and Social Management Framework (ESMF) for the Environmental Assessment (OP 4.01), Physical Cultural Resources (OP 4.11), and Pest Management (OP 4.09). The ESMF outlines the process for undertaking an environmental and social assessment to guide the implementing and executing agencies at the national, county, and community levels to identify, assess, and avoid or mitigate the potential negative impacts of the proposed subprojects and microprojects.

52. The ESMF also defines uniform screening mechanisms and monitoring procedures for identifying and managing localized, potentially adverse environmental and social impacts. The screening will utilize the following evaluative tools: (i) an Environmental and Social Screening Form/Checklist to help identify potential adverse environmental and social impacts; (ii) an Environmental and Social Project Report that will outline simple environmental mitigation measures for microprojects that do not require a full Environmental and Social Impact Assessment report; and (iii) a summary of World Bank safeguard policies to ensure that they are taken into account during the subproject and microproject planning stage.

53. The ESMF also includes a capacity-building and training program to support the mainstreaming of safeguards implementation based on the lessons learned from the implementation of WKCDD&FMP and KAPAP. In addition, the ESMF provides guidance on handling complaints that may arise during project implementation. Based on the environmental and social screening process provided in the ESMF, Environmental and Social Impact Assessments/Environmental and Social Management Plans shall be developed and relevant environmental assessments undertaken. Monitoring and reporting formats are provided in the ESMF document and shall be customized to the respective subprojects and microprojects during implementation.

Table A3.4: Safeguards Policies Triggered by NARIGP

SAFEGUARD POLICIES TRIGGERED BY THE PROJECT		YES	NO
OP/BP 4.01	Environmental Assessment	X	
OP/BP 4.04	Natural Habitats		X
OP/BP 4.36	Forests		X
OP 4.09	Pest Management	X	
OP/BP 4.11	Physical Cultural Resources	X	
OP/BP 4.10	Indigenous Peoples	X	
OP/BP 4.12	Involuntary Resettlement	X	
OP/BP 4.37	Safety of Dams		X
OP 7.50	Projects in International Waters		X
OP 7.60	Projects in Disputed Areas		X

54. ***Pest Management (OP 4.09).*** Project activities may indirectly result in increased pesticide and other agro-chemical use. Overall, the project is neither expected to have significant pest management issues nor to finance substantial quantities of pesticides. However, to guide the project in procurement, management, and disposal of these chemicals, the ESMF includes an Integrated Pest Management Plan (IPMP) to guide (including training and capacity-building activities for farmers) their safe handling, storage, and disposal .

55. ***Physical Cultural Resources (OP 4.11)***. Microprojects are not expected to traverse areas of cultural or historical importance. In addition, due to the CDD nature of project activities, civil works are expected to be small-scale and localized. However, the ESMF includes a procedure for handling "chance finds." Chance find procedures will also be included in the respective microproject contracts and Environmental and Social Management Plans.

Social Safeguards

56. In addition to the three environmental safeguards, the KCSAP has triggered two social safeguards—Involuntary Resettlement (OP 4.12), and Indigenous Peoples Policy (OP 4.10). Due to the CDD approach, the area and the design of microprojects are not known ex ante. Accordingly, the GoK has prepared a Resettlement Policy Framework (RPF) and the Vulnerable and Marginalized Group Framework (VMGF) that will take into account all resettlement and inclusion aspects of subprojects and microprojects supported under the KCSAP.

57. ***Involuntary Resettlement (OP 4.12)***. Although no resettlement is envisaged, this policy is triggered as a precautionary measure. The GoK has prepared an RPF for the purpose of establishing resettlement and compensation principles, the organizational arrangement, and criteria to be used to meet the needs of people who could be affected by the various microprojects supported under KCSAP. The RPF guides compensation due to involuntary resettlement, including impacts on livelihoods, acquisition of land, or restrictions to access to natural resources. RPF also: (i) presents the relevant policy and legal framework pertaining to resettlement; (ii) anticipates the potential project impacts and suggests mitigation measures; (iii) provides eligibility criteria for compensation; (iv) includes valuation methods for compensation of asset categories; (v) outlines steps for preparing the Resettlement Action Plan (RAP), implementing, and monitoring; and (vi) includes disclosure arrangements. The RAPs will provide guidelines on how microprojects will avoid, manage, or mitigate all related compensation and displacement risks.

58. ***Indigenous Peoples (OP 4.10)***. This policy is triggered because it is likely that Indigenous Peoples (IPs) or VMGs are present in, or have collective attachment to, the project area. The VMGF outlines the processes and principles of: (i) screening to determine if a proposed microproject investment will be undertaken in the vicinity of vulnerable and marginalized communities; and (ii) the preparation of a Vulnerable and Marginalized Group Plan (VMGP), including the social assessment process, consultation and stakeholder engagement, disclosure procedures, communication, and a grievance redress mechanism. A detailed VMGP will be prepared for each microproject if the location screening has determined that IPs or VMGs are present in the area.

59. **Safeguards Consultations.** The first consultation and disclosure workshop was held in Nairobi on September 20, 2016. The workshop was attended by about 80 participants from 24 counties and included representatives from national and county governments, Council of Governors, NEMA, KEPHIS, STAK, Kenya National Bureau of Statistics (KNBS), several project implementing agencies (KALRO, KMD), and representatives of VMG/IP organizations, NGOs, and KENAFF. The United Nations Environment Programme (UNEP) participated as an independent observer. MoALF underlined the importance it attached to environmental and social safeguards and emphasized that KCSAP envisages no and/or minimal physical relocation of project-affected persons during its implementation in the 24 counties. The majority of subprojects and microprojects are to be carried out on-farm with minimal and reversible impacts. Every effort will be made to ensure that the siting of subprojects and microprojects avoids physical resettlement of anyone and minimizes economic displacement. Additional consultations were held simultaneously in six counties on October 24–25, 2016. The final consultation and disclosure workshop was held in Nairobi on October 28, 2016.

60. Overall, feedback from the various consultation workshops was supportive of the project. While participants endorsed the draft ESMF, RPF, and VMGF documents they also pointed to areas that needed improvement. With regard to project design, participants: (i) welcomed the channeling of TA and resources directly to communities and underlined the importance of ring-fencing such resources against leakages; (ii) reiterated that the northern and northeastern counties, which are relatively insecure, should not be further marginalized; (iii) asked if free prior and informed consent would apply to KCSAP; (iv) emphasized the importance of timely dissemination of information, in appropriate language (including vernaculars) and form (written, electronic and verbal); and (v) underlined that VMGs' livelihood activities should be given special attention. Participants endorsed the CDD approach. The CIG representatives stated that they had benefitted from previous and ongoing projects with CDD-type activities and believed that KCSAP would build on those successes and good practices. Participants welcomed the fact that the KCSAP's support will also benefit IPs. The detailed comments and MoALF responses are captured in the respective frameworks (ESMF, RPF, and VMGF).

61. The ESMF, RPF, and VMGF were publicly disclosed in-country on the MoALF Website[61] on November 11, 2016 and at the World Bank InfoShop on November 14, 2016.

Capacity Building and Training on Environmental and Social Safeguards

62. Effective implementation of the ESMF, VMGF, and RPF will require adequate technical and institutional capacity, especially with regard to screening processes, planning, and M&E. There is a need for targeted capacity building and training on safeguards implementation and monitoring at the national, county, and community levels. Table A3.5 summarizes the critical safeguards capacity building and training to be provided.

Table A3.5: **Safeguards Capacity Building and Training Support for KCSAP**

Level	Key Target Groups	Type of Training
National	NPCU, NPSC, NTAC	Sensitization on the PICD; and Environmental and Social Safeguard Frameworks
County	CPSC County Project Technical Team (with line department and ministries at the county level)	PICD; Environmental and Social Safeguard Framework; Application of the screening checklists, manuals, and tools; Conflict resolution and grievance redress mechanism; Social audits; Report writing; Citizen and stakeholder engagement
Community	Community-level structures (VCs, POs, SACCOs, CIGs, VMGs, and CDDCs).	PICD; Skills on screening and use of environment and social checklist; Checklist for RFP and RAP implementation; VMGF and VMGP training; Conflict resolution and grievance redress committee; Participatory M& E and reporting; Gender screening; Training on CIDP; Lobby and advocacy; Building farmers' organizations

Monitoring & Evaluation

63. **KCSAP will be underpinned by a solid monitoring, learning, and evaluation system that will feed into decision support systems.** The monitoring and evaluation (M&E) and

[61] The safeguards documents for the KCSAP can be downloaded from the links below: http://www.kilimo.go.ke/index.php/media-center/downloads/ and http://www.kapp.go.ke/projects/kcsap/frameworks.html.

management information system (MIS) will be set up at the national and county levels. Its primary objective will be to enforce the culture of results-based project M&E and provide the basis for an evidence-based decision-making process. These systems will be designed to provide concurrent feedback to key stakeholders about progress toward the project's key results (see Annex 1).

64. An integrated MIS that builds on the experiences and lessons learned from WKCDD&FMP and KAPAP will be developed under the project. The MIS will have the capability of monitoring project activities based on the AWP&Bs, financial and procurement reporting, and M&E reporting against the results framework. The MIS will be linked to an ICT-based Agricultural Information Platform. The latter draws upon data collected during the implementation of project activities to generate reports that: (i) compare implementation performance at the national, county, and community levels; (ii) links physical implementation to financial reporting; and (iii) give project stakeholders relevant information with which to make informed business and analytical decisions.

65. An M&E Officer and M&E Assistants will be responsible for collecting data, compiling, analyzing, and reporting at the national and county levels, respectively. The project will strengthen the overall monitoring and evaluation capacity by investing in ICT infrastructure and training at the national and county levels.

66. At the community level, KCSAP will adopt the participatory M&E approach, whereby non-committee members of CIGs/VMGs/POs/SACCOs (a man and a woman) will be elected to monitor microproject activities. KCSAP will build on the experience of WKCDD&FMP, which has successfully implemented web-based and geo-tagged M&E and MIS that include real-time monitoring images and data for each microproject across all participating subcounties.

Annex 4: Implementation Support Plan

Kenya Climate-smart agriculture Project (P154784)

Strategy and Approach for Implementation Support

1. The strategy for successful implementation support (IS) of the KCSAP operation will focus on mitigating the risks identified at various levels and supporting risk management plans as proposed in the Systematic Operations Risk-Rating Tool (SORT).

Implementation Support Plan

2. The IS plan will comprise a number of critical review instruments to assess progress toward achieving the PDO and overall implementation progress, and to effectively respond to issues and challenges as they arise. Such reviews will include, among others: (i) IS missions conducted semi-annually to include other development partners and CGIAR centers as appropriate; (ii) a mid-term review that will include a comprehensive assessment of the progress achieved at the mid-point of project implementation; and will serve as a platform for revisiting project design issues and identifying where adjustments might be needed; (iii) project impact assessment; and (iv) implementation completion, where an independent assessment of the project will be undertaken and lessons drawn to inform future or similar operations. The IS Strategy, as articulated above, will include a concerted plan of technical, fiduciary, and safeguards support needed to ensure due diligence over the course of project implementation.

3. ***Technical support.*** At the technical level, the World Bank team will assemble the appropriate technical skills mix and experience needed to support implementation of this complex and large operation. This team will include participation by the International Finance Corporation (IFC), particularly with regard to issues around policy pertaining to, and regulation of, the Kenya seed industry and commodity VCs. It will also include the participation of FAO and CGIAR centers to bring in new knowledge on various climate change aspects.

4. ***Fiduciary support.*** Given the *high* fiduciary risk rating, reviews will be further enhanced by the World Bank's FM and procurement specialists to ensure that fiduciary systems and capacities remain adequate during the course of project implementation in accordance with the World Bank's fiduciary requirements.

5. ***Financial management support***. The World Bank will require that quarterly IFRs be submitted to the World Bank as well as the annual external audit report for review. The World Bank will review other project-related information as well, such as the internal control, oversight, and reporting systems. Annual and unannounced project-site visits will be carried out by the World Bank to review the FM systems, including internal controls. Monitoring of actions taken on issues highlighted in the audit review of KCSAP, external audit reports, auditors' management letters, internal audits, and other reports will be reviewed by the World Bank, including SoE transaction reviews. FM capacity training for MoALF and project coordination units (NPCU, CPCUs, etc.) will be carried out by effectiveness. Additional FM training will be conducted during project implementation as needed.

6. ***Procurement support.*** The World Bank will undertake IS missions every six months. An independent agency/firm will be recruited to conduct regular procurement audits for the county-level investments and CDD-type operations. Procurement capacity training for MoALF and project coordination units (NPCUs, CPCUs, etc.) will be provided prior to effectiveness.

7. ***Safeguards support.*** The World Bank's safeguards team will consist of social and environmental specialists who will guide the project team in applying the agreed safeguard instruments as well as reviewing compliance during IS missions. An enhanced capacity-building action plan is outlined in Annex 3, Table A3.5 to guide safeguards implementation and monitoring activities.

Table A4.1: Main Focus of Support to Project Implementation

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First 12 months	• Project effectiveness and implementation start-up • Establishment of an NPCU • Safeguards instruments application/compliance • M&E system (methodology, etc.) in place • Fiduciary training provided • PICD and VC prioritization • Standardized training modules developed	• Lead Agriculture Economist (TTL) • Climate Change specialist (Consultant) • Senior Social Development Specialist (Co-TTL) • Irrigation Specialist (FAO) • Value Chain Specialist (FAO) • Agriculture Specialist/Agronomist (FAO) • ICT Specialist • Senior Operations Officer • M&E Specialist • Safeguards Specialists (Social and Environmental) • Nutrition Expert (FAO) • Fiduciary Specialists (FM and Procurement) • Legal Counsel • Finance/Disbursement Officer • Leadership, Learning and Innovation (LLI) Engagement Leader • International Agricultural Research on Climate Change Experts (CGIAR centers in Kenya)	US$150K – US$200K (est.)	• FAO Investment Center (TCI) • CGIAR centers (Kenya)
13-48 months	• Implementation of planned activities/review of AWP&Bs • Monitoring, reporting against targets • IS missions conducted • Mid-term review undertaken (year 3) • First impact assessment	• Lead Agriculture Economist (TTL) • Senior Social Development Specialist (Co-TTL) • Irrigation Specialist (FAO) • Value Chain Specialist (FAO) • Agriculture	US$150K – US$200K/year (est.)	• FAO/TCI • CGIAR centers (Kenya)

	conducted	Specialist/Agronomist (FAO) • ICT Specialist • Senior Operations Officer • M&E Specialist • Safeguards Specialists (Social and Environmental) • Nutrition Expert (FAO) • Fiduciary Specialists (FM and Procurement) • LLI Engagement Leader • International Agricultural Research on Climate Change Experts (CGIAR centers in Kenya)		
49-60 months	• Implementation of planned activities/review of AWP&Bs • Monitoring, reporting against targets • IS missions conducted • Impact assessment conducted • Project completion and ICR preparation	Same as above	US$150K – US$200K/year (est.)	• FAO/TCI • CGIAR centers (Kenya)

Table A4.2: Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
• Agriculture Economist • Climate Change • Social Development • Irrigation • Value Chains • Nutrition • Agronomy • ICT • Financial Management • Procurement • Safeguards (social and environment) • Legal • Finance/Disbursements • Operations	2 staff weeks	1–2 trips/year	

Table A4.3: Partners

Name	Institution/ Country	Role
Canadian International Development Agency (CIDA) Department for International Development (DfID) European Investment Bank (EIB) European Union (EU) Food and Agriculture Organization (FAO) Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) International Fund for Agricultural Development (IFAD) Japan International Cooperation Agency (JICA) The Netherlands Embassy United States Agency for International Development (USAID) United Nations Industrial Development Organization (UNIDO) United Nations Development Programme (UNDP)		Development Partners currently involved in Kenya's agricultural sector

Annex 5: Economic and Financial Analysis

Kenya Climate-Smart Agriculture Project (P154784)

1. Introduction

1. The economic and financial analysis of the KCSAP is based on experience with similar CDD projects in the agricultural sector of Kenya and in other countries/regions, and it follows the World Bank guidelines. To justify the KCSAP public financing decision, the economic and financial analysis aims to answer three questions: What is the rationale for public sector financing? What is the World Bank's value added? What is the project's development impact?

2. The analysis has three parts. The first part is an overview of tangible and intangible benefits that could be achieved by the project. The second part is the financial analysis, conducted at the farm level to estimate the viability of adopting CSA TIMPs for 11 commodities[62] identified as climate-smart priority commodities in the 24 participating counties. Given that the project has adopted a CDD approach, the specific interventions are not known ex ante, so the models are indicative. The third part is the economic analysis. It evaluates the project's benefits and costs to the national economy, which include the aggregation of beneficiaries' net incremental benefits from adopting CSA TIMPs, valued in economic terms, as well as an assessment of environmental benefits likely to accrue from reduced GHG emissions and increased carbon sequestration.

3. Ex ante economic and financial analyses of agricultural projects that invest in research and development, introduce new technologies and improved crop and livestock management practices, and provide capacity building usually encounter enormous challenges. The overriding challenge is how to capture the diverse project outcomes such as improved input availability, improved natural resources conservation, and reduced poverty levels in the wake of limited and unreliable time-series data. Measuring the degree of technology adoption among beneficiaries and assessing the attribution of specific project interventions to outcomes are also challenging tasks. The reliability of predicted future cost and benefit flows may also present a problem.[63] In the case of CDD-type operations like the KCSAP, investments are not known ex ante. Thus this analysis is based on assumptions with regard to the available CSA intervention options and draws from previous experience with projects including WKCDD&FMP, KAPAP, and KAPSLMP.

Value added of World Bank support

4. The World Bank is well positioned to assist the GoK in implementing KCSAP. The World Bank is able to draw on vast global knowledge and experience leveraging VC, landscape, and CDD approaches to design and deliver demand-driven and evidence-based interventions to achieve desired CSA outcomes. World Bank involvement facilitates the mobilization of resources from across the World Bank Group (IFC, MIGA) and via partnerships with other donors. Most importantly, KCSAP builds on and complements previous and ongoing

[62] Cassava, green grams, sorghum, millet, pigeon peas, bananas, tomatoes, honey, indigenous poultry (meat and eggs), dairy, and red meat (cattle). The increase in productivity of these commodities is tracked in the M&E system, except for honey. The M&E system also tracks aquaculture, although it is not covered in this analysis.

[63] See Horstkotte-Wesseler, G, M. Maredia, D. Byerlee, and G. Alex (2000), "Ex Ante Economic Analysis in AKIS Projects: Methods and Guidelines for Good Practice," Agriculture Knowledge & Information Systems Good Practice Note, Report 20881, World Bank, Washington, DC.

interventions funded by the World Bank, including KAPAP, WKCDD&FMP, and KAPSLMP. The design of the KCSAP was informed by elements of NARIGP, a project that targets 21 counties in Kenya over 2016–2021. KCSAP will target the remaining 24 counties, excluding the urban counties of Nairobi and Mombasa. Both projects provide technical and institutional support to the targeted counties in a similar time period, thus allowing for synergies and the efficient and effective management and implementation of both projects.

Rationale for public sector financing

5. The rationale for public financing of this project is strong, because KCSAP will support public and global goods, as well as on-site environmental benefits; basic agricultural R&D; institutional and technical capacity building; and wider opportunities for inclusive growth and shared prosperity.

6. *Public and global goods.* The implementation of TIMPs at the household and county level will provide global public goods in the form of reduced GHG emissions per unit of output and increased carbon sequestration, along with the public on-site environmental benefits that could result from improved watershed management or reforestation. Such on-site public benefits may include a reduction of land degradation, leading to reduced sedimentation and siltation of rivers and streams; improved water quantity and quality; and improvements in the microclimate owing to sustained forest cover, all of which can positively affect agricultural production, productivity, and household and eco-system resilience.

7. *Basic agricultural research and development.* Support for basic agricultural research is widely seen as a public responsibility, while applied research and product development are increasingly the domain of the private sector. Even so, applied agricultural research for small-scale farmers may be less attractive to the private sector because it entails higher risks and market development costs, which often limit profits. For that reason, public financing of agricultural R&D is warranted[64] to support the development and multiplication of improved varieties of crops that are particularly important for ASALs (dryland cereals, legumes, and other "traditional high-value crops") but cannot attract private R&D firms because of low profit. Another consideration relevant to public financing is that Component 2 of the proposed project aims to develop research infrastructure and strengthen institutional capacity to coordinate delivery of public goods (specifically, CSA TIMPs).

8. *Institutional and technical capacity building.* The project supports institutional and technical capacity building for CGs to fulfill their mandates to deliver agricultural sector services of appropriate quality, including crop and animal husbandry, extension, agricultural marketing, and related services. The proposed project will also strengthen the institutional and technical capacity to deliver other public goods such as agro-weather, climate, and market information services.

9. *Wider opportunities for inclusive growth and shared prosperity.* The project will contribute to the operationalization of NEDI, a special government program to develop infrastructure (water, transport, off-grid energy) and agriculture primarily in support of the livestock subsector in northern and northeastern Kenya. Several of these investments, such as

[64] See Echeverria, R.G. and N.M. Beintema, (2009), "Mobilizing Financial Resources for Agricultural Research in Developing Countries: Trends and Mechanisms," GFAR Working Paper, Global Forum on Agricultural Research (GFAR), Rome.

infrastructure, energy generation, veterinary and animal health services, can generate common good benefits and thus justify public sector financing.

10. *Development impact.* The investment components of the project will: (i) improve the livelihoods of direct and indirect beneficiaries involved in agricultural production activities; (ii) improve the provision of ecosystem-related goods and services, which will increase resilience in the ecosystem, agri-food systems, and households; and (iii) enhance the potential to increase value added and tax revenue for the government, contributing to the overall development impact. The financial analysis described here shows that the project has great potential for increasing and stabilizing net household income, as well as for making households more resilient to adverse weather and climate change risks.

2. Project Development Objective and Project Benefits

11. The KCSAP's PDO is "to increase productivity and build resilience to climate change risks in the targeted smallholder farming and pastoral communities in selected counties in Kenya, and in the event of an Eligible Crisis or Emergency, to provide immediate and effective response." The project aims to reach approximately 521,500 households as direct beneficiaries across 24 participating counties. About 181,500 households of those beneficiaries will be organized into CIGs and VMGs and receive training on CSA TIMPs. It is assumed that at the end of the project, 60 percent, or about 108,900 beneficiary households will have adopted at least one CSA TIMP. The project is expected to provide a range of direct tangible and indirect benefits to the beneficiary households, as discussed next.

Productivity and income increases

12. Direct and tangible project benefits will include *increased crop and livestock productivity, resulting in increased household incomes*. These benefits will stem from beneficiaries' adoption of CSA TIMPs, including improved seed and animal breeds; and improved agronomic, animal, and tree husbandry practices developed and tested under Component 2. For instance, practices such as integrated soil fertility management and conservation agriculture can increase maize yields by between 30 and 170 percent. For example, under KAPAP, depending on the level of inputs used, maize yields increased from about 0.4 t/acre to 0.6 t/acre, and in terraced trials from 1 t/acre to more than 1.2 t/acre. Monitoring results of the Kenya Agriculture Carbon Project show that farmers adopting sustainable soil and water management practices experienced increases in maize yield of 0.5–1.0 t/acre compared to control farms, where yields were 0.4–0.6 t/acre.[65]

13. Applying CSA TIMPs not only has the potential to increase agricultural productivity but also to *halt productivity and production losses due to climate change*. With climate change, as extreme events become more frequent and intense, yield levels are expected to decline, and yield variability is likely to increase. In Machakos, Kitui, and Makueni, variations in climate have

[65] Bryan, E., C. Ringerl, B. Okoba, C. Roncolio, S. Silvestru, and M. Herrero (2013), "Adapting Agriculture to Climate Change in Kenya: Household Strategies and Determinants," *Journal of Environmental Management* 114: 26–35. Chesterman, S., and C. Neely (eds.) (2015), "Evidence and Policy Implications of Climate-smart Agriculture in Kenya," CCAFS Working Paper No. 90, CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), Copenhagen. UNCD (United Nations Convention to Combat Desertification) (2009), *Benefits of Sustainable Land Management*, WOCAT and Centre for Development and Environment, University of Berne. Tittonell, P., M. Crbeels, B. van Wijk, B. Vanlauwe, and K. Giller (2008), "Combining Organic and Mineral Fertilizers for Integrated Soil Fertility Management in Smallholder Farming Systems in Kenya: Explorations Using the Crop-Soil Model FIELD," *Agronomy Journal* 100(5):1511–26.

caused maize yields to decline drastically, by 150 kg/acre per year.[66] Livestock populations can be devastated when drought and extreme rainfall variability trigger periods of severe feed scarcity, especially in dryland areas. Increases in the frequency of drought from one year in five to one year in three can lead to a rapid, unrecoverable decline in herd size.[67] About 1.8 million cattle could be lost in Kenya by 2030 because of more frequent drought, and the value of the lost animals and foregone production is estimated at US$630 million.[68] The economic cost of the 1998–2000 drought to the Kenyan economy was estimated at US$2.8 billion, mainly based on losses of crops and livestock, forest fires, damage to fisheries, reduced hydropower generation, reduced industrial production, and reduced water supply.[69] The introduction of sustainable land, water, and rangeland management practices under KCSAP will enable agricultural production and livelihoods systems to be more resilient and potentially reduce the economic cost of climate change.

14. In addition, the proposed project will support the federation of CIGs and VMGs into producer organizations (POs), help to strengthen private sector involvement, and improve farmers' market access and VC participation, which will provide incentives for enhancing the quality and quantity of production, employment, and livelihood opportunities.

15. The agro-weather and market information services provided through Component 3 will facilitate production decision-making for more efficient natural resource use and income-enhancing activities. By closing information gaps and reducing transaction costs, ICTs supported through KCSAP can enhance farmers' market opportunities; facilitate the dissemination of technical, productivity-enhancing knowledge; and empower small-scale farmers, agro-pastoralists, and pastoralists. For instance, a study in rural Niger finds that mobile phones reduce the search cost of obtaining market price information from US$0.8 to US$0.2, allow people to obtain information on a more frequent basis, and help them make more efficient production and sales decisions.[70] Certain prerequisites in human and physical capacity are essential for these benefits to be realized in agricultural communities, however. For example, it is crucial to integrate different types of knowledge (such as indigenous knowledge for weather forecasting and modern meteorological forecasts), which, to date, remains a significant challenge.[71]

Community benefits

16. The project provides intangible benefits such as community empowerment and cohesion through promotion of CIG and VMG membership. The PICD approach improves the targeting of

[66] Omoyo, N.N., J. Wakhungu, and S. Oteng'I (2015), "Effects of Climate Variability on Maize Yield in the Arid and Semi-arid Lands of Lower Eastern Kenya," *Agriculture and Food Security* 4: 8 (DOI 10.1186/s40066-015-0028-2).

[67] Thorsnton, P.K., J. van de Steeg, A. Notenbaert, and M. Herrero (2009), "The Impacts of Climate Change on Livestock and Livestock Systems in Developing Countries: A Review of What We Know and What We Need to Know," *Agricultural Systems* 101: 113–27.

[68] Thornton, P.K., P.J. Ericksen. M. Herrero, and A.J. Challinor (2014). "Climate Variability and Vulnerability to Climate Change: A Review," *Global Change Biology* 20: 3313–28 (DOI: 10.1111/gcb.12581).

[69] Stockholm Environmental Institute (2009), "Economics of Climate Change, Kenya." Project report.

[70] Aker, J (2008), "Does Digital Divide or Provide? The Impact of Mobile Phones on Grain Markets in Niger," BREAD Working Paper No. 177. Goyal, A., and C. Gonzalez-Velosa (2013), "Improving Agricultural Productivity and Market Efficiency in Latin America and the Caribbean: How ICTs Can Make a Difference?" *Journal of Reviews on Global Economics* 2: 172–82.

[71] Rao, K.P.C., W.G. Ndegwa, K. Kizito, and A. Oyoo (2011), "Climate Variability and Change: Farmer Perceptions and Understanding of Intra-seasonal Variability in Rainfall and Associated Risk in Semi-arid Kenya," *Experimental Agriculture* 47: 267–91. Speranza, C.I., B. Kiteme, P. Ambenje, U. Wiesmann, and S. Makali (2010), "Indigenous Knowledge Related to Climate Variability and Change: Insights from Droughts in Semi-arid Areas of Former Makueni District, Kenya," *Climatic Change* 100: 295–315.

the most vulnerable members of each community who are eligible for participating in VMGs. Thus the project supports an inclusive community development process and enhances the formation of social capital and governance skills. An empirical study shows that community-developed facilities typically have higher utilization rates and better maintenance than facilities developed through decisions by external actors.[72] Other studies indicate that the sustainability of water systems was enhanced when communities controlled the key investment decisions and shared the cost of the investment,[73] and community-organized irrigation systems generated higher levels of agricultural productivity than systems constructed by the government.[74] In India, an impact evaluation of a CDD project found significant gains for beneficiaries in terms of nutrition intake and asset accumulation, which were about 15 percent and 26 percent higher compared to the control group, respectively.[75] The impact survey from the WKCDD&FMP found that the number of participants in decision-making processes had nearly doubled from 40 to 78 percent, and mean monthly household income had more than doubled compared to non-beneficiaries, whose income had on average declined.[76] Project effectiveness can be diminished, however, if communities' social capital is too low. Several studies also argue that institutional support from external agencies, such as providing technical backstopping facilities, is required to ensure that benefits of community-driven projects can be reaped.[77]

Project governance benefits

17. Growing evidence suggests that CDD approaches also can improve the efficiency of public financing. Strengthened institutional capacity and CDD interventions, with inclusive and transparent decision-making processes, can increase the effectiveness and efficiency of delivering funds and implementing project activities. A recent study in Bangladesh found that CDD approach led to effective delivery of funds for community infrastructure and village development, and community-led fund management led to recurrent savings in annual operating costs.[78]

Environmental benefits

18. The project promotes sustainable landscape management practices and adoption of CSA TIMPs at the household and county levels. Their adoption will provide environmental benefits, on-site public benefits, and global environmental benefits. On-site public benefits are externalities related to the ecological functions of the watershed or landscape. These functions are widely recognized but not easy to document or quantify. Forest and watershed protection are important for: (i) soil conservations or control of soil erosion to reduce on-site and off-site

[72] Dongier, P., J. Van Domelen, E. Ostrom, A. Rizvi, W. Wakeman, A. Bebbington, S. Alkire, T. Esmail, and M. Polski (2003), "Community-driven Development," in *Poverty Reduction Strategy Paper Sourcebook*, World Bank, Washington, DC.

[73] Sara, J., and T. Katz (1997), "Making Rural Water Sustainable: Report on the Impact of Project Rules," United Nations Development Programme (UNDP) and World Bank Water and Sanitation Program, Washington, DC.

[74] Lam, W.F. (1998), *Governing Irrigation Systems in Nepal: Institutions, Infrastructure, and Collective Action*, Oakland, CA: ICS Press. Tang, S.Y. (1992), *Institutions and Collective Action: Self-governance in Irrigation*. Oakland, CA: ICS Press.

[75] Wong, S. (2012), "What Have Been the Impacts of World Bank Community-Driven Development Programs? CDD Impact Evaluation Review and Operational and Research Implications," Sustainable Development Network, Report No. 69541, World Bank, Washington, DC.

[76] ALPEX Consulting Africa (2014), Western Kenya Community Driven Development and Flood Mitigation Project: Household Impact Assessment Survey. Final report. Processed.

[77] Mansuri, G, and V. Rao (2003), "Evaluating Community-Based and Community-Driven Development: A Critical Review of the Evidence," Working Paper, Development Research Group, World Bank, Washington, DC.

[78] People's Republic of Bangladesh (2010), Empowerment and Livelihood Improvement "Nuton Jibon" Project/Social Investment Program Project. Processed.

sedimentation resulting in siltation of rivers and reservoirs; (ii) water flow regulation, including flood and storm protection, decreased rain water run-off (which could otherwise cause localized flooding, with possible adverse impact on fisheries and reservoirs), and water quantity and quality regulation; (iii) microclimate regulation; and (iv) enhanced biodiversity benefits. Several of these impacts translate into monetary benefits (which are not assessed here, however). For instance, the WKCDD&FMP ex ante evaluation of benefits suggested that the implementation of CSA practices and off-farm erosion control reduced sedimentation and lowered treatment costs for water companies in the intervention area. Water companies reduced chemicals used for water treatment (such as aluminum compounds and chlorine to purify and disinfect water) by more than 50 percent.

19. Sustainable management practices also provide public good benefits in the form of reduced GHG emissions. Practices such as agroforestry prevent land degradation and reduce losses of topsoil, thus inhibiting the escape of carbon into the atmosphere. Globally, soils store more than double the carbon of the atmosphere and biomass combined,[79] and they have considerable potential for carbon sequestration. The shadow price of carbon, or social cost of carbon (SCC), presents the marginal damage cost of carbon emissions; it is estimated as the present value of the stream of future economic damages of increased GHG emissions. The World Bank proposes using an SCC of US$30/t in the economic analysis.[80] Under the NARIGP, the net carbon balance assessed on agroforestry interventions in Kitui County was about –2 $MtCO_2e$ over 20 years. The analysis shows that the potential benefits accruing to society from avoiding damages from carbon emissions ranged from US$1 million per year to US$3 million per year (at a price of US$10 or US$30 per tCO_2e emission).

Improving nutrition

20. Nutrition mainstreaming is key under Component 1 and can contribute to large potential benefits at the individual and national levels. These benefits are not quantified in this analysis, but numerous studies demonstrate the high economic cost of malnutrition, which include direct losses in productivity due to poor physical status and diseases linked to malnutrition, as well as indirect losses such as those arising from poor cognitive development, losses in education, and losses caused by increased healthcare costs.[81] At an individual level, farmers who are undernourished are found to be less productive. For instance, childhood stunting, reflected in a 1 percent loss in adult height, is associated with a 1.4 percent loss in productivity.[82] In Zimbabwe, the effect of malnutrition on schooling has been calculated to reduce lifetime earnings by 12 percent.[83] A study across several African countries found that undernutrition causes economic losses ranging from 1.9 to 16.5 percent of GDP. In addition, governments spend billions of

[79] UNCCD (United Nations Convention to Combat Desertification) (2015), "Science-Policy Notes: Pivotal Soil Carbon," ((http://www.unccd.int/Lists/SiteDocumentLibrary/Publications/2015_PolicyBrief_SPI_ENG.pdf, January 2016).
[80] World Bank (2014), "Technical Guidance Note on the Social Value of Carbon" or http://www.worldbank.org/en/topic/climatechange/brief/integrating-climate-change-world-bank (Accessed January 2016).
[81] World Bank (2006), "Why Invest in Nutrition?" in *Repositioning Nutrition as Central to Development: A Strategy for Large-Scale Action*, http://siteresources.worldbank.org/NUTRITION/Resources/281846-1131636806329/NutritionStrategyCh1.pdf (accessed January 2016). Herforth, et al. (2012).
[82] Hunt, J.M. (2005), "The Potential Impact of Reducing Global Malnutrition on Poverty Reduction and Economic Development," *Asia Pac. J. Clin. Nutr*. 14(S): 10–38.
[83] Behrman, J.R., H. Alderman, and J. Hoddinott (2004), "Nutrition and Hunger," in *Global Crises, Global Solutions*, edited by B. Lomborg, Cambridge University Press.

dollars on interventions to deal with poor nutrition and its effects.[84] Examples from India suggest that micronutrient deficiencies alone may cost India approximately US$2.5 billion annually, about 0.4 percent of its annual GDP,[27] and that foregone wage employment from child malnutrition and productivity losses costs India another US$2.3 billion. In addition, improvements in nutrition can provide public good benefits; for example, better nutrition can reduce the spread of contagious diseases and increase national economic productivity.[85]

3. Financial Analyses

21. Under Component 1, communities can select a wide range of CSA TIMPS for their priority commodities and engage in other on- and off-farm livelihood diversification strategies. To assess the financial viability of interventions supported under KCSAP, farm budgets for 11 commodities were analyzed. Despite the regional and agro-ecological variation present across counties, the analysis treats farmers as homogeneous entities and assumes average values in the "with project" (WP) and "without project" (WOP) scenarios.

22. The timeframe for each analysis is 20 years, with a discount rate of 12 percent reflecting Kenya's average commercial lending rate. The exchange rate is US$1 to KSh.101.4 (November 2016). Data and information on labor requirements, input use, and production potential were obtained from farm management handbooks for representative counties, county household surveys conducted by the Agriculture Sector Development Support Program, related projects, technical studies by Tegemeo Institute, discussions with KALRO researchers, and technical experts. Market prices of inputs and outputs used were sourced from the Agriculture Food Security, and Market Information Subdivisions of MoALF; the Economic Review of Agriculture (ERA) (2013, 2015); and the Regional Agricultural Input Information System (AMITSA). It is assumed that family labor constitutes about 20 percent of farm labor and is valued at an opportunity cost of KSh 200 per person per day, which is also the average rural wage rate. Markets are assumed to be competitive, and home consumption is valued at market price. The following paragraphs describe each of the 11 farm models. Table A5.1 summarizes national trends in productivity and wholesale price for selected commodities.

Table A5.1: National average trends in productivity and price for selected commodities

Commodities	Productivity and wholesale price (KSh)	2010	2011	2012	2013	2014
Sorghum	Kg/acre	295	255	302	306	335
	KSh/kg	28.2	25.5	41	40	42.4
Green grams	Kg/acre	167	178	196	154	189
	KSh/kg	-	-	84.4	82	96
Irish potatoes	Ton/acre	9t/acre	5.5	4.9	5	4.7
	KSh/kg	12.5	23.1	34.2	27.2	28
Millet	Kg/acre	218	287	255	309	517
	KSh/kg	52	57.8	63	66	73.6
Pigeon peas	Kg/acre	262	247	251	262	287
	KSh/kg	-	-	-	-	-
Cassava	Ton/acre	2.1	4.5	5.1	5.7	5.4

[84] African Union Commission, NEPAD Planning and Coordinating Agency, UN Economic Commission for Africa, and UN World Food Programme (2014), "The Cost of Hunger in Africa: Social and Economic Impact of Child Undernutrition in Egypt, Ethiopia, Swaziland and Uganda," abridged report, UNECA, Addis Ababa.
[85] World Bank (2006).

	KSh/kg	14.8	16.2	20.6	20.2	19.6
Tomatoes	Ton/acre	-	-	7.6	7.4	6.7
	KSh/kg	-	-	48	53	65
Ripe bananas	Ton/acre	-	-	11	11	11
	KSh/kg	-	-	42	43	73

Source: ERA 2013, 2015.

Sorghum and green grams

23. Sorghum is rather under-utilized but is one of the most important cereal crops in drought-prone areas. Despite its suitability in semi-arid areas, the area under sorghum production is low, and farmers attain low yields. The main constraints are lack of income to purchase fertilizer or quality seed, and susceptibility to pests and diseases. Kenya, and particularly large companies such as East African Breweries, remain net importers of sorghum from Tanzania and Uganda. Thus there is significant market potential for sorghum production for brewing and animal feed production.[86] Sorghum is often intercropped with green grams, which are equally critical in semi-arid areas, which account for about 95 percent of green gram production in Kenya.

24. At the national level, the average sorghum yield was 0.3 t/acre (Table A5.1), though yields vary notably across target counties (in 2014, Kisumu County had an average yield of 0.7 t/acre, Nyeri 0.3 t/acre, and Marsabit 0.1 t/acre). The national average yield of green gram in 2014 was 0.2 t/acre, again with large variations between target counties (the yield was 0.04 t/acre in Wajir, 0.17 t/acre in Tharaka Nithi, and 0.3 t/acre in Marsabit).[87]

25. The WP scenario assumes the introduction of improved seed, fertilizer, and soil management practices, which are known to result in yields of 0.8–2.0 t/acre.[88] The scenario also assumes the adoption of improved green gram varieties such as K26 and KS20, which attain yields of up to 0.5 t/acre, mature early, and do well in dry areas.[89] The financial analysis assumes a moderate yield increase in sorghum from 0.35 t/acre to 0.63 t/acre and in green grams from 0.18 t/acre to 0.32 t/acre, and average sorghum and green gram wholesale prices of KSh 42/kg and KSh 87/kg, respectively. Note however that the use of improved seed, application of fertilizer, and associated increase in labor time also increase production costs compared to the WOP scenario. The incremental net benefits over 20 years were US$794/acre, the benefit-cost (BC) ratio was 1.8, and switching values for benefits and costs were –44 percent and 79 percent.

26. Sorghum also has potential nutrition and gender benefits. The crop has high levels of iron and zinc, which can help to reduce micronutrient malnutrition.[90] Female-headed households cultivate crops more frequently than livestock, and decision-making power over crops is usually

[86] FAO (Food and Agriculture Organization) (2013), "Analysis of Incentives and Disincentives for Sorghum in Africa: Monitoring African Food and Agricultural Policies (MAFAP/SPAAA)," Rome. Muui, C.W., R.M. Muasaya, and D.T. Kirbui (2013), "Baseline Survey on Factors Affecting Sorghum Production and Use in Eastern Kenya," *African Journal of Food, Agriculture, Nutrition and Development* 13(1).
[87] ERA (2015).
[88] FAO (2013).
[89] See https://www.mfarm.co.ke/blog/post/green-grams; accessed November 2016.
[90] Muui, Muasaya, and Kirbui (2013).

allocated to females,[91] so improvements in sorghum and green gram production have the potential to improve women's incomes.

Finger Millet

27. Millet can tolerate drought in the early stages of growth and is a climate-smart crop for ASALs. Average yields are relatively low, however, as farmers either lack inputs, wrongly apply fertilizers, or use broadcast sowing methods. From 2013 to 2014, millet registered a 38 percent increase in production, to 177,552 tons, even though the area under production declined by 17 percent. This production increase could be explained by increased awareness and use of drought-tolerant and high-yielding varieties.[92]

28. In the project area, average finger millet yields vary notably, from 120 kg/acre in Lamu, 291 kg/acre in West Pokot, and 692 kg/acre in Machakos. KALRO reports two new varieties (P-224 and Gulu-E) that mature early and are less susceptible to finger millet blast disease, and notes that improved crop management practices can increase yields to 650 kg/acre and that the use of improved varieties can increase yields to 890 kg/acre.[93] Additional benefits of finger millet include its high calcium and carbohydrate content. The small size of the seed makes it less prone to pests, and grain can be stored up to 10 years without significant deterioration.[94]

29. In the financial model, similar improvements in agronomic and management practices are assumed together with a yield increase from 300 to 900 kg/acre. Improved sowing techniques and fertilizer application more than double the labor requirement, however. The resulting annual net benefits are around US$152 per acre, with an NPV of incremental net benefits of US$403. The BC ratio of 1.45, and switching values for benefits of –31 percent and cost of 45 percent, attest to the robustness of the result.

Tomatoes

30. Tomatoes are a leading vegetable crop in terms of production and value; they have a key role in supporting dietary diversity, employment, and as a source of quick income for small- and medium-scale farmers. They are particularly attractive to the younger producers, who tend to have smaller plots. Tomato production is beset by several constraints, however, including pest and diseases, poor post-harvest technologies, and poorly organized market infrastructure that leads to unpredictable price fluctuations.[95]

31. Several low- to medium-cost technologies can notably improve productivity and income. For instance, the United States Agency for International Development (USAID) reports yields of 5 t/acre and increases in gross margins of 126 percent from US$750 to US$1,672 per acre.[96] Sigei et al. (2014) even suggest a yield of 10 t/acre and a net revenue of US$2,202. In this

[91] ASDP (Agriculture Sector Development Support Program) (2014), "Volume 1. Household Baseline Survey Report," Kitui County. Government of Kenya.
[92] ERA (2015).
[93] See http://www.kalro.org/fileadmin/publications/brochuresI/Fingermillet.pdf; accessed November 2016.
[94] FAO (Food and Agriculture Organization), International Treaty for Plant Genetic Resources for Food and Agriculture (undated), "Improving Finger Millet and then returning it to Farmers' Fields," www.planttreaty.org/sites/default/files/FACTSHEET%20KENYA.pdf; accessed November 2016.
[95] Sigei, K.G., H.K. Ngeno, A.M. Kibe, M. Mwangi, and M.C. Mutai (2014), "Challenges and Strategies to Improve Tomato Competitiveness along the Tomato Value Chain in Kenya," *International Journal of Business and Management* 9 (9).
[96] USAID (United States Agency for International Development (USAID) (2014), USAID Kenya Horticulture Competitiveness Project (USAID-KHCP), Annual Report No. 4, 2013–2014.

analysis, the WP scenario assumes improved weeding and disease control, improved seed, soil analysis to allow optimal fertilizer application, and mulching, which increases crop yields from 1.2 t/acre to 3 t/acre. This scenario leads to an annual net income of US$1,581, NPV of incremental net benefits of US$7,983, and a BC ratio of 5.2. The switching values for benefits and costs are –81 percent and 420 percent, respectively.

32. For market-oriented crops such as tomatoes, adult males usually are the main decision-makers. For that reason, KCSAP requires effective strategies for targeting female producers to ensure that they also benefit from project interventions related to these types of vegetables.

Irish Potatoes

33. The main challenge in Irish potatoes production is the limited use of clean, certified seed.[97] For instance in Nyandarua County, where 70 percent of income from crops is generated by potatoes, about 82 percent of farmers still depend on poor quality seed obtained from informal sources. This practice, coupled with inadequate field rotation, leads to low productivity and spreads seed-borne diseases. The poor marketing infrastructure and farmers' lack of market information prompt farmers to sell to middlemen at low prices, which tends to make this venture unprofitable.[98]

34. Project interventions that improve access to certified seed, good agronomic practices, and soil testing to allow suitable fertilizer application have the potential to increase potato yields and farmers' incomes. In 2013, average yields were 2.9 t/acre in Nyandarua County and 1.9 t/acre in Nyeri County. Notably, women in Nyandarua reported 25 percent lower crop yields and lower fertilizer application than men,[99] indicating high potential for increasing benefits for women if interventions are appropriately targeted. Potato yields can reach 10–14 t/acre at research stations and under optimal conditions; under farm conditions they can reach 5–8 t/acre. USAID (2014) reports that farmers achieved up to 5 t/acre and a gross margin of US$828 per acre.

35. In this analysis, the introduction of clean, certified seed, soil testing, improved timing of planting, and improved fertilizer type and application are assumed, which results in a yield increase from 3 t/acre to 6.5 t/acre, annual net revenue of US$566, an NPV of incremental net benefits of US$2,202 over 20 years, and a BC ratio of 1.69. The switching values for benefits and costs are –41 percent and 69 percent, respectively.

Cassava

36. Cassava can grow under marginal conditions on infertile soils and can tolerate periods of drought. Cassava roots can be harvested as needed, contributing to household food availability during extended periods.[100] National average yields are about 5 t/acre but vary by county (7 t/acre in Baringo versus 3.8 t/acre in Siaya, for example). Improved varieties, several of which are tolerant to brown streak disease, can yield as much as 8–28 t/acre.[101]

37. To avoid the spread of two viral diseases (cassava mosaic and cassava brown streak) the adoption of appropriate practices, especially the use of resistant or tolerant cultivars and virus-free planting material, is recommended. The WP scenario assumes intercropping with beans to improve soil productivity (nitrogen fixation); optimal spacing; clean, disease-tolerant varieties; and an increase in manure application. Labor, particularly for harvest and processing, is the main production cost. The model assumes an increase in dry cassava yield (which is about 40 percent of fresh cassava) from 1.4 t/acre to 4 t/acre, leading to annual average net benefits of US$513, an NPV of incremental net benefits of US$2,523, and a BC ratio of 1.4. The switching values for benefits and costs are –29 percent and 40 percent, respectively.

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[97] ERA (2015).
[98] Muthoni, J., H. Shimelis, and R. Melis (2013), "Potato Production in Kenya: Farming Systems and Production Constraints," *Journal of Agricultural Science* 5(5); ASDSP (Agricultural Sector Development Support Programme) (2014), Volume 1: Household Baseline Survey Report, Nyandarua County. Processed.
[99] ASDSP (2014).
[100] FAO (Food and Agriculture Organization) (2013), "Cassava Farmer Field Schools: Resource Material for Facilitators in Sub-Saharan Africa." FAO Plant Production and Protection Paper No. 218, Rome.
[101] See http://www.infonet-biovision.org/PlantHealth/Crops/Cassava; accessed November 2016.

Tissue-Culture Bananas (TCB)

38. While both traditional banana cultivation and TCB production are financially worthwhile, studies find TCB to have a higher stream of benefits with a net present worth that is 3.4 times greater than traditional production. There are several benefits to adopting TCB: substantial reduction of production loss due to pests and diseases,[102] early maturity, early fruiting, bigger bunches (at least 20 kg compared to 10–15 kg for traditional bananas), and higher yields (about 21 t/acre compared to 12 t/acre for traditional bananas).[103] In addition, bananas contribute to nutrition security, as they often provide up to 25 percent of total household caloric intake. Supporting banana cultivation can contribute to women's empowerment; a survey found that 85 percent of women had control over consumption and sale of bananas; and that the additional income went toward purchasing food, paying school fees, and improving the quality of housing.[104]

39. The WP scenario assumes that the adoption of TCB (450 plants/acre) (compared to traditional banana suckers in the WOP), soil testing, improved fertilizer application, and mulching leads to a yield increase from 11 t/acre to 18 t/acre. These practices require approximately 20 percent more labor time and more production inputs but lead to an annual net benefit of US$6,485, an NPV of incremental net benefits over 20 years of US$5,803, and a BC ratio of 5.34. The switching values for benefits and costs are –81 percent and 434 percent, respectively.

Pigeon Peas

40. Pigeon peas, a drought-resistant crop, have notable potential to increase household incomes, in particular when intercropped with cereals. Pigeon peas can fix up to 40 kg N/ha, implying a savings in production costs for smallholder farmers and leading to increased cereal yields. Pigeon peas face challenges related to pests and diseases, the affordability of fertilizer or herbicides, and a lack of extension services. The WP scenario assumes a yield increase from 0.5 t/acre to 0.9 t/acre due to the adoption of adapted varieties, a more timely planting date (dry planting and planting during the onset of rains), improved plant population density and spacing, fertilizer application at the beginning of the season, and optimal application of chemicals for pest/disease control. Apart from the increased inputs, these improvements will require more labor for weeding and harvesting. These improved agronomic and management practices have the potential to achieve a net benefit of US$300; the NPV of incremental net benefits is US$672 over 20 years, and a BC ratio of 2.08. The switching values for benefits and costs are –52 percent and 108 percent, respectively.

Apiculture

[102] Kasyoka, M.R., M. Mwangi, N. Korf, J. Mbaka, and N. Itonga (2011), "Banana Distribution and Their Seed Systems in Central and Eastern Kenya," *African Crop Science Conference Proceedings* 10: 457–9.
[103] Mbogoh, A.G., F.M. Wambugu, and S. Wakhusama (2003), "Socio-economic Impact of Biotechnology Applications: Some Lessons from the Pilot Tissue-culture (TC) Banana Production Promotion Project in Kenya, 1997–2002," in *Proceedings of the 25th International Conference of Agricultural Economists (IAAE) 16–22 August 2003, Durban, South Africa*.
[104] Africa Harvest Biotech Foundation International (2008), "Socio-economic Impact Assessment of the Tissue Culture Banana Industry in Kenya," Nairobi (http://issuu.com/africaharvest/docs/socio-economic, accessed November 2016).

41. A CIG or VMG can establish a local honey refinery, which facilitates the adoption of modern Langstroth beehives among community members.[105] The financial analysis assesses the benefits of a farmer with 10 modern Langstroth beehives. Aside from the tangible benefits of increased honey yields (5–15 kg with a traditional log hive and as much as 50 kg with a Langstroth hive), improved apiculture can have gender equity benefits. Women traditionally do not use log beehives, which would require them to climb trees, but they can easily access modern Langstroth beehives. The WP scenario shows an NPV of US$12,413 and a BC ratio of 5.6. Switching values show that results allow for a –82 percent reduction in benefits and 456 percent increase in cost before the NPV becomes zero. Even a farmer with 3 modern Langstroth beehives could still achieve a positive NPV of US$950 and a BC ratio of 2.7, with switching values for benefits of –64 percent and cost of 174 percent. This shows how improved apiculture is financially viable.

Dairy

42. An inadequate supply of nutritious feed is among the main challenges of dairy farmers in semi-arid regions. Inadequate feed storage decreases availability and quality.[106] Average milk yield per cow during the dry season varies on average between 3.5 for local cows, 6.8 for crossbreeds, and 9.7 kg/animal/day for exotic breeds. Adult male-headed households typically report higher milk yields.[107] In high-producing, non-ASAL counties, average milk production from local cattle was 6 liters/animal/day; for crossbreeds it was 7.7 liters/animal/day and for exotic breeds it was 11.3 liters/animal/day.[108]

43. The analysis assumes a smallholder dairy farm with one dairy cow, one heifer, and one calf in the first year; and three or four dairy cows after 10 years in the WOP and WP scenarios, respectively. An increase in productivity from 5 to 8 liters/animal/day, resulting in 2,592 litres/animal/year in year 10, is assumed. This increase is achieved by preventive health checks, improved hygiene to reduce risk of mastitis, establishment of a stable, improvement of pastures, adoption of feed conservation practices, and improved feed formulation and quantity of supplementary feed. Farmers have access to more efficient artificial insemination services, which reduces the cost of each attempt. The WP's incremental net benefits compared to WOP are US$4,085 over a period of 20 years, with a BC ratio of 2.52 and switching values for benefits of –60 percent and costs of 28 percent.

Local Poultry

44. Indigenous chickens are quite popular because of their low cost of production compared to exotic breeds and are preferred by many consumers. Average productivity is 51 eggs/year for local chicken, 124 eggs/year for; improved local chicken, and 378 eggs/year for exotic breeds. On average an egg is sold for KSh.11. Decision-making power in poultry activities usually rests with women, who also take responsibility for marketing.[109] Poultry production provides

[105] Information for beekeeping provided by a beneficiary of WKCDD&FMP and agri-business webpage http://www.agricoop.info.ke/files/downloads/Production%20of%20honey.pdf.
[106] Njarui, D.M.G., J.M. Wambua, S.N. Nguluu, D.M. Mwangi, and G.A. Keya (2011), "Feeding Management for Dairy Cattle in Smallholder Farming Systems of Semi-arid Tropical Kenya," *Livestock Research for Rural Development* 23(5).
[107] ADSP (2014).
[108] ADSP (2014).
[109] ADSP (2014).

nutritional benefits, requires no excessive labor inputs or skills, and serves as a "savings account" for women who have easy access to tradable products.

45. The analysis assumes the replacement of 10 indigenous chickens with 10 improved indigenous chickens, which have a longer production period of 160 days compared to 140 days, higher productivity (96 eggs/hen/year instead of 51 eggs/hen/year), a 10 percent reduction in egg losses, and a higher meat price. Hens are vaccinated and receive supplementary feeding, which increases labor requirement and cost. This result in an annual net benefit of US$100, with a BC ratio of 2.5; and an NPV of incremental net benefits of US$707 over a period of 20 years.

Livestock production under pastoral/extensive production system

46. Pastoralism contributes significantly to Kenya's economy; livestock production accounts for nearly 20 percent of agricultural GDP. To enhance resilience of pastoralist systems, KCSAP will support improved access to feed and water resources, the provision of animal health services, and increased market integration. Resilience is defined as owning at least 15 tropical livestock units (TLU) if households earn 70 percent of their income from livestock.[110] Households with less than 4.5 TLU/capita are considered unable to escape poverty even during times when grazing pastures are adequate.[111] A recent study in Garissa found that the average number of cattle per household was 38 TLU (5.1 TLU per capita), of which 22 percent (33 head) were cattle, 54 percent goats, 19 percent sheep, and 6 percent camels.[112] In Marsabit, between 2009 and 2013, the average livestock owned equaled 13 TLU (2.6 TLU per capita). Several studies attest to the positive relation between household per capita income and herd size. As herd sizes decline, households diversify income toward alternative sources, and turn increasingly to non-livestock activities. [113]

47. A study in Marsabit reports that about 72 percent of income is related to livestock (average KSh 94,200), of which the largest share is from milk sales. At the same time, less than 10 percent of households sell milk, suggesting that the bulk of the milk produced was for home consumption. Due to poor marketing infrastructure, households sold milk mostly to their neighbors at a price ranging from KSh 31.7 to KSh 69.1. The average number of cattle sold was 1.8 head/year,[114] and sales of sheep and goats are more common. Livestock de-accumulation is largely attributable to losses from drought and starvation (approximately 45 percent) or disease fatalities (about 31 percent), and losses are mainly recorded for sheep and goats.[115]

48. The financial analysis focuses on direct benefits to producers from cattle, expressed in return flows from milk and meat. The herd dynamics are modelled with DynMod[116] over 20

[110] Three categories of resilience are distinguished for pastoralist households: (i) resilient households should own more than 15 TLU, (ii) vulnerable households own 7.5–15.0 TLU, and (iii) non-viable households own less than 7.5 TLU and are likely to be forced to seek an alternative livelihood strategy. De Haan, C., E. Duebern, B. Garancher, and C. Quintero (2014), "Pastoralism Development in the Sahel: A Road to Stability?" Global Center on Conflict, Security, and Development, Nairobi

[111] Little, P., J. McPeak, C. Barrett, and P. Kristjanson (2008), "Challenging Orthodoxies: Understanding Pastoral Poverty in East Africa," *Development and Change* 39(4): 585–609.

[112] Mwanyumba, P.M., R.G. Wahome, L. MacOiyo, and P. Kanyari (2015), "Pastoralist Livelihoods, Resources, and Strategies in Garissa County, Kenya," *Livestock Research for Rural Development* 27 (10).

[113] Mburu, S.K. (2016), Incomes and Asset Poverty Dynamics and Child Health among Pastoralists in Northern Kenya. PhD dissertation, Faculty of Business, Economics and Social Sciences, University of Hohenheim.

[114] Mburu, S., S. Otterbach, A. Sousa-Poza, and A. Mude (2016), "Income and Asset Poverty among Pastoralists in Northern Kenya," *Journal of Development Studies* (http://dx.doi.org/10.1080/00220388.2016.1219346).

[115] Mburu, S.K. (2016).

[116] Lesnoff, M. (1), 2009-2013. DYNMOD: A spreadsheet interface for demographic projections of tropical livestock populations, User's manual. CIRAD (French Agricultural Research Centre for International Development), http://livtools.cirad.fr.

years. The required parameters and information for financial models were obtained from ILRI researchers[117] and collected in the course of two surveys, one in Isiolo County (2014) and the other in Isiolo and Marsabit Counties (2015). An average cattle herd size of 15 heads (10 TLUs) is assumed, which increases to 23 head WOP and 28 head WP. The project introduces improved feeding practices and animal health services, which would decrease mortality by 50 percent, increase sales by 60 percent, and increase the price per animal by 10 percent. Milk productivity per cow increases by 10 percent from 0.9 liters to 1 liter/day, and household milk sales rise to 20 percent (from 10 percent). It is assumed that pastoralists have improved market information that reduces brokerage fees by 50 percent per head. The resulting annual net benefit with project is US$238 in year 10. The incremental net benefits of US$643 are relatively small over a period of 20 years, and the BC ratio is 1.72. To value pastoralist interventions, however, it is not sufficient to quantify the value of livestock products (milk, meat, hides). Pastoralism is a livelihood system that integrates livestock husbandry with other activities, with strong social, environmental and cultural objectives.[118]

Concluding notes on the financial analysis

49. **The financial analyses demonstrate the viability of project interventions for targeted households**. Overall, the financial models for selected crops show positive incremental net benefits for adopting CSA TIMPs. Returns to family labor largely show increasing values. However, it remains notable that CSA practices or the introduction of other crops often increase labor requirements, mainly due to the need for weeding, precise planting, fertilizer/pesticide application, and increased harvesting time. The models assume yield increases that may be higher than the targets in the results framework, but they are feasible or even considered moderate by some experts. Across all crop analyses, the lowest switching values are –28 and 29 percent, which indicates the relative robustness of the results. Tables A5.2a and A5.2b present the main assumptions and results for each commodity.

Table A5.2a: Results of the financial analyses for selected commodities

Commodities	Yields (kg/acre)*			Net revenue (including family labor)		
	WOP	WP	Rate of change	WOP	WP	Rate of change
Cassava/Beans	1400/0	4000/400	186%	145	513	253%
Sorghum/Green grams	350/180	630/324	80%	128	257	100%
Finger Millet	300	900	200%	77	152	96%
Pigeon peas	526	890	69%	169	291	72%
Bananas	11000	18700	70%	4,998	6,485	30%
Tomatoes	1200	3000	150%	660	1,581	140%
Irish Potatoes	3080	6160	100%	271	566	109%
Dairy	5	8	60%	2,523	4,605	83%
Poultry (eggs/flock)	560	960	71%	- 18	100	668%
Honey (kg/hive)	0	9	-	-	2,791	-
Cattle	-	-	-	238	333	40%

[117] Data collected by and kindly made available by Francis Wanyoike and Nelly Njiru. At the time of writing, survey results had not been published. In the future, ILRI publications can be found on: https://www.ilri.org/Publications.

[118] Hesse, C., and J. MacGregor (2006), Pastoralism: drylands' invisible assets? Developing a framework for assessing the value of pastoralism in East Africa. Processed.

Table A5.2b: Results of the financial analyses for selected commodities

Commodities	Return on family labor (Net revenue /person days)			Benefits-costs ratio	Switching values cost	Switching values benefits	NPV (@ 12%; 20 years) of incremental net benefit
	WOP	WP	Rate of change	With project			
Cassava/Beans	10	20	105%	1.40	0.40	-0.29	2,523
Sorghum/Green grams	6	10	60%	1.79	0.79	-0.44	794
Finger Millet	15	14	-9%	1.45	0.45	-0.31	403
Pigeon peas	19	17	-10%	2.08	1.08	-0.52	672
Bananas	230	230	0%	5.34	4.34	-0.81	5,803
Tomatoes	97	100	3%	5.20	4.20	-0.81	7,983
Irish Potatoes	11	19	70%	1.69	0.69	-0.41	2,202
Dairy	-	-	-	2.52	0.28	-0.60	4,085
Poultry	0.80	4	603%	2.54	1.54	-0.61	707
Honey	-	-	-	5.56	4.56	-0.82	12,413
Cattle	-	-	-	1.72	0.72	-0.42	643

4. Economic Analysis

50. The economic analysis aggregates the incremental net benefits of crop and livestock production as identified in the financial analysis (but valued at economic prices) and the environmental benefits captured by the project's net carbon balance (Annex 6), to derive the project's NPV and Economic Internal Rate of Return (EIRR).

Beneficiaries

51. It is assumed that at the end of the project, 60 percent of beneficiaries targeted through CIGs and VMGs (approximately 108,900 beneficiary households) will have adopted at least one CSA TIMP. The beneficiary households are included in the analysis according to the phasing provided in the results framework (see Annex 1). Table A5.3 presents the number of beneficiaries by agro-ecology, county, and VC.

Table A5.3: Beneficiaries by agro-ecology, county, and value chain

Agro-ecology and county	Value chain	Number of beneficiaries
Arid counties (6 counties): Marsabit, Isiolo, Tana River, Garissa, Wajir, and Mandera.	Cattle (1 value chain)	• 49,500 beneficiaries total
Semi-arid counties (9 counties): West Pokot, Baringo, Laikipia, Machakos, Nyeri, Tharaka Nithi, Lamu, Taita Taveta, and Kajiado.	Sorghum-green grams; millet; cassava; pigeon peas; poultry (4.5 value chains)	• 5,867 beneficiaries/value chain • 26,400 beneficiaries in semi-arid counties
Non-ASAL counties (9 counties): Busia, Siaya, Nyandarua, Bomet, Kericho, Kakamega, Uasin Gishu, Elgeyo Marakwet, and Kisumu.	Bananas, Irish potatoes, tomatoes, dairy, beekeeping, poultry (5.5 value chains)	• 6,000 beneficiaries/value chain • 33,000 beneficiaries in non-ASAL counties

Benefit streams

52. Two benefit streams are included in the economic analysis: (i) incremental net benefits from the financial analyses; and (ii) monetized environmental benefits from the EX-ACT model (see Annex 6).

53. *Incremental net benefits.* Incremental net benefits accrue to smallholder households as derived in the financial analysis, but valued in economic prices. Beneficiaries are assumed to bring one hectare under cultivation.

54. *Monetized environmental benefits.* These benefits are captured from potential community-level interventions by CIGs/VMGs and landscape-level interventions implemented by CGs. A net carbon balance is calculated and expressed in tCO_2-equivalent emission (see Annex 6). As project investment is demand driven, the analysis is indicative, but it is largely in line with the assumptions of the economic analysis. It is assumed that 108,900 beneficiary households adopt CSA TIMPs on one acre, and about 1.2 million cows (dairy and cattle)[119] are brought under improved management. It is further assumed that counties implement agroforestry and improved pasture management on a total of 24,000 ha. The resulting net carbon balance over a period of 20 years is –2,276,150 tCO_2e, or approximately –113,807 tCO_2e per year. It is assumed that these values are achieved from year three onward. To monetize these benefits as an avoided cost to society, the SCC of US$30 is used for sensitivity analysis. The base scenario takes a more conservative approach and uses a social value reflecting an approximate market value of US$10 per tCO_2e.[120]

Economic prices

55. Economic prices were calculated for traded goods, including sorghum, fertilizers, improved seed, and agro-chemicals. Transfer payments are eliminated, commodity-specific conversion factors are derived, and the shadow exchange rate factor applied on traded goods. Due to the low trade volume and/or perishability of commodities in this analysis, it is assumed that they are traded locally, and hence only financial prices are used. The daily wage rate of KSh 200 was discounted by 0.6, taking into account the rural unemployment rate of 40 percent.

Project cost

The analysis is conducted over a period of 20 years with a discount rate of 6 percent, as proposed by a recent World Bank guidance note. The COSTAB software was used to convert project financial cost into economic cost by removing price contingencies, exchange rate premium, and taxes/duties. The project cost was phased over the first five years according to phasing proposed in the COSTAB. The analysis only considers investment cost and disregards costs for Component 4. As a result, investment and recurrent costs amounted to US$253 million from year 1 to 5, and US$2.5 million (approximately 10 percent) recurrent cost from year 6 to year 20.

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[119] A household is assumed to have 2 dairy cows on average, and a pastoralist household to have 15 head of cattle on average.

[120] Placing an adequate price on GHG emissions helps mobilize financial investments required to support mitigation actions. For governments, carbon pricing can be an instrument to mitigate emissions and a source of revenue. Carbon prices vary significantly—from less than US$1/$tCO_2e$ to US$130/$tCO_2e$. Eighty-five percent of emissions are priced at less than US$10/$tCO_2e$, which is considerably lower than the price that economic models have estimated is needed to meet the 2°C climate stabilization goal recommended by scientists; see World Bank (2015), *State and Trends of Carbon Pricing*, Washington, DC. In addition, the shadow price for carbon, or social cost of carbon (SCC), is assessed. The SCC is an estimate of the economic damages associated with a small increase in CO_2 emissions, conventionally 1 metric ton, in a given year. This dollar figure represents the value of damages avoided for a small reduction in emissions. The climate change damages include changes in net agricultural productivity, human health, property damages from increased flood risk, and changes in energy system costs, such as reduced costs for heating and increased costs for air conditioning. Given current modelling and data limitations, not all important damages are assessed. The SCC is assessed with three integrated assessment models; estimates for 2020 for discount rates between 5 percent and 2.5 percent are US$12, US$43, and US$62 per ton of CO_2-equivalent emission. See United States Environmental Protection Agency Technical documentation available at http://www3.epa.gov/climatechange/EPAactivities/economics/scc.html (accessed January 2016).

Results and sensitivity analyses

56. Based on the above assumptions, the analysis shows an ***NPV of US$304 million with an EIRR of 16.7 percent.*** Sensitivity analyses for key variables demonstrate the robustness of the results (Table A5.4). The NPV is positive for all proposed changes, and the EIRR is above 6 percent. For some changes such as land area under cultivation, or number of participating beneficiaries, however, the EIRR becomes critically low.

Table A5.4: Results of the sensitivity analysis

Changes	NPV (US$)	EIRR (%)	Changes	NPV (US$)	EIRR (%)
Base case					
	303,984,720	16.7%			
Change in adoption rate			**Increase in project cost**		
-10%	250,832,014	15.2%	+10%	280,133,777	15.3%
-20%	197,679,308	13.6%	+20%	256,282,833	14.1%
-30%	144,526,601	11.9%	+30%	232,431,890	13.0%
+10%	357,137,426	18.1%	-10%	327,835,664	18.3%
+20%	410,290,133	19.4%	-20%	351,686,607	20.1%
+30%	463,442,839	20.6%	-30%	375,537,551	22.2%
Change in incremental net benefits			**Area on which TIMPs are adopted**		
-10%	249,735,305	15.2%	2 acre	228,934,696	14.6%
-20%	195,485,889	13.6%	1.5 acre	153,884,672	12.2%
-30%	141,236,474	11.8%	1 acre	78,834,648	9.4%
+10%	358,234,136	18.1%	3 acre	379,034,744	18.7%
+20%	412,483,551	19.5%	3.5 acre	454,084,768	20.5%
+30%	466,732,967	20.7%	4 acre	529,134,792	22.1%
Change in social value of carbon			**Delay of project benefits by 1 year**		
0 USD/tCO_2e	293,017,628	16.3%	1 year	252,719,289	14.5%
30 US$/$tCO_2e$	325,918,905	17.5%			

5. Conclusion

57. The financial analysis confirms the financial viability of the interventions from household's point of view. For the selected VCs, the household could achieve an NPV of incremental net benefits of between US$403 for millet and US$12,413 for honey production over a period of 20 years. As noted, cross all analyses, the lowest switching value are –29 and 28 percent, which indicates the relative robustness of the results.

58. The economic analysis shows an NPV of US$304 million with an EIRR of 16.7 percent. These values prove to be robust against several changes in key variables. Note that the NPV and EIRR may even be underestimates, as the analysis accounts only for a moderate share of targeted project beneficiaries. Benefits can also be expected to accrue to beneficiaries of county-level investments, those engaged in PPPs, those who receive agro-weather and market information, and those with increased access to improved seed and breeds developed under Component 2. In addition, a range of intangible benefits could not be monetized in this analysis but will add significant value to the project investment.

Annex 6: Greenhouse Gas Accounting Analysis

Kenya Climate-smart agriculture project

Background and Methodology

68. **Motivation.** The World Bank Environment Strategy (2012), adopted a corporate mandate to account for the greenhouse gas (GHG) emissions for investment lending. The quantification of GHG emissions is an important step in managing and ultimately reducing emissions, as it provides an understanding of the project's GHG mitigation potential and can support sectoral strategies to promote low-carbon development, as envisioned in Kenya.

69. **Accounting methodology.** The World Bank has adopted the Ex-Ante Carbon-balance Tool (EX-ACT), developed by FAO in 2010,[121] to estimate the impact of agricultural investment lending on GHG emissions and carbon sequestration in the project area. EX-ACT is a land-based appraisal system that allows the assessment of a project's net carbon-balance. The latter refers to the net balance of tons of CO_2 equivalent (tCO_2e) of GHGs that were emitted or carbon sequestered as a result of project interventions compared to a "without project" scenario. EX-ACT captures project activities in following five modules: land use change, crop production, livestock and grassland, land degradation, inputs and investment.

Scenario development for analysis

70. **Demand-driven project activities.** Component 1 of KCSAP supports the introduction of CSA TIMPs to achieve the triple-wins: increased productivity, enhanced resilience, and reduced GHG emissions per unit of output. The CSA TIMPs supported under the Component 1 are on-farm interventions to be implemented by small-scale farmers, agro-pastoralists, and pastoralists, as well as landscape-wide investment to be implemented by CGs. The envisioned interventions are likely to have significant potential for reducing GHG emissions and increasing carbon sequestration, thus leading to a negative net carbon balance for the proposed project. Given that KCSAP has adopted a CDD approach, the actual CSA interventions will be determined through participatory approaches by communities and CGs during project implementation. For that reason, the estimated net carbon balance presented in this annex is only indicative.

71. **Potential number of beneficiaries and target area.** Values for the EX-ACT analysis are largely in line with the values demonstrated in the results framework (Annex 1) and with assumptions made in the economic and financial analyses (Annex 5). It is assumed that in the current and "without project" scenario there are 181,500 beneficiaries, of which 82,500 are under Subcomponent 1.3 and 99,000 under Subcomponent 1.2, and that they cultivate about 40,000 ha. It is further assumed that in the "with project" scenario, out of 181,500 beneficiaries who are organized in CIGs and VMGs and receiving training/agricultural advisory services, approximately 60 percent (108,900 beneficiaries) will adopt at least one CSA TIMP by the end of the project. The "with project" scenario assumes that there are 59,400 beneficiaries in 17 semi-arid and non-ASAL participating counties (under Subcomponent 1.2), and 49,500 beneficiaries in seven arid counties (under Subcomponent 1.3). Several climate-smart priority VCs have been identified under each subcomponent:

[121] See http://www.fao.org/tc/exact/ex-act-home/en/.

- ***Subcomponent 1.2:*** Root crops (cassava), beans and pulses (green grams, pigeon peas), grains (millet, sorghum), potatoes, fruits and vegetables (bananas, tomatoes), and livestock (honey, dairy, indigenous poultry meat and eggs).
- ***Subcomponent 1.3:*** Cattle/red meat.

72. It is also assumed that under Subcomponent 1.2 there are approximately 5,400 beneficiaries per VC who implement at least one CSA TIMP on about 1 acre of agricultural or pasture land, thus resulting in 24,000 ha or 1,400 ha/per county. Beneficiaries who are involved in dairy production are assumed to own on average 2 dairy cows, resulting in 10,800 cows. It is further assumed that each pastoralist targeted under Subcomponent 1.3 owns an average of 15 cattle, resulting in 742,500 animals. These animals would receive improved feeding and animal health services, which will increase their productivity.

73. For interventions at the landscape level, it is assumed that counties (under Subcomponents 1.2 and 1.3) will implement sustainable landscape management practices on 240,000 ha by the end of the project. Since the type of investment is not pre-determined, this analysis assumes that 10 percent of the area will be brought under SLM practices; of that area, 50 percent will be brought under agro-forestry and 50 percent under improved pasture management.

74. **Type of interventions**. Table A6.1 gives an overview of interventions in the current "without project" and "with project" scenarios. It is expected that CSA intervention such as improved seed and agronomic practices, no tillage and residue management, improved nutrient management, and improved manure application will be implemented. These interventions are distributed equally across the target area. EX-ACT makes it possible to differentiate between a range of crop categories, which are also indicated in Table A6.1.

75. **Basic assumptions in EX-ACT model.** The assumptions for this analysis were informed by discussion during project preparation and appraisal. The project areas under assessment are assumed to be in a tropical dry climate and moisture regimes. The soil type is assumed to be largely High Activity Clay Soil. The project duration is 5 years, and the capitalization period is assumed to be 15 years. Dynamics of implementation are assumed to be linear over the project period. Default Tier 1 coefficients are used. Table A6.1 also provides information on scenarios and values inputted into the respective EX-ACT modules.

Results of the Net Carbon Balance Analysis

76. **Total net carbon balance**. Results presented in Table A6.2 indicate that the proposed project could potentially constitute a notable carbon sink of –2,276,150 tCO_2e over 20 years, or -1.8 tCO_2e/ha/year. These results must be interpreted with caution, however, because KCSAP is a demand-driven project and the specific interventions are not known at present. An examination of the results by CSA intervention reveals that the county-level SLM investments, particularly the introduction of agro-forestry, contribute 72 percent of the total net carbon balance and thus could constitute the largest carbon sink. The second-largest effect comes from improved grassland management (with and without inputs), which is assumed to be a county- and community-level investment, followed by improved agricultural practices at the farm level. The analysis also shows that livestock interventions constitute the smallest carbon sink. In the absence of specific information, the analysis assumes that the livestock herd follows the same

rate of growth in the "without project' and "with project" scenarios. Fertilizer consumption constitutes the only carbon source, to the extent of 15 percent of the carbon balance.

Table A6.1: Interventions for current, without project, and with project scenarios

Type of intervention	Initial scenario	Without project scenario	With project scenario	
Subcomponent 1.2: Community-level investments				
Interventions target 40,081 ha agricultural/pasture land:	Traditional cultivation:		Improved management practices:	
Beans/pulses	7,287 ha		4,372 ha	Improved seed and agronomic practices; manure and nutrient management; no tillage and residue management;
Grains	7,287 ha		4,372 ha	
Root crops	3,644 ha		2,186 ha	
Potatoes	3,644 ha		2,186 ha	
Pasture land†	10,931 ha moderately degraded		6,559 ha	Grassland improved with inputs
Other (fruits and vegetables)	7,287 ha		4,372 ha	Improved water management and no tillage/residue management
Input use	No fertilizer		100 kg nitrogen fertilizer/ha 50 kg phosphorus fertilizer/ha	
Dairy cows	18,000 head/traditional management		10,800 head	Improved feeding practices
Subcomponent 1.3: Community-level investments				
Improved feeding practices	1,237,500 head		742,500 head	Improved feeding and animal health services
Subcomponent 1.2 and 1.3: County-level investments				
Land area brought under agro-forestry and improved pasture management	12,000 ha: 50% set aside land and 50% agricultural land 12,000 ha: moderately degraded pasture land		12,000 ha under agroforestry 12,000 ha improved pasture management without inputs	

† Note that beneficiaries involved in honey, dairy, and poultry production are assumed to cultivate 1 acre of pastureland.

Table A6.2: Results of the scenario analysis (in tCO_2e emission)

Potential activities	EX-ACT category	Gross fluxes			Result per year		
		Without	With	Balance	Without	With	Balance
County level investments							
Introduction of agroforestry	Other LUC	0	-217,635	-217,635	0	-10,882	-10,882
	Perennial	0	-1,415,700	-1,415,700	0	-70,785	-70,785
Community-level investments							
On-farm TIMPs	Annual	0	-329,065	-329,065	0	-16,453	-16,453
Fertilizer	Inputs and investments	0	343,408	343,408	0	17,170	17,170
Dairy/cattle improved practices	Livestock	29,345,638	29,243,046	-102,592	1,467,282	1,462,152	-5,130
Community and county level Investments							
Pasture management	Grassland	0	-554,566	-554,566	0	-27,728	-27,728
Total		29,345,638	27,069,488	**-2,276,150**	1,467,282	1,353,474	**-113,807**
Per hectare		458	422	-36			
Per hectare per year		22.90	21.12	-1.78	22.90	21.12	-1.78

77. **Sensitivity analysis**. The sensitivity analysis shows that the project remains a net carbon sink even if adoption rates decrease and different soil conditions are accounted for. The project target areas are expected to have diverse soil types, so a sensitivity analysis was conducted for Low Activity Clay soil type, which is also present in the project areas. The results show a small change in the net carbon balance, which decreases to –2,204,071 tCO_2e over 20 years. Assuming a reduction in the area under improved management of –10, –30 and –50 percent, the net carbon balance decreases to –2,048,535 tCO_2e , –1,593,305 tCO_2e , and –1,138,075 tCO_2e , respectively.

78. **Conclusion**. Achieving reductions in GHG emissions and an increase in carbon sequestration is an important co-benefit to this project. As the project is demand-driven and the exact interventions are not known at appraisal, this ex ante analysis aims at providing first insights into the project's GHG emissions mitigation potential. The results show that the project can constitute a sizeable net carbon sink of -2,276,150 tCO_2e over 20 years. This indicative analysis may have shortcomings, however, related to the treatment of increased livestock herd growth, resulting manure, long-term reduced adoption rates of CSA TIMPs, increased transport and road traffic, or increased agro-processing or other energy-intensive activities along the VCs, which could constitute a carbon source and thus decrease the project's net carbon balance. The analysis will be updated during the mid-term review and end of the project period using actual data collected from the various CSA interventions.

Annex 7: Gender Mainstreaming and Inclusion of Youth and Vulnerable Groups
Kenya Climate-smart agriculture Project (P154784)

1. **The social pillar of Kenya's Vision 2030 states that it aims to ensure equity in power and resource distribution between the sexes, improved livelihoods for all vulnerable groups, and responsible, globally competitive, and prosperous youth**. Specific strategies involve increasing women's participation in all economic, social, and political decision-making processes; improving access to all disadvantaged groups (for example, to business opportunities, health and education services, housing, and justice); and minimizing vulnerabilities through the prohibition of retrogressive practices (such as female genital mutilation and child labor); and by scaling up training for people with disabilities and special needs.

2. Increasing social capital among the poor is a guiding principle of the proposed project, which emphasizes the importance of enhancing economic and social *inclusion* of VMGs in targeted rural communities. Under the project, VMGs will comprise unemployed youths, indigenous peoples, elderly women and men, widows/orphans, the differently-abled, recovering substance abusers, and people living with HIV/AIDS. KCSAP will seek to mainstream gender-informed approaches in its design (microprojects and subprojects), implementation, and monitoring of activities by factoring in the different needs, constraints, and opportunities of women, men, girls, and boys across all project components. Specifically, the project will provide marginalized women, youths, and other vulnerable groups with targeted interventions that recognize their different skill needs and resources compared to other members of the community.

3. A gender divide is evident in the use of both traditional and modern technologies in Kenya. While technologies are expected to strengthen VMGs' ability to compete in market economies—with increases in income controlled by women—regrettably, technology has been underused in unlocking economic opportunities for women, youths, and other VMGs. For example, animal-drawn plows were developed to pursue men's work in clearing farmland, and they are either too heavy for women to push or have handles that women cannot reach. The result is that women continue to use traditional, more labor-intensive methods, undermining their agricultural productivity. There are other notable limitations that prevent vulnerable communities from improving productivity by adapting to climate change, improving their resilience, and strengthening their economic participation; these limitations include insufficient access to critical information and professional opportunities, and even to efficient household energy for cooking, heating, and lighting, as well as for home-based agricultural and industrial activities. Generally the rural poor, the majority of whom are women, have access only to fuels that are inefficient in converting to energy. Thus vulnerable rural communities disproportionately lack access to clean, efficient, reliable, safe, and affordable energy service options.

4. Often technologies are created but vulnerable communities cannot be enticed to adopt them. Developers must first ask what technologies vulnerable communities need to increase their economic opportunities, and then they must involve them—as technology innovators, developers, and drivers of the process—to design something that is not only acceptable for their needs but so user friendly that they can't afford not to use it.

5. This annex identifies the key gender gaps in the agricultural sector relevant to the project and highlights the main objectives of gender mainstreaming and social inclusion strategies. It presents action plans for operationalizing these strategies and closing the gender gaps as part of

the project's design. These strategies are based on good practices and lessons learned from implementing CDD and agricultural projects in Kenya[122] as well as globally.

Women in Kenya's Agricultural Sector

6. Women make significant yet often unrecognized contributions to Kenya's economy,[123] and gender gaps are particularly noticeable in the agricultural sector, as it provides support to the very poor.[124] Kenyan women are a major force in agriculture, providing over 70 percent of the labor, yet they own only a fraction of the land titles,[125] which reduces their incentives to invest in land and possibly contributes to lower productivity. A 2011 study found that a much higher percentage of men (81 percent) compared to women (19 percent) own land individually in Kenya. The study also found that men's overall landholdings tend to be at least four times larger than women's, and that men tend to farm larger parcels of land compared to women.[126] Women are also disadvantaged in their access to other types of agricultural inputs, such as extension information and services[127] and access to credit.[128] It is suggested that allocating land, labor, capital, and fertilizer more equally would increase agricultural yields in Kenya by more than 20 percent,[129] which demonstrates the serious consequences of gender disparity.

7. Given the highlighted challenges for women's participation in the agricultural sector, Kenya's ASDS (2010–2020) emphasizes that new interventions should focus more on equality and equity of outcomes than on equal treatment, as traditional interventions in the sector tend to affect men and women differently. It also notes that women suffer from poorer health and nutritional status as well as high maternal mortality.

8. According to the Kenya Country Partnership Strategy (2014–2018), the key gender gaps for agriculture are land rights, agricultural productivity, and women's access to inputs and agricultural extension advice. The Country Partnership Strategy's gender focus areas are female education, entrepreneurship, and rural women's groups. Gender gaps and their prioritization vary in different regions in Kenya, however.

Overall Strategy and Objectives

9. A strategy for gender mainstreaming and social and economic inclusion of youth and VMGs was designed to achieve the following objectives (Figure A7.1):

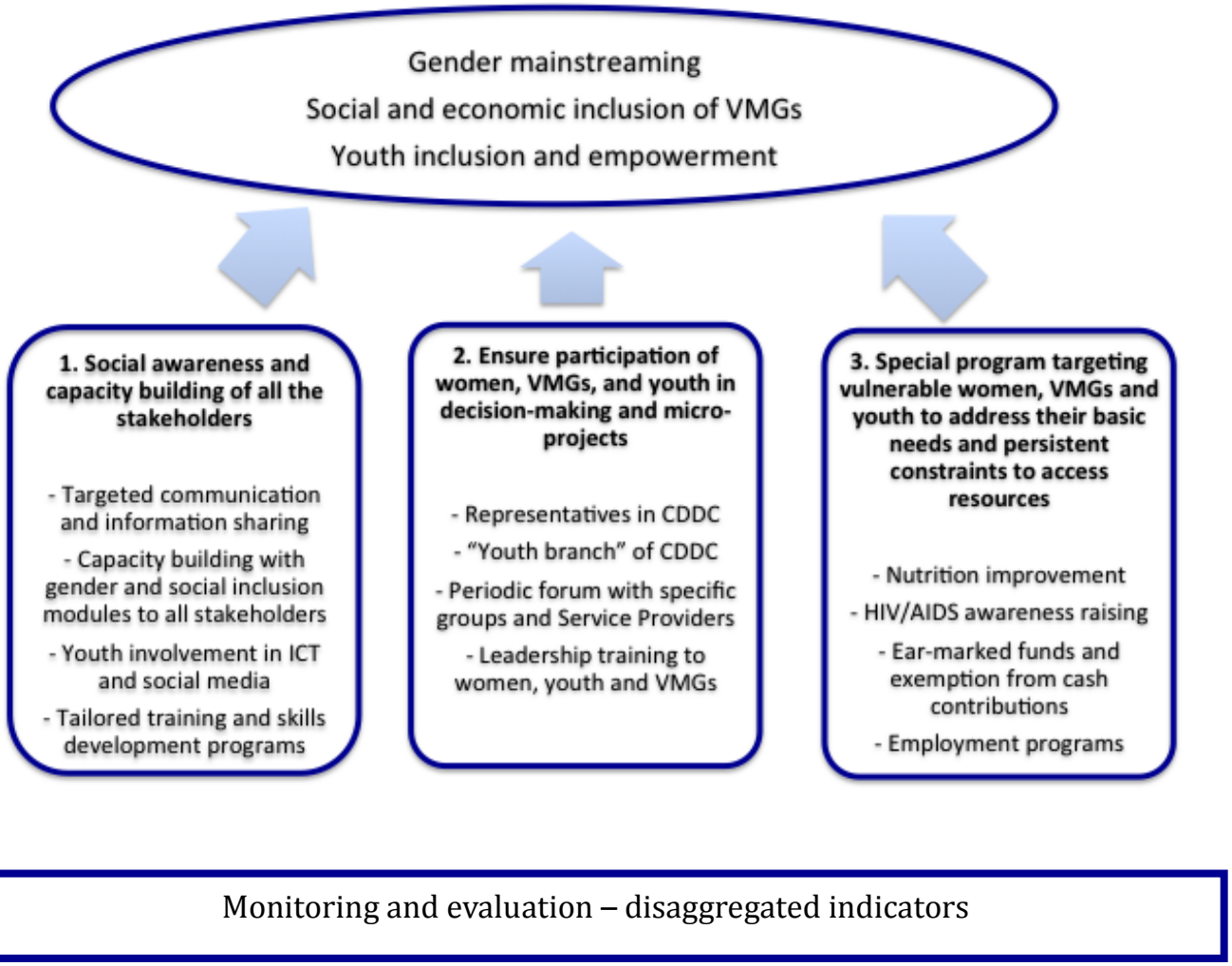
(i) Build awareness about gender mainstreaming, and social and economic inclusion among all project stakeholders—men, women, community members, SPs, and CGs.

[122] KAPAP, WKCDD&FMP, KAPSLMP, East African Agricultural Productivity Program, and Accelerating Rural Women's Access to Agricultural Markets (GROOTS).
[123] Kenya ranks 121st of 149 countries included in the Gender Inequality Index in 2013. Of adult women, 25.3 percent have reached at least a secondary level of education compared to 31.4 percent of their male counterparts. Female participation in the labor market (population ages 15–64) is 62.0 percent compared to 72.2 for men, and women's share of the seats in parliament in 2013 was 19.9. For every 100,000 live births, 360 women die from pregnancy-related causes, and the adolescent birth rate is 93.6 births per 1,000 live births (http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/KEN.pdf).
[124] World Bank Country Partnership Strategy for 2014-2018. Annex on Gender.
[125] AfDB (African Development Bank) (2007), *Country Gender Profile*, Tunis.
[126] Tegemeo Institute (2011).
[127] For example, a study in 2013 says that a significantly larger proportion of male (54 percent) than female (41 percent) primary farmers had received extension services over the previous year; see World Bank, "Tapping the Potential of Farming in Kenya," Gender Policy Note, Washington, DC.
[128] For example, women in sub-Saharan Africa receive less than 10 percent of small farm credit and 1 percent of credit extended in the agricultural sector (FAO 2011).
[129] World Bank (2009), *Gender in Agriculture Sourcebook*," Washington, DC.

(ii) Ensure that men, women, and VMGs participate and benefit equitably under the project (in other words, ensure social and economic inclusion).

(iii) Reduce the gender gaps and discrepancies across different social groups by improving human development status.

Figure A7.1: Overall Gender and Inclusion Strategy for Achieving KCSAP Objectives



10. The strategy will be broadly operationalized along three pillars of activity to: (i) provide targeted information, education, and communication and capacity building to all stakeholders; (ii) ensure full representation of men, women, youths, and all social groups in community-level institutions and decision-making processes; and (iii) provide targeted programs and investments to VMGs to boost their human development status and social capital. Action plans were developed that cut across the project's three technical components (Table A7.1). Further details will be outlined in the PIM. An indicative list of indigenous peoples is presented in Table A7.2 for information. To the extent possible, performance indicators were disaggregated by gender and by social subgroup (such as CIGs and VMGs) to measure their participation in the decision-

making process, implementation of microprojects, and sharing of benefits accruing from the various interventions.

Table A7.1: Action Plans by Subcomponent – Gender Mainstreaming and Social and Economic Inclusion of Youth and Vulnerable and Marginalized Groups

Gender Mainstreaming	***Social and Economic Inclusion of Youths and Vulnerable and Marginalized Groups***
Cross-cutting:	
Closing the gender gaps starts with increasing awareness of gender, and that is why changing the mindset among CGs and technical staff, especially male stakeholders, is critical. Therefore, a module on capacity building and training on gender mainstreaming (across the 3 technical components) will be provided to all stakeholders, including NPCU, CPCUs, CGs, subcounty and ward administrators, SPs/facilitators, extension workers, and community members. *Gender analysis (GA) at the outset of project implementation.* GA—which will reveal who has what and why, who does what and why, who makes decisions and why, and who needs what and why—is carried out to develop an understanding of the site-specific gender, cultural and socio-economic context. This analysis will explore differential vulnerability of men and women, youths, and other VMGs to risk, opportunities and benefits, power relations within the household and the community, willingness to take on risk, and modes of access to sources of information. Findings of the GA will inform the application of any promoted CSA TIMP.	Social inclusion, like gender mainstreaming, also starts from good communication and social awareness actions using various media, combined with capacity building and training. A module on social inclusion will be included in the capacity building of all stakeholders, including communities, POs, and counties.
Component 1: Upscaling Climate-smart Agricultural Practices	
Subcomponent 1.1: Building Institutional Capacity and Strengthening Service Delivery	
A. Capacity Building at Community Level	
Component 1 will contribute to closing the gender gap in productivity, increase women's groups' capacity, and promote female entrepreneurship. The participatory process is part of GA and creates a basis for finding relevant ways to address the gender gaps. Subcomponent 1.1 will build capacity at different levels to enable men, women, and VMGs to participate in planning and prioritizing CSA investments. Special attention is paid to SPs' capacity to address gender issues. *PICD process:* PICD is an important process that allows community members to identify the difference between men's and women's roles and assets, time allocation for work, and other activities. The PICD process will be conducted through a gender mainstreaming and social inclusion lens. Implementation of the PICD process will form part of the ToRs for SPs. The detailed PICD approach will be described fully in the PIM. *Modalities of capacity building:* Studies and on-the ground experience have shown that it is not easy for women to participate in meetings and training for development projects, due to their wide range of responsibilities, from caring for the family welfare (food preparation, cleaning, and childcare) to economic activities (such as small commerce and markets).	*Decision making:* At the community level, capacity building using an inclusive PICD process and participatory identification of VMGs will be essential. In addition to having modules on cross-cutting themes like inclusion, it is important to have conflict resolution as part of the training and awareness creation for communities. Capacity building delivered by SPs will ensure that marginalized groups are meaningfully included in decision-making processes for microprojects. The use of quotas, in combination with capacity building for these groups, can be one approach. *Facilitators/trainers and modalities of training:* Selection of qualified facilitators and trainers who can deliver training modules using an inclusive approach will be dependent on well-developed ToRs. The training modules that are developed for the communities should ensure that language and tools should not create barriers that could exclude the participation of certain groups in capacity-building measures. It is important to recognize that different groups may be more receptive to different modes of capacity building and means of communication. For example, effective use of ICT, existing social media networks, and cultural events and performances could be ways to better reach and communicate with youths.

Gender Mainstreaming	***Social and Economic Inclusion of Youths and Vulnerable and Marginalized Groups***
Therefore, the project will select the timing and venue of key meetings and information sharing to ensure that both men and women can participate and access information (for example, when planning training sessions, avoid market days and male-dominated gathering places). *Content and targets for capacity building within the community:* Men and women have different comparative advantages in agricultural production.[130] It is observed that women are good at managing grassroots activities when trained and equipped with skills and some inputs. However, certain activities are still managed by men, such as planting that requires heavy machinery, large animals, or bringing products to the market in bulk. Therefore, training sessions will need to first identify who will play the main role in certain types of activities, and then train those target groups—male or female—to ensure training can actually make changes on the ground.[131] *Involvement in decision making:* A practice that worked well under WKCDD&FMP was the requirement that in CDDCs not more than two-thirds of the members should be of one gender. The project will further facilitate opportunities for female representatives to share their opinions and to influence decisions to be made as a group, by: • Periodically creating visible interfaces between female representatives and SPs as the project proceeds. • Identifying one member of the CDDC as a "gender and social inclusion champion," who will collaborate with the relevant county-level officers and ensure that community-level group formation and activity identification are done in an inclusive way. *Saving group formation:* Women will be encouraged and supported to build their capacities (financial management skills) to form saving groups that can be federated into women only SACCOs. The project will provide matching grants to boost the SACCOs' capital. The SACCOs will ultimately be linked to microfinance institutions and commercial banks. Further details will be outlined in the PIM. *"Soft skills" for women and girls:* At the community level, dedicated training will be provided to help improve the confidence of women and girls to make informed decisions. This will form part of the ToRs for SPs. Although gender quotas allow more women to participate in meetings, they are	*Community Development Plan formation:* Community Development Plans will be required to include a Social Inclusion (including Gender) dimension to ensure certain funds are channeled and secured for youths and marginalized groups. *Specific capacity building for VMGs:* As the target groups become clear and awareness of the social and economic inclusion principle of the project is widely shared, community members will be invited to participate in training and capacity-building sessions. Marginalized groups may have specific capacity-building needs. Therefore, dedicated skills training for such groups should be developed. Young people may need separate training programs tailored to their needs and lifestyles.[132] *Representation in community institutions:* In CDDC, when similar groups have not yet been present, a "youth branch" of CDDC could be created, where young members will take specific roles—for example, a role in communications and monitoring using mobile devices.

[130] A recent study in Kenya finds that women have an especially strong role in producing tea, coffee, various fruits and vegetables, cereals, and poultry. Their participation is not often fully recognized or visible, partly because food crop production, where women's participation is high, tends to be less visible than alternative agricultural pursuits, as it requires less capital and labor. "Even then, women tend to be regarded as 'assistants on the farm' rather than farmers or economic agents in their own right. Such perceptions, along with cultural and social norms, make it difficult for women to graduate from subsistence farming to more commercial agricultural enterprises." See "Supporting Women's Agro-Enterprises in Africa with ICT," a study conducted from August 2012 to April 2014.

[131] In addition to county-specific data and studies, the *Gender in Agriculture Sourcebook* (World Bank 2009) has sections on livestock, fisheries, crops, etc., that could be useful in developing county-specific strategies.

[132] Lessons on the ground show that youth groups require additional time and capacity-building, given that they tend to be less patient (they want to see quick returns) and are more mobile, but with opportunities and sufficient support, they can prosper with lots of energy and enthusiasm.

Gender Mainstreaming	*Social and Economic Inclusion of Youths and Vulnerable and Marginalized Groups*
not always effective when it comes to decision making. Therefore, quotas need to be complemented by training and capacity building to build members' self-esteem and confidence, improve literacy skills, and facilitate access to social networks, including the use of mobile devices for greater connectivity. *Raising awareness of health risks:* The infection rate of HIV/AIDS is much higher in girls and young women compared to their male counterparts. As a result, women's higher vulnerability to health risks is connected to their perceived lower social status. An awareness program focusing on social and health risks for young women and girls, with topics such as malaria prevention and reproductive health, including risks of HIV/AIDS, will form part of training sessions targeting women and girls.	
B. Capacity Building at County Level	
Gender-sensitive sensitization and awareness creation: As part of gender sensitization and awareness creation campaigns for counties, the project will use techniques to ensure that project information is accessible to both men and women with different skills and literacy levels. With guidance from NPCU, a tailored communication plan that takes into consideration varying capacities and access to project information will be developed in each county that draws upon existing local radio programs and media, information boards, text messages, meetings, and faith-based organizations. *Capacity building for county technical staff:* Capacity building for county technical staff will include training on gender modules. Relevant staff in county departments for Gender and Social Development will also receive similar capacity building and training.	*Inclusive sensitization and awareness creation:* For sensitization and awareness creation campaigns for counties under subcomponent 3.1, the project will use techniques to make project information accessible for VMGs with different skills and literacy levels. *Capacity building for county technical staff:* Capacity building for county technical staff will include training on social inclusion modules. Relevant staff in the county departments for Gender and Social Development will also receive similar capacity building and training.
Subcomponent 1.2: Supporting Investments in Smallholder Agro-pastoral Production Systems ***Subcomponent 1.3: Supporting Investments in Pastoral Production Systems (Window I)***	
Subcomponents 1.2 and 1.3 have a key role in closing the gender gap in productivity through community-level investments, VC development, and enterprise development. *VMG grants:* This subcomponent provides targeted grants for VMGs, including women. Such grants could be used, especially by marginalized women, to purchase water tanks, organize training programs, hire technical advisors to start their own businesses, and use applications and mobile devices as needed, for example.	*VMG grants:* These subcomponents include targeted grants for VMGs, including youth. VMGs will be exempted from the community cash contribution requirement. The menu of goods and services available must include those that are of relevance and interest to VMGs and should not include activities that discourage their participation.
Value chain selection: Under KAPAP, gender issues were used as a criterion for the selection of priority commodities, and gender was explicitly considered in the design of training and dissemination of technologies. Women are shown to be good at certain areas of the VC process, including processing and marketing. The project will identify and provide customized support to high-potential VCs that are conducive to the roles of women. More generally, social aspects will be considered in VC selection to ensure that the poor and	*Value chain selection:* Similar to the gender dimension, social aspects will be considered in the selection of VCs to ensure that VMGs participate and benefit under this subcomponent. *Assessment of Producer Organizations (POs):* POs will need to pay attention to inclusion dimensions. For existing POs, some relevant questions to ask include: Which community members/farmers/smallholder producers organize in POs, which ones do not, and why? Who

Gender Mainstreaming	***Social and Economic Inclusion of Youths and Vulnerable and Marginalized Groups***
vulnerable also benefit. Women tend to have more limited access to key assets and services. Therefore, each participating county will need to be innovative in addressing such challenges. As communities and POs identify key commodities and VCs, SPs will help to identify gender gaps and opportunities in selected key commodities, and include them in capacity-building measures accordingly.	receives support from POs, who does not, and why? For new POs, it will be important to incorporate the principles of inclusion.
Subcomponent 1.3: Supporting Investments in Pastoral Production Systems (Window II)	
Employment during the construction phase of the infrastructure: Under this subcomponent, the project will support vulnerable women to work in construction sites. Counties will also be encouraged to link vulnerable women to other county-level support programs (e.g., safety net programs like cash transfers for the poor).	*Temporary employment during infrastructure development phase:* Employment at construction sites for VMGs, including youths, will be promoted. Counties will also be encouraged to link VMGs to other county-level support programs.
Component 2: Strengthening Climate-Smart Agricultural Research and Seed System	
Subcomponent 2.1: Supporting Climate-Smart Agricultural Research and Innovations	
Component 2 will assist in reducing the gender gap, especially in women's access to agricultural TIMPs through extension/advisory services that eventually will lead to reducing the gender gap in productivity. Among other initiatives, this subcomponent will support development and dissemination of TIMPs that deliver CSA triple-wins. This subcomponent therefore will also emphasize TIMPs that suit women, youths, and VMGs, such as TIMPs that reduce drudgery or otherwise save time for the household to engage in other productive ventures. Beyond CSA practices, the community investments in climate change adaptation and mitigation supported through the project will need to partner with community-based organizations of women, youths, and VMGs to go beyond a focus on agricultural productivity and support income generation, access to savings, and nutrition services.	Activities to ensure gender is mainstreamed in CSA may include developing seed and breeds of types favored by youths, women, and VMGs—for example, crops such as vegetables and fruits, and livestock such as small ruminants (rabbits, goats, sheep) and local poultry. Other activities that may require research packages and mapping are tree nurseries (which are becoming an important source of income, particularly for VMGs, women, and youths and should be encouraged); tree-based landscape initiatives such as agro-forestry systems; conservation agriculture for vegetables and fruit; apiculture; and flexi-biogas technology that provides cooking gas, lighting, and even electricity for smallholders with livestock. Mapping gendered farm management systems is a method for classifying gendered farm management systems with approaches to collecting and geo-referencing information on the dominant pattern in each area. It also provides a way to analyze and integrate gender in VC analysis and development: mapping gender roles and relations along the VC; moving from gender inequalities to gender-based constraints; assessing the consequences of gender-based constraints; taking action to remove gender-based constraints; and measuring the success of action.
Gender-disaggregated data are needed on access to and use of technologies, because documentation and strong evidence are needed to better address the problems that exist and guide decisions about investments.	Support the collection of gender-disaggregated statistics and indicators related to key technologies. Such data are lacking and can be complemented by research on the contextual and locally-specific factors that limit access by VMGs, such as laws pertaining to property rights and women's ability to obtain credit.
Labor-saving technology: Analysis has shown that women tend to work longer hours compared to men. Introduction of labor-saving technologies through POs can help to reduce women's workload.	*In terms of tools and equipment*, the project may consider those that will ease labor-intensity, such as ox plows that are gender friendly. Such options enable vulnerable groups to move away from traditional methods that undermine their

Gender Mainstreaming	*Social and Economic Inclusion of Youths and Vulnerable and Marginalized Groups*
	agricultural productivity.
Component 3: Supporting Agro-weather, Market, Climate and Advisory Services	
Subcomponent 3.1: Improving Agro-meteorological Forecasting and Monitoring	
Subcomponent 3.2: Developing Integrated Weather and Market Information System	
Component 3 contributes to closing the gender gap in productivity by ensuring that the channels for distributing data and weather, climate, and market information are available for women. One of the main obstacles to effective meteorological forecasting is Kenya's limited agro-meteorological observation network. With more measurement stations, better understanding of weather variability, and enhanced ability to predict shifting weather patterns, farmers' resilience to climate change will be enhanced, with a potentially transformative impact on food security in Kenya.	
In Kenya, systems that integrate agro-weather data and analyze large amounts of crop, pasture, soil, climate, and market data are rudimentary. This subcomponent will address this problem by financing activities related to: (i) developing big data for CSA; (ii) strengthening the Market Information Systems and services; and (iii) delivering integrated weather and market advisory services using ICTs[133] and existing agricultural extension networks.	Weather-related information, if available, is accessed and used differently by men and women, depending on their circumstances. Therefore, the project will strive to have an information hub (for example), about women and men farmers: where they farm, how they source water, what crops they grow, what inputs and extension services they receive, whether they market surplus produce, and what their needs are. Without baseline data about VMGs, women, youth and men farmers, there is no way to measure how much change (quantitative change) and what kinds of change (qualitative change) may happen. Develop entertaining and educational shows (in local languages) that engage youths, VMGs, and male and female farmers in local media forms/types.
Subcomponent 3.3: Building Technical and Institutional and Capacity	
This subcomponent will finance institutional and technical capacity building of national and county governments to enable them to deliver on their Component 3 mandates. The main areas for capacity building will include sensitization of stakeholders on CSA concepts and climate change risks; capacity needs assessment; short-term and long-term training; and provision of IT equipment and operations and maintenance budgets.	Work with the private sector and POs of women, youths, and VMGs to develop technology and services that meet their needs. Address resource constraints and poor incentives while keeping down the costs of using ICTs for farmers who are female, young, or members of other VMGs. Support women's, youths', and other VMGs' participation in decision-making related to climate-smart agricultural investments, particularly at the local level.
Component 4: Project Coordination and Management	
Subcomponent 4.1: Project Coordination	
This subcomponent will finance the costs of project supervision and oversight provided by the NPSC, NTAC, CPSCs, and any other project administration expenses.	It will be ensured that all the decision-making bodies at national, county, and community level include both men and women. Also, all other stakeholders, such as enumerators (market information) will include both men

[133] ILRI has just begun a project with USAID support to provide a comprehensive market information system that will include forage condition forecasts for pastoral systems.

Gender Mainstreaming	*Social and Economic Inclusion of Youths and Vulnerable and Marginalized Groups*
	and women.
Subcomponent 4.2: Monitoring & Evaluation and Impact Evaluation	
An M&E system will be established to collect and process appropriate information, to verify the output, effects, and eventually the impacts of project activities over time. Baseline information for M&E will be collected by project effectiveness.	To the extent possible, performance indicators were disaggregated by gender and by social subgroups. Indicators for closing the gender gap may include: (i) percentage change in crop yield per hectare and year as result of the CSA intervention (disaggregated by male- or female-headed household and household members); and (ii) number of farmers who have access to and use: (a) weather and climate information services and (b) price information on a regular basis (disaggregated by sex).
Component 5: Contingency Emergency Response	
This zero-cost subcomponent is meant to finance eligible expenditures related to emergency response costs in case of natural disasters affecting the agricultural sector. This contingency facility can be triggered through formal declaration of a national emergency by the government authority and upon a formal request from GoK to the World Bank through the National Treasury.	In case of crisis and natural disasters women, youth and other VMGs are impacted the most. During recovery and reconstruction period special attention will be given to women, youth and VMGs.

Table A7.2: Indicative List of Indigenous Peoples/VMGs in Kenya

(i) Indigenous hunter-gatherers (H-G), including small fishing and agricultural communities

Tribal affiliation (2009 Census)	Name of marginalized community/group	Population	Livelihood	Location (County)
Mijikenda	Aweer (Boni)	7,600	H-G, Agric.	Lamu (11 villages in forests)
Mijikenda	Dahalo	2,400	H-G	Lamu, Tana River
Mijikenda	Waata (Watha, Sanye)	12,582	H-G Agric.	Lamu, Tana River
Kalenjin	Dorobo	35,000	H-G	
Kalenjin	Ogiek	79,000 (20,000)	H-G (honey) Agro-past.	Mau Forest/Mount Elgon
Kalenjin	ElMolo	<3,000	Fishermen	Lake Turkana
Kalenjin	Sengwer	>33,000	H-G Agric.	Trans-Nzoia, Elgeyo-Marakwet, West Pokot
Swahili	Munyoyaya	1,600	Fishermen	Garissa (Tana River)
Walwana	Malakote (Ilwana/Walwana)	17,000?	Fish. /Agric.	Tana River
Notin 2009 Census	Omotik	Ext.?	H-G	Narok
Notin 2009 Census	Bajuni	15,000?	Fishermen	Mainland and coral islands off the coast of Lamu
Notin 2009 Census	Yaaku (Yiaku)	200? 4,000?	H-G (honey) Pastoralists	Laikipia C (Mukogodo F.)
Burji	Burji	24,000	Agric.	Marsabit
Kipsigis Notin 2009 Census	Talai		Internally Displaced People (IDP)	Kericho

Source: KNBS–2009 Population and Housing Census (2011) and Paul Lewis, Ethnologue: Languages of the World—

Online version at http://www.ethnologue.com.
Note: The Ogiek estimate their population at between 20,000 and 60,000.

(ii) Indigenous nomadic and semi-nomadic pastoralists and agro-pastoralists

Tribal Affiliation (2009 Census)	Name	Population	Livelihood	Location County
Maasai	Maasai	840,000	Semi-Nomadic Pastoralists	Kajiado, Narok, Nakuru, Laikipia
Ilchamus	Ilchamus/Njemps	33,000	Agro-past. / Fishermen	Baringo C. L.Baringo
Kalenjin	Endorois	000? 60.000?	Pastoralists	Baringo C. L. Bogoria
Kalenjin	Pokot	635,000	Semi-Nomadic Past. /Agric.	West Pokot
Kalenjin	Saboat	240,000	Agro-pastoralists	Trans Nzoia, Bungoma.
Samburu	Samburu	240,000	Semi-Nomadic Pastoralists	Samburu C./
Turkana	Turkana	988,592	S-Nomadic Pastoralists	Turkana, Isiolo
Rendille	Rendille/ArialRendille	60,000	Semi-Nomadic Pastoralists (camel)	Marsabit C. Isiolo C.
Borana	Borana Galla (Oromo)	169,000	Semi-Nomadic Pastoralists	Marsabit, Isiolo, Tana R., Garissa
Gabra	Gabra	89,515	Nomadic Camel	Marsabit
Sakuye	Sakuye	27,000	Semi-Nomadic	Marsabit, Isiolo
Dasenach	Dasenach	12,500	Agropast. Fish.	North Lake Turkana/
Somali	Somali	2,300,000	Nomadic Pastor.	Mandera, Wajir
Orma	Orma	66,000	Nomadic Pastor.	Lamu,Tana River, Garissa/

Sources: KNBS–2009 Population and Housing Census (2011) and Paul Lewis, Ethnologue: Languages of the World—Online versionathttp://www.ethnologue.com

Notes: The **Ilchamus** and the **Njemps** belong to the same ethnic group but are listed under both names in the 2009 census, with 28,000 and 5,000 individuals, respectively. **Galla** is a derogative name for the **Borana** but they are listed under both names in the 2009 census, with 8,000 and 161,000 individuals, respectively. The **Somali** include various clans, including the Ajuran, Degodia, Arri (Gurreh, Gari), Hawiyab, Murile, Ogaden, Wardei, etc., some of whom are listed as independent groups in the 2009 census.

Annex 8: MAP
Kenya Climate Smart Agriculture Project (P154784)