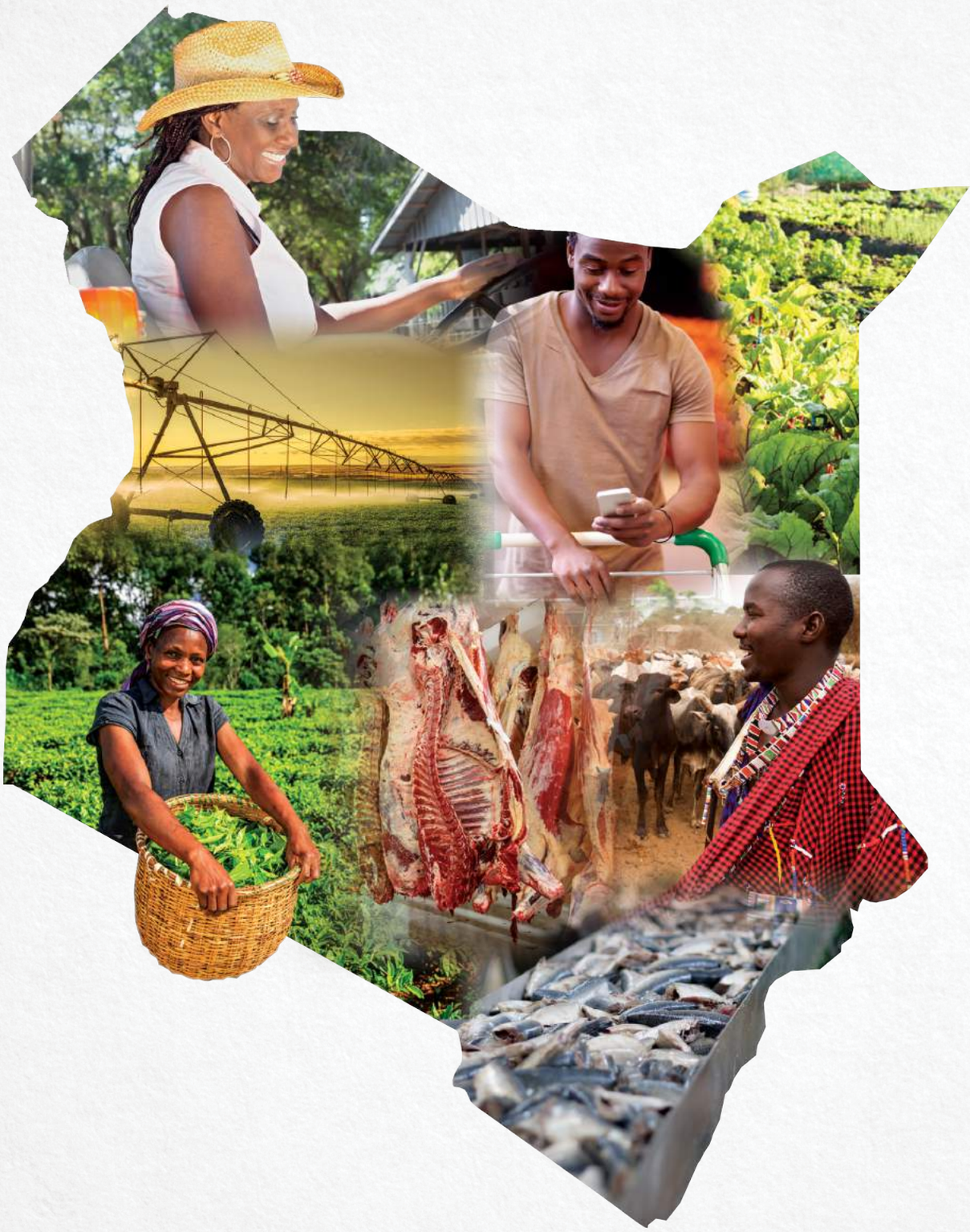
AGRICULTURAL SECTOR TRANSFORMATION *and* GROWTH STRATEGY



TOWARDS SUSTAINABLE AGRICULTURAL TRANSFORMATION *and* FOOD AND NUTRITION SECURITY IN KENYA

2019-2029

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Note: As per guidelines from the Ministry of Agriculture, Livestock, Fisheries and Irrigation style guide, spelling across this strategy follows Oxford English Dictionary (OED) conventions (i.e. organization, industrialization)

ACKNOWLEDGEMENTS

Agriculture is the bedrock of Kenya's development: Message from the Cabinet Secretary

Despite Kenya's impressive advances across the economy, in innovation and entrepreneurship, private sector enterprise, infrastructure, public service delivery and human capabilities, agriculture continues to be the bedrock of the development of our nation and the key to creating equitable and sustainable growth for our people. No large country has ever achieved significant growth without modernizing its agricultural sector. In addition to driving our economic growth, agriculture also creates jobs for our rural communities and is essential to satisfying the nutritional needs of all our people.

The importance of agriculture has been highlighted in Kenya through Vision 2030 and the Medium-Term Plan III, and most recently the President's Big Four priority agenda for 2017-2022, which emphasizes the importance of 100% food and nutrition security for all Kenyans.

We have made progress in modernizing agriculture in Kenya but we have not yet reached our full potential. To achieve this potential, we must do agriculture in a different way, from how we develop policy at the national level, to how we allocate resources in our farming households. Not only will we adopt new ideas under the mandate we have been given, we will be bold in achieving them. We have developed nine flagships that serve as the core of our 10-year Agricultural Sector Growth and Transformation Strategy (ASTGS). These flagships draw on the status of our agriculture today, a rigorous and thorough review of data, lessons from global best practice, and our local realities. The actions inherent in these flagships are bold and ambitious. They will help to transform our agriculture sector in Kenya, drive 100% food and nutrition security, and ensure food is affordable, especially for those most in need. This strategy details the flagship projects prioritized for implementation within in the first five years. Following a review of their performance, an additional set of projects will need to be developed for the next five years of the strategy to match the transformation needs at the time.

On behalf of the Ministry of Agriculture, Livestock, Fisheries and Irrigation (MoALFI), I would like to convey profound gratitude to all who participated in the development of this strategy. It was a highly consultative and iterative process that left no one behind. Every institution and individual that shared their time, perspectives and expertise deserves recognition.

A special mention goes to His Excellency the President Uhuru Kenyatta and the Deputy President William Ruto for their vision to provide access to affordable and nutritious food to every single Kenyan. My Ministry would like to also thank all of the national government institutions, including other ministries, parastatals, commissions and universities, as well as research institutions for their commitment to transforming agriculture. To the affiliate institutions of county governments, which include the County Executive Committee members, Members of County Assemblies (MCAs) and regional economic blocs led by the Council of Governors, thank you. The Joint Agriculture Sector Consultation and Cooperation Mechanism (JASCCM) and all its constituent bodies have been invaluable partners in this effort. We acknowledge the ASTGS task force, the core team and the secretariat for their tireless efforts in coordinating the development of this strategy. You have all worked hand in hand to chart a clear path to implementation potential that will be led by the counties.

The Ministry wishes to express immense gratitude to our development partners across the Agriculture and Rural Development Donor Group (ARDDG), with special note to the the Alliance for a Green Revolution in Africa (AGRA); the Food and Agriculture Organization (FAO) of the United Nations (UN); the German Development Cooperation (GDC), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ); the Japan International Cooperation Agency (JICA); the Swedish Embassy; the United Nations Environment Programme (UNEP); and the United States Agency for International Development (USAID). You have been a reservoir of global best practices for domestication and dissemination of lessons learnt. We thank you for the timely financial support extended to this process.

We also acknowledge and appreciate private sector institutions and other non-state actors, including farmer organisations, civil society and the media, whose interests spread across various value chain processes and support areas such as research, and whose operations will contribute to successful implementation of the ASTGS. These stakeholders are acknowledged by name in the Appendix.

I am 100% committed to driving this agenda and seeing real results. We know what to do – now to the work of doing it.

MWANGI

Hon. Mwangi Kiunjuri, EGH, MGH
Cabinet Secretary, Ministry of Agriculture, Livestock, Fisheries and Irrigation

FOREWORD

Towards implementation with the counties: Message from the Chief Administrative Secretary and Principal Secretaries

We are excited to share the Agricultural Sector Transformation and Growth Strategy (ASTGS) with you, as we seek to rapidly transform this critical sector. Achieving our potential in agriculture will achieve food security, improve our farmer and local community incomes, lower the cost of food, and increase employment (particularly for women and youth). These are our absolute priorities.

The strategy is simple. It has nine bold that represent a departure from how we have done things in the past. They draw from extensive national and county-level consultation, global best practices and input from technical experts, all tailored to our immediate needs.

Our focus now is on the implementation of this strategy. We have defined clear actions with owners for each element of the strategy. We have also developed detailed budgets to mobilize the resources to achieve them. We are in the process of establishing the Agricultural Transformation Office (ATO), which will by answerable to the Cabinet Secretary in the Ministry of Agriculture, Livestock, Fisheries and Irrigation (MoAFLI). The ATO will ensure that we stick to our timetable and address challenges as they arise.

In addition to extensive consultations with relevant stakeholders as we designed the strategy, our engagement with key stakeholders will only intensify during implementation. The counties are the bedrock of implementation and will need support from government and non-state actors including the private sector to move forward.

We invite you to join forces with us to drive this critical agenda.

For the Ministry of Agriculture, Livestock, Fisheries and Irrigation:

Dr. Andrew Tuimur, *Chief Administrative Secretary*

Prof. Hamadi Boga, Acting *Principal Secretary State Department for Crops Development, State Department for Agriculture Research*

Mr. Harry Kimtai, *Principal Secretary, State Department for Livestock*

Prof. Japheth Micheni Ntiba, *Principal Secretary, State Department for Fisheries Aquaculture and Blue Economy*

Prof. Fred Segor, *Principal Secretary, State Department for Irrigation*

FOREWORD

Collaborating to drive agricultural transformation in the counties: Message from the Council of Governors

Agriculture is the bedrock of our society. ~60% of our exports are from the sector. We are all farmers — each one of us. Even those who do not farm directly, earn our livelihoods on the backs of the many farmers in this country.

While we have made great strides in the sector that is almost fully developed and empowers the counties to determine our destiny, we must be careful to not be complacent. Our constitution is clear — "every person has the right to be free from hunger, and to have adequate food and of acceptable quality" (Article 43, Constitution of Kenya 2010). We are yet to this right for all Kenyans.

We believe that the future of our country , and our counties depends a healthy and well-fed population built on equal opportunity, dignity and the pursuit of material prosperity for all. It is in this spirit that we have committed the energy, time and resources of our governments to Food and Nutrition Security aligned with the Big Four agenda of the national government (alongside ensuring Industrialization through Manufacturing, Universal Health Care and Decent Housing). Achieving food security also has other benefits —employment of the youth, increased incomes for our farmers, lower market prices for food and increased exports of Kenyan products.

The counties have been actively engaged in shaping the 10-year Agricultural Sector Transformation and Growth Strategy (ASTGS) and the accompanying 5-year National Investment Plan (NAIP) from the beginning. The strategy can only succeed with the counties in the driving seat of implementation. We are very encouraged by the ASTGS' attention to the realities of devolution. Particularly the priorities we raised around increasing private sector involvement, accelerating farmer registration, creating market linkages fro farmers through SME's, and generating the data to ensure evidence-based interventions that give farmers the support they need at the grass-root level.

We owe it to ourselves, our people, and to this nation to collaborate for full realization of the ASTGS and its aspirations to directly impact the livelihoods of ~3.3 million farming households, accelerate agricultural production and agro-processing, and reduce the number of food insecure Kenyans to zero. We commit to rapidly domesticating the ASTGS, and implementing the nine flagships. However, we also ask you — our country residents, our civil servants, farmers and agricultural entrepreneurs, small, medium and large companies and foreign investors stand with us. We will work with each of you to ensure that every farmer and value chain player in the sector gets the most efficient enabling environment to support their economic growth.

H.E. Hon. FCPA Wycliffe Ambetsa Oparanya, EGH
Governor, Kakamega County and
Chairman, Council of Governors

ACRONYMS AND ABBREVIATIONS

AA	Advanced Analytics
APDT	Agro-processing delivery team
AIRC	Agricultural Information Resource Centre
ARDDG	Agriculture and Rural Development Donor Group
ASAL	Arid and Semi-Arid Land
ASDS	Agricultural Sector Development Strategy
ASDSP	Agricultural Sector Development Support Programme
ASTGS	Agricultural Sector Transformation and Growth Strategy
ATO	Agricultural Transformation Office
ATVET	Agricultural Technical Vocational Education and Training
BAFPS	Bureau of Agriculture and Fisheries Products Standards
CAADP	Comprehensive Africa Agriculture Development Programme
CAN	Calcium Ammonium Nitrate
CARPS	Capacity Assessment and Rationalization of the Public Service
CEC	County Executives/County Executive Committees
CETRAD	Centre for Training and Integrated Research in ASAL
CFTA	Continental Free Trade Area
CGIAR	Consultative Group on International Agricultural Research
CGE	Computable General Equilibrium
CIDP	County Integrated Development Plan
CIMES	County Integrated Monitoring and Evaluation System
CO	Chief Officer
CoG	Council of Governors
COMESA	Common Market for Eastern and Southern Africa
CYMITT	The International Maize and Wheat Improvement Centre
DAP	Diammonium Phosphate
DATER	National Research and Extension Department
DRM	Drought Risk Management
D.P.	Deputy President
EAC	East African Community
EDE	Ending Droughts Emergencies
EEZ	Exclusive Economic Zones
EPZ	Export Processing Zones
ERA	Economic Review of Agriculture
ERS	Economic Recovery Strategy
FAO	Food and Agricultural Organization
FAW	Fall Armyworm
FCDC	Frontier Counties Development Council
FDI	Foreign Direct Investment
FRA	The Food Reserve Agency
GAM	Global Acute Malnutrition
GAMWHZ	Global Acute Malnutrition, weight for Height Z-Score
GDP	Gross Domestic Product
GHI	Global Hunger Index
GODAN	Global Open Data for Agriculture and Nutrition
H.E.	His Excellency
HR	Human Resources
IAA	Institutional Architectural Assessment
IAIP	Integrated Agro-Industrial Parks
ICT	Information and Communication Technology

IFPRI	International Food Policy Research Institute
IGF	Intergovernmental Forum
ILRI	International Livestock Research Institute
ISFM	Integrated Soil Fertility Management
IWRM	Integrated Water Resources Management
JASCCM	Joint Agricultural Sector Consultation and Cooperation Mechanism
JASSCOM	Joint Agricultural Sector Steering Committee
JKP	Jumuiya ya Kaunti Za Pwani
JRC	Joint Research Centre
JSR	Joint Sector Review
KAAA	Kenya Agribusiness and Agroindustry Alliance
KAINeT	Kenya Agricultural Information Network
KALRO	Kenya Agricultural and Livestock Research Organization
KCC	Kenya Co-operative Creameries
KEFRI	Kenya Forestry Research Institute
KENAFF	Kenya National Farmers' Federation
KEPHIS	Kenya Plant Health Inspectorate Service
KEPSA	Kenya Private Sector Alliance
KES	Kenya Shillings
KFSSG	Kenya Food Security Steering Group
KIHBS	Kenya Integrated Household Budget Survey
KIRDI	Kenya Industrial Research and Development Institute
KMFRI	Kenya Marine and Fisheries Research Institute
KMC	Kenya Meat Commission
KNBS	Kenya National Bureau of Statistics
KODI	Kenya Open Data Initiative
KPI	Key Performance Indicator
KTDA	Kenya Tea Development Authority
LINKS	Livestock Information Network Knowledge System
LiLO	Legislation and Intergovernmental Liaison Office
M&E	Monitoring and Evaluation
MAFAP	Monitoring and Analysing Food and Agricultural Policies
MLND	Maize Lethal Necrosis Disease
MoALFI	Ministry of Agriculture Livestock, Fisheries and Irrigation
MT	Metric Tons
MTIP	Medium-Term Investment Plan
MTP	Medium-Term Plan
NACOSTI	National Council of Science Technology and Innovation
NAFIS	National Farmers Information Service
NaHMIS	National Horticulture Market Information System
NAIP	National Agriculture Investment Plan
NARS	National Agricultural Research System Policy
NBA	National Biosafety Authority
NCPB	National Cereals and Produce Board
NDMA	National Drought Management Authority
NDOC	National Disaster Operation Centre
NDMU	National Disaster Management Unit
New KCC	New Kenya Cooperative Creameries
NFNSP	National Food and Nutrition Security Policy
NFNSP-IF	National Food and Nutrition Security Policy Implementation Framework
NFSC	National Food Security Council
NGO	Non-Governmental Organization
NIB	National Irrigation Board

NLMIS	National Livestock Marketing Information System
NOREB	Northern Region Economic Bloc
NRF	National Research Fund
ODC	Open Data Cube
PHPTC	Post-Harvest Processing and Trading Centres
PIATA	Partnership for Inclusive Agricultural Transformation in Africa
PPP	Public Private Partnership
PPPU	Public Prívate Partnership Unit
PROGRESA	Programa Nacional de Educación, Salud y Alimentación
RFP	Request for Proposal
R&D	Research and Development
SCP	Satellite Collection Points
SDGs	Sustainable Development Goals
SEKEB	South East Kenya Economic Bloc
SEZ	Special Economic Zone
SFR	Strategic Food Reserve
SFRTF	Strategic Food Reserve Trust Fund
SME	Small and Medium-Sized Enterprise
SPS	Sanitary and Phytosanitary
SRA	Strategy for Revitalizing Agriculture
UPOV	Union for the Protection of New Varieties of Plants
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
USSD	Unstructured Supplementary Service Data
WFP	World Food Programme
WRA	Water Resources Authority
WHZ	Weight for Height Z-Score

SELECTED GLOSSARY OF TERMS

Agro-processing Delivery Team (APDT):
Members of the Agriculture Transformation Office (ATO) who support pre- and post-feasibility study requirements for the agro-processing hubs detailed in flagship 3. The APDT will pre-screen approved service providers for the agro-processing hubs, manage the feasibility study grant programme, and maintain a library of standard project agreements.

Agricultural transformation:
A decades-long process characterized by four main shifts including (1) modernization of on-farm production and input markets from subsistence to commercial agriculture serving local and export demand; (2) value in the value chain moving from primary production towards processing and retail; (3) on-farm employment shifting into more productive agricultural jobs; and (4) changing demand for what people eat (e.g., more processed foods, animal proteins) and where they buy them (e.g., formal retailing).

Anchor:
A key outcome of the theory of change of this Agricultural Sector Transformation and Growth Strategy (ASTGS). Three anchors are articulated herewith: increasing small-scale farmer incomes, increasing agricultural output and value-add, and boosting household food resilience. Under each anchor, are ~2 flagship projects to drive the intended outcomes. Anchors are designed to guide the full 10 years of implementation while the flagships are designed for ~5 years, and need to be reviewed and revised in year 5 of implementation.

SME accelerator:
Contracted profit or not-for profit companies that select, train, mentor, scale and conduct performance management of high-potential SMEs under flagship 1. These accelerators will be selected jointly by national and county governments to operate across the country. Foremost, the, accelerator must be able to demonstrate a proven track record in training and scaling SMEs in Kenya, or in a similar context. The accelerators may be a group of companies or organizations, but must be primarily headed by an impartial party and operate at a competitive price. These SME accelerators should be able to support SMEs with varying business models.

Climate-smart agriculture (SA):
As defined by the FAO, CSA is an approach for developing agricultural strategies to secure sustainable food security under climate change.

Domesticated:
The process by which the counties translate the national-level ASTGS into an actionable county-level plan. This will require the counties to adopt the ASTGS to their county operating environments, budgetary processes, and Country Integrated Development Plans (CIDPs). JASCCM is a critical enabler of domestication as the interface between national and county level.

Farmer:
A person who owns, works on or operates an agricultural enterprise that cultivates land or crops, or raises animals including livestock and fish. Whenever this document refers to “farmer”, it assumes crop and fish farmers, pastoralists, including all animal and poultry husbandry, and fisherfolk.

Flagship:
A strategic project with a lifetime of at least 3-5 years, and both high feasibility and impact within Kenya’s operating context and goal of sustainable transformation and food security.

Food secure/security:
A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

Household:
While a household may have two farmers (and ~2-3 other members of the household as per the latest Kenya Integrated Household Budget Survey), the primary income earner tends to be the man in the household, particularly in rural areas that comprise 60-70% of the small-scale farmers targeted. For the relevant flagships:
i. Flagship 1 is focused on production and analysis focuses on individual income-earning farmers
ii. Flagship 2 is based on one e-voucher per household. As the data gets better, may be able to isolate to one e-voucher per farm
iii. Flagship 6 is focused on the entire household, income and non-income earners

Food resilience:
As defined by the FAO, this is the ability of a household to keep within a certain level of well-being (i.e., being food-secure) by withstanding shocks and stresses. This definition implicitly considers both ex ante actions that reduce the risk of households becoming food insecure, and ex post actions that help households cope after a crisis occurs.

Vulnerable population:
With respect to determining targets for the strategic food reserve coverage, this population is defined as the ~1.3 chronically million food-insecure Kenyans in ASAL areas, and the approximately 4 million Kenyans in need of government support to be food-secure during emergencies (e.g., droughts) based on historical data. For this population, the assumed per capita consumption is 114 kg/capita/year of maize.

Small/Medium Enterprise (SME):
Comprise both formal and informal businesses concentrated in urban and peri-urban areas. As defined by the Kenya Institute for Public Policy Research and Analysis (2014), Kenyan SMEs have 10-100 employees, and an annual turnover of KES 500,000 to KES 5 million per year.

EXECUTIVE SUMMARY

"Every person has the right to be free from hunger, and to have adequate food of acceptable quality."

Article 43, Constitution of Kenya (2010)

Providing food and nutrition security to all Kenyans is a national mandate. The country's future depends on a healthy population and an economy that is resilient to the effects of climate change, global swings in staple food prices, and the effects of emerging pests and diseases like the Fall Armyworm (FAW) and the Maize Lethal Necrosis Disease (MLND). Such risks threaten the welfare and livelihoods of many Kenyans and destabilise the economy.

Agricultural transformation is a decades-long process which involves modernization of on-farm production, and shifting production towards more value addition. Agricultural transformation is critical to growing the economy, reducing the cost of food, alleviating poverty and therefore delivering 100% food and nutrition security. Apart from Singapore and Hong Kong, no country has achieved upper middle-income status without transforming its agricultural sector. Kenya is no exception. Millions of citizens depend on agriculture for income and food security, and the country's economic growth therefore depends on enabling these people to achieve food security and contribute more fully to the economy.

Kenya has taken big strides over the years to build its macro-economic foundations for agricultural transformation: ~33% of total GDP, ~60% of informal employment and ~60% of exports come from the agricultural sector, with the largest contribution coming from crops production.[i] Transforming the agriculture sector will cement these foundations for economic growth by providing the tools to combat price volatility, improving the environment for private investment, and developing more strategic approaches to lower the country's dependence on food imports.

To transform Kenya's agricultural sector and make it a regional powerhouse, the Government has formulated the Agricultural Sector Transformation and Growth Strategy (ASTGS). The strategy is anchored in the belief that food security requires a vibrant, commercial and modern agricultural sector that sustainably supports Kenya's economic development, national priorities, commitments to the Malabo Declaration under the Comprehensive Africa Agriculture Development Programme (CAADP), and the United Nations Sustainable Development Goals (SDGs). Building on lessons learned from prior strategies, ASTGS takes an *evidence-based approach, as well as a sharp focus on implementation and delivery with the counties at the centre.* This approach is the basis for addressing the effects of climate change and the challenges that constrain agricultural output, productivity and natural resource management in Kenya today. Sustaining this evidence-based foundation will require data for rigorous performance management today, as well as the research and innovation to propel decision making and technologies that the transformation will require for the future.

The ASTGS prioritizes three anchors to drive the 10-year transformation, with specific targets set for the first five years:

- Anchor 1: Increase small-scale farmer, pastoralist and fisherfolk incomes:
  - Raise average annual small-scale farmer incomes by ~40% from KES 465/day to 625/day (~35% increase)[ii]
  - Directly benefit ~3.3 million Kenyan farming households, and 15 million Kenyan lives
- Anchor 2: Increase agricultural output and value add:
  - Expand agricultural GDP from KES 2.9 trillion to KES ~3.9 trillion (~6% CAGR)
  - Grow contribution of agro-processing to GDP by KES ~130 billion over 5 years (~50% from KES 260 billion today)
- Anchor 3: Increase household food resilience:
  - Reduce the number of food-insecure Kenyans in the ASAL regions from 2.7 million on average to zero,[iii] while reducing the cost of food and improving nutrition
  - Protect households against shocks: environmental and fiscal

i Kenya Economic Survey 2017, Kenya National Bureau of Statistics. In 2016 terms, Ag GDP is KES 2.3 trillion and total GDP is KES 7.2 trillion at market prices. 2016 numbers are still subject to revision.

ii Currently, small-scale farmer income is ~KES 400 a day, based on total household income from FAO Family Farming Data Portraits. Analysis assumed that 60% of this is from on-farm income from the same source, and then adjusted for Purchasing Power Parity (PPP) and inflation into 2018 KES baseline. Over the past ~10 years incomes have grown 35%, below the pace required to meet the Sustainable Development Goal (SDG) of doubling incomes between 2016-2030. If incomes are KES 145k today (~KES 400/day), without a transformation they should grow to 170k (~KES 465/day) by 2023 based on historical trends. Transformation Is estimated to contribute an incremental ~35% to 229k (~KES 625/day).

iii Currently, ~1.5mn Kenyans are chronically food-insecure, including 1.3mn in ASALs. During emergencies, the most severe of which are droughts historically, number rises to ~3.4-3.7mn total, so this is an average of ~2.7mn chronically and in-emergency food-insecure. The. ASTGS assumes that in the aspirational case, 100% coverage of the average food-insecure population (taking % of population that is food-insecure from 2008-2017 and extrapolating to the 2022 population); conservative case is full coverage of chronic food-insecure population in ASALs of ~1.3 million.

The path to achieving these outcomes must address the unique challenges and opportunities for women and youth in the sector by incorporating tailored opportunities for these groups as an integral part of delivering the ASTGS. Women comprise more than half of Kenya's population, youth between 18-35 comprise ~35%. But these two groups are underrepresented in agriculture and as a result do not receive full benefits of participation in the sector.[1]

Nine big ideas ("flagships") underpin the anchors to define the strategy in the context of devolution: two flagships t*o increase small-scale farmer, pastoralist and fisherfolk incomes*; two flagships *to increase agricultural output and value-add*; two flagships to boost household food resilience; and finally three enablers that run across the transformation:

ANCHOR 1: *Increase small-scale farmer, pastoralist and fisherfolk incomes*

1. Target ~1 million farmers in ~40 zones (initially) producing crops, livestock and fish served by ~1000 farmer-facing SMEs that provide inputs, equipment, processing and post-harvest aggregation

2. Shift nationwide inputs support programme focus to empower ~1.4 million registered high needs farmers to access a wide range of inputs (e.g. seeds, crop protection, fertilizer, equipment) from a variety of private and public providers, using e-vouchers for digital service delivery

ANCHOR 2: *Increase agricultural output and value-add*

3. Establish ~6 large-scale agro- and food-processing hubs across the country through a rapid Public-Private-Partnership (PPP) process (i.e. one-stop shop) targeting both domestic and export markets

4. Unlock ~50 large-scale private farms (>2,500 acres each) with ~150,000 acres under sustainable irrigation from existing projects (e.g., rehabilitate dams) with government-provided infrastructure (e.g., power, roads) and protected land ownership

ANCHOR 3: *Boost household food resilience*

5. Restructure governance and operations of the Strategic Food Reserve (SFR) to better serve ~4 million vulnerable Kenyans through: i. reserves optimized for emergency responses only; ii. buy/sell guidelines published with pre-determined emergency release triggers for stocks and cash; iii. private sector warehousing; iv. price stability managed through Treasury

6. Boost food resilience of ~1.3 million farming, pastoralist and fishing households in arid and semi-arid lands (ASALs) through community-driven design of interventions, and more active economic bloc coordination of development partner and private sector resources

ENABLERS

7. Launch three knowledge and skills programmes: i. field-and-forum curricula for ~200 national and county government leaders who will drive the strategy; ii. skill building for public and private sector flagship implementers (including agri-business skills for ~1,000 farmer-facing SMEs); iii. management/ technical training for ~3,000 youth-led and digitally-enabled government extension agents

8. Strengthen research and innovation as launch priority digital and data use cases to better drive decision making and performance management. First wave of use cases includes: i. digital subsidy delivery programme; ii. production forecasting and digital performance monitoring of small-scale farmers and SMEs; iii. forecasting and monitoring SFR buy/sell needs

9. Actively monitor two key food system risks: i. sustainable and climate-smart natural resource management including health of water basins, soil quality and land use; and ii. rapid-response crisis management for pests and diseases, climate and global price shocks

Delivery will be a collaborative effort chaired by Cabinet Secretary of the Ministry of Agriculture, Livestock, Fisheries and Irrigation, drawing on input and expertise as required from the Cabinet Secretaries from the Ministries of Devolution and ASAL areas; Environment and Forestry; Industry, Trade and Cooperatives;

Lands and Physical Planning; Ministry of Transport, Infrastructure, Housing and Urban Development; Water and Sanitation; and The National Treasury.

The MoALFI will formulate, implement and monitor agricultural policy and regulation, while developing and coordinating programmes to support crops development, livestock, fisheries, irrigation and research that are critical to delivering the ASTGS. Furthermore, the MoALFI Cabinet Secretary will ultimately be responsible for delivering the targets for the sector.

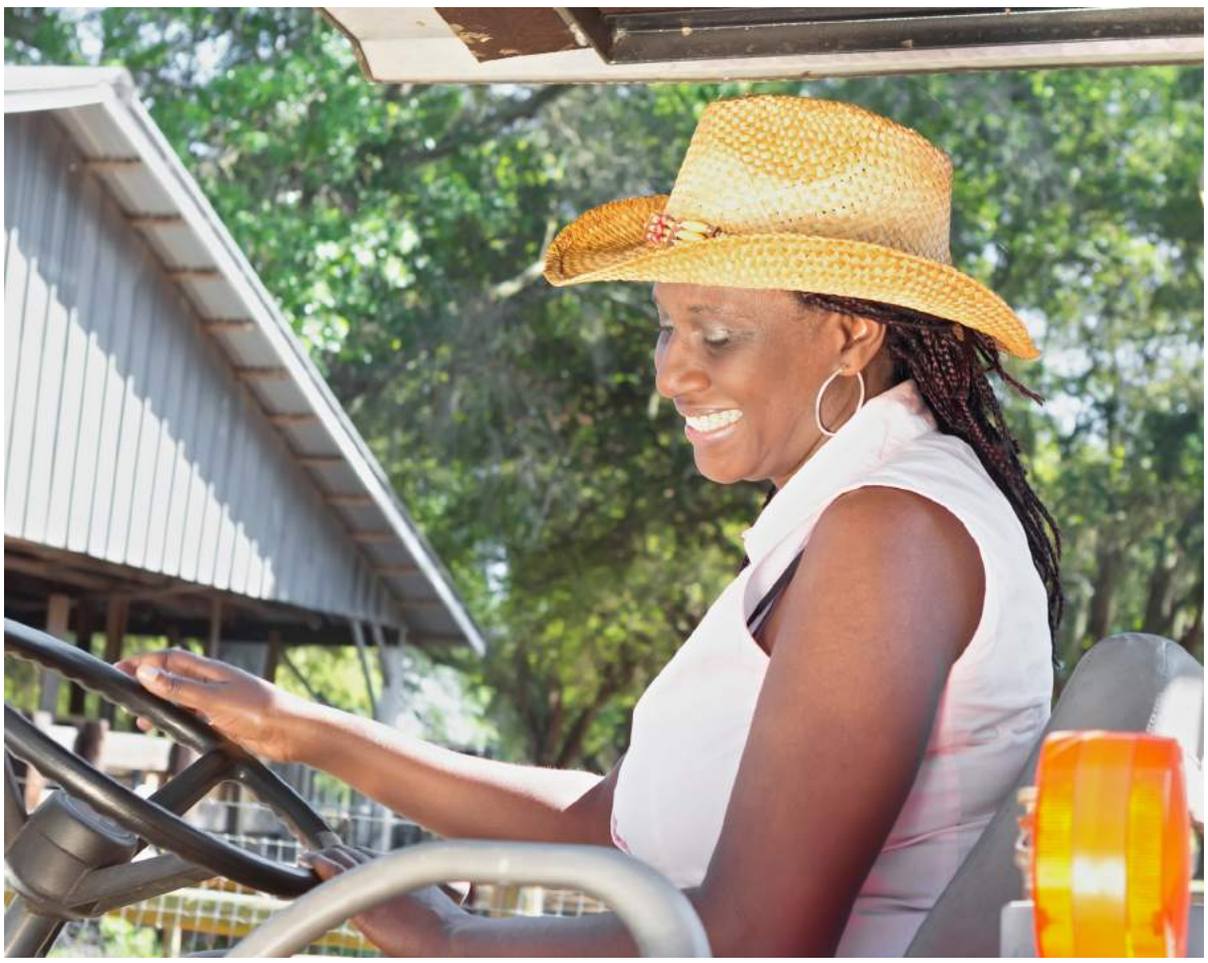
The Agricultural Transformation Office (ATO) will support inter-ministerial coordination, performance management and mutual accountability across the sector, and should play its role in close collaboration with and reporting to the MoALFI Chief Administrative Secretary (CAS). The ATO Director will work closely with the MoALFI Cabinet Secretary on his/her transformation mandate. The ATO will also collaborate closely with the Joint Agricultural Sector Steering Committee (JASSCOM) and the Council of Governors as these latter bodies support the counties to domesticate the ASTGS. This domestication is critical not only for ongoing County Integrated Development Plans (CIDPs), but also as the counties draft their own 10-year Agriculture Sector Development Plans (ASDPs).

Early estimates show that the strategy has the potential improve the lives of ~3.3 million small-scale farming households (~15 million Kenyans), and contribute additional agricultural GDP of up to KES ~170 billion p.a. in five years (up to KES 460 billion). An additional up to KES 230 billion p.a. can be added to total GDP from other sectors (e.g., construction and manufacturing) as a result of transformation in agriculture.

The ASTGS is expected to cost up to KES 440 billion over five years: ~KES 230 billion in agriculture-specific costs, and ~KES 210 billion in agriculture-supportive spend including power, roads and price stability initiatives. With the right approach, up to 80% of costs can be financed through public private partnerships (PPPs), particularly in the agro-processing and arable land flagships. Therefore, the Government of Kenya (GoK) and development partners would need to finance 20% of cost which includes e-vouchers, extension and the enablers. To meet this obligation, the GoK needs to raise an additional KES 8-10 billion per year to cover their financing obligations to the strategy (~30% increase in current disbursed budgets).

"We are all farmers. Even if we do not work the land, our parents did – and this is what has paid for our education and development."

– H.E. President Uhuru Kenyatta,
Africa Green Revolution Forum, 2016



01

WHERE ARE WE NOW: KENYA'S AGRICULTURAL CONTEXT

1.1 KEY SECTOR FACTS

The agricultural sector is the backbone of the economy with great potential for growth and transformation. It directly contributes about 33% of total Gross Domestic Product (GDP), and an additional ~27% to GDP through linkages to other sectors such as manufacturing and construction. The sector employs more than 40% of the total population and about 70% of the rural population. A more detailed review of the sector follows in *Chapter 1.3*, but Figure 1 identifies some key sector facts with respect to small-scale farmer incomes, agricultural output and value addition, and finally household resilience.

FIGURE 1: KEY AGRICULTURE SECTOR FACTS

KEY SECTOR FACTORS

SMALL-SCALE FARMERS INCOMES

~8.6M

Farmers in Kenya representing ~4.5 million farming households, even if only ~350,000 formal jobs exist in the sector

~60%

Of production, including **60-70%** *of all maize production comes from small-holders.* But only **10-15%** *of incomes* for these farmers come from maize.

<7%

Of land is irrigated, *most arable land is rain fed.*[iv]

2nd LARGEST

Livestock herd in Africa **13th** *largest number of dairy cows in the world, but* **138th** *yields due in part to cold chain storage.*

1.5-2.5X

More time on farm than SSA peers[v] with lower levels of mechanisation.

AGRICULTURAL OUTPUT AND VALUE ADD

~33% Of total GDP.

~80% Crops

~15% Livestock

<2% Fish and Aquaculture

~3% Other[vi]

iv Of irrigated land, 42% by small-scale schemes ~15ha/scheme, 40% commercial over 45,000ha, 18% government schemes with avg. 2600ha/scheme, but only 2 counties (Tana, Kirinyaga) have capacity >8,000ha.
v Including Tanzania, Ethiopia, Uganda and Nigeria. Kenya mechanization rates are <5x Nigeria.
vi Forestry and support activities. Range is due to use of 2009 constant or 2016 current prices that are still subject to revision.

~2.3% Of national budget[vii] (~KES 60bn), of which **~KES 5bn** *spent on subsidies* (equivalent to ~13% of Ministry of Agriculture budget)

<5%

Of total gross commercial loans in Kenya go to agriculture (~KES 94bn)

KES100bn

Opportunity for Kenya to capture from *closing yield gaps in maize, beans and tea* to best in class regional peers[viii]

16%

Processed share of agro exports, below East Africa peers in Tanzania (27%) and Uganda (34%)

1/8

Value add per agricultural worker compared to SSA peers.[ix] Kenya at KES ~80k, peers at KES 350-750k.[x]

HOUSEHOLD RESILIENCE

1.3M

Chronically food insecure Kenyans in ASALs, primary due to drought. Increases to ~4M Kenyan's during severe droughts.

2X

More price volatility than rest of EAC peers[xi] including Uganda, Tanzania, Rwanda, Burundi for key staples

6 *of* 7

Water catchment areas under severe stress by 2030.[xii]

3-4x

more potential for fisheries production in Lake Victoria, a significant opportunity to boost GDP and protein in Kenyan diets

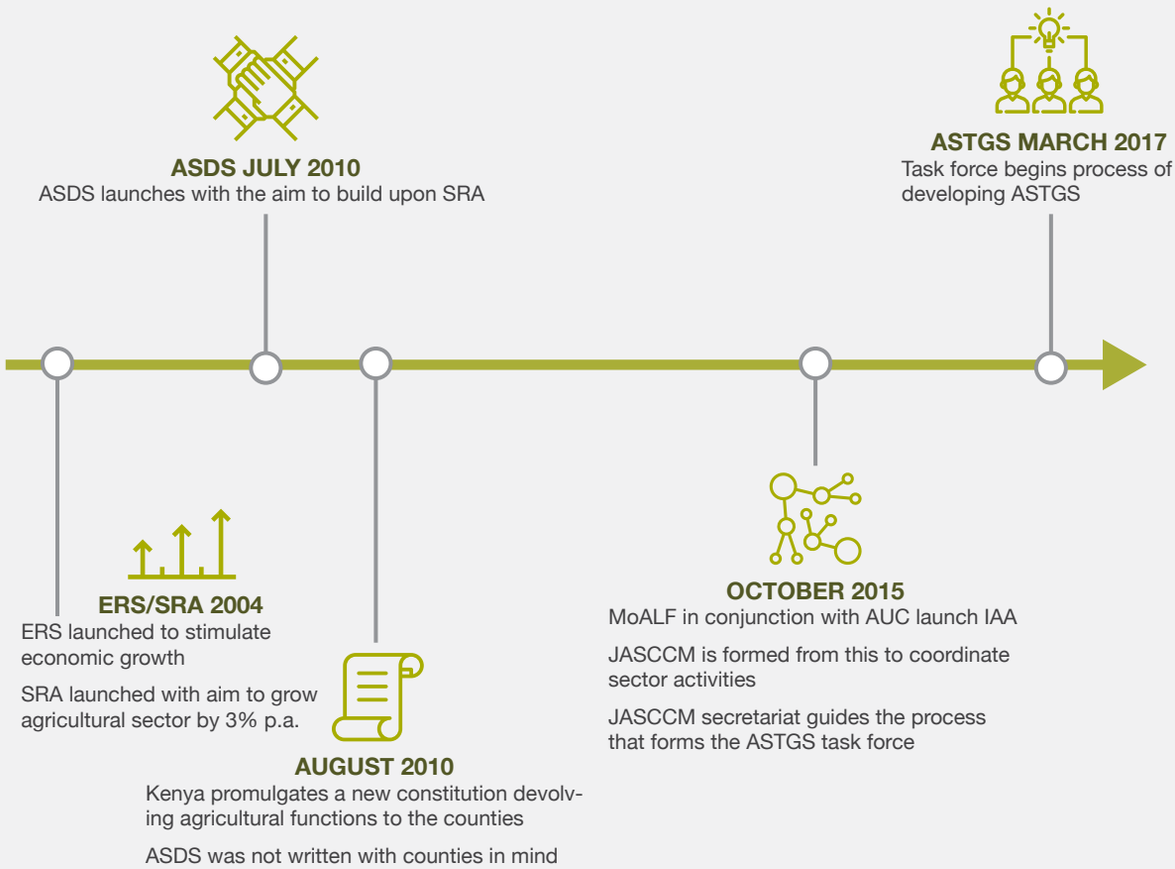
21 *out of* 100

Score on Global Hunger Index (1 is best), ranked better than regional peers, particularly on the availability of food

SOURCE: Observations of Economic complexities; EIU; GEC; Kaves-USAID; APHILIS; FAOSTAT; Expert interviews; I_DEV; CBK; KIHBS; Kenya economic survey 2017; KNBS; World Bank; Kenya Bureau of Statistics; CommTRADE 2013; Kenya Demographic and Health Survey, FAO; Kenyan Demographic and Health survey 2014; UMCES Data Africa; IFPRI; APHTACIS; Kenya market trust; FAOSTAT; Tegemeo; National Water Master Plan; State Department of Fisheries

vii CAADP target is 10%.
viii Regional includes Ethiopia, S. Sudan, Uganda, Rwanda, Burundi, Tanzania and Somalia.
ix Including Tanzania, Ethiopia, Uganda and Nigeria. Kenya mechanization rates are <5x Nigeria.
x Different strategies: Nigeria via extension and liberalizing markets for seeds, fertilizer, Mauritius increased budget allocations, Cape Verde optimized water use, South Africa inccreased spend in agriculture.
xi Measured by standard deviation in consumer price food indicies, Kenya is at 7, EAC is at 4.
xii OECD defines "under secure water stress" where ratio exceeds 40%. Only Lake Victoria North Catchment Areas will have ratio of <40% at 2030.

BOX 1: HISTORY OF AGRICULTURE STRATEGIES IN KENYA



1.2 A BRIEF HISTORY OF AGRICULTURE STRATEGIES IN KENYA

In 2004, after years of stagnation and negative growth, the Kenyan Government launched the Economic Recovery Strategy for Wealth and Employment Creation (ERS), with an emphasis on economic growth, wealth creation and employment as a means of eradicating poverty and achieving food security (see Box 1). The strategy identified agriculture as the leading productive sector for economic recovery and recognized the revival of agricultural institutions and investment in agricultural research and extension as critical for sustainable economic growth. The development of the sector was considered to be a top priority in poverty reduction because it was the most important economic activity relied on by the poor in rural areas for their livelihood.[2] In addition to the ERS in 2004, the Government launched the Strategy for Revitalizing Agriculture (SRA). The sector surpassed the SRA growth target of 3.1% to reach a high of 6.1% in 2007. However, the growth trend was interrupted in 2008 by external factors of post-election violence, global food crises, global escalation of fuel and fertilizer prices and global financial crises.[3]

In 2008, the government launched Vision 2030 as the overall national long-term development blueprint to transform the country into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. In Vision 2030, agriculture is identified as a key sector in achieving the envisaged annual economic growth rate of 10%, through transformation of smallholder agriculture from subsistence to commercially oriented. In response to entrenching the aspirations of Vision 2030, the Agricultural Sector Development Strategy (ASDS) was developed and became the overall national policy document for the rural sector ministries since.

In October 2015 the Ministry of Agriculture, Livestock and Fisheries (MoALF) conducted an Institutional Architectural Assessment (IAA) to establish the institutional and policy landscape of the agriculture sector in Kenya. The IAA was an interim step in preparation for a Joint Agriculture Sector Review (JSR) that is conducted biennially under the CAADP Framework. The study found that poor sector coordination had resulted in reduced investments in the agriculture sector both at national level and in the counties. The Cabinet Secretary in the then MoALF, the Chair of the Council of Governors (CoG) and the Chair of the Agriculture and Rural Development Donor Group (ARDDG) resolved to establish a mechanism to enhance coordination in the sector through an inclusive consultation process.

In 2016, the Joint Agriculture Sector Inter-Governmental Secretariat (IGS) was asked to lead a review of the ASDS and design a new Agriculture Transformation and Growth Strategy that was compliant with the Constitution of Kenya (2010) and the CAADP Malabo Declaration. JAS-IGS played a central role in guiding the processes that led to the 2019 Agriculture Sector Transformation and Growth Strategy (ASTGS), and the extensive multi-year, multi-stakeholder consultative process to support the ASTGS design – including national and county level governments and non-state actors including the private sector. The ASTGS is thus aligned with the 100% food and nutrition security aspiration in the Big Four presidential agenda, the medium-term national agriculture sector priorities and Medium-Term Investment Plan III, as well as the longer-term commitments to the CAADP/Malabo Declaration, the UN SDGs, the AU Agenda 2063.

1.3 AGRICULTURAL SECTOR TRENDS

Agriculture has always played a major role in the Kenyan economy. As of 2016, the sector was valued at KES 2.3 trillion, and contributed about 33-36% of GDP.[4] Growth in the agricultural sector also has strong linkages to the broader economy: 1% of growth in agriculture is estimated to drive 1.6% overall GDP growth.[5]

To determine the starting point for this agricultural transformation, Kenya's agriculture sector was evaluated using *14 Timeless Tests of Agricultural Transformation*, and benchmarked to ~30 countries from around the globe.[6] Varying levels of agricultural data exist to run these tests at the national and county levels, as well as for the agricultural sub-sectors (i.e., crops, fisheries, livestock). Therefore, the most robust analysis focused namely on six tests:

- Macro-economic tests: (i) agricultural GDP growth and contributions to overall GDP
- Socio-economic tests: (ii) historical trends of farmer incomes and employment; (iii) food security indicators
- Agriculture food system tests: (iv) output by production volume and value; (v) output yields and yield gaps; (vi) level of value-add processing

Macro-economic tests

Agricultural contribution to GDP

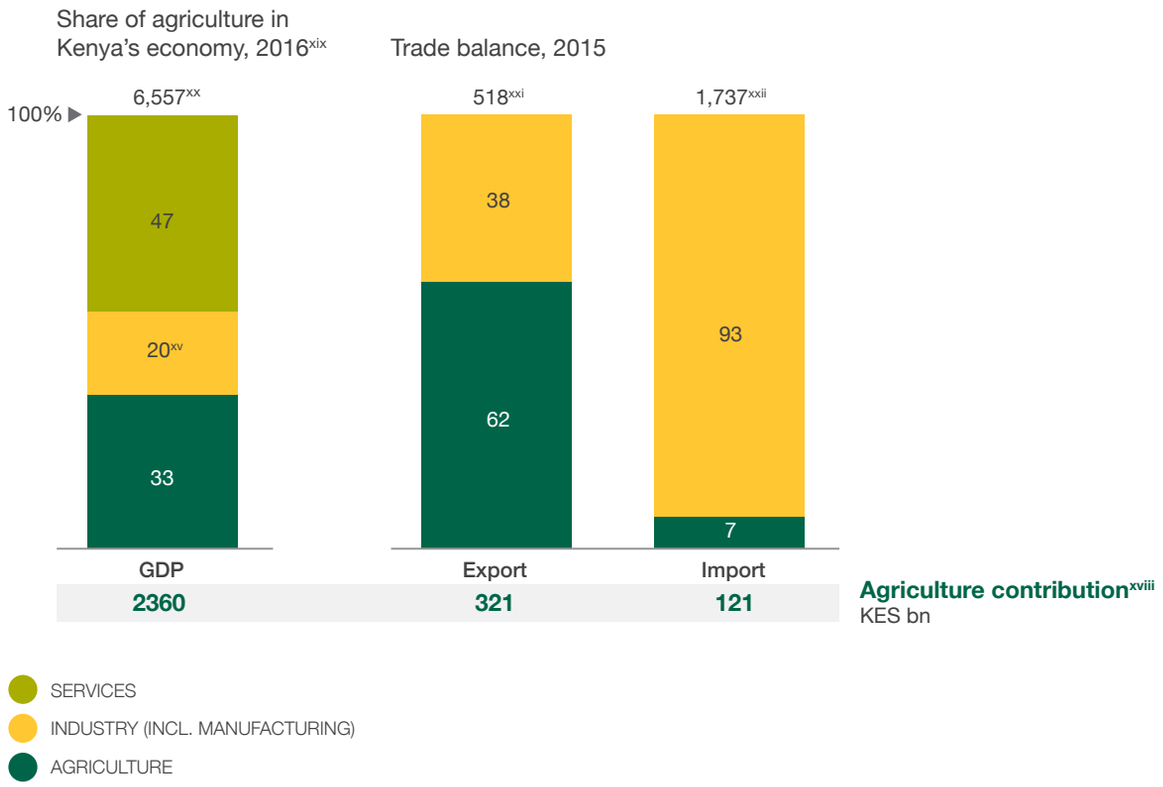
In 2016, agriculture contributed ~33% to Kenya's GDP[xiii] ~60% of exports and 7% of imports. The services and industry sectors represent 47% and 20% respectively of GDP (with manufacturing ~11% of the industry share), but with much higher shares of imports (*Figure 2*).

Overall, the agriculture sector has grown at an average ~4.8% between 2012 and 2016, slightly below growth across the Kenyan

xiii Agricultural contribution to GDP is 33% at 2016 current prices (Economic Survey 2017).
xiv Total GDP from KNBS statistics. Split by sector is from World Bank Development Indicators.
xv Manufacturing accounts for ~11% of the ~20% from industry.
xvi Agricultural imports include vegetable products, animal products, and animal hides. Services are considered to be minimal and are not measured in export statistics. Remainder is considered as manufacturing.
xvii Agricultural exports includes vegetable products, animal products, animal hides, and animal and vegetable bi-products. Services are considered to be minimal and are not measured in export statistics. As such, the remainder is considered as manufacturing.
xviii Current prices. For import and export, the exchange rate of KES 101/USD and percentage contribution was used.

FIGURE 2: CONTRIBUTION OF AGRICULTURE TO GDP AND TRADE

The agriculture sector accounts for ~33% of GDP and more than 60% of Kenya's exports



SOURCE: World Bank, OEC, Central Bank of Kenya, KNBS

economy. Kenya's agricultural growth rate is on par or ahead of countries in the region that had a similar mix of agriculture, manufacturing and services for the period 2012-2016, including Rwanda (~5%) and Uganda (2%).[7] But Kenya lags economies like Senegal and Cameroon, which ended this period with growth rates of ~6.5% and ~6.8% respectively.[8] Despite having a smaller contribution of agriculture to GDP (~15-17%) in this period, Senegal's agriculture sector is similar to Kenya's including employment of ~51-53% the sector, mostly rain-fed, where crops and small-scale farmers contribute the largest share to production.[9]

According to the World Bank's Enabling the Business of Agriculture 2017 rankings, Kenya is in the top 10 out of 62 for metrics such as integrated water management, including individual water use; seed development and quality control including plant breeding; and access to financial services including non-bank lending institutions and branchless banking.[10] The Government should work to at least maintain and where possible continuously improve the country's performance against these metrics.

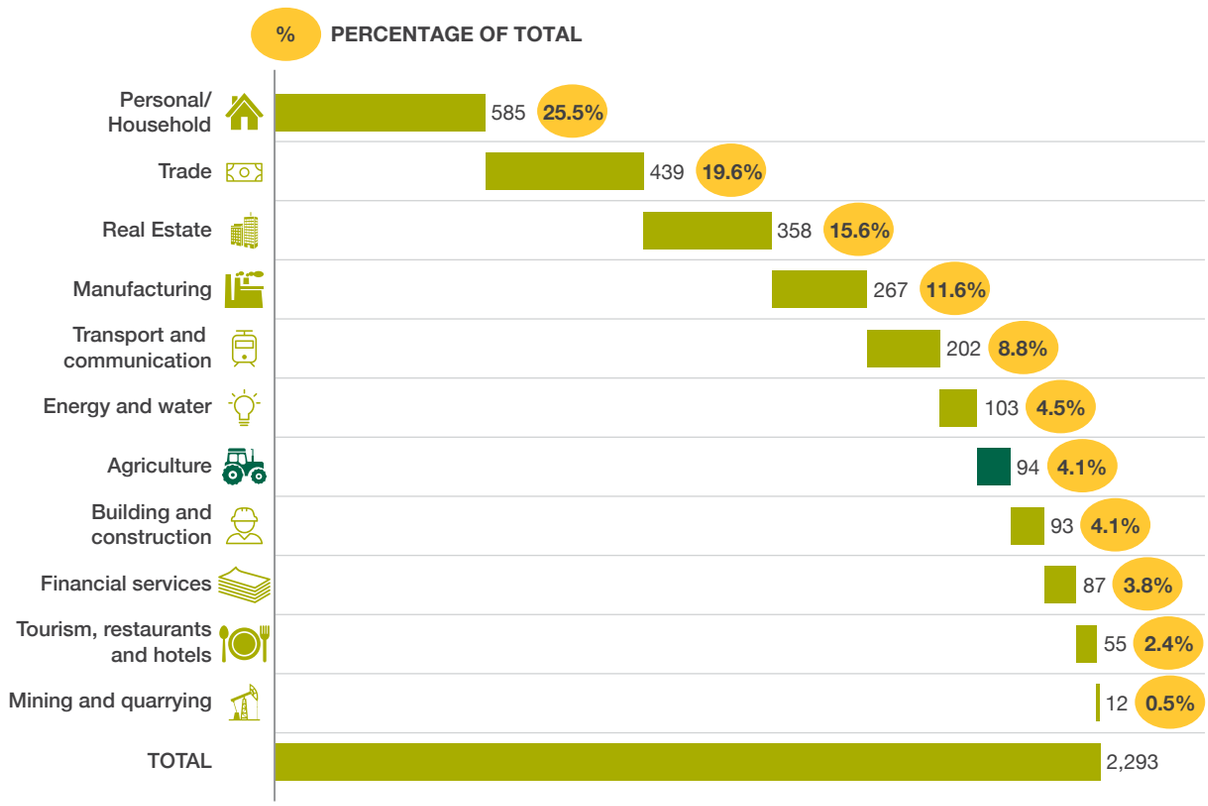
However, Kenya fares poorly along metrics associated with markets, fertilizer and machinery, where the country ranks 59, 43 and 29 out of 62 respectively.[11] Marketing issues arise from agribusinesses facing significant regulatory obstacles in producing, marketing and exporting agricultural products. Issues in fertilizer are driven by poor quality control and registration, and issues in machinery are driven by low tractor operability, testing and standards. A concerted effort is needed to address these areas.

xix Total GDP from KNBS statistics. Split by sector is from World Bank Development Indicators
xx Current prices. For import and export, the exchange rate of KES 101/USD and percentage contribution was used
xxi Manufacturing accounts for ~11% of the ~20% from industry
xxii gricultural imports include vegetable products, animal products, and animal hides. Services are considered to be minimal and are not measured in export statistics. Remainder is considered as manufacturing
xxiii Agricultural exports includes vegetable products, animal products, animal hides, and animal and vegetable bi-products. Services are considered to be minimal and are not measured in export statistics. As such, the remainder is considered as manufacturing

FIGURE 3: LENDING TO AGRICULTURE AS OF DEC 2016

Lending to agriculture is smaller than other sectors

Lending to agriculture makes up ~4% of total lending, despite agriculture contributing ~36% of GDP
Sectoral distribution of gross loans, December 2016, KES bn



SOURCE: Central Bank of Kenya

Food imports overall increased at ~10% per year from 2006 to 2016, with agricultural exports growing at 2% per year in the same period, suggesting a declining food trade balance.[12]

Kenya spent ~2.6% of the national budget on agriculture in 2016 – significantly below the ~10% CAADP target.[13] On average, between 2012-2016, MoALFI spent 6% of budget on food security. However, allocations varied significantly from 1% in 2012/2013 to 28% in 2016/2017, when the disaster declaration was reissued due to unfavourable rains.[14]

Budgetary allocations to agriculture vary significantly at the county level with an average of 6%. However, some counties, e.g., Uasin Gishu, allocated over 10% of their total budget to agriculture.[15]

Finally, across the sector, private lending does not reflect the needs and importance of agriculture to GDP. Commercial lending makes up <5% of total lending in Kenya, despite agriculture contributing ~5x more than this to GDP (Figure 3). None of the ~10 sub-Saharan African countries investigated on this metric matched commercial lending to share of GDP by sector, but some are doing better than Kenya. In Tanzania, for example, agriculture contributed ~28% of GDP in 2008, and commercial lending to the sector was 12%.[16]

Socio-economic tests

Farmer incomes, employment and productivity

The ILO estimates that ~62% of Kenya's total employable population of ~28 million earn some income from agriculture, including farm and other off-farm employment related to agriculture (e.g., agri-businesses).[17] Determining which share of these ~18

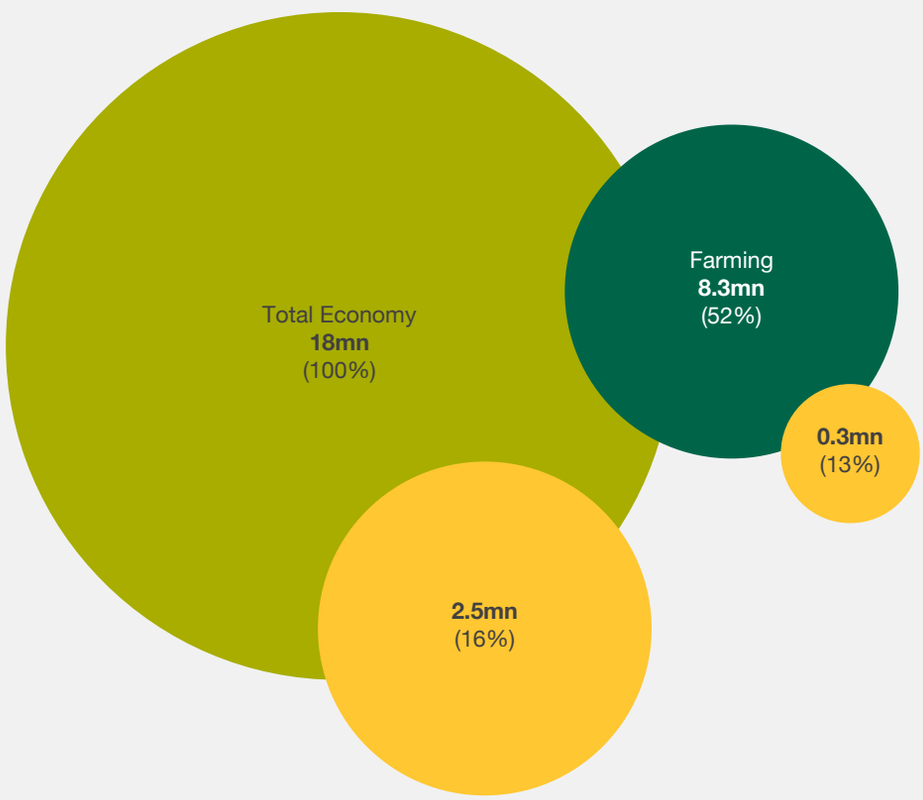
million people are farmers is difficult.

Nonetheless, ASTGS has estimated that of the employable population, half of them (~9 million) are farmers – both those formally employed (~340,000) and those in informal employment (~8.3 million) as seen in Box 2.

Agricultural activity is at the heart of many Kenyan communities, either for tilling or pasture for the ~3 million farmers, or as a source of income the other millions of Kenyans involved in agriculture. Informal employment in agriculture is at least 8x the size of formal employment, with Kenyans spending 1.5-2.5x more time on the farm compared to peers in Nigeria and other areas.[18] Women do most of the work on the farm.[19]

BOX 2: ESTIMATED NUMBER OF FARMERS IN KENYA

There are ~9 million Kenyan farmers today; most are in the informal sector



"We are all farmers. Even if we do not work the land, our parents did – and this is what has paid for all our education and development"

– H.E. President Uhuru Kenyatta,
Africa Green Revolution Forum, 2016

FORMAL EMPLOYMENT AS SHARE OF TOTAL EMPLOYMENT

SOURCE: ASTGS Working Team Analysis, Kenya Economic Survey 2017

It is important to note, however, that the agricultural employment growth rate is lower than that of other sectors, at ~2.3% for agriculture 3.8% for manufacturing and 4% for services.[20, 21] Furthermore, within agriculture, crops accounted for the largest share of employment, at 80%, with livestock and fisheries at 15% and less than 3% respectively.[22]

The value added per worker has remained relatively stable between 2006-2016 at ~KES 98,000 per year, but lags best-in-class countries in Africa by up to 7x: Nigeria, South Africa and Cape Verde have value added per agricultural worker of ~KES 730,000 per year.[23] Low value added per worker implies low levels of technology adoption and investment in labour productivity, and therefore lower incomes. Kenya's peers have pursued different strategies to increase value added – for example Nigeria improved extension services and liberalised markets for seeds and fertilizer; Mauritius increased budgetary allocations to agriculture; and Cape Verde improved rural infrastructure and water utilization.[24]

A regional analysis of Kenyan farmer incomes shows that they vary by county and value chain and are influenced by factors such as agro-ecology, access to markets, and availability of extension services, seeds and fertilizer. For example, a maize farmer in Trans Nzoia has an income potential of KES 10,200 per acre vs. KES 2,400 per acre in Kakamega.[25]

Food security indicators

Kenya's Global Hunger Index[xxiv] (GHI) scores have decreased steadily since 1990 in line with global trends, and at 21 in 2017 are below Tanzania, Ethiopia and Rwanda, but above South Africa.[26] ASTGS uses a more robust set of performance indicators beyond the GHI composite score to assess Kenya's food and nutrition security namely: availability, affordability and quality (Figure 4). This broader set of indicators better reflects the Global Food Security Index (GFSI) 0= worst, 100 = best), where for 2016, Kenya ranks 83 out of 113 overall, ~47 for availability, ~39 for affordability and ~42 for quality.[27]

Compared to other East Africa Community (EAC) countries, Kenya fares well in availability per capita, but is behind in affordability and quality/ nutrition. Kenyan children <5 years old get more calories on average than their EAC peers and therefore have lower prevalence of stunting, at 26%, (an important CAADP indicator).

However, on average, ~30% of households regularly lack enough money for food, with households in Western Kenya ranging as high as 45%.[28] As Figure 4 shows, price volatility in Kenya is two times the EAC average based on consumer price indices. Kenya is behind the EAC average on both of these CAADP indicators.

Finally, while most Kenyan households report an acceptable level of food quality, rural households and pastoralist communities tend to have lower dietary diversity than the national averages, and higher micronutrient deficiencies including in iron and Vitamin A.[29]

xxiv The GHI is a composite score that measures undernourishment, child wasting, child stunting, and child mortality. Ranges from 0 (best) to 100 (worst).

FIGURE 4: KENYA FOOD SECURITY PERFORMANCE COMPARED TO EAC

Kenya performs better than EAC peers[xxv] on availability of food, but lags behind in affordability and nutrition

	Indicator	Unit/Definition	Values	Kenya comparison to EAC[xxiv] average	Part of CAADP indicators[xxxi]?
AVAILABILITY	Depth of food deficit	kcal/capita/day 2014-16	137 / 177		NO
AVAILABILITY	Prevalence of stunting, height for age[xxvii]	% of children <5 yrs 2013-15	26 / 34		YES
AVAILABILITY	Per capita food supply variability[xxviii]	kcal/caput/day 2013	19 / 26		NO
AFFORDABILITY	Food consumption as a share of household expenditure	% household expenditure 2010	55 / 58		YES
AFFORDABILITY	Price volatility	standard deviation[xxix] 2016	7 / 4		YES
QUALITY & NUTRITION	Diet diversification – energy supply from cereals, roots and tubers	% 2011-13	57 / 52		NO
QUALITY & NUTRITION	Protein quantity[xxx]	grams 2016	43 / 41		NO
QUALITY & NUTRITION	Vitamin A supplementation coverage	% coverage 2015	37 / 67		NO
QUALITY & NUTRITION	Dietary availability of vegetable and animal iron	mg/person/day 2016	13 / 14		NO

KENYA
EAC[xxv] AVERAGE
BETTER THAN EAC[xxv] AVG
NEAR[xxvi] EAC[xxv] AVG
WORSE THAN EAC[xxv] AVG

SOURCE: FAO, World Bank , EIU, UNICEF

Agriculture food system tests

Output by production volume and value

Overall, between 2012-2016, agricultural growth can further be broken down into sub-sectors, including:

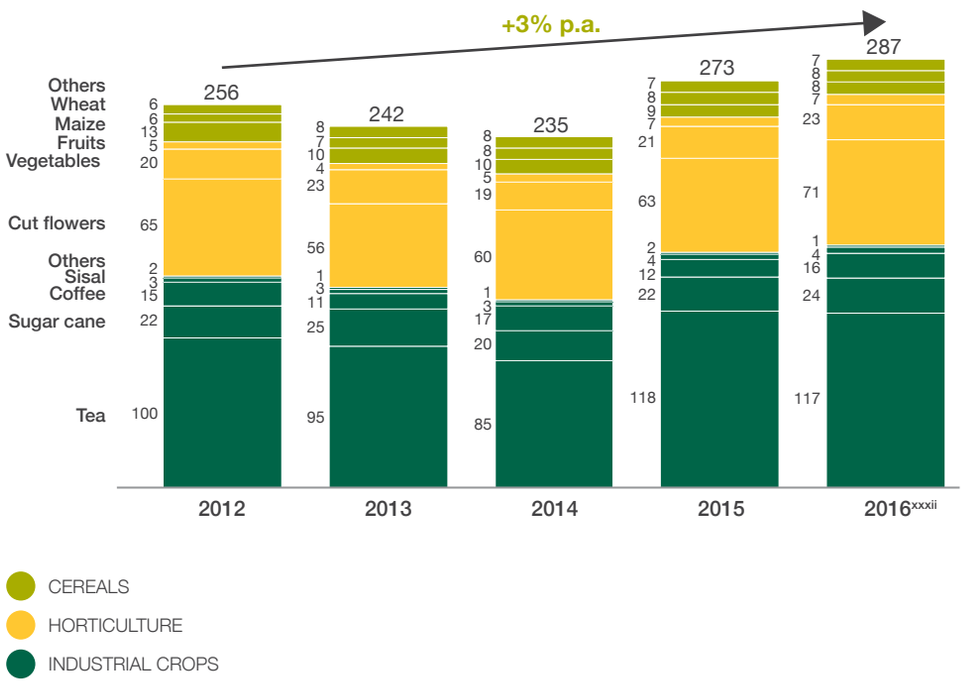
- Crop production that accounted for ~80% and grew at ~25% since 2012[30]
- Livestock that accounted for ~15% and grew

xxv East African Community - includes Kenya, Uganda, Tanzania, Rwanda, and Burundi. Weighted average by population (South Sudan is excluded given anomalous social and economic situation—civil war, etc.)
xxvi Considered to be near average if within 5% of EAC average.
xxvii Does not include Burundi.
xxviii Per capita food supply variability corresponds to the variability of the "food supply in kcal/caput/day" and compares the variations of the food supply across countries and time.
xxix Based on Consumer Prices Food Indices (2010 = 100).
xxx Protein Digestibility Corrected Amino Acid Score (PDCAAS). Assesses the presence of 9 essential amino acids in the average national diet.
xxxi Indicators in the CAADP Results Framework 2015-2025 food security section that have not been explicitly mentioned are: Prevalence of wasting and underweight, cereal import dependency, minimum dietary diversity – women, and minimum acceptable diet for 6-23 months old infants. These are all addressed in the analysis either directly or with proxies.

FIGURE 5: SHARE OF CROPS BY MARKETED AGRICULTURAL PRODUCTION

Industrial crops such as tea make up ~60% of Kenya's crop production

Marketed agricultural production at current prices[xxxii], 2012 - 2016, KES bn



SOURCE: Kenya Economic Survey 2017

at ~8% p.a. since 2012[31]

- Fisheries that accounted for ~2% and grew by ~6% p.a. since 2012[32]

Figure 5 further breaks down crop production into food crops (cereals, others), industrial crops, and horticulture (floriculture, other). The top six crops are tea, cut flowers, sugar cane, vegetables, coffee and maize. Together, they constitute ~90% of Kenyan crop market value.

Food crops which include cereals (e.g., maize, wheat, sorghum, rice, millet), pulses (e.g., beans, green grams, pigeon peas, cow peas, dolichos, chickpeas), and roots and tubers (e.g., sweet potatoes, Irish potatoes, cassava, arrowroots and yams). Maize accounts for ~50% of cereals value. Within industrial crops that include tea, coffee, sisal, sugar cane and others such as pyrethrum and cotton, tea has the biggest share with a marketed value of ~70%. It is worth dividing horticulture into cut flowers (~70%) and fruits and vegetables, of which vegetables (including green beans) dominate.

While livestock contributes less than 20% to agriculture GDP, it plays an important economic and socio-cultural role among many Kenyan communities, particularly the northern ASALs that have >60% of Kenya's beef cattle population. However, much of these pastoral cattle do not meet the 350 kg minimum market weight. Additionally, they tend to be very vulnerable to disease, drought and theft. Livestock includes beef and dairy cattle, sheep and goats, camels, poultry and pigs. Produce from livestock comes predominately from milk (i.e., dairy), but the fastest-growing sub-sector is meat, which has almost doubled in the period 2012-2014 (Figure 6).

While fisheries and aquaculture contributed <2% to agricultural GDP, the Kenya Marine and Fisheries Research Institute (KEMFRI) estimates suggest that the sector has created direct incomes for ~0.5 million

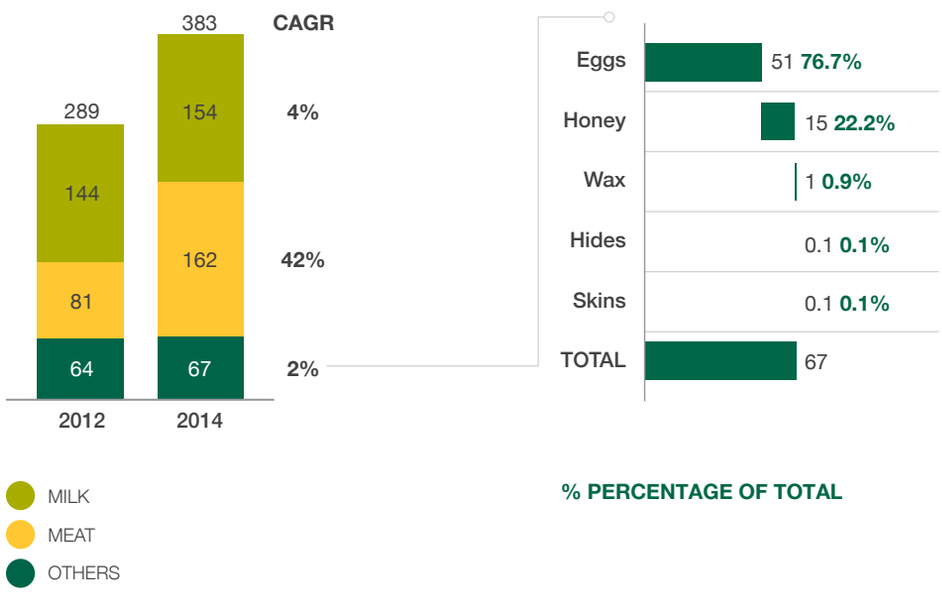
xxxii Measures the market value of commodities differs from GDP that is calculated from national accounts.

FIGURE 6: SHARE OF LIVESTOCK PRODUCED

Kenya's livestock produce is primarily from dairy

Meat is the largest livestock product by value
Value of livestock products 2012-2014, KES bn

Eggs make up ~80% of 'Other' livestock products
Value of 'Other' livestock products 2014, KES bn



SOURCE: Economic Review of Agriculture 2015

Kenyans and earned KES 7 billion for exports.[33] More than 90% of total annual fish production comes from Lake Victoria, but unsustainable use of water resources rich in fish have led to a reduction of natural fish stocks.[34]

Today, aquaculture provides ~25% of fish production, but accounts for >50% of direct employment (Figure 7). In particular, freshwater aquaculture grew~4-6x between 2006-2014 as a result of the national Economic Stimulus Programme (2009-2012), although recent performance has been declining.[35] Globally, aquaculture production has increased by ~30% every decade for the past 50 years.[36] African production is only ~2% of global production, which is dominated by Asia, and Kenya only represents 4% of the African market, which is led by South Africa at 56%.[37] Opportunities abound.

Furthermore, the potential for fish production to support food security and nutritional needs has been under-appreciated. Inland and marine water areas including the Exclusive Economic Zones (EEZ) cover the equivalent of ~30% of Kenya's land area.[38xxxiii] Fish is also a rich source of micronutrients, vitamins, minerals, fatty acids and high-quality protein, and already plays an essential role in the diets of billions of consumers, many of them poor, malnourished and living in low- and middle-income countries. [39] Furthermore, common carp has more zinc, calcium and iron than poultry and most plant sources.[40]

Output yields and yield gaps

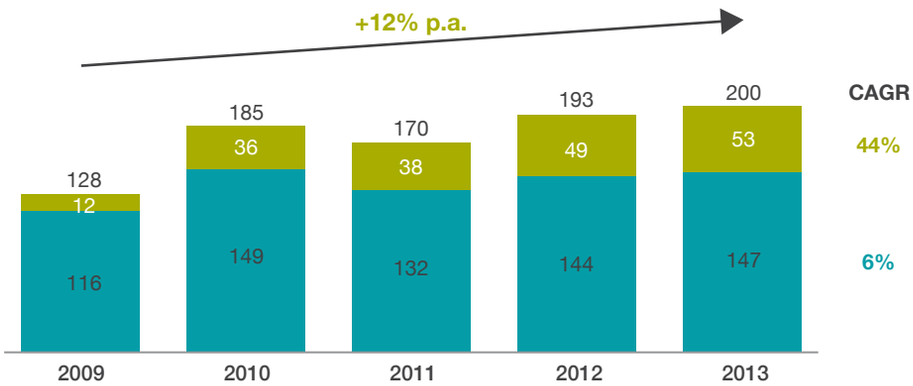
When compared to East African countries including Ethiopia, Uganda, Rwanda, Burundi and South Sudan, Kenya has significant potential to increase yields, particularly in crops like beans, maize and tea (Figure 8).

xxxiii Kenya currently has ~142,000 km² of EEZ. However, Kenya has applied for an extra ~103,000 km² meaning the EEZ could potentially reach 42% of Kenya's land mass (which stands at ~580,000 km²).

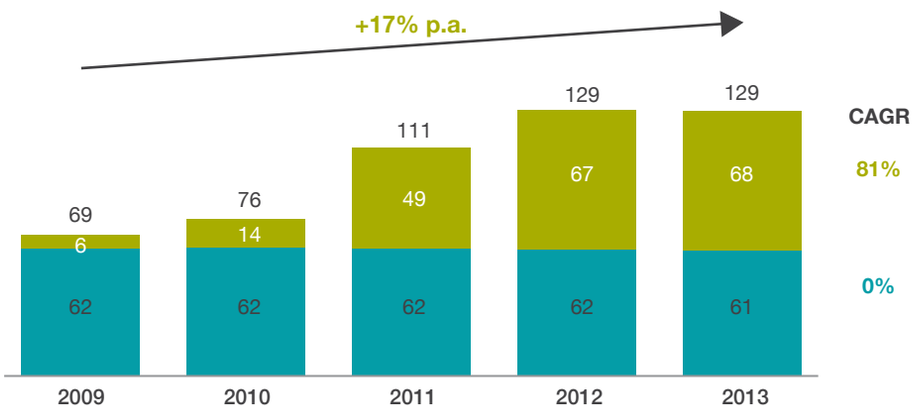
FIGURE 7: SHARE OF CAPTURE FISHERIES AND AQUACULTURE

Aquaculture and capture fisheries contribution to GDP and employment

Real GDP contribution, USD m



Employment[xxxiv], '000 people



CAPTURE FISHERIES

AQUACULTURE

SOURCE: Kenya Economic Survey 2014, Statistical Abstract 2014, Fisheries Annual Statistical Bulletin (various years), Expert Interviews

Increasing Kenyan yields to meet best-in-class East African production presents a ~KES 100 billion opportunity.

The existing yield gaps are driven by productivity challenges on both large and small farms; in the case of beans and maize, issues like delayed access to high-quality seeds, poor farming practices (e.g., improper use of fertilizers), poor mechanization and significant post-harvest losses are driving this gap.

Also, although tea is one of Kenya's highest export earners, high production costs, driven by labour and output fluctuations during periods of drought without access to drought-resistant varieties, are driving some of the yield gap observed.[41] *Figure 9* shows that 20-25% of cereal production is lost post-harvest, with the bulk of losses occurring during drying, threshing and shelling.

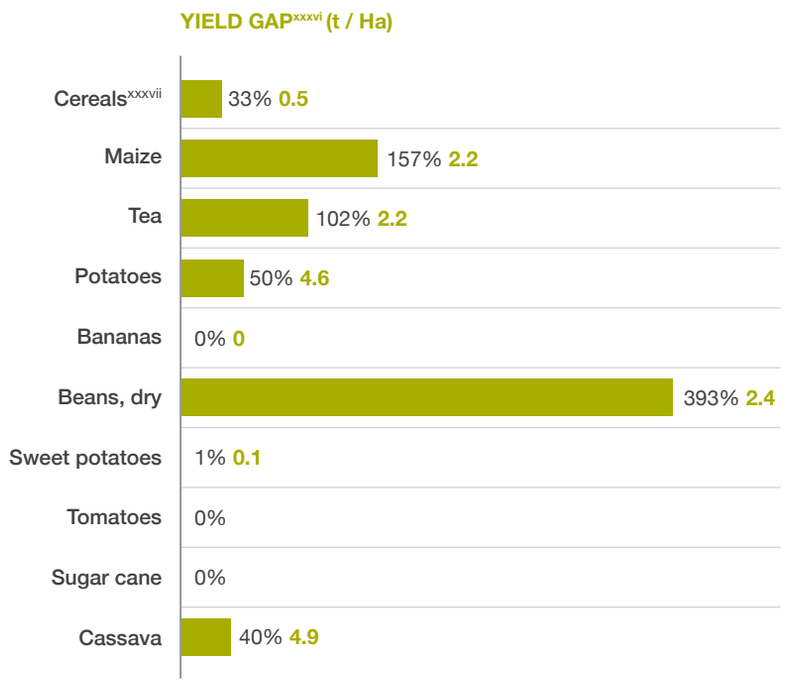
Finally, despite Kenya having the 13th largest number of dairy cows in the world, our yields rank 138th,[xxxv] in part due to cold chain storage issues and partly because most milk is sold through informal channels.[42] It is clear that yield and poor post-harvest handling concerns affect all agricultural subsectors.

xxxiv Fishermen and fish farmers.
xxxv Ranking varies depending on the year e.g. in 2016 Kenya had the 11th largest dairy herd and was 162th in yield.

FIGURE 8: YIELD IMPROVEMENT POTENTIAL OF KEY CROPS

Kenya has potential to increase yields by up to 4x in select value chains

Yield improvement potential[xxxvi] for select crops based on yield gap to regional best, %

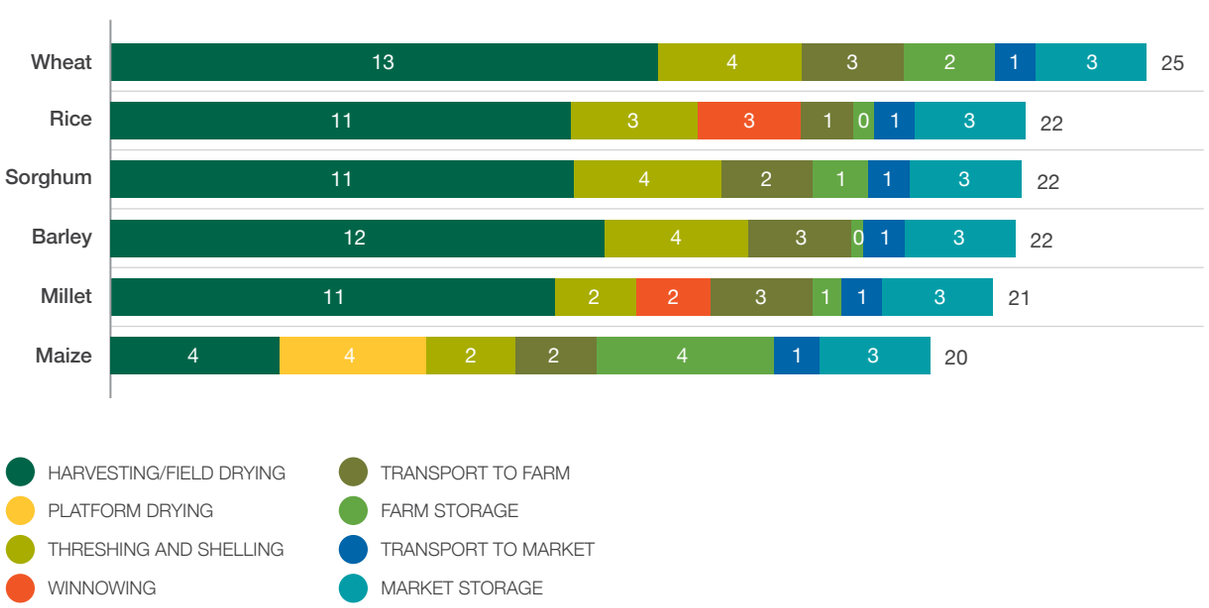


SOURCE: FAOSTAT

FIGURE 9: POST-HARVEST LOSSES IN CROP VALUE CHAINS

Post-harvest losses are between 20-25% driven by gaps in harvesting and drying

Post-harvest losses by value chain stage (2013) % of harvest weight



SOURCE: APHLIS

xxxvi As compared to Eastern Africa countries i.e. Ethiopia, Tanzania, Uganda, Rwanda, Kenya, Burundi, and South Sudan.
xxxvii 2011-2013 average.

Level of value-add processing

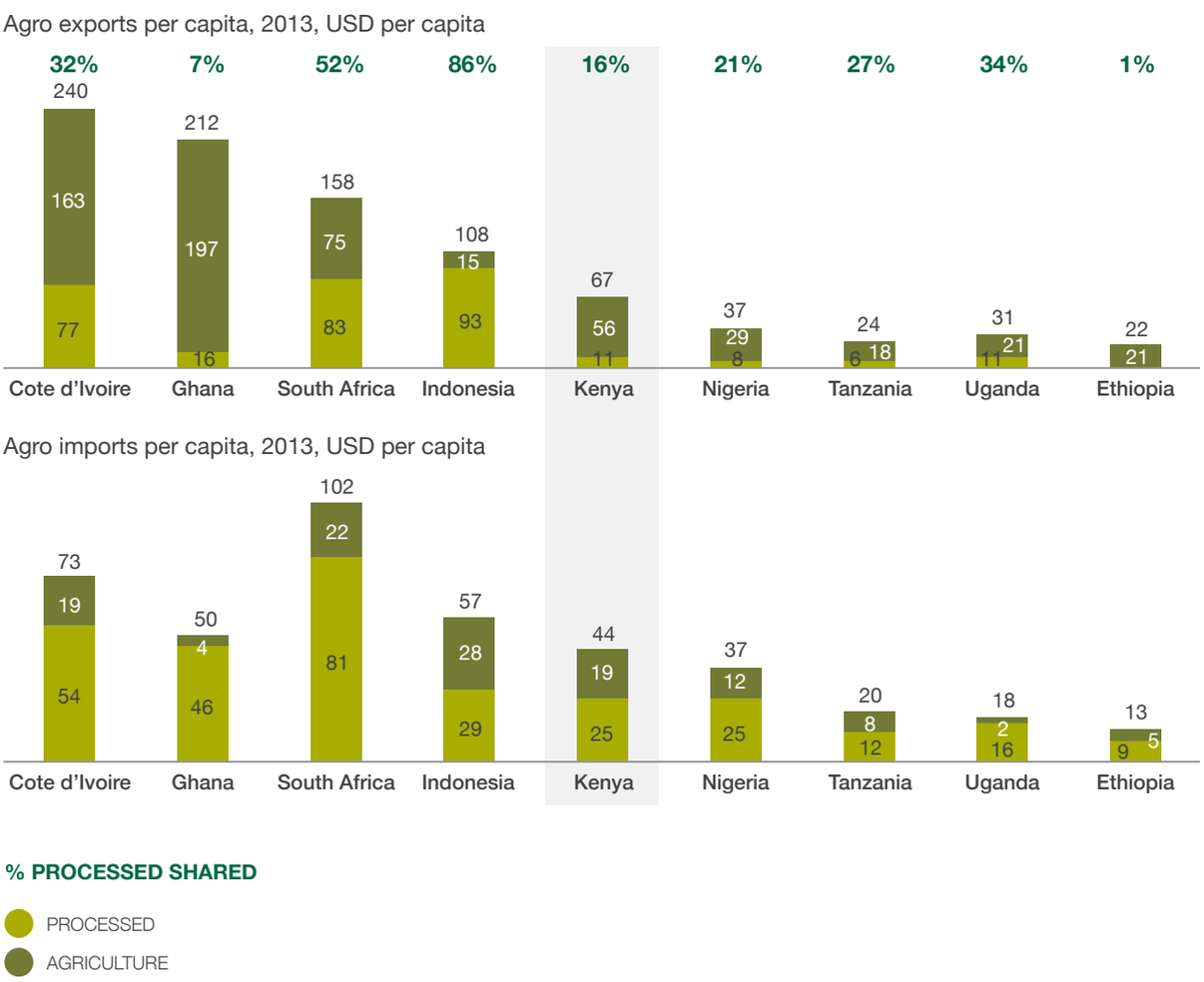
Value addition in the agricultural sector entails the process of increasing the economic value and consumer appeal of a crops, agricultural, livestock or fisheries commodity. This can be done through cleaning, grading, drying, storing, packaging, processing, cooling, drying, extracting, branding, quality certification or any other type of process that differentiates the consumer product from the original primary agricultural products.[43]

The challenges in post-harvest handling before processing in cereals are enumerated in Figure 8, but similar challenges occur in the dairy and fisheries value chains. The limited storage capacity in most smallholder farms, coupled with seasonality of produce, has a negative effect on the quantity and quality of raw materials for value addition and agro-processing.[44]

Figure 10 shows that Kenya currently has the lowest share of agro-exports per capita amongst peers at 16% of agricultural exports

FIGURE 10: LEVEL OF AGRO-PROCESSING IN KENYA

Only 16% of Kenya's agro exports are processed—a lower share than regional peers



SOURCE: Commtrade 2013

compared to 27% in Tanzania and 34% in Uganda. There is significant opportunity for Kenya to boost these ratios both for small-scale and large-scale producers in crops (e.g., processing imported wheat into pasta), livestock (e.g., dried beef), and a variety of opportunities in the fisheries value chain provided for in the Draft Agricultural Policy (2016), including fish filleting, canning, smoking and other by-products.[45]

1.4 DEFINING KENYA'S AGRO-ECOLOGICAL ZONES AND FARMER SEGMENTS

Kenya can be divided into seven distinct agro-ecological zones based on soil type and rainfall (Figure 11). These agro-ecological zones are the basis for value chain and flagship selection to ensure they are sensitive to the needs of farmers in these areas. Below is a brief description of the seven zones.

1. *Western (~1.6 million farming households):* moderate to deep red soils of medium-high fertility and two seasons of medium rains suitable for mixed staples and cash crops including maize, French beans, sugar cane, groundnuts, sweet potatoes, Irish potatoes, dairy, poultry and a variety of fish species

2. *Rift Valley (~0.4 million farming households):* mixed shallow/low with deep/highly fertile soils and one season of moderate rainfall suitable for mixed staples, cash crops and livestock including maize, wheat, sorghum, Irish potatoes, honey, goats, sheep, chicken and dairy cattle

3. *Central highlands (~1 million farming households):* deep red highly fertile soils, two seasons of high rainfall suitable for cash crops including coffee, tea, Irish potatoes, French beans, bananas, tomatoes and other staples including dairy cattle and poultry

4. *Semi-arid uplands (~0.5 million farming households):* red, acidic, low to moderately fertile soils, with one season of low rains suitable for dryland crops such as sorghum and pigeon peas, and beef cattle

5. *Northern ASALs (~0.4 million farming households):* sandy, saline, shallow, low-fertility soil with one season of rain at best, suitable for livestock pastoralism including camels, goats and sheep, with occasional maize cultivation on raised plateaus

6. *Central ASALs (~0.3 million farming households):* saline, low-fertility soils, with one season of rain at best, suitable for livestock pastoralism including beef cattle, goats and sheep, with occasional maize cultivation on raised plateaus

7. *Coast (~0.3 million farming households):* mix of sandy, deep, low and highly fertile soil and two seasons of moderate rainfall suitable for mixed staples and cash crops including maize, sorghum, millet, cashew nuts, mangoes, marine fish, crustaceans and molluscs and livestock such as poultry

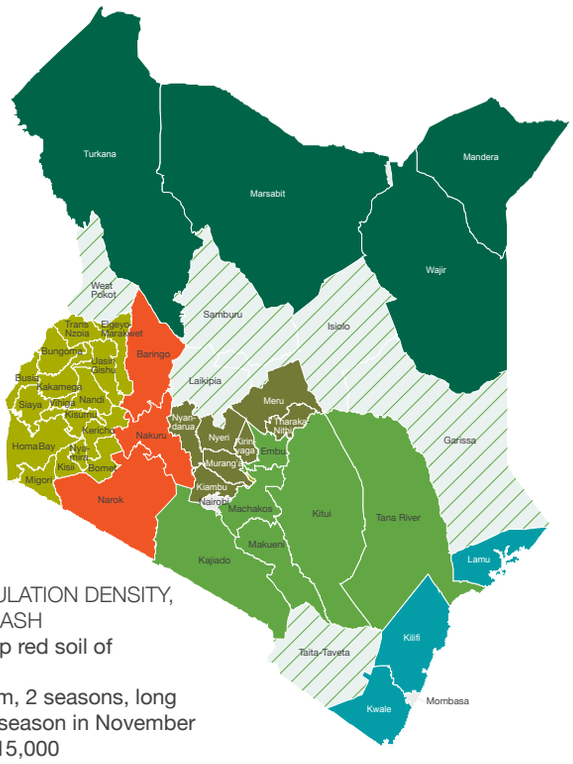
A more granular perspective on agro-ecological zones is available for the country in the Farm Management Handbook of Kenya, and implementers are encouraged to further segment these zones and farmers as necessary during implementation. Within agro-ecological zones, there are still significant differences in farmer behaviour driven by differences in how we define farmers based on farm size, incomes and the value chains grown. Defining a farmer and the optimal farm size is a non-trivial task (Box 3). But using these definitions, ASTGS estimates there are ~8-9 million farmers in Kenya, which is equivalent to the ~4.5 million farming households in Figure 11, assuming that one head of household is earning income from farming.[xxxviii]

The ASTGS focuses on commercial production in these zones, whether small- or large-scale. Conversations with farmers and analysis of

xxxviii While ~60-70% of Kenyans earn income from agriculture according to the ILO, data from the 2016 Kenya Economic Survey provides wage employment (~340,000), and we estimated that the agricultural share of informal employment is ~60% (~8 million) based on information from the Social Accounting Matrix of Kenya (2014), produced by the Joint Research Center (JRC) of the European Commission 8.3m farmers. Different assumptions based on county level populations, assuming that ~50% are rural, and of these ~70% of working age population are farmers returns similar results (~8.7m)

FIGURE 11: MAP OF KENYA'S SEVEN AGRO-ECOLOGICAL ZONES

Kenya's farmers, pastoralists, and fisherfolk can be mapped to seven agro-ecological zones



1.6m

WESTERN - HIGH POPULATION DENSITY, MIXED STAPLES AND CASH
Soil: mix moderate-deep red soil of medium-high fertility
Rainfall: 1,200-1,800mm, 2 seasons, long season in March, short season in November
Income: (KES/month): 15,000
Farm size: 0.5-5 acres

0.4m

RIFT VALLEY – MIXED STAPLES, CASH, LIVESTOCK
Soil: mixed shallow/low with deep/highly fertile
Rainfall: 600-1,200mm, 1 season, March
Income: (KES/month): 30,000
Farm size: 2-60 acres

1.0m

CENTRAL HIGHLANDS – CASH CROPS
Soil: deep red highly fertile with some clay
Rainfall: 1,600->2,000mm, 2 seasons, March & Nov
Income: (KES/month): 30,000
Farm size: 2-5 acres

0.5m

SEMI-ARID UPLANDS – DRYLAND CROPS
Soil: red, acid, low to moderately fertile
Rainfall: 600-1,200mm, 1 season, November
Income: (KES/month): 15,000
Farm size: 2-5 acres

0.4m

NORTH ASALS – PASTORALIST, CAMELS
Soil: sandy, saline, shallow, low fertility
Rainfall: <200-600mm,1 season, November
Income: (KES/month): <10,000
Farm size: group ranches

0.3m

CENTRAL ASALS – PASTORALIST, CATTLE
Soil: saline, weak, low fertility
Rainfall: 400-800mm, 1 season, November
Income: (KES/month): <10,000
Farm size: group ranches

0.3m

COAST – MIXED STAPLES AND CASH
Soil: mix of sandy, deep, low and high fertile
Rainfall: 600-1,200mm, 1 season, November
Income: (KES/month): <10,000
Farm size: 1-10 acres

 # ESTIMATED FARMING HOUSEHOLDS[xxxix]

SOURCE: ASTGS Working Team Analysis based on 2018 UNICEF population data, Kenya Economic Survey agriculture employment data, Agro-Climatic Zone Map of Kenya, Climate Hazards Group Infrared rainfall data, USAID-KAVES Value Chain Anaylsis, Expert Interviews

xxxix Total households = 4.5mn, members per household = 5 according to the Kenya Integrated Household Budget Survey. We further assume that each household has two farmers (male and female), giving a total of ~9mn farmers. Other ~3 household members are assumed to be outside of working age.

BOX 3: ASTGS DEFINITION OF A FARMER AND FARM SIZE

A person who owns, works on, or operates an agricultural enterprise that cultivates land or crops, or raises animals including livestock and fish. Whenever ASTGS refers to "farmer", therefore it assumes crop and fish farmers, pastoralists – including all animal and poultry husbandry – and fisherfolk.

The ASTGS uses the following thresholds for farm size as defined by ASDS and KIHBS:

Category	Small-scale	Mid-size	Large-scale
Size of farm*	1.2 – 12 acres	12 – 2,500 acres	>2,500 acres
Share of farms in Kenya	~66%	~20%	~14%
% marketed agricultural produce	~65%	5%	~30%

**ASDS categories are 0.5-7 acres, 8-120 acres, and 121 – 74,000 acres respectively*

SOURCE: ASDS 2009-2020, KIHBS 2006

BOX 4: ASTGS PERSPECTIVES ON LAND USE AND LAND REFORM

Of Kenya's 143 million acres of land, the Draft National Land Use Policy (2016) identified ~20% as government trust land, ~67% as community-owned, and ~13% as privately owned. Ownership is in one of two tenures: freehold that gives the holder absolute ownership of the land, or leasehold where temporary land ownership is honoured for a period of <99 years by paying a fee to the landholder.[46] Most of Kenya's medium- to high-potential agricultural land, i.e., "arable land" (~20% of total land), and medium- to marginal-potential land suitable for some drought-tolerant crops, livestock and wildlife conservation (~20%) is owned by communities. The remaining ~60% of land has high-range land potential for pastoralism and wildlife conservation.[47]

There are several challenges to achieving scale required for commercial production in Kenya due to existing land use practices in the country – including significant sub-division of land in freehold and community-owned land areas, and therefore limited potential for increasing technology, mechanization, and broader infrastructure on these lands. Large tracts of arable land continue to be publicly owned, and providing long-term lease to the private sector to operate this land more efficientlt with their own investments can be quite complicated.

Three primary levers exist for land reforms that can support agricultural transformation – land titling to define who owns the land; terms of title to define terms of holding, including length and rules around inheritance, rental price setting, foreign ownership, and maximum size of land; and finally, redistribution of land from one title holder to another. A global review of ~10 countries since World War II shows mixed results of these reforms in boosting agricultural productivity and optimum scale:

- Land titling: Portugal in 1975 encouraged land titling through cooperatives, with the state offering subsidized credit for collectives. But it was not economically viable and led to a decline in agricultural productivity.

- Terms of title: In West Bengal-India the state improved terms of land rental agreements, removed land rents, and set maximum land-holding periods, which resulted in ~70% growth in agricultural productivity within 14 years. ~30% of this productivity growth can be attributed to the land reform that took place. Poland in 1995 leased state land to private ownership, which resulted in productivity increases of 20% within five years.

- Redistribution of land: Chile in the 1970s nationalized land to better coordinate cooper/mining needs and productivity fell. A reversal of the reform in 1974 saw output trends reverse reaching 8.7% annual growth by 1985. However, China's land reforms in the 1950s to redistribute land to poorer farmers who formed cooperatives for scale saw productivity increase by 3.5% p.a. for a decade.

farmers who formed cooperatives for scale saw productivity increase by 3.5% p.a. for a decade.

Given the mixed experience of various countries with land reforms, it is critical for Kenya to implement a robust land use policy that best serves the needs of the country and agricultural transformation. Reviewing and modifying the existing Draft Land Policy (2016) that considers the implications of devolution is an important first step as Kenya begins this 10-year agricultural transformation. ASTGS outlines provisions for several land-use interventions that can support agricultural transformation within the context of the existing policy:

- Incentivizing communities to lease land for commercial agricultural development but also considering other forms of grouping small-scale producers e.g., out-grower schemes, market-oriented cooperatives as appropriate (see Chapter 4, ~40 zones flagship, ~50 farms flagship and agro-processing flagship)
- Designing contracts that provide medium-term lease tenures for publicly owned land (~10-15 years) to allow sufficient investment in the land by private operators (see Chapter 4, ~50 farms flagship)
- Mindful zoning within highly productive agricultural zones, and encouraging use of drought-tolerant crops and sustainable grazing techniques, for example in ASAL areas (see Chapter 4, ~40 zones flagship, ASAL resilience flagship)

However, more structural land reforms should be considered in line with the evaluation of MTP III.

SOURCE: National Spatial Plan (2015-2045), ILRI, Expert Interviews

The thresholds of investment required, suggest that a small-scale farm becomes commercially viable and moves beyond pure subsistence at ~12 acres. ~2,500 acres larger farmers can justify investment in the land, soil and water infrastructure. *See Box 4 for challenges in achieving scale for commercial production.*

The scope of "agricultural enterprises" differs significantly by Kenya's agro-ecological zones (Figure 11), and agricultural data at the farm level is quite varied in Kenya. Therefore, it will be important to build detailed farmer profiles by agro-ecological zone, including information like farm size, value chains cultivated, soil, etc., as part of effective implementation of any transformation in the sector. See detail in Chapter 4 on investing in data and research for better decision making.

1.5 PRIORITIZING VALUE CHAINS FOR ASTGS

Today Kenya currently produces about ~100 different value chains (Figure 12).

To identify the highest-potential value chains for agricultural transformation, and therefore priorities for ASTGS, these ~100 value chains were evaluated and filtered for:

1. Income potential and dietary diversity for agricultural transformation and food security: Certain value chains are more likely to raise small-scale farmer incomes and offer dietary diversity (e.g., potatoes, horticulture, poultry)

2. Kenya's agro-ecology and competitiveness: By focusing on the highest-production value chains, one can identify what Kenya currently grows well. Ideally, one would also ask what can Kenya grow well, but data was very limited to support such an analysis

3. National priorities beyond food production: The current Government priorities, as articulated in the Big Four, Vision 2030, MITP III, ASDSP and others address food security, modernization of the sector, inputs to manufacturing and raising incomes, and require consideration of some non-food crops (e.g., cotton).

From this process, 13 value chains emerged with the highest potential for agricultural transformation, including: staples (maize, potatoes, rice, beans), horticulture (fruits, vegetables), livestock and fish (beef, poultry, sheep/goats, camels, fish, dairy), and others (imported wheat). However, we identified 25 similar value chains to these (e.g., other pulses, other cereals such as millet and sorghum for

maize, and cassava in lieu of potatoes). Counties are strongly encouraged to select similar value chains that best suit their agro-ecology.

ASTGS recognizes the importance of several cash crops to the overall agricultural sector, despite their limited ability to support broad-based agricultural transformation due to the low share of smallholder farmers involved in production (e.g., flowers have <3% of smallholders involved), limited nutritional benefits (e.g., tea) or low competitive advantages (e.g., non-Bt[xl] cotton).[48] The ASTGS nonetheless encourages continuation of successful activities in these value chains that are relatively well organized and coordinated, relative to those that require transformation. Where a natural extension exists to the ASTGS flagships, additional interventions are possible, for example:

- Branded tea: Support ongoing "Buy Kenya" campaign and SME knowledge and skills building for value-added tea varieties. ASTGS has a strong emphasis on training SMEs and promoting institutional buying mandates that can extend to branded tea in high tea-growing regions (see Chapter 4 – flagship 1)
- Sugar processing: Extend agri-business training to sugar cane millers (see Chapter 4 – flagship 1)
- Coffee: Protect land for coffee through zoning (Chapter 4 – flagship 9)
- Cotton: Encourage use of cotton seed for textiles/feed (Chapter 4 – flagship 6)

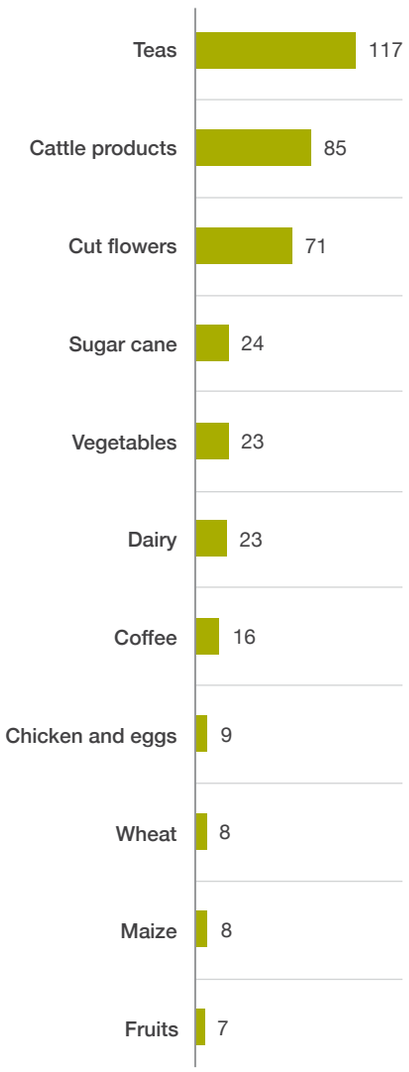
After the first five years of implementation MoALFI should review value chain selection with particular attention to national priorities at the time.

xl Bt cotton is a type of GMO cotton that has been genetically modified by the insertion of one or more genes from a common soil bacterium, Bacillus thuringiensis.

FIGURE 12: LIST OF KENYA'S ~100 PRODUCED VALUE CHAINS

Kenya produces ~100 value chains, with the highest production value coming from tea, livestock products and flowers

Top value chains by marketed value, 2016, KES bn



Other value chains

CEREALS	Wheat Sorghum Millet	Oats Barley Rice	Amaranth Simsim Rye	
LEGUMES	Beans Green grams Pigeon peas	Cowpeas Dolichos Chickpeas	Garden peas Snow peas French beans	French peas Lentils
STARCHY ROOTS	Irish potatoes Arrowroots	Yams Cocoyam	Sweet potatoes	Cassava Ginger
FRUITS AND VEGETABLES	Bananas Tomatoes Mangoes Watermelons Pumpkin Coconut Kale Cabbages Pawpaws Passionfruit	Oranges Tangerines Carrots Limes Lemons Butternuts Onions Eggplants Pineapples Stevia	Courgettes Asparagus Coriander Spinach Leeks Celery Garlic Dates Apples Strawberry	Grapes Pears Cucumbers Apricots Artichokes Dates Yellow Berries
LIVESTOCK PRODUCTS	Pigs Goats Sheep Camels	Ducks Wax Honey Rabbits	Quail Snails Peacocks	
OTHERS	Macadamia Cotton Cashews Groundnut Pepper	Capsicum Soya beans Bambara nuts Chillies Bees & honey	Freshwater fish Marine fish Cocoa Feed grasses	Sunflower Pyrethrum Mushroom Aloe Vera Tobacco

SOURCE: Kenya Economic Review of Agriculture 2015, KNBS County Statistical Abstracts

02

TRANSFORMING AGRICULTURE TO GROW THE ECONOMY

2.1 THE CASE FOR AGRICULTURAL TRANSFORMATION

Agriculture is critical for Kenya's development

Agricultural transformation is critical to growing the economy and alleviating poverty. Apart from Singapore and Hong Kong, no country has achieved middle-income status without modernising its agricultural sector. Kenya is no exception. Millions of households depend on agriculture for income and food security, therefore the country's social stability and economic growth depends on enabling these people to contribute to the economy and offering them better food security. This is the mark of a successful ***inclusive*** agricultural transformation (see Box 5).

Kenya has taken big strides over the years to build its macroeconomic foundations. Transforming the agriculture sector will cement these foundations for economic growth by providing the tools to combat price volatility, improving the environment for private investment, and developing more strategic approaches to lower the country's dependence on food imports.

Rural growth creates jobs for local communities, and their surrounding villages and towns. Agricultural transformation essentially describes the processes of rural economic growth. Although ASTGS focuses on productivity and market access for small-scale producers, these dynamics also stimulate job creation in all related businesses – agricultural and non-agricultural. Furthermore, the engines of rural growth stimulate employment opportunities in secondary and tertiary cities, and can turn smaller towns into vibrant commercial centres. The transformation also boosts the economy, but its immediate effects in rural areas will change migration and employment over the next decade.

Food and nutrition security is a critical government mandate. The country's future depends on a healthy population and an economy that is increasingly more resilient to the effects of climate, global swings in staple food prices, and the effects of threats like the fall armyworm. Such risks threaten the welfare and livelihoods of many Kenyans and destabilizes the economy. Kenya faces the dual challenges of tackling undernutrition today, and planning for growing overnutrition and rising diabetes rates. However transforming the agricultural sector will create resilience and change the country's capacity to provide nutritious food for all Kenyans.

The time to transform is now

Kenya has the right macroeconomic foundation for transformation.
Sustained agricultural transformation requires reasonable macro-economic stability. In countries struggling with inflation, exchange rates, high costs of financing and volatility in global food prices, agricultural transformation has a much higher rate of failure and a lower potential impact.[49] Kenya has made the changes necessary to create a modern, stable macroeconomic environment and is therefore well positioned to transform its agriculture, although it will have to address institutional and political issues that could hinder its progress.

Kenya has improved the private sector investment climate. Countries that benefit most from agricultural transformation invest in raising productivity of small scale producers, while enabling private sector investment. This combination of state and private sector engagement accelerates transformation to build a modern, highly productive agricultural sector. Kenya is further down this path than some of its neighbours and its modern industrialization strategy is linked to agricultural transformation; in particular, the private sector investment enabling environment is already in place. Kenya continues to improve in its

BOX 5: DEFINING INCLUSIVE AGRICULTURAL TRANSFORMATION

Agricultural transformation: What it means and signs it is happening

What is meant by 'agricultural transformation'	How do we know it is happening?
For most agrarian economies, successful agricultural transformation is a decades-long process which involves:	**Early indicators**
Modernization of on-farm production and input markets, from subsistence to commercial agriculture serving local and export demand	Rising incomes and declining poverty
A shift of the value in the value chain away from primary production and toward processing and retail	Productivity gains Yield increases Greater value-addition per worker
Ultimately a **shift of farmers out of farming** and into more productive jobs (in agricultural value chains or out of agriculture)	Increase in national agricultural output
Changing demand in terms of the foods people eat (e.g., more processed foods, animal proteins and fruits/veg) and where they buy (e.g. more formal retailing)	Increase in demand for animal proteins, sweeteners, oils and processed foods

SOURCE: ASTGS Working Team Analysis

World Bank Ease of Doing Business ranking, reaching 80 out of 190 and earning a place as the third most competitive economy in Africa after Mauritius (25) and Rwanda (41).[50]

Risks to Kenya's agricultural transformation

Nonetheless Kenya will face some challenges with transformation firstly, predictability and transparency to further accelerating private sector investment. Running simultaneous industrial and agricultural transformations requires accelerated private sector investment through both domestic growth of private sector and increased Foreign Direct Investment (FDI) flows. Kenya's private sector growth is constrained from accelerating investments because investment policies can be unpredictable and make it difficult to do business at times (e.g., parastatal engagement in markets is not always predictable for example with seed regulations).

Second, public sector reform is a lengthy, expensive and difficult process that requires coordination of policies across government ministries, county governments, parastatals and the civil service. Most countries (across all income classes) – including Kenya – would benefit enormously from public sector reform. However, most countries struggle to reform their public agricultural sector due to low budget allocations to the sector, limited capabilities for performance management, and challenges in accountability when multiple ministries – and different levels of government - have to coordinate for impact. There is significant variation in the readiness of Kenya's public institutions to reform.

2.2 KENYA'S READINESS TO TRANSFORM

No matter how good an agricultural transformation strategy one may have, it will not work if institutional, organizational and political constraints prevent progress and real impact. Successful countries adhere to three groups of "Transformation Readiness Factors" that can help ease agricultural transformation.

One set of factors can often decide whether a transformation succeeds or fails ("essential factors" – like political commitment). A second set keeps the transformation on track once it has gathered speed and can be built over time ("build now factors" like basic input supply systems). The last set focuses on a country's attributes, highlighting longer-term challenges to transformation ("build over time factors" like port infrastructure). *See the National Agriculture Investment Plan for more details.*

Kenya has made progress in some important areas. For example, political support is strong, with the current administration committed to agricultural transformation; input supply systems have been developed, including a policy and regulatory framework to support the seed system; storage infrastructure exists, although it is under-utilized; and the country has increased talent in policy analysis and evidence-based policymaking.

However, Kenya must focus on three additional factors to support readiness across the country:

- **Managing a devolved agricultural transformation.** The ability to coordinate across county and national levels in agricultural policy and investments is key.
- **Mobilizing resources.** First, the contribution to agriculture in the national budget is ~2.3%, significantly below regional peers including Malawi at ~16% and Ethiopia at ~15%.[51, 52] Second, the composition of the budget, i.e., the percentage spent on "enablers" like extension and research is much lower than that spent on subsidies. Kenya is supposed to dedicate two% of GDP to research and innovation, for example, but only achieves ~0.5%, of which only a fraction is available for research and innovation grants through the National Research Fund.[53] Third, disbursement mechanisms to ensure timely payments for agreed budgets at the national and county levels; while Kenya's agricultural sector disbursement rates have been ~70-80% in the past five years, payments from government (e.g., for maize purchase in national reserves) are often delayed.[54]
- **Ensuring impact from policies and regulations.** Government needs to be more effective in coordinating across ministries, ratifying fact-based policies, and implementing policies and regulations on time.

2.3 PRINCIPLES FOR KENYA'S TRANSFORMATION

Kenya's agricultural transformation is designed to adhere to nine principles:

1. **Create market-driven strategies that target growth.** While raising productivity by giving producers access to better inputs is critical, it is also necessary to improve market opportunities by selecting the right value chains, geographies and institutional changes.

2. **Set a new standard for public sector engagement.** Agricultural transformation will depend heavily on Kenya's ability to make institutional reforms in the public sector. Improving the governance, accountability and scope of key institutions will be the most powerful lever to shift the sector towards more stable markets, and boost food security and economic growth.

3. **Manage the transformation across both the national and county levels.** All successful agricultural transformations must be managed carefully, with a transformation mindset and leadership decision-making mechanisms that support fact-based change. This is especially true for Kenya, where the new devolution structures are still being adapted as the country implements.

4. **Implement as much as possible through the private sector – with oversight.** Kenya's vibrant agribusiness sector has tremendous potential to be a powerful engine of transformation – more so than in many other countries – with important implications for co-financing. Evidence suggests that private sector-driven transformation is effective when two things happen: first, active public oversight directs the private sector to critical areas of transformation; and second the government promotes fact-based regulations and transparent transactions.

5. **Make the transformation inclusive.** Kenya's low-income households depend heavily on agriculture for their incomes and food security. Agricultural reform that does not improve their lives could have the opposite effect – i.e., increase unemployment, create unrest and constrain overall economic growth. Kenya must focus on reducing poverty levels and improving food security.

6. **Invest in talent.** Talented people are at the heart of every successful agricultural transformation – from policymakers to business owners to farmers. The Government must face forward, embracing a younger, digital-enabled country that can adapt and adopt lessons from around the world. To do this, it must invest in talent pool building a highly capable work force of change-makers, including last-mile extension officers.

7. **Mobilize more resources.** Successful agricultural transformations require strategic financing. Countries finance their transformations from the usual sources – national commitment, development finance, private sector investment and development partner contributions. To mobilize more resources, Kenya must first improve its disbursement mechanisms and utilization of development funds through monitoring and evaluation systems, accountability, key enabling business environment policies, and mapping to regional and global frameworks including CAADP and the SDGs.

8. **Invest in change agents.** In countries where small-scale farmers drive most of the production, agricultural transformation depends on changing the behaviour of these farmers, pastoralists or fisherfolk. Change agents are front-line people who engage with the producers including extension workers, agro-dealers, traders.

9. **Promote a sustainable and resilient transformation.** Actively managing Kenya's natural resources is at the heart the country's ability to respond to looming food system risks including climate change and disaster management. Addressing these challenges will not only sustainably increase agricultural production and put food on the table today, but it will also ensure that future generations of Kenyans can continue to benefit from agriculture.

03

THE ASTGS APPROACH

3.1 DEFINITION OF THE AGRICULTURAL SECTOR UNDER ASTGS

The Agricultural Sector Development Support Programme (ASDSP) defined the agricultural sector as 10 sector ministries including: (i) Agriculture; (ii) Livestock Development; (iii) Fisheries Development; (iv) Cooperative Development and Marketing; (v) Lands; (vi) Water and Irrigation; (vii) Regional Development Authorities; (viii) Environment and Mineral Resources; (ix) Forestry and Wildlife; (x) Development of Northern Kenya and other Arid Lands.[55]

ASTGS has defined eight sector ministries to lead the National Government contributions to agricultural transformation, given the current agricultural context and the initial set of interventions proposed for the first five years' ASTGS (see below). These ministries include:

1. Ministry of Agriculture, Livestock, Fisheries and Irrigation (MoALFI)

2. Ministry of Devolution and ASAL areas

3. Ministry of Environment and Forestry

4. Ministry of Industry, Trade and Cooperatives

5. Ministry of Lands and Physical Planning

6. Ministry of Transport, Infrastructure, Housing and Urban Development

7. Ministry of Water and Sanitation

8. The National Treasury

As per the interventions required, the Ministry of Health; the Ministry of Education, Science and Technology; the Ministry of the EAC, Labour and Social Protection; and the Ministry of Information, Communications and Technology may be called upon to support implementation.

ASTGS will support transformation of the sector over the next 10 years. The accompanying National Agriculture Investment Plan (NAIP) covers the first five of these years. Throughout this period, it is essential for the accountable ministries to be specific enough about the proposed interventions, clearly define a sustainable path to impact and make informed trade-offs about short-term results. But it is also important to maintain the flexibility to adapt the approach as the sector learns from implementation and circumstances change. Therefore, this sector definition and all the supporting recommendations within ASTGS should be reviewed and adapted in line with the Medium Term Plan (MTPIII) evaluations for their ability to deliver outcomes supporting 100% food security, and better serve the evolving needs of the transformation.

3.2 ASTGS THEORY OF CHANGE

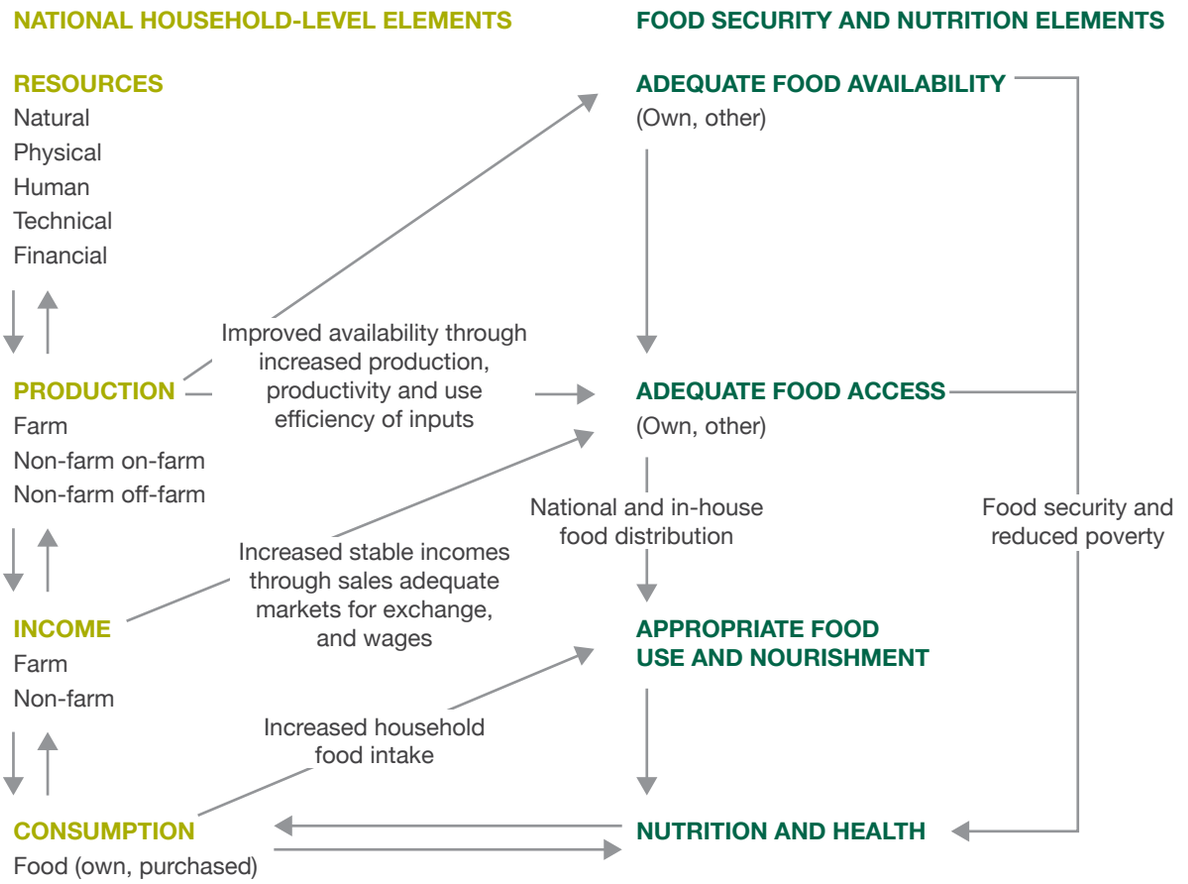
A transformation of the whole agricultural sector, driven by Kenya's national and county governments as well as the private sector, is essential to not only achieve Kenya's short-term 100% food security aspirations, but also to create a sustainable path to a modern agricultural sector over the next 10 years. The strategy is grounded in the belief that food security requires a vibrant, commercial and modern agricultural sector that sustainably supports economic development.
Accordingly, making nutritious foods affordable and available to all Kenyan households is a central goal of an agricultural transformation. Price policy goals often focus on stable and reasonable prices for producers (farmers) and affordable prices for consumers. This is a challenging balance. But it is additionally critical to make sure the goal is focused on nutritious food. For farming households these goals mean improving productivity, market opportunities and working toward more predictable prices received for their produce.

These actions should both raise incomes for smallholders as well as improve the availability of food. When farmers shift out of staple crops—for example into horticulture and livestock—greater quantities of nutritious food will become available. For non-farming households, as consumers, the affordability and availability of nutritious food requires a similarly targeted policy and regulatory framework.

In general, the price of basic food items is only one indicator of the larger goals of an agricultural transformation. While price data informs assessments of food insecurity, particularly for lower-income households, it does not integrate many other important issues, such as measures of nutrition, household income, gender equality, producer prices, food safety or price stability. In addition to metrics that assess the affordability of food (e.g. % of the population able to afford a basic basket of food), the population share with adequate nutrients, gender equity metrics, foodborne disease burden, poverty indices, non-staple food energy scores and many other metrics can be important indicators of agricultural transformation.

Figure 13 from the National Food and Nutrition Security Policy Implementation Framework (NFNSP-IF) identifies all the key elements of national household food and nutrition security: from resources, production, income and consumption at the household level, to the availability, access and nourishment of food as the drivers of overall nutrition and health. There are three key links between the household and nutrition and health outcomes: (i) improve food availability through increased production, productivity and efficient use of inputs; (ii) increase stable incomes through sales, adequate markets for exchange and wages; and (iii) increase household food intake.

FIGURE 13: KEY ELEMENTS OF HOUSEHOLD, FOOD & NUTRITION SECURITY



SOURCE: National Food and Nutrition Security Policy Implementation Framework (2017-2022), adopted from the USAID Food and Nutrition Technical Assistance / WFP models

Key actors and beneficiaries of the transformation

Accordingly, the ASTGS approach builds upon NFNSP-IF, and designs the transformation around the three groups of people critical to making the link between household consumption and overall food and nutrition security:

- **small-scale farmers, pastoralists, and fisherfolk households,** as well as **the local SMEs, larger business and agricultural markets that support them;**
- **large-scale commercial farmers, and the eco-system of firms, domestic and export markets, and smaller farming communities** that support them across the agricultural supply chain; and
- **the millions of Kenyans who are still food-insecure** – not just during times of emergency, but chronically all year round.

These people are either leading agricultural transformation on the ground (on and off the farm), or they are the beneficiaries most in need of food. Orienting the strategy around improving the livelihoods of these key stakeholders – farmers and food-insecure populations – is consistent with the SDG approach to consider people, planet and prosperity as key aspects of sustainable development.

First, for small-scale farmers to sustainably make the link between household consumption and food security, they must increase their productivity and shift production from subsistence to market-oriented output. If local agricultural markets and businesses are also activated, then impact at the farm level can support broader rural development and poverty reduction. ASTGS small-scale farmer interventions increase productivity (e.g., through better irrigation and feeds to ensure at least two harvests a year), so these farmers

can boost local production of food, gain higher incomes for selling to market, and increase their resilience to economic and environmental shocks. While ASTGS will directly target income increases and household food resilience for ~3.3 million farmers, raising incomes has the potential to bring many agrarian Kenyan families living close to the poverty line above it.

Second, more large-scale commercial agricultural output means more food on the table in Kenyan homes, and more food for export. Some of the largest cereal producers in Kenya achieve 8-12 tonnes/hectare of maize on commercially run private farms, almost double current yields on large government-owned farms.[56] Optimal conditions for these farms as described later in Chapter 4 include provisions for mixed cropping which can benefit local communities with jobs and off-take for produce. Increasing value-add from agro-processing creates additional off-take opportunities for small- and large-scale commercial farmers, and opens up new local and export markets for processed products. Growing Kenya's contribution of agro-processing to Kenya's GDP gives the potential to add ~KES 130 billion in output, a 50% increase from Kenya Bureau of Statistics (KBS) figures of ~KES 260 contribution.

Finally, supporting the needs of Kenya's most food-insecure populations requires a transformation that addresses three main issues. First, streamlining operations of the Strategic Food Reserve to target the ~4 million most at-risk populations during times of emergency. Second, employing more cost-effective methods (e.g., cash transfers) to stabilize prices all year round, including for the urban poor, some of whom are chronically food-insecure. And finally, bolstering household resilience in ASAL regions (e.g., growing more drought-resistant crops, more sustainable grazing, adapting environmentally friendly farming practices) to ensure that affordable, quality food is available to Kenya's ~1.3 million ASAL chronically food-insecure households at all times.

While these three groups of actors are at the heart of agricultural transformation, they cannot successfully make the linkages between household production and food security without support from a number of other players in the food system (e.g., traders), state and non-state actors at the national and county levels – including government agencies that define the agricultural sector (Section 4.1), development partners, not-for-profit organizations and civil society, which will be addressed as most relevant throughout this strategy.

Consideration for women, youth and persons with disabilities

Finally, it is critical to mention the unique challenges preventing many women, youth and persons with disabilities (PWDs) from being fully active and productive members of these groups driving agricultural transformation. Agriculture employs ~75% of Kenya's women (compared to 50% of Kenyan men), but only half of these women own their farms.[57,58] This lower level of ownership limits the ability of these women to join cooperatives and other farmer-based organizations that have collateral that can help facilitate access to more affordable and higher-quality inputs, as well as access to markets.[59] It also limits their ability to access financing with their land as collateral, and this in part drives yield gaps of up to 20-30% between male- and female-managed agricultural enterprises.[60] These constraints are more acutely experienced by women in rural communities.

While youth between the ages of 18-35 make up more than 35% of Kenya's population, less than 10% of the youth labour force is directly engaged in agriculture.[61] Many of these youth access their information through their internet-enabled mobile phones: internet penetration in Kenya is amongst the top 20 in the world, with >90% of the population accessing the internet through mobile data.[62] However, Kenyan youth have limited access to land and other agricultural factors of production, and face relatively higher barriers to market access.[63] They also must confront limiting perceptions in their communities of the sector as one for older and more rural populations, as opposed to one that offers transformative opportunities for on- and off-farm employment and businesses. The average age of the Kenyan farmer is 60, and adoption of modern technology and agricultural approaches can be more difficult and costly – in terms of learning – for older populations.[64]

Finally, PWDs are an important stakeholder that can overlap with women and youth. PWDs make up at least 10% of Kenya's population, with over 66% of these people are living in rural areas where agriculture is the main source of economic livelihood.[65] Furthermore, just over 50% of PWDs in Kenya are women, 35% are youth (and another 40% soon to be youth in the age bracket of 0-14), and poverty impacts PWDs more acutely than it does the total population.[66] The issues articulated above for women and youth therefore require additional attention for PWDs.

The ASTGS approach and resulting interventions are fully mindful of these challenges facing women, youth and PWDs, and incorporate tailored opportunities for these groups as part of the strategy (e.g., minimum participations thresholds for certain flagships as detailed below).

3.3 OVERVIEW OF THE ASTGS ANCHORS AND ENABLERS

The ASTGS approach is centred on three anchors and a set of enablers – small-scale commercial production, large-scale commercial production and value-add, and household food resilience. These anchors and enablers cover nine big ideas ("flagships"), to deliver a vibrant, commercial and modern agricultural sector that sustainably supports Kenya's development in the context of devolution, short-term national aspirations for 100% food security, and longer term global CAADP and SDG commitments (Figure 14).

Over 600 activities were recommended for transformation in the sector by the year-long nationwide consultative process led by the MoALFI until January 2018. Between January-April 2018, MoALFI undertook a period of rapid prioritization of these activities to align on the flagships, drawing on insights from 600+ reports and databases, 500+ national and county government stakeholders from across the country, over 150 organizations and global experts.

A flagship is defined as a strategic project with a lifetime of at least 3-5 years, and both high feasibility and impact within Kenya's operating context and goal of sustainable transformation and food security. Feasibility is defined as a high level of political commitment from MoALFI officials, the demonstrated capabilities of public sector implementers to execute or learn to execute, and finally the buy-in from potential investors, development partners and private sector or not-for-profits to implement as measured from a series of problem-solving workshops and consultations.

Impact is a quantitative assessment made once the flagship design was deemed feasible, and based on top-down sizing estimates. A flagship achieves impact in at least one of the following: affects at least 500,000 small-scale farmers across the country, contributes at least KES 10 billion to agricultural GDP in five years, or involves a high-impact intervention identified in the economic models generated by a number of research/policy institutions for the ASTGS. In developing these flagships, full consideration was given to the focus areas of the five state departments within the current Ministry of Agriculture, Livestock, Fisheries and Irrigation, including: crops development, livestock, fisheries, irrigation and research.

This ASTGS outlines the specific flagship projects for implementation within the first five years of the strategy (see Figure 14) with additional implementation and financing details contained in the accompanying five-year National Agriculture Investment Plan (NAIP). Following a review of the performance of these projects, an additional set of projects will need to be detailed for the second five-year period to best match the transformation needs at the time. Any new flagship projects will need to align with the theory of change of the strategy, and will still have to drive the outcomes determined by the three anchors of the ASTGS.

Box 7 below shares some potential scenarios for the flagship projects that could be designed for the second five years of ASTGS: an expansion in the scale and scope of the initial flagships (e.g., new value chains, additional geographies), adjusting a specific design element of the initial flagships (e.g., doubling down on the export market focus

for agro-processing zones), and finally adding a brand new flagship project (e.g., specific initiatives targeting growth of medium- and emerging-size farms).

A brief overview of the flagships projects for the first five years follows:

Anchor 1: Increase small-scale farmer incomes

The two flagships in this anchor aim to support small-scale farmers, pastoralists and fisherfolk to transition from highly diversified subsistence production to more specialized and market-oriented output in higher-yield value chains. Of the ~13 priority value chains identified in Chapter 1, flagships in this anchor focus on those that best support rural development and poverty reduction including potatoes, horticulture, dairy, beef, poultry, fish and maize for food security. Counties should select similar value chains that are most suited for their agro-ecologies, and not feel constrained to these:

1. Target ~1 million farmers in ~40 zones (initially) producing crops, livestock and fish served by ~1000 farmer-facing SMEs that provide inputs, equipment, processing and post-harvest aggregation

2. Shift nationwide input support programme focus to allow ~1.4 million registered high needs farmers to access a wide range of inputs (e.g. seeds, crop protection, fertilizer, equipment) from a variety of private and public providers, using e-vouchers with digital service delivery

Anchor 2: Increase agricultural output and value-add

The two flagships in this anchor enable large-scale farmers to competitively and sustainably utilize suitable agricultural land for efficient production to serve local and export demand and as inputs into agro-processing. It also seeks to increase Kenya's share of agro-processing through competitive processing for domestic and export needs. Value chains for this anchor are not prescribed, with the exception of minimum thresholds of maize grown on government land. Producers and processers must demonstrate the ability to be competitive in their locations and for their desired end markets. Sample value chains considered to test the impact of these flagships include rice, fish, horticulture, potatoes, dairy, beef, imported palm oil and wheat:

1. Establish ~6 large-scale agro- and food-processing hubs across the country through a rapid PPP process (i.e. one-stop shop) targeting both domestic and export markets

2. Unlock ~50 large-scale private farms (>2,500 acres each) with ~150,000 acres under sustainable irrigation with government-provided infrastructure (e.g, power, roads) and protected land-ownership

Anchor 3: Increase household food resilience

The two flagships in this anchor increase the ability of the country and individual households to respond to acute emergencies and price shocks with a mix of nutritious traditional staple crops, while building resilience to address food system risks. At the national level, the value chains of focus are maize and beans; but at the household level, value chains are region-specific and can include millet, sorghum, maize, beans, etc.:

1. Restructure governance and operations of the Strategic Food Reserve (SFR) to better serve ~4 million vulnerable Kenyans through: i. reserves optimized for emergency responses only; ii. buy/sell guidelines published with pre-determined emergency release triggers for stocks and cash; ii. private sector warehousing; and iv. price stability managed through Treasury (i.e., minimum price controls via cash transfers)

2. Boost food resilience of ~1.3 million farming and pastoralist households in ASALs through community-driven design of interventions, and more active economic bloc coordination of development partner and private sector resources

Enablers:

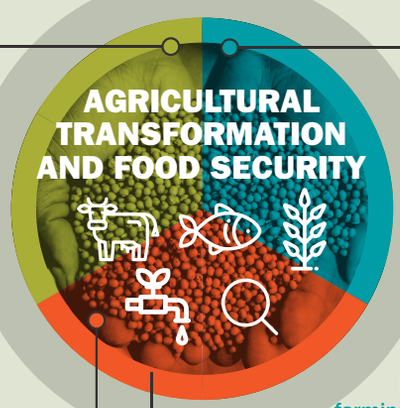
All enablers directly support the needs of the anchor flagships. They are centred on a preliminary list of "use cases" that should be reviewed and updated as the needs of the anchors evolve and they begin to deliver the desired results:

FIGURE 14: THE NINE ASTGS FLAGSHIPS

9 FLAGSHIPS

DRIVE KENYA'S AGRICULTURAL TRANSFORMATION AND SUPPORT FOOD SECURITY ASPIRATIONS

"A vibrant, commercial and modern agricultural sector that sustainably supports Kenya's development in the context of devolution, short-term national aspirations for 100% food security, and longer-term global CAADP and the SDG commitments"



INCREASE SMALL-SCALE FARMER INCOMES

1 **Target 1 million farmers, pastoralists and fisherfolk in an initial 40 zones served by 1000 farmer-facing SMEs** *that provide inputs and equipment including for irrigation, processing and post-harvest aggregation*

2 **Shift nationwide inputs support programme focus to register 1.4mn high-needs farming households and empower them to access a range of inputs** *from multiple providers, enabled by an e-voucher delivery system*

BOOST HOUSEHOLD FOOD RESILIENCE

5 **Restructure the Strategic Food Reserve (SFR) to better serve 4mn high-needs Kenyans** *through competitive digital reserve stock and cost management with private sector, and price stability managed through the Ministry of Finance*

6 **Boost food resilience of 1.3mn farming, pastoralist, and fishing ASAL households through community driven design of interventions,** *and more active coordination of development partners and private sector resources through regional economic blocs*

INCREASE AGRICULTURAL OUTPUT AND VALUE ADDITION

3 **Set-up 6 agro-processing hubs across Kenya using a one-stop-shop rapid PPP process** *for local and export markets*

4 **Unlock 50 large-scale private farms (>2,500 acres) with 150,000 acres under sustainable irrigation from existing infrastructure** *(e.g., rehabilitate dams, dual-purpose hydro-power), with competitive bidding, and government provided infrastructure (e.g, power, roads)*

The Agricultural Transformation Office (ATO) will report to the Chief Administrative Secretary (CAS) at MoALFI and will help deliver the transformation via inter-ministerial coordination, performance management, and mutual accountability. It will share best practices and lessons learned across key transformation stakeholders, and escalate issues to the Cabinet Secretary at MoALFI as necessary

ENABLED *by*

7 KNOWLEDGE AND SKILLS
Launch 3 knowledge and skills building programs focused on technical and management skills in the field *for 200 national and county government transformation leaders, 1000 farmer-facing SMEs, and 3000 extension agents*

8 RESEARCH, INNOVATION AND DATA
Strengthen research and innovation, and launch priority digital and data use cases for better decision making and performance management *(first wave to include digital subsidy registration amd delivery, farmer and SME performance, automated SFR buy / sell needs)*

9 SUSTAINABILITY AND CRISIS MANAGEMENT
Actively monitor 2 key food system risks: i. sustainable and climate-smart natural resource management *including sustainable irrigation and water basin health, soil quality and land use; and* **ii. crisis management for pests diseases, climate and global price shocks**

SOURCE: Team Analysis

1. **Launch three knowledge and skills programmes:** i. field-and-forum curricula for ~200 national and county government leaders who will lead the transformation; ii. skill building for public and private sector flagship implementers (including agri-business skills for ~1,000 farmer-facing SMEs); iii. management/ technical training for ~3,000 government youth-led and digital-enabled extension agents

2. **Strengthen research and innovation as launch priority digital and data use cases to better drive decision making and performance management.** The first wave of use cases include: i. digital e-voucher delivery programme; ii. production forecasting and digital performance monitoring of small-scale farmers and SMEs; iii. forecasting and monitoring of SFR buy/sell needs

3. **Actively monitor two key food system risks:** i. sustainable and climate-smart natural resource management including health of water basins, soil quality and land use; and ii. rapid response crisis management for pests and diseases, climate and global price shocks These nine big ideas should be considered as an entire portfolio of interventions. Farmers in each and every county have the potential to benefit from at least five flagships – the new e-voucher programme (flagship 2), the national strategic food reserve (flagship 5), and the three enablers around knowledge and skills, research and analytics, and sustainability and climate change.

Furthermore, the six big ideas of the main anchors provide a path to 100% food and nutrition security by covering people across all of Kenya's agro-ecological areas (including urban poor), all the time – year round and during periods of emergency (see Figure 15). Finally, to ensure compliance with the NFNS-IF, ASTGS has fully integrated nutrition needs into the design, planning, implementation and monitoring of agricultural programmes and projects as detailed in Chapter 4.

BOX 6: A NOTE ON AGRICULTURAL MARKETING AND TRADE

It is important to recognize that success of these flagships is dependent on the ability of Kenya to trade its agricultural commodities in regional and international markets, keeping in mind commitments of Kenya's membership of the East African Community (EAC), Common Market for East and Southern Africa (COMESA), the recently signed Africa Common Free Trade Area agreement, and other trading relationships. The flagships are therefore designed to support a shift from subsistence agriculture to competitive and market-oriented production that meets the high food safety and quality standards for regional and global trade. More specifically, each of the flagships as appropriate considers:

- **Agricultural market infrastructure:** In addition to supporting plans for rural development (e.g., roads and electricity) in associated sector Ministries, this strategy has a strong emphasis on developing post-harvest handling infrastructure to support small-scale farmer production across anchor 1, and the Strategic Food Reserve (SFR) in particular

- **Market information and access:** The digitally enabled extension officers in flagship 7 will work closely with the SME accelerators in flagship 1 to provide farmers with real-time market data (e.g., pricing). The SME accelerators are further encouraged to carefully select the location for farmer-facing SMEs where they are most likely to succeed (i.e., close to city centres) to accelerate market access for the farmers that buy from and sell to them

- **Structured trading systems and agricultural marketing support:** The strategy strongly supports implementation of the Warehouse Receipt Systems Bill, which will provide a structured grain trading system that is essential to the reforms recommended to the SFR. Much of the agricultural marketing support is value chain-specific, and this strategy does not prescribe value chains. However, at the national level, the Agricultural Transformation Office (ATO) described below ensure that strategy implementation shares data (e.g., projected yield increases) and collaborates with the marketing boards as appropriate.

- **Food quality and food standards:** In addition to supporting the implementation of the National Food Safety Policy (Draft, 2010), this strategy outlines infrastructure that supports food safety (e.g., hermetic bags for the SFR), and product traceability -- including for export oriented output outlined in anchor 2.

BOX 7: HORIZONS OF THE 10-YEAR ASTGS

Potential evolution of the flagships over 10 years

First 5 years: aligned to 1ST NAIP

Second 5 years: aligned to 2ND NAIP

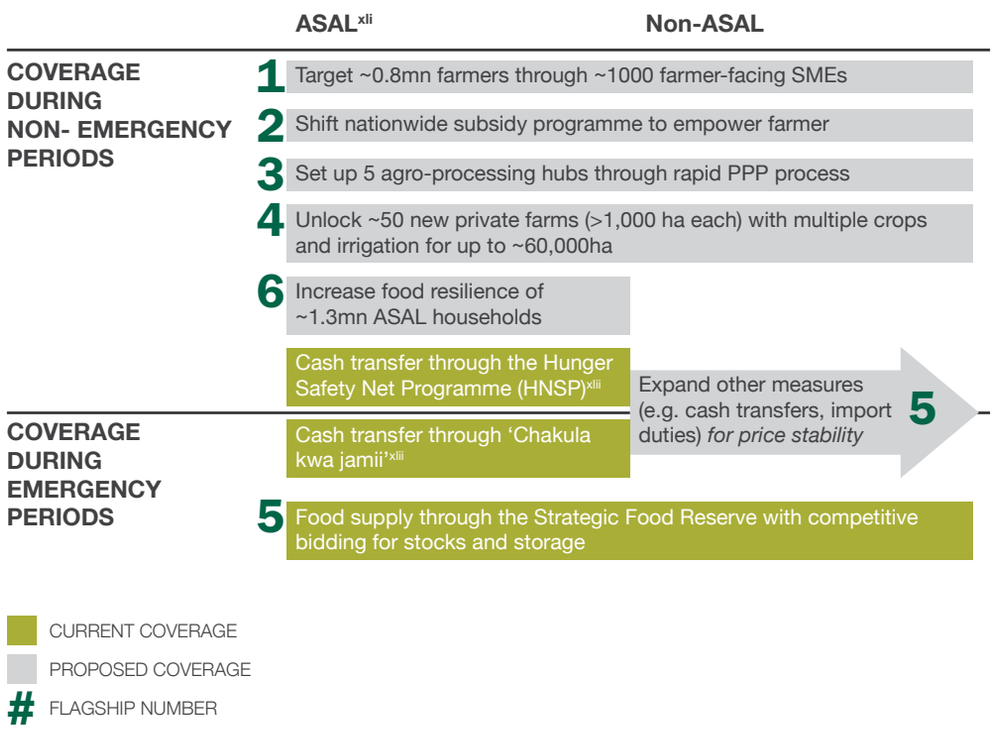
Flagship Projects	Expand scope of existing interventions	Adjust scope of existing flagships	Design brand new flagship
Increase small-scale farmer incomes			
1 Target 1 million farmers in 40 zones with ~1000 farmer-facing SMEs **2** Shift nationwide subsidies focus to register 1.4million households	Cover more farmers, pastoralists and fisherfolk in more regionswith a refreshedset of value chains and inputs in focus	Increase focus on market access (e.g., include more agro-dealer SMEs in business accelerator	Expand contract farming models, with commercial farms providing additional technical support surrounding farmers
Increase agricultural output and value addition			
3 Set-up 6 agro-processing hubs across **4** Unlock 50 new large-scale private farms under sustainable irrigation	Increase number of hubs and farms for focus, covering even more and value chains	Increase emphasis on regional and gloabal export markets Expand farms to include non-publicly owned land	Develop more niche medium size and emergent farmers theat complement production efforts of small-scale and commercial farmers
Boost household food resilience			
5 Restructure the Strategic Food Reserve (SFR) to better serve Kenyans with 2-3 commodities **6** Boost food resilience of 1.3million ASAL households	Store commodities (e.g., 4-5) Expand ASAL areas in scope for resilience flagship	Shift flagship emphasis from coordinating existing ASAL efforts, to suppoting the specific 2-3 specific interventions driving the most impact	Increase coordination between county or economic bloc, and national food reserve systems
Enablers			
7 Launch 3 knowledge and skills building programmes for 200 national and county leaders, 1000 SMEs, and 3000 extension agents	Train more talent at all levels of transformation	Develop a trai-the-trainer approach to rapidly scale skills learned to additional transformation leaders, SMEs and existing extention officers	Build an agricultural transformation Academy to reimagine how MoALFI recruits, trains and retains national county talent Create the extension force of the future
8 Strengthen research and innovation, and launch 3 priority digital & data use cases	Include more priority use cases aligned with specific research agendas like biotechnology	Focus on open and shared data platforms to support research, innovation and performance monitoring	Embrace advanced analytics and "internet of things (IoT)" approach to drive more predictive insights from data
9 Actively monitor 2 key food system risks: including sustainable and climate smart natural resource management and crisis management for pests and diseases, climate and global prices	N/A	Identify new food system risk for focus (e.g., trade related)	Shift from crisis management to more resiliency building interventions for pests and diseases, climate and global price shocks

ILLUSTRATIVE: 2ND NAIP INTERVENTIONS ARE SUBJECT TO CHANGE, BUT ANCHORS WILL REMAIN

FLAGSHIP NUMBER ● Transformation themes (Anchors)

FIGURE 15: NATIONAL COVERAGE OF THE 6 BIG IDEAS

The six anchor transformation flagships provide national coverage all year round and support food security for all



SOURCE: ASTGS Working Team Analysis

Delivery mechanism

The delivery mechanism for ASTGS will be a collaborative effort between the Office of H.E. the President or the Deputy President, the MoALFI and key sector players at the county and national levels. At the national level, these stakeholders include leadership at the Ministries of Devolution, Environment, Industry, Lands, Transport, Water, Treasury, and the Agricultural Transformation Office (ATO) as the primary body supporting national inter-ministerial coordination. At the county level, the Council of Governors (COG) and the Departments of Agriculture at the County Level, supported by the Joint Agricultural Sector Consultation and Cooperation Mechanism (JASCCM-IGS), are critical to delivery.

The delivery mechanism for ASTGS will be a collaborative effort between the office of the Cabinet Secretary MoALFI through the Chief Administration Secretary (CAS), and key sector players at the county and national levels.

The ATO will be the primary coordinating force for national delivery of the ASTGS flagships through inter-ministerial coordination, performance management and mutual accountability. The ATO Director will work closely with the MoALFI Cabinet Secretary on his/her transformation mandate, as well as support mobilization and disbursement of public resources. The ATO will also collaborate closely with the Joint Agricultural Sector Coordinating Mechanism (JASCCM) that is responsible for supporting the counties to domesticate ASTGS and support them in implementation on the ground. The ATO will include a dedicated team focused on food system risks with rapid response capabilities for cross-agency crisis management.

xli Arid and Semi-Arid Lands
xlii Existing programme

The ASTGS process has consulted with all 47 counties to identify which flagships are most aligned with their County Integrated Development Plans (CIDPs) (see Chapter 5). But the ASTGS appreciates that every county will face different challenges in its pursuit of transformation that will require implementation to be flexible and draw on local knowledge and expertise.

The ASTGS process has also mapped out all existing programmes at the MoALFI and sector ministries that could be relevant to these flagships (see the NAIP, Appendix 1). Before the strategy is fully implemented, there is a need to further align budgetary allocations between ongoing programmes and these flagships. This may require MoALFI and sector ministries to de-prioritize some programmes that no longer meet the needs of the transformation.

3.4 MEASURING IMPACT OF THE TRANSFORMATION IN THE FIRST FIVE YEARS

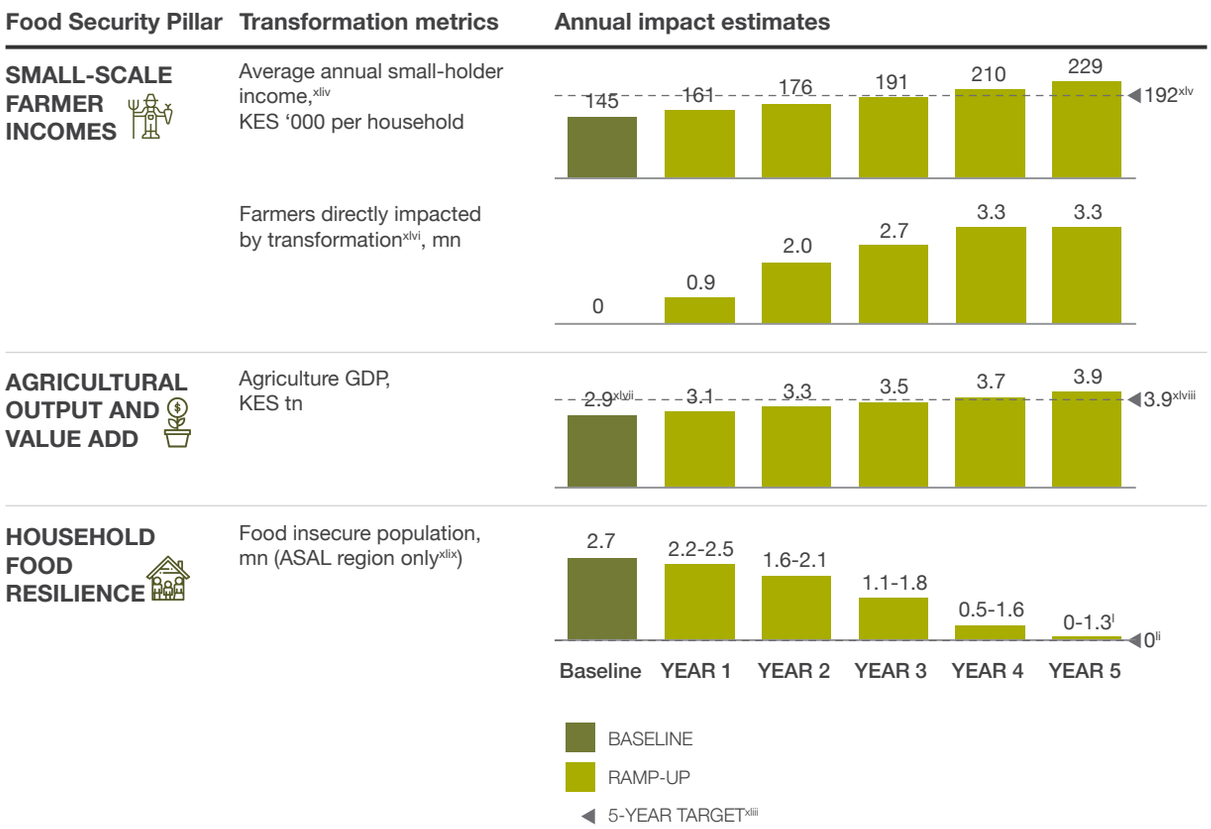
The success of the transformation by 2023 is delivering on the three output metrics that are key to achieving 100% food and nutrition security, ensuring that every Kenyan has access to affordable and nutritious food, and that Kenya remains committed to CAADP and SDG obligations (Figure 16):

- Increase average small-scale farmer incomes by ~40% and directly impact ~3.3 million small-scale farmers, pastoralists and fisherfolk
- Increase agricultural GDP by 35% to KES 3.9 trillion
- Reduce the food-insecure population to 0-1.3 million, while reducing the cost of food and improving nutrition

Kenya is in the process of building an Agricultural Transformation results framework aligned to the NSNP-IF, national results framework requirements, and key commitments to the Sustainable Development Goals, Malabo Declaration and the Comprehensive Africa Agriculture Development Programme (CAADP). For further details, please see the discussion of objectives, targets and M&E in the NAIP that accompanies this strategy document. However, the ASTGS approach articulated above identifies the key intervention areas (i.e., flagships), output metrics (i.e., small-scale farmer incomes, agriculture GDP, reduction in food insecure population, farmers directly impacted by the transformation) and outcomes (i.e., 100% food and nutrition security through a vibrant, commercial and modern agricultural sector) as the basis for alignment to a results framework.

FIGURE 16: OUTCOME METRICS FOR ASTGS

Through agricultural transformation, these flagships will help Kenya achieve the Big Four food security targets, CAADP and SDG commitments



SOURCE: Kenya Economic Survey; World Bank; MAFAP; CAADP Results Framework; Big Four targets; FAO Family Farming Knowledge Platform

3.5 CONSIDERATION OF POLICY, LEGAL, AND REGULATORY FRAMEWORKS TO SUPPORT THE ASTGS APPROACH

The human right to food in Kenya is provided for in Article 43 of our Constitution, which anchors the policy, legal and regulatory frameworks of the ASTGS:

"Every person has the right to be free from hunger, and to have adequate food of acceptable quality." – Article 43, Constitution of Kenya (2010)

The Constitution further embraces sustainable exploitation, utilization, management and conservation of the environment and natural resources, and identifies sustainable development as an important value and principle of governance.

xliii Based on Big Four targets, unless otherwise stated.
xliv Assume KES ~145,000 for 2017/18 based on FAO Family Farming Knowledge Platform data (2005 household income of USD 2,819 in 2009 international dollars; income from farm is 60%), and income CAGR if 3% (based on historical GDP per capita CAGR).
xlv Based on SDG goal of doubling smallholder income between 2016 and 2030, and assuming constant CAGR over this period.
xlvi In addition to farmers impacted, we have estimated a cumulative ~200-300k direct on- and off-farm jobs. Does not include indirect jobs through economy-wide multipliers; estimate ranges exist, with differing assumptions shown in he NAIP.
xlvii Take 2016 Ag GDP from Kenya Economic Survey and apply 5% CAGR (based on 2012-16 historical CAGR).
xlviii Based on CAADP-Malabo targets of 6% CAGR in agriculture GDP.
xlix Non-ASAL food-insecure population (~10 mn people, based on the National Food and Nutrition Security Policy Implementation Framework) will be addressed indirectly through Flagships 1-4 (see next page for details), which will increase production and reduce food prices, and also through the income-boosting effects of Flagships 1-2.
l Aspirational case is 100% coverage of the average food-insecure population (taking % of population that is food-insecure from 2008-2017 and extrapolating to the 2022 population); conservative case is 100% coverage of minimum food-insecure population size; assume linear ramp-up.
li Based on Big Four target of 100% food and nutrition security, and average ASAL food-insecure population of 2.7 mn over 2008-2017.

This strategy supports policies that address food and nutrition security with alignment to county-level CIDPs, the NAIP and MTPIII, while maintaining coherence to overarching development blueprints including the CAADP Malabo declaration, the SDGs, the AU 2063 agenda and various regional and continental trade arrangements that affect agriculture, including the recently signed Africa CFTA.

In the past decade, the sector as defined in Chapter 1 has pursued legal and regulatory framework reforms including:

- Climate Change Act No. 11, 2016
- Community Land Act No. 27, 2016
- County Governments Act No. 17, 2012
- Crops Act No. 16, 2013
- East African Community Protocol on Environment and Natural Resource Management, 2006
- Energy Act, 2016
- Fisheries Management and Development Act No. 35, 2016
- Forest Conservation and Management Act No. 34, 2016
- Green Economy Strategy and Implementation Plan, 2016-2030
- Irrigation Policy, 2015
- Kenya Agricultural and Livestock Research Act No. 17, 2013
- Land Commission Act, 2012 (Revised 2016)
- Land Registration Act, 2016
- Lands Acts No. 6, 2013
- Mining Act No. 12, 2016
- National Agriculture Policy, Fisheries and Ocean Policy, 2008
- National Environment Policy, 2014
- National Food and Nutrition Security Policy, 2011
- National Food and Nutrition Security Policy Implementation Framework, 2017 2022
- National Land Policy Sessional Paper No 3, 2009
- National Livestock Policy Sessional Paper No 2, 2008
- National Agricultural Sector Extension Policy, 2012
- National Agricultural Research Systems Policy, 2012
- National Wildlife Conservation and Management Policy, 2017
- Plant and Seed Plant Varieties Amendments Act, 2016
- Public Health Act, 1986; (Revised 2012)
- Public Private Partnership Act, 2013
- Vision 2030; and the Third Medium-Term Plan – MTPIII (2018-2022) for Vision 2030
- Warehouse Receipt Systems Bill, 2019
- Water Act No.43, 2016
- Wildlife Conservation and Management Act CAP 376, 2013

The flagships largely operate within the purview of these national policies and regulations, and push for their enforcement as necessary (e.g., clarification of mandates between national and county governments in the Water Act 2016). There are two exceptions:

- Restructuring the Strategic Food Reserve (flagship 5) will require a revision to the Public Finance Management Act 12 of 2012—Strategic Food Reserve Trust Fund Regulations (2015) to separate the price stability mandate from SFRTF emergency food provision and allow for competitive bidding for storage facilities for these reserves by the private sector, and will require publication of emergency trigger criteria as recommended in Chapter 4 under flagship 5
- Investing in data and research (flagship 8) will require a revision to the Access to Information Act No. 31 of 2016 to add penalties for non-compliance with data standards for the flagship

These changes are discussed in detail in Chapter 4. The ATO will work with the Policy Department at MoALFI and committed development partners to pave the way for these

changes. Any policy changes required at the county level to support the flagships will need to be determined by the County Legislatures, and some guidance is provided in Chapter 5 of this document.

The review and development of certain existing policy and regulatory frameworks can accelerate the impact of the flagships, and drive broader transformation of agriculture beyond the flagships. The following ongoing policy efforts should be prioritized within the first three years of ASTGS implementation:

- Draft Agricultural Policy, 2016
- Draft National Food Safety Policy, 2010
- Draft National Land Use Policy, 2016
- Amendments to regulations around key inputs including seeds and fertilizer, access to finance, post-harvest handling, extension and marketing including:
  - Access to Government Procurement Opportunities (AGPO) and procurement affirmative action
  - Agricultural commodity import regulations and standards
  - CESS taxation provisions
  - Credit Guarantee Cabinet Paper
  - Crop Production and Livestock Act, 1977 (Revised 2012), The Animal Breeding Act, 2001, Consolidation of animal health law, enacting various Fisheries provisions
  - Exchange and benefits-sharing guidelines
  - Fertilizer and Animal Feedstuffs Act, CAP 345, 2012
  - Kenya School of Agriculture Bill, 2015
  - National Agricultural Sector Extension Policy, 2012
  - Seed Certification, Industry Regulations in the Seed and Varieties Act - CAP 326, 1991 (Revised 2012), and provisions for the International Union for the Protection of New Varieties of Plants (UPOV)

This is not an exhaustive list, and should be reviewed as necessary to be sensitive to the evolving needs of the transformation.

While these policies and regulatory frameworks provide a guide to implement the strategy, they must be accompanied by strong governance to ensure successful policy implementation and good stewardship of Kenya's resources. A key enabler to this strategy is the training and development of the transformation leaders – from the national and county-level decision-makers, to the farmers and SMEs on the front line *(see flagship 7)*.

3.6 WHY IS THIS STRATEGY DIFFERENT?

Much has been achieved in the agricultural sector in the last decade – including the implementation of the Consolidated Agricultural Reform Legislation at the national level, and emerging pockets of excellence in county-level agricultural transformation and food security. Examples include Homa Bay county which hosts the largest fish farm in East Africa – a farm that grew to market dominance in two short years, and now serves over 10,000 households.[67] Another example is Garissa, which is building a modern abattoir to increase production in what is already one of the largest livestock markets in East Africa, with over 10,000 animals traded per week in an area that has over 80% of Kenya's beef cattle.[68] Similarly, the recent launch of the Ndengu Revolution/Inua Mkulima Project in Kitui and Meru provides green gram seed to farmers and offers expertise on getting a bumper crop to boost household food resilience.[69]

The sector also continues to see success of Kenya's largest agricultural export earners, including floriculture that contributes ~1.3% to national GDP and continues to innovate in product offerings; Kenyan coffee that, despite mass production challenges, ranks amongst the world's best specialty varieties; and initiatives driven by the Kenya Tea Development Authority (KTDA) in Farmer Field Schools that is raising productivity of smallholder tea farmers by up to 30%.[70, 71, 72]

However, food security, poverty reduction, transformation of agriculture from subsistence to commercial farming and agribusiness, access to large-scale markets and agricultural

credit remain difficult challenges that must be addressed.[73] Previous strategies including the Strategy for Revitalising Agriculture (SRA) 2000-2014 and the Agriculture Sector Development Strategy (ASDS) were technically sound, contained well researched ideas informed by several experts, and were inclusive in defining the agriculture sector. However, they were completed before devolution and needed a stronger emphasis on prioritizing interventions to focus on impact. Over the past decade under these strategies, agriculture has maintained its contribution to GDP at ~25-30%, and 1.5 million Kenyans continue to be food-insecure, but this number can increase to as high as ~4 million during droughts.

ASTGS builds on the lessons learned from SRA and ASDS to provide an easy to articulate plan aligned with achieving the current national objectives, CAADP/Malabo, the UN SDGs, and Agenda 2063 of the African Union. Counties, private sector investors and implementing partners, development partners, other key non-state actors and not-for-profit or NGO implementers and a broad base of researchers and technical experts have been consulted from the onset in ASTGS's persistent pursuit of:

- a mutual understanding of **counties and devolution as the bedrock of implementation,** and therefore the need to coordinate national, development partner and private sector resources at the county level
- a disciplined focus on **evidence-based outcomes** aligned with Kenya's national agenda
- an **orientation around a prioritized set of nine flagships** that have been vetted by key implementing partners **for their feasibility, innovation**, and inclusion of **digital, research and data-driven tools**
- strong bias **for partnership with the private sector to drive results and share risk.** This has required a fully **incorporated prioritization of impact and budgets** from the design phase
- **coordinated responses to food system risks across national and county levels** including sustainable land, soil and water use, climate-smart and climate resilient agriculture, and crisis responses to pests, disease and global price shocks

3.7 ASTGS CONTRIBUTION TO THE BIG FOUR AGENDA

Making nutritious food affordable and available to all is a central goal of any agricultural transformation. The ASTGS is grounded in the belief that achieving 100% food security – a goal of the Big Four -- requires a vibrant, commercial and modern agricultural sector development. In the first five of ASTGS, the flagships will not only lay the ground for the longer 10-year transformation of the sector, but these flagships will contribute significantly to the Big Four agenda by improving the availability of food for all. See Box 8 for additional detail.

BOX 8: ASTGS CONTRIBUTION TO THE BIG FOUR

The Big Four Agenda and the ASTGS

Relevant flagship X

First five years of the ASTGS (NAIP I) → Next 5 years

Big Four Agenda	ASTGS contribution
100% food and nutrition security	• **Protect ~4mn vulnerable households** from severe food shocks by increasinghousehold resilience and improving operations of the Strategic Food Reserve(SFR) • **Increase food production** by KES 400bn from commercial farming for priority value chains • **Boost farmer productivity** for ~3.3mnfarming households 1 2 3 4 5 6
Manufacturing to be 20% of GDP by 2022	• Increase agro-processing GDP by ~KES130 bn through 6 planned **agro-processing hubs** and **high volume** standardised inputs from largescale farms 3 4
Universal Health Care	• **Boost resilience in ASAL** regions and provide **better nutrition** from additionalcommodities in the SFR, therefore **reducing strain** on national healthsystem. To impacting ~4mn Kenyansduring emergencies and 1.3mn chronically 5 6
Affordable housing	• **Free household income** for other housing related costs by increasing farming household income (from ~KES 465 to KES 625/day). This will **increase food affordability** (~40% cost of household budget) for non-farming households 2 5 6

Based on theperformance offlagships over the firstfive years, the next fiveyears of ASTGS (NAIPII)may:

- Expand scope of existing interventions(e.g., more geographies)
- Adjust scope of existing flagships(e.g., value chains)
- Design brand new flagships

III)See potential evolution of the flagships over 10 years (See Box 6) for more details

FLAGSHIP NUMBER

SOURCE: ASTGS, NAIP, Big 4 documents, Team analysis

04

FLAGSHIP PROJECTS

4.1 ANCHOR 1 – INCREASE SMALL-SCALE FARMER, PASTORALIST AND FISHERFOLK INCOMES

There are ~4.5 million small-scale farmers in Kenya, including 3.5 million crop farmers, 600,000 pastoralists and 130,000 fisherfolk.[74, 75, 76] Collectively, their output accounts for ~60% of national produce, on approximately ~80% of Kenya's land under agriculture.[77, 78] Average farmer household incomes per annum were estimated at USD 2,819 in 2005, and, with 60.5% of income coming from on-farm activities, this equates to approximately KES 145,000 per year in 2018.[lii],[79] Depending on productivity, typical gross profit margins for small-scale farmers vary from region to region, e.g., that for maize ranges from 13% to 37%.[80]

lii Based on 2005 2,819 Assume 2005-2018 CAGR in line with GDP per capita CAGR

However, millions of small-scale farmers are unable to afford key inputs, mechanization and new technologies, such as artificial insemination, to achieve high productivity. For example, only 7% of small-scale farmers irrigate and just 2.9% of households use motorized equipment, four times lower than those of Kenya's regional neighbours. Productivity is significantly affected by these limited investments, leaving some farmers with yields up to five times lower than they could achieve, and far below global average.[81, 82] For example, the average dairy yield in Kenya is 1,209 litres per milking cow, commonly the Sahiwal, compared with the 2,100 litre global average and 4,187 litres per high-yielding Friesian.[83, 84]

Successful agricultural transformations have focused on the farming household, providing opportunities for farmers to earn a better income.[85] Growth in those farmers' incomes is fundamental to economic and social development of Kenya, to farmers' ability to reinvest in their farms and to the sustainable supply of food for all.

In practice, this means raising farm productivity and shifting the mix of production to include higher-value crops and livestock. Among crop farmers, 60% of small-scale farming land is allocated to the production of maize, followed by 17% beans and only 1% to 5% of any other commodity. This limited diversity has significant implications for crop rotation, soil health, disease and insect pressure management, and dietary nutrition. In addition, it exposes Kenya to the potentially severe consequences of a major crop disease or crop failure.[86]

The two flagships in this anchor will support small-scale farmers, pastoralists and fisherfolk to transition from highly diversified subsistence production to more specialized and market-oriented output in higher-yield value chains. Of the ~13 priority value chains identified in Chapter 1, flagships in this anchor focus on those that best support rural development and poverty reduction, including potatoes, horticulture, dairy, beef, poultry, fish and maize for food security. Counties should select similar value chains that are most suited for their agro-ecologies.

Growing a greater diversity of crops is not only essential to improving national nutrition and working towards 100% food security, but also to increasing profitability for farmers, through production of higher-value crops and adoption of new technologies (such as solar-driven irrigation, artificial insemination and high-quality fish feed), thereby enabling them to afford and make a business case for such investments.

Smallholder farmers with access to structured markets with predictable demand and supply produce more and have higher incomes.[88] Key to achieving this is ensuring farmers have linkages to agribusinesses providing off-take, as well as assisting farmers to aggregate into groups.[88] Aggregation supports farmers to improve their productivity through increased access to services and markets, and enhances their competitiveness by reducing transaction costs of agribusinesses choosing to work with them. Kenya is a lead example of the potential role that small-scale farmer linkages to Small and Medium-Sized Enterprises (SMEs) have in poverty reduction and rural development.[89] The Kenyan experience has contributed to a growing realization in many African countries that support for local level agribusiness needs to be a major focus of public policy concern, if agriculture is to be transformed into a competitive sector for development and poverty reduction.[90]

With the main goal of increasing farmer incomes, the two flagships will focus on increasing access to markets via 1,000 SMEs and lowering the cost of inputs through a restructured subsidy system, with further details as follows:

1. Target ~1 million farmers in ~40 zones (initially) producing crops, livestock and fish served by ~1,000 farmer-facing SMEs providing inputs, equipment, processing and post-harvest aggregation. This ecosystem will stimulate local agricultural markets and businesses

2. Shift nationwide inputs programme focus to allow ~1.4 million high-needs farmers to access a wide range of inputs (seeds, crop protection, fertilizer, equipment) from a variety of private and public providers, enabled by e-voucher digital service delivery

FLAGSHIP 1: Target ~1 million farmers in ~40 zones (initially) served by ~1,000 farmer-facing SMEs

"Agricultural transformation that is so much a cornerstone of the Malabo Declaration will not occur unless all key stakeholders in African governments, the development community, UN agencies and the investment arena can effectively partner African SMEs who are the centre of the African agro production, processing and distribution sectors"

- Chris Muyunda, Vice President of the Comprehensive Africa Agricultural Development Programme (CAADP) Non-State Actors Coalition (CNC)[91]

A. CHALLENGES

Small-scale farmers have limited access to an affordable variety of high-quality inputs and equipment that are well suited to their needs. As a result, yields are significantly lower than potential, signalling an opportunity for improvement in cleaner production that considers output alongside efficient resource use.[92]

Small-scale farmers also have limited markets for their produce, and not all farmers participate in collective action (e.g., self-organization of farmers into organizations like cooperatives). Therefore, some farmers are unable to aggregate produce for buyers. This weakens farmers' negotiating power and forces them to take the prices offered by middlemen, thus lowering their income. For some farmers, low levels of aggregation also correlate with use of inadequate storage facilities, contributing to post-harvest losses at the farm level of up to 20%.[93, 94] Overall, these challenges put all farmers at a disadvantage in terms of their overall income, as well as exacerbating national food insecurity and vulnerability.

In addition, gender inequities, including access to information, water, energy and finance, are holding women back from achieving their full agricultural potential. Inadequately meeting the needs of women farmers has been shown to negatively impact food security in many countries.[95, 96] For example, if women farmers had the same access as men to improved agricultural inputs, such as fertilizer and seed, maize yields would increase by as much as 16% in Malawi, 17% in Ghana, and 19% in western Kenya.[97]

To improve market access to both inputs and off-take, the Government will drive rapid transformation by working with local change agents across the country. A change agent is a person or group of people who provides a front-line agricultural service along the value chain, transforming the economics for producers. In Kenyan agribusiness, these change agents will be ~1,000 SMEs, including mechanization and irrigation equipment suppliers, farmer associations, agro-dealers, warehouses, aggregators and processors.

Leveraging local change agents for agricultural transformation has been successfully demonstrated to work in multiple countries, including Morocco and Ethiopia. Change agents provide a critical interface with, and are trusted by, farmers. Their interactions translate to small, yet incremental, on-farm shifts, amounting to large-scale behaviour changes that underpin a successful agricultural transformation. Change agents might offer financing for farming inputs such as fertilizer, aggregate crops and products from livestock and fisheries, or facilitate marketing services. They can help farmers make the transition, for example, from growing maize to more complicated but lucrative opportunities such as tomatoes, potatoes and horticultural crops.[98]

SMEs will be able to act as these local change agents, given their ability to reach far more farmers than Government or any large private sector company might be able to achieve, by nature of being local and able to provide last-mile services (i.e., direct to farm gate or farmer-based organization).

Kenya's SMEs comprise both informal and formal businesses, although the majority are informal. They are typically concentrated in urban centres and peri-urban areas due to

FIGURE 17: DEFINITION OF MICRO, SMALL AND MEDIUM ENTERPRISES

Definition of Micro, Small and Medium Enterprises in Kenya

Enterprise size	Number of employees	Annual turnover, KES
Micro	<10	<500,000
Small	10-49	500,000 - 5mn
Medium	50-99	5mn - 800mn

SOURCE : Kenya Institute for Public Policy Research and Analysis (KIPPRA), 2014; ASTGS Working Team Analysis

better services and infrastructure compared to rural areas.[99] Agribusiness SMEs are also most likely to thrive in urban centres owing to the significant populations creating demand, and will especially thrive if near areas of high agricultural productivity, as they also require access to sufficient supply (inputs or farm produce) to drive the entire supply chain.

The definition of SMEs varies by country and, in Kenya, the classification of enterprises is primarily by the number of employees engaged by firms and their turnover, as per Figure 17.[100]

SMEs contribute over 80% of Kenya's employment and over 40% of the country's GDP.[101] However, 70% of the country's SMEs have historically failed.[102] They face multiple barriers to entrepreneurial success, including constrained product and service innovation, limited managerial and operational skills, limited business advice and training opportunities and difficulty recruiting quality staff. They also experience limited access to affordable, formal finance, given the high perceived lending risk and low ability for lenders to accurately profile them.[103]

Women-owned SMEs, making up approximately 34% of total SMEs in Kenya but making up 54.9% of failed businesses, experience overall slower growth and are disproportionately concentrated in unlicensed businesses that are mostly micro and informal in nature, compared with SMEs owned by men.[104, 105] This is attributed to several factors, most notably that they are less likely to access formal finance and will receive smaller loans with higher interest. Similarly, SMEs owned by youth (18-35-year-olds) experience constraints to accessing finance, with major hindrances including insufficient education level and prior experience, as well as inadequate business plans.[106]

Challenges relating to access to finance stem from the perceived risk of lending to SMEs. This is largely due to two key reasons: Firstly, it is often difficult to obtain information about the SME's financial credibility, including financial data to build a credit history and a detailed business plan, meaning lenders must charge higher interest rates, particularly for smaller loans, to cover operating costs and the risk premium. Secondly, interest rate caps mandated by the Government have the unintended impact of making lending to SMEs unattractive to lenders.[107] As a result, agriculture is the most underfunded sector in Kenya, receiving an average of only 3% of total credit extended to the economy.[108]

There is an opportunity for "SME accelerators" to directly help SMEs overcome these barriers. Accelerators typically provide 6-18 months of mentorship and support to businesses (early or mature stage) in their goal to expand their markets. The emphasis of the SME accelerators is on rapid growth, through holistic advisory services to solve all organizational, operational and strategic difficulties faced by the business.[109]

1 million SMALL-SCALE FARMERS IMPACTED

1,000 FARMER-FACING SMES SUPPORTED WITH ACCELERATOR SERVICES

16,000 HECTARES OF ADDITIONAL IRRIGATION

KES 20,000 ADDITIONAL INCOME PER SMALL-SCALE FARMER PER YEAR

B. FLAGSHIP SOLUTION

Overview

This flagship will improve farmer access to affordable, appropriate inputs, well-priced markets for offtake and improved post-harvest handling and aggregation, by developing and growing ~1,000 existing farmer-facing SMEs as the key change agents to drive agricultural transformation in Kenya. These efforts will initially be focused in ~40 high productivity zones, divided into six "lots". SME accelerators will provide support services and access to finance to SMEs in a particular lot and will support SMEs based on SME potential, farmer needs, gender inclusivity and priority value chains. The ATO will, in conjunction with a government project appointed to manage the initiative, monitor performance of these zones very closely and share best practices across zones as they are discovered during implementation.

Impact and investment

By year five of implementation, this flagship will have estimated impact of:

- Increase in small-scale farmer incomes (KES): ~20,000 per farmer per annum
- Total agriculture sector value created (agriculture GDP increase summed over five years): ~KES 50 billion
- Increase in agricultural GDP in year five: ~KES 15 billion
- Farmers impacted: ~1 million
- Investment required: ~KES 10 billion

Design

The approach includes five steps:

1. Focus initially on ~40 high-productivity zones where rapid growth of agribusiness SMEs will be most likely to succeed, i.e., where there is presently significant demand from local population, access to markets via roads and where they will have access to sufficient supply, due to relatively high yields of key value chains. SMEs will be at the helm of agricultural transformation, with efforts to support them first being directed to existing enterprises, building on already strong business models that are ready for rapid expansion, to drive fast impact, before opening up to new SMEs

2. Contract for- and not-for-profit "SME accelerators" with the right experience and capabilities to carefully select, train, scale and performance-manage high potential SMEs, whilst ensuring strong participation of SMEs led by women and youth, as well as a strategic balance of agribusiness types and sizes based on farmer needs: including larger agriculture centres, "hub agro-dealers", off-takers and processors including for cottage industry, plus smaller agro-dealers, agents leasing and selling mechanization and irrigation equipment. These accelerators should be business model-agnostic, and able to work with all types of SMEs

3. Prioritize SMEs serving the top 5-10 key value chains that will provide the greatest potential impact to small-scale farmers in terms of improved yield and increased incomes. In Figure 18, the ASTGS identifies the top ~six

FIGURE 18: SME RECOMMENDATIONS BY PRIORITY VALUE CHAIN

Farmer-facing SMEs have high potential to increase efficiency and productivity in priority value chains that will vary by zone

Value chain	Sample SMEs with high potential to increase efficiency and productivity
POTATOES	**Seed multipliers:** bulk clean seed for sale to small scale farmers **Ambient storage:** for farmer based organisations (FBOs) to aggregate **Large scale cold storage:** for larger markets to aggregate **Processors:** Build trusted relationships with aggregators and farmers. Leverage storage units to smooth price fluctuations
HORTICULTURE	**Aggregators:** cold storage provider linked to multiple FBOs and contract farmer(s), with quality control services, credit provision and information center **Processors:** Encouraged to establish more units across the country in areas where farmers have organized into groups with an aggregator providing quality control
DIARY	**Fodder producers:** for good quality, affordable fodder **Small scale chilling stations:** small scale, solar-powered cold storage baths to chill 5-6 x 50 liter milk cans at 8 degrees until collected by a local truck **Cooling tanks at hub agro-dealers:** with 5,000 litres capacity, linked to 20+ stations **Large bulking centers:** in hub and spoke model with 50,000-100,000 litres capacity linked to 5-10 cooling tank units
POULTRY	**Hatcheries:** sell both indigenous and improved breed chicks **Producers:** adopt a semi-intensive production system utilizing improved breeds **Medium to large traders:** : also sell inputs, with focus in lower income areas **Small processors:** with regular supply of indigenous birds
BEEF	**Feedlots for livestock fattening:** utilize ranches to fatten and finish well-selected young steers **Feed and water stations:** establish along key trekking routes, with fees for water and feed with integrated advisory **Hide treatment units:** treat hides and advise pastoralists on best practices, including tick control and branding
FISH	**Feed producers:** produce more affordable, sustainable feeds **Hatcheries:** produce good quality fresh water fingerlings (tilapia, catfish, Nile perch) **Beach Management Units (BMUs):** self-organize marine fisherman for aggregation, chilling and processing **Chilling:** set up chilling unit near BMUs

SOURCE: Potato Value Chain Analysis, USAID-Kenya Agricultural Value Chain Enterprises, August 2015; French Bean Value Chain Analysis, USAID-Kenya Agricultural Value Chain Enterprises, March 2014; Dairy Value Chain Analysis, USAID-Kenya Agricultural Value Chain Enterprises, August 2015; Market analysis of Kenyan poultry industry, Technoserve, February 2016; End Market Analysis Of Kenyan Livestock And Meat, USAID, March 2012; Kenya's aquaculture brief 2017, KMFRI Aquaculture Division Researchers, 2017; Expert Interviews

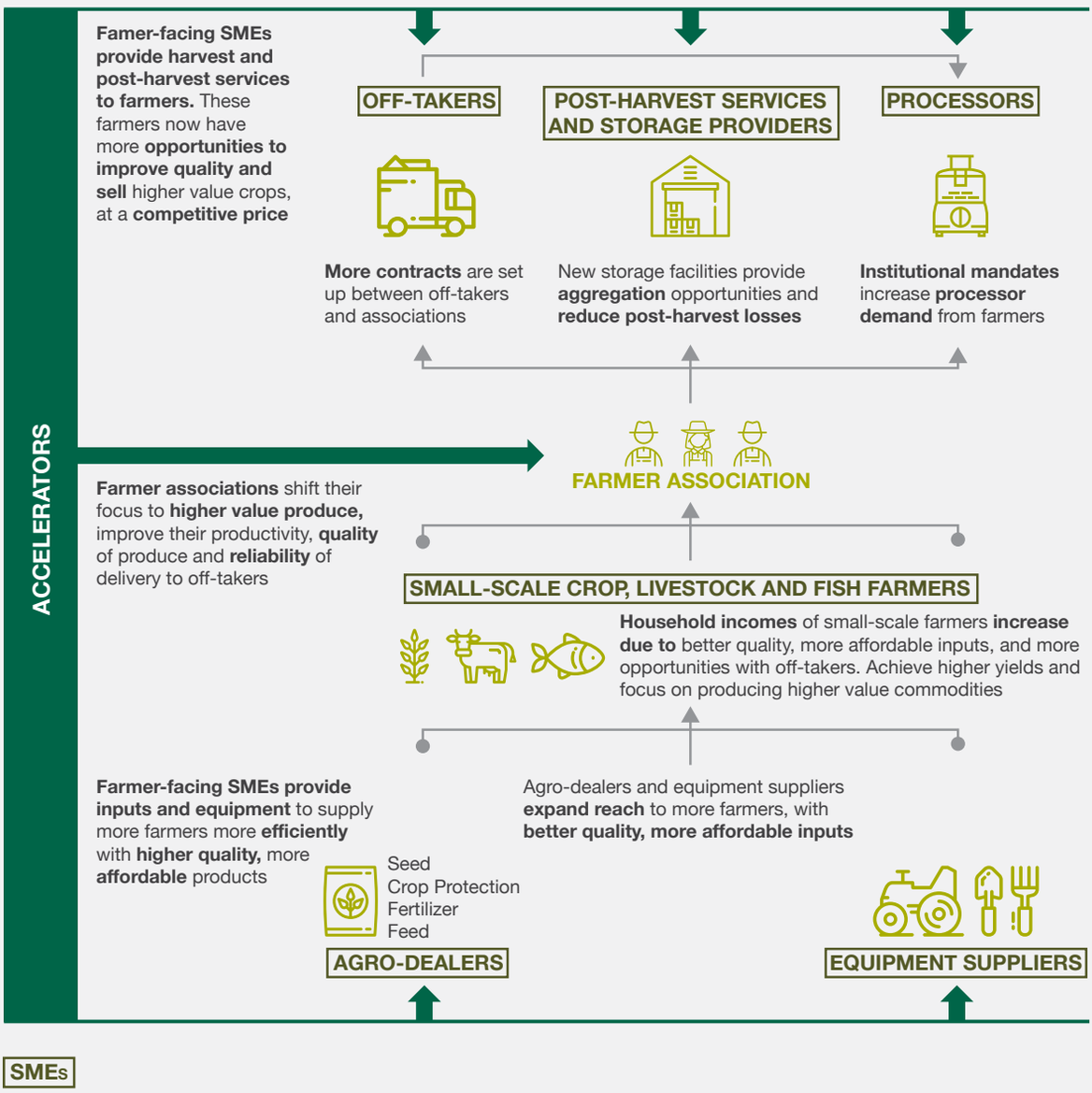
value chains – potatoes, dairy, horticulture (i.e., green beans), beef, poultry and fish (see Figure 52 and Figure 53 for full list of priority value chains the various counties have identified) – which represent great opportunities for small-scale farmers and SMEs, due to the high percentage of small-scale farmers producing these commodities (up to 90%), potential to increase productivity given high-yield gaps (up to 3x), high competitive advantage for Kenya in production, and regional demand as an indicator of future demand that could be fulfilled from Kenyan production

4. Attract (through the implementing government project) insurance, debt and equity financing from local and development banks and channel this specifically to SMEs selected by accelerators, either directly or via local lenders (including banks, micro-finance institutions, insurers and financial technology (FinTech) companies)

5. Track the number of farmers impacted by improved access to inputs and off-take provided by SMEs, including percentage of those who are female, and how they have been

BOX 9: HOW FARMER-FACING SMES INCREASE SMALL-SCALE FARMER INCOMES

Farmer-facing SMEs can raise incomes for small-scale farmers by supporting better productivity and market access



SOURCE: ASTGS Working Team Analysis

impacted against metrics such as change in yield, income and volume sold

Selecting the ~40 high-productivity zones

Especially given the high rate of failure of SMEs in Kenya, it is crucial that the efforts to support them are directed to ensure the best chances of success. As described earlier, SME success hinges on being in urban areas and having access to high supply and demand. For this reason, ASTGS analysed Kenya's agro-ecology and population distribution to identify ~40 initial high-productivity geographies which represent a combination of the country's: (i) highest-productivity areas across the six most commonly produced value chains across crops, livestock and fisheries, measured by yields; (ii) highest populations within 40 kilometres of urban and peri-urban areas as an indication of demand and SME potential; and (iii) road access as an indication of access to markets.

SMEs in these zones will therefore be the primary focus of the initiative, given that these locations will offer the greatest opportunity for growth. Once initial efforts in these zones have proved successful, the country may wish to explore further expansion of SME support to other areas.

The SMEs will work directly with the farmers providing farming inputs such as fertilizer, aggregating crops and products from livestock and fisheries, or facilitating marketing services. They will be expected to help farmers make the transition, for example, from focusing on staples to producing higher-value commodities, facilitated by the emphasis on priority value chains in each zone.

The estimated farmers within ~40 km of the city centres in these zones is ~1 million. These ~40 zones were based on agro-ecological characteristics and not along county lines, as these better reflect the production potential of an area. However, all of Kenya's regional economic blocs are represented, and each one has at least one area identified as part of the 40 zones.

Importance of farmer-based organizations and institutional mandates

It would be impractical to expect a single SME accelerator to provide services to SMEs in all ~40 zones, so the zones will be divided into six "lots" (Figure 19) of 6-7 zones per lot, which will each be released in a competitive bidding process. Each lot will inevitably include a variety of agribusiness types, including agriculture centres, larger "hub agro-dealers", off-takers and processors, smaller agro-dealers and equipment agents. In addition to these SMEs, it will be critical to support farmer-based organizations (FBOs) such as Farmer Associations, Farmer Interest Groups and Cooperatives.

With an estimated 1,400[liii] farmer associations in Kenya, the accelerators will need to select (with the help of the Kenya National Farmers' Federation) those with the greatest potential to grow and succeed, whilst providing them with opportunities for off-take in partnership with the private sector.[111] Assistance to these FBOs should take into account some key lessons learned from the past in Kenya's co-op movement (Box 10).

The ATO should consider implementing institutional mandates to drive off-take from farmer associations. An example of this would be to mandate millers to blend maize with a particular percentage of other flours (e.g., maize-millet, maize-cassava, maize-millet-sorghum, maize-sorghum). This would play a role in encouraging contract farming, as well as contributing to reaching the goal of 100% food security, by reducing the pressure on maize demand.

liii Assuming an average of ~200 farmers per association, and 68% farmers being in an association (average of range 60-75%.

BOX 10: SUCCESSES AND FAILURES OF COOPERATIVES IN KENYA

What is behind the historical successes of cooperatives?

i. Farmers who are cooperative members tend to be more aware of their rights, and as a result are more empowered to demand results from their leaders

ii. The Government has continued to regard the cooperative movement as a critical pillar of the Kenyan economy, which has led to the enactment of several policies that are amenable to the success of the sector

iii. Generally, most Kenyans appreciate the primacy of the cooperative sector in wealth creation

iv. As a result of the above, many new cooperatives in other commodities, particularly fresh produce, bananas and macadamia are being set up and are projected to grow

What has caused a reduced interest in being part of cooperatives?

i. Numerous cooperatives, particularly coffee societies, were reportedly mismanaged in the 1980s and 1990s, and many of those involved have not been fully held to account

ii. The mistrust associated with the mismanagement in the 1980s and 1990s still abides and farmers are reluctant to join cooperatives as a result

What makes dairy cooperatives different?

i. The sector has a historical advantage, with a solid foundation established in the 1960s and 1970s, when the Kenyan dairy cooperative movement was not only the most successful in Africa but also highly regarded globally

ii. Milk is a fast moving consumer good, which means farmers can be paid on delivery or at least on a monthly basis, unlike coffee. Coffee is another commodity that had a very strong cooperative sector in the 1960s and 1970s in Kenya). But the supply chain is long and payments can take several months

iii. Barriers to entry are much lower than other commodities, such as coffee

Other farmer based organisations

As a result of the mistrust created by the cooperatives, other farmer based organisations (FBOs), including Farmers Associations, Common Interest Groups and Producer Business Groups, Rotating Credit and Savings Associations, among others, have been established and many of these have thrived. However, many still experience key constraints including limited skills in business management, bookkeeping, marketing and face limited access to information and finance.

SOURCE: Expert interview, Lead of a Farm Association, April 2018

Selection of SME accelerators through competitive bidding

To ensure this initiative can be launched early in Year 1, the bidding process, funding and overall management of the initiative will be assigned to (and stay with, for the duration of the initiative, depending on performance) an already existing government project selected by the ATO, e.g., Enable Youth Kenya (funded by the African Development Bank). The project will need to establish an “Accelerator Selection Committee”, which must include relevant county government officials, to select the SME accelerators. The members of this committee may evolve over time and, for example, include representatives from successful SMEs supported by the programme from Year 2 or 3 onwards.

CASE STUDY: Enable Youth Kenya Programme

The Enable Youth Kenya Programme has been established by the Government of Kenya within the MoALFI to manage a KES 3.3 billion loan over five years from African Development Bank to create business opportunities and employment for young women and men along priority agricultural value chains.

They aim to do this through agribusiness incubation, including targeting fresh graduates aged 18-35 with agribusiness ideas, and some already established agribusinesses, to train at eight upgraded Youth Agribusiness Incubation Centres (YABICs) around the country (four in universities, one under the MoALFI and one under the Ministry of Industry). Enable Youth will provide a financing link by providing loans and training in developing business plans.

There are strong complementarities between the efforts planned by Enable Youth and the SME accelerator programme in the ASTGS. The latter focuses primarily on established SMEs, with in situ, tailored training, whilst the former is mainly modelled on in classroom training for early agripreneurs. If agripreneurs who have graduated from the YABICs are successful in their businesses, they may well apply for further support through the ASTGS accelerator programme.[111]

The lots will be released for bidding of SME accelerator services in a phased approach. In Year 1, two lots will be released, with a view to contracting one SME accelerator per lot, each with a three-year, renewable contract. In Year 2, lessons learned from Year 1 will be incorporated into a new tender process for the remaining four lots. From Year 2 onwards, an accelerator can bid for and, if successful, manage more than one lot.

The SME accelerators, which may be for- or not-for-profit, will be selected and performance-managed according to a range of criteria developed by the Selection Committee (see sample Figure 20). Foremost, the accelerator must be able to demonstrate a proven track record in training and scaling SMEs in Kenya, or in a similar context. The accelerators may be a group of companies or organizations, but must be primarily headed by an impartial party and operate at a competitive price.

The accelerators must also be able to provide off-take opportunities for farmer associations (e.g., through contract farming and connections to off-takers), serve priority value chains (see Figure 52, Figure 53), which have been identified in consultation with the counties on the basis of high projected demand and greatest potential impact on farmer incomes, as well as provide at least 10 key training services as seen in Figure 21. To do this, the accelerator must be partnered with private sector entities, who must dedicate time to training the SMEs in practical business skills, and commit to providing off-take opportunities for farmers in that zone.

FIGURE 19: MAP OF SME LOTS TO RUN FLAGSHIP 1

The ~40 high potential zones will be divided into 6 "lots" with a mix of SME types[liv]

SME Type	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5	Lot 6	Total
Ag Centers and Hub agro-dealers	4	6	4	4	5	6	**29**
Ambient and cold chain storage facilities	21	32	21	20	23	29	**146**
Agro-dealers and equipment suppliers	107	159	107	101	114	147	**735**
Processors	4	5	4	3	4	5	**25**
Total SMEs	**136**	**202**	**136**	**128**	**146**	**187**	**935**

AREA COVERED

25KM RADIUS

15KM RADIUS

LOT

1

2

3

4

5

6

AGRO-PROCESSING

ALREADY PROPOSED/ EXISTING SEZ/EPZ

High potential zones (radius around cities/towns) for SMEs

1 Busia	9 Kisumu	17 Molo	25 Kiambu/Thika	33 Meru	41 Malindi
2 Siaya	10 Kitale	18 Narok	26 Nyeri	34 Chuka	42 Garissa
3 Bungoma	11 Kapenguira	19 Nakuru	27 Nanyuki	35 Kibwezi	43 Wajir
4 Homa Bay	12 Nandi Hills	20 Ol Kalou	28 Makuyu	36 Kitui	
5 Migori	13 Litein	21 Naivasha	29 Machakos	37 Mwingi	
6 Kakamega	14 Kericho	22 Ngong	30 Taveta	38 Wundanyi	
7 Kisii/Nyamira	15 Eldoret	23 Lodwar	31 Embu	39 Mombasa	
8 Kimili	16 Bomet	24 Athi River	32 Isiolo/Archers	40 Kilifi	

SOURCE: ASTGS Working Team Analysis

liv Methodology to find zones: Use yield maps and farmer segments to identify the most productive farmer segments (proxy for supply) ;Identify Tier 1 - Tier 3 secondary and tertiary cities based on population thresholds that capture ~65% of population (proxy for demand) ; Geolocate a 15km or 25km radius for each city, to identify sub-county level zones.

Crucial role of private sector partners

Given that many SMEs will be input providers, the accelerators should plan to partner with private sector entities that trade in quality inputs. Partnerships should be with a minimum of three companies for any category of inputs (e.g. fertilizer, seed, etc.) to avoid any market being dominated by one input provider. The accelerator will have to play a mediatory role between the private sector partners and SMEs to ensure that trade and distribution of inputs is conducted in the best interest of the farmers in that zone. The accelerator should also seek large successful farmers to participate in providing training services to farmer associations.

Accelerators will also need to partner with organizations with small-scale irrigation expertise, as irrigation gives farmers the ability to double output by growing outside of the rainy seasons, playing a critical role in agricultural transformation and the ability of farmers to increase incomes. Therefore, it will be mandatory that the accelerators select some SMEs that are irrigation equipment suppliers, to promote access to affordable, small-scale irrigation equipment. Through this initiative, the goal is to provide new irrigation systems to cover ~40,000 acres of small-scale farmland. SMEs selling the equipment will need to take into account the sustainable water management initiatives outlined in flagship 9 of this document. This includes promotion of drip irrigation kits, rainwater harvesting systems, licences for pumps, and awareness and compliance with water monitoring and rationing requirements.

Furthermore, mechanization providers will also be included in the private sector partnerships, giving huge potential for increasing agricultural production and transforming rural families' livelihoods. In Kenya, where farmers are part of an ageing community, agricultural mechanization can also play a powerful and successful role in attracting youth and making them active players in the agriculture and food sectors and along the value chain.[112]

FIGURE 20: SAMPLE SELECTION CRITERIA FOR ACCELERATORS

MoALFI will nominate a government project to select accelerators based on 10 criteria

EXPERTISE AND EXPERIENCE	**Track record** of successfully supporting SMEs in Kenya or similar context, including ability to offer the key training services identified
	Demonstrated **fluency in financial services and products for SMEs,** and understanding of where to access and broker them
	Recognition of and **sensitivity to food supply systems** and **access to technology** in urban and peri-urban areas
	Commitments from key private sector players to dedicate time to provide SMEs with business development **training**, as well as provide **off-take opportunities**
PROGRAM DESIGN	Detailed **path to selecting, training and scaling SMEs**, including a list of criteria that the accelerators will use to select the SMEs that apply for assistance
	Outline of how the accelerator will ensure a **diversity of service distribution across SME types and sizes**
	Plan to **ensure inclusivity** by way of supporting a minimum of **33%**[lvi] **women-led and 30%**[lvii] **youth-led businesses** (e.g. through youth agribusiness centres), with a minimum of 33% overall employment of women
	An outline of how they aim to promote **development of priority value chains** as well as how their efforts will contribute to **ensuring food security** for the region
	A **realistic SME graduation plan** whereby SMEs must meet certain performance criteria to continue to receive benefits from the programme as part of a **"grow or go" model**, based on documented **quarterly performance reviews**[lv]
	A **monitoring and evaluation plan**, ideally with some form of real-time data collection of SME performance

SOURCE : Kenya Institute for Public Policy Research and Analysis, 2014; ASTGS Working Team Analysis

lv Performance metrics will be aspirational yet attainable and will anchor on a key metric for each SME type e.g. number of farmers reached, percentage increase in yields for farmers, volumes sold for agro-dealers or off-take for processors

lvi This 33% follows the two-thirds gender rule of the Kenyan Constitution 2010

lvii H.E. the President has directed 30% allocation of all Government procurement to the youth

FIGURE 21: TRAINING SERVICES TO BE PROVIDED BY SME ACCELERATORS

MoALFI will nominate a government project to select accelerators based on 10 criteria

SOURCE : Douglas et al, September 2017, An exploratory study of critical success factors for SMEs in Kenya; Simuyu 2016, Effect of Government Policy and Regulations on the Growth of Entrepreneurial Women Micro and Small Enterprises in Trans Nzoia County, Kenya

Selection and performance management of SMEs

To receive support from the accelerators, SMEs will need to make an application to the programme. These SMEs are essential change agents in this ecosystem. Their selection, training and scale-up through knowledge and skills building is the key function of the accelerators. The accelerators will need to provide support to address the unique financial and business needs of women and youth and ensure gender inclusion when selecting SMEs, including a minimum of 33% and 30% employment and ownership of SMEs, for women and youth, respectively.[113] This inclusion will be one firm criteria accelerators will need to include when assessing SME eligibility for support (see sample eligibility criteria in Figure 22). Beyond inclusion of women and youth, firms that propose and deliver on specific transfer of skills and technologies to these communities will be duly considered (e.g., climate-smart technologies).

Training of the SMEs will be conducted through a combination of classroom training for cross-cutting skills such as financial literacy and digital/online training, plus tailored on site mentoring and support at the SME location.

The accelerators will conduct performance management of the SMEs according to ambitious yet attainable KPIs against a "grow or go" model, including growth in SME turnover, number of small-scale farmers reached through SMEs, number of female farmers engaged and number of jobs created. This performance, together with accelerator performance metrics, will feed directly through to the ATO. In turn, the ATO will support sharing of best practices within and across lots, and

FIGURE 22: SAMPLE SME ELIGIBILITY CRITERIA

Sample eligibility the accelerators will use to select SMEs

Proof of operation **within zone lot**
Submission of **valid business licenses**, which can vary from micro to medium-sized, from sole trader to franchised
Demonstrated work in **agribusiness** with ability to positively impact **relevant high-priority value chains** for that zone lot
Verified **bank or M-pesa account holder** with **6 months - 2 years'** statements and good credit rating/history
Financial viability including pipeline, business plan and/or other evidence, and **turnover of >KES 400,000 per annum**[lix]

SOURCE : Kenya Institute for Public Policy Research and Analysis, 2014; ASTGS Working Team Analysis

CASE STUDY: Nigeria's You Win! Programme

YouWin! is a youth development programme, established by the regime of President Goodluck Jonathan to empower Nigerian youth. The programme is a private and public initiative with the aim of financing outstanding business plans for aspiring entrepreneurial Nigerian youth. Since 2015, it has disbursed over NGN 11 billion to 1, 500 beneficiaries who have started or expanded their businesses across a variety of sectors, including information and communication technology, manufacturing, services and agricultural production and processing.[114]

determine which accelerators will be renewed for operation of their lots, or which are eligible to bid for future lots, based on performance. Finally, to create a competitive environment for SMEs, the implementing government project overseeing this flagship, together with international finance institutions, multilateral development banks and local lenders, will establish an annual competition with incentives for SMEs, awarding grants to best performing SMEs by zone, by lot and nationwide *(see the You Win! Case study)*.

Providing SMEs with access to finance

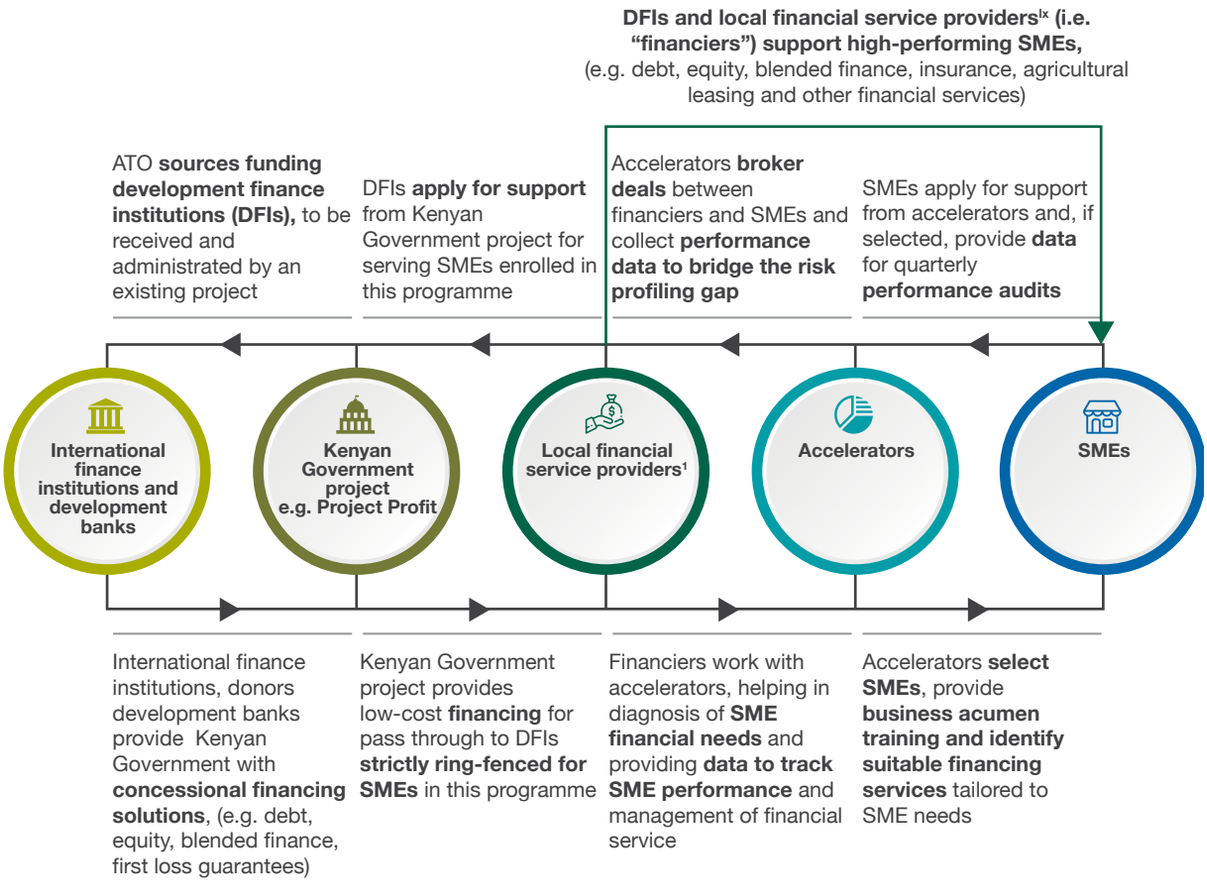
A major constraint to SMEs not yet addressed by the above measures is that they have limited access to affordable finance. To address this, the Government of Kenya has an important role to play in attracting international agriculture financing (e.g., equity, debt, asset-based and blended finance), which can be directed through an existing project, such as Enable Youth or the Programme for Rural Outreach of Financial Innovations (PROFIT)[lviii] to lenders, including banks, microfinance institutions (MFIs), fintech companies and insurers (Figure 23) or direct to SMEs. The important caveat to awarding these funds is that they will be ring-fenced specifically for lending to the SMEs under this initiative, with specific tracking and reporting requirements and strictly no use of funds otherwise (including holding and alternative investments).

Lenders experience a key challenge in risk-profiling SMEs. To address this, the lenders will work directly with the accelerators, who will play a key role in brokering financing arrangements between the lenders and SMEs. They will do so by highlighting the strongest contenders for low-risk financing, providing financial statements, credit histories, performance profiles and business plans. As the brokers of the financial arrangements, the accelerators will be responsible for issuing an interest subsidy (potentially granted by international development banks) to bridge the affordability gap for SMEs to acquire loans. This system will reduce risk for banks, unlock lending from local financial institutions and fintech companies, and allow lending of lower-interest loans and affordable insurance policies to the SMEs registered under this initiative.

lviii PROFIT, funded by the International Fund for Agricultural Development (IFAD) and the Government of Kenya, aims to reach 287,750 farmers through improved sustainable access of poor rural households to a broad range of cost effective financial services, effectively managed assets and market produce.
lix Definition of MSME from the Kenya Micro and Small Enterprises Act, No 55 of 2012

FIGURE 23: SME FINANCING MODEL

Financiers provide demand-driven financing solutions for SMEs, and accelerators provide SME performance data to bridge the risk profiling gap



SOURCE : ASTGS Working Team Analysis; Expert Interviews

Key benefits of the flagship

By supporting a significant proportion of women- and youth-led SMEs, Kenya will improve equity in access and control of productive resources by all genders and groups who are most in need.

By supporting agribusiness SMEs to thrive (including Farmer-Based Organizations and cooperatives), farmers will have greater access to a wider variety of higher-quality inputs, made more affordable through sale in a more competitive market. Many SMEs supported under this initiative will be farmer-based organizations, aggregators and off takers, which will provide farmers with greater access to markets, thereby moving the farmer to a position of greater bargaining power.

Farmers will also benefit from the information passed down by SMEs about inputs and best practice application, as this will inevitably form part of input supply and marketing training by private sector partners (this flagship is focused on market access benefits for farmers rather than knowledge development – see extension initiative in flagship 7 for how ASTGS plans to develop farmer knowledge to support flagship 1).

In addition, the initiative will promote establishment of small and medium-sized storage facilities combined with best practices in post-harvest handling and storage to extend shelf life of produce and reduce farm losses and post-harvest waste. These outcomes will lead to the overall impact of increasing farmer incomes and reducing vulnerability to food insecurity.

lx e.g. Microfinance Institutions, insurance providers, equipment leasing provoders

BOX 11: IMPROVING FOOD SAFETY AND STANDARDS

Food supply systems are complex and involve a wide range of stakeholders in the food value chain right from farm production, slaughter of animals or crop harvesting, processing, storage, transport and distribution before reaching the ultimate consumers. Many food safety risks exist along the farm-to-form continuum given the complexity of the system in areas ranging from awareness and education to legislation and traceability, amongst others.

The Constitution of Kenya (2010) recognizes the right to safe food as a fundamental right (Article 43 and 46). Furthermore, issues of food safety and standards are regulated by a variety of laws including the Public Health Act, Cap 242, the Food Drug Chemical Substances Act, Cap 254, and the various international standards agreements that Kenya is party to including the WTO Sanitary and Phytosanitary Measures (SPS) agreement, to protect consumers, animals and plant health.

However, Kenya faces various challenges with upholding high levels of food safety and meeting international regulations and standards. Although significant investments have been made to address food safety risks and open up the country's capacity to partake in international agro-food exports and trade, there are still high incidences of interceptions and rejections of Kenyan exports relating to failure to meet international food safety standards. As of December 2017, the main reasons for rejections included high levels of:

- Aflatoxin and general poor hygiene in the milk value chain
- Pesticide residues in fruits and vegetables, particularly where pre-harvest intervals have not been observed
- Avian influenza
- Cholera and pesticides in Nile perch

Other concerns include microbial contaminants such as E. coli, Salmonella and other bacteria in fruits and vegetables, meat and fish, as well as zoonotics and prions, such as Bovine Spongiform Encephalopathy (BSE or "mad cow disease") in beef.
Building political will to drive investment in food safety systems that directly address the biological, chemical and physical hazards commonly identified throughout post-harvest handling and processing will be key to tackling these challenges and opening Kenya's ability to export agro-food products.

The strategy outlines where these investments can go – within flagship 1 it is primarily to support storage and warehousing for some of the ~1,000 SMEs. But, more broadly, flagship 2 includes provisions to subsidize post-harvest storage, while flagship 3 outlines clear food safety standards all agro-processing facilities must meet to pass the feasibility stage, with use of hermetic bags, bulking and moisture testing as appropriate for both flagship 3 and flagship 5 in the Strategic Food Reserve (SFR)

SOURCE: Food Control System in Kenya, Food and Agriculture Organization of the United Nations, April 2018

Entrepreneurs whose SMEs fail in the programme will still carry the knowledge acquired from the accelerator training and, for example, be able to utilize this in farmer associations, SACCOs, new or other family businesses, positively impacting the wider community.

Finally, this initiative will promote establishment of small and medium-sized storage facilities combined with best practices in post-harvest handling and storage to improve food safety extend shelf life of produce and reduce farm losses and post-harvest waste. (See Box 11: Improving food safety.) These outcomes will lead to the overall impact of increasing farmer incomes and reducing vulnerability to food insecurity.

C. IMPLEMENTATION RISKS AND HOW TO MITIGATE THEM

Selection and replacement of inadequate accelerators

Inadequate quality of services provided by the accelerator will quickly cause the programme to lose credibility. For this reason, it is critical to select high-calibre accelerators.

Selection of accelerators may prove challenging if they appear to offer very similar services with paralleled expertise. The implementing government project could bring independent SME accelerator experts onto the selection committee to rigorously assess the bids and transparently choose the accelerators based on investigation of the accelerator capability against the criteria.

If an accelerator is not performing, swapping them out for a newly selected accelerator could leave SMEs unsupported during the transition time and cause instability and compromise trust in the programme. This would need to be mitigated by tightly tracking performance of the accelerator such that there is ample time to prepare for a transition and ensure a thorough handover between accelerators.

Unfair selection of SMEs for programme support and financing

Even with the foundation of clear selection criteria for SMEs, a key risk to manage will be rent-seeking behaviour by accelerators to 1) select SMEs to be part of the programme and 2) select SMEs to be financed. The ATO and implementing government project must conduct close monitoring and evaluation to ensure SME selection is fair and accurate against selection criteria (for 1 – selection to the programme) and performance data compared with KPIs (for 2 – selection for financing).

High SME failure rate

High numbers of SMEs may fail to meet performance standards, or break even, despite efforts by accelerators, due to market shocks or otherwise. To minimize this, accelerators should conduct thorough due diligence on the SMEs prior to selection and monitor their performance very carefully. The “grow or go” messaging to all SMEs that are part of the programme should be clear, to incentivize maximum efforts to succeed in meeting performance targets and receiving continued support from accelerators.

Low prioritization by private sector to commit time to train SMEs

Private sector may commit to dedicating time for training SMEs but in practice de-prioritize these efforts, leaving gaps in the SME acceleration process. To mediate this, the accelerators will aim to set aside a budget to contract the hours of private sector players such that they are both financially incentivized and legally bound to deliver on their commitments.

Restrictions to SMEs caused by complex regulations

Despite all efforts to provide SMEs with business development support and financing, SMEs may still be hampered by the complex regulatory environment they face, including, e.g., bureaucratic process of issuing and renewing licences. To address this, at Year 1, the accelerators will compile a list of the main regulatory constraints to SMEs, which the national and county governments will address by identifying and implementing solutions for in Year 2 onwards. This may include, for example, accessing tax break policies already in place, such as tax exemption for small scale irrigation equipment.

Low ability of SMEs to maintain sufficient stocks, due to limited working capital

Some SMEs will be able to access finance to grow their businesses. However, for SMEs such as agro-dealers, this may not be finance for working capital to ensure they have sufficient stock in the run-up to planting season. Accelerators should include tailored support in their training to such businesses to help them access and manage working capital, recover debts and encourage advanced orders.

D. KEY MILESTONES

1. Draw up detailed programme design and establish management mechanism: Build on design outlined in strategy and draw up full scope of work, testing the viability of the model with potential accelerator partners. Select an existing government project, e.g., Enable Youth, to oversee this initiative. Decide on system to manage and report performance of selected government project, accelerators and SMEs, including an annual incentivization competition. Decide on cadence of reporting. Identify members of the "Accelerator Selection Committee", including county representatives, to select the accelerators.

– Responsibility: MoALFI, implementing government project selected to manage initiative

– Start date: Q3 2019

2. Select accelerators to manage zone clusters: Refine budget, source/identify funds and agree on criteria (e.g., zones in each lot, criteria for selection of accelerators) to select accelerators. Publish a Request for Proposals (RFP), including zones per lot, selection and evaluation criteria. Review submissions against criteria, select accelerators for first two lots and award contracts.

– Responsibility: Accelerator Selection Committee

– Start date: Q4 2019

3. Begin quarterly evaluation of implementing project, accelerators and SMEs and run annual grant award competition: Validate and evaluate data submitted by accelerators and the implementing project. Publish an evaluation report, including scores and recommended improvements. Run annual competition and award grants to SME winners at zone, lot and national level.

– Responsibility: MoALFI, implementing government project

– Start date: Q2 2020

4. Plan for Years 2-5 of the programme: Review lessons learned from Year 1 and integrate them into the new RFP. Launch competitive bidding process and select accelerators for the remaining four lots.

– Responsibility: MoALFI, implementing government project and Accelerator Selection Committee

– Start date: Q2 2020

Note: All flagships need to be further detailed to move from strategy to implementation, and achieve the milestones laid out above. See NAIP for conversation on immediate next steps.

FLAGSHIP 2: Shift nationwide inputs support programme focus for ~1.4 million high needs farmers to access a wide range of inputs from a variety range of providers through e-vouchers

A. CHALLENGES

Small-scale farmers often adopt a highly complex and risk-averse decision-making approach to their farming to protect their limited incomes. This, combined with difficulties in accessing low-cost, flexible finance, means they are often unwilling or unable to invest in inputs which could have a great impact on productivity and incomes, such as fertilizers and lime that match soils, seeds of higher-value crops, livestock health inputs, fish feed, extension services and mechanization. Without these investments in productivity-enhancing inputs, small-scale farmer incomes are limited. Significant investment is required to improve small-scale farmer ability to invest in improved inputs to drive increased yield and, ultimately, incomes.

This limited ability to invest is not a problem unique to Kenya and multiple countries around the world have provided their farmers with subsidies to help alleviate the costs and increase the farmers' ability to invest. Currently, the Government of Kenya allocates KES 5 billion, mainly to target increased maize production through fertilizer and maize seed subsidies every year,[115] coming to an estimated subsidy of KES 6,215-8,340 per farmer with an average land holding of ~0.5ha. The subsidy has historically typically included basal dressing fertilizer (Diammonium Phosphate, DAP), top dressing fertilizer (calcium ammonium nitrate, CAN), and improved maize seed.

As a result, there has been a significant increase in the uptake of fertilizer, with a 36% increase in use on maize fields between 1997 and 2010.[116] Similarly, the use of improved seed amongst small-scale farmers has increased from 67% in 2000 to 81% in 2010.[117] Despite this increased uptake of fertilizer and improved seeds, average maize yields have declined from 2.2 MT/hectare in the 1990s to 1.74 MT/hectare in 2012 and are still well below potential.[118]

One key reason for this seemingly incongruous outcome is that the fertilizers being used are driving soil pH down, and it is the soil acidity that is the major limiting factor for crop production. It is estimated that soil acidity affects ~9 million acres under maize, legume, tea, coffee and other crops, mostly in the Nyanza, Rift Valley and Western provinces.[119] However, most farmers in these areas have not conducted soil tests and are unaware of their soil needs. Using lime to neutralize soil acidity, together with other inputs that match soil needs, such as phosphate fertilizers, could lead to an increased yield of up to 77% in these areas over five years (see Figure 24).[120]

There is therefore an opportunity to have a significant impact on small-scale farmer yields, and therefore incomes, by linking inputs support programmes to soil testing results and enabling farmers to choose appropriate inputs from their local agro-dealers to match their soil needs.

CASE STUDY: The Ethiopian Soil Information System

The Ethiopian Soil Information System (EthioSIS) launched a comprehensive, nationwide digital map charting soil fertility in 2012 to tackle the country's low farm productivity, a challenge made more acute by climate change. New fertilizer combinations used as a result of the analysis boosted wheat yields from around 1 tonne to 3 tonnes per hectare on more than 40 percent of Ethiopia's agricultural land in 2015.

In addition, since the initiative began, Ethiopia has experienced an influx of international fertilizer companies including Israel-based ICL and Morocco's Office Cherifien de Phosphate (OCP).[121]

CASE STUDY: Nigeria's Growth Enhancement Support Scheme

Nigeria's large-scale targeted input subsidy programme, the Growth Enhancement Support Scheme (GES), established in 2012, targets only full-time and non-commercial farmers. Farmers receive an e-voucher via their mobile phones, which entitles them to buy fertilizer and improved seed from local agro-dealers at a subsidized price. The impact of the GES has been twofold: 1) Farmers who participated in the GES increased their maize yield by 26.3%; 2) Participants increased their per capita total consumption expenditure by 30.7% – a large improvement in welfare; and 3) Poverty headcount ratio has declined by 17.7% points among participants as a result of this consumption growth.[122]

FIGURE 24: SOIL ACIDITY AND POTENTIAL YIELD INCREASE FROM LIMING

Soil acidity affects ~7.5mn hectares under crop production; training farmers to use lime to neutralize pH can increase yields by ~77%

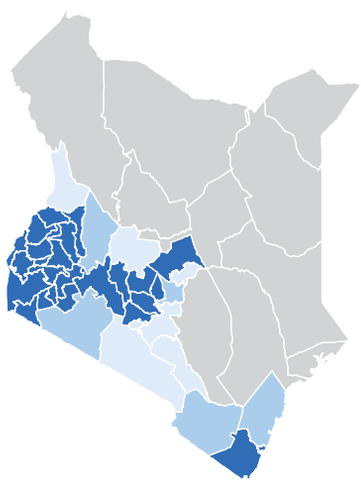
Soil acidity is a major yield limiting factor for crop production worldwide. In Kenya, soil acidity is a major problem affecting 13% of land area, covering ~7.5 million hectares under maize, legume, tea and coffee crops, grown by over 5 million smallholder farmers.

In these areas:
<4% farmers are aware of soil problems
<8% carry out chemical analysis on soils
<3% apply lime to soils

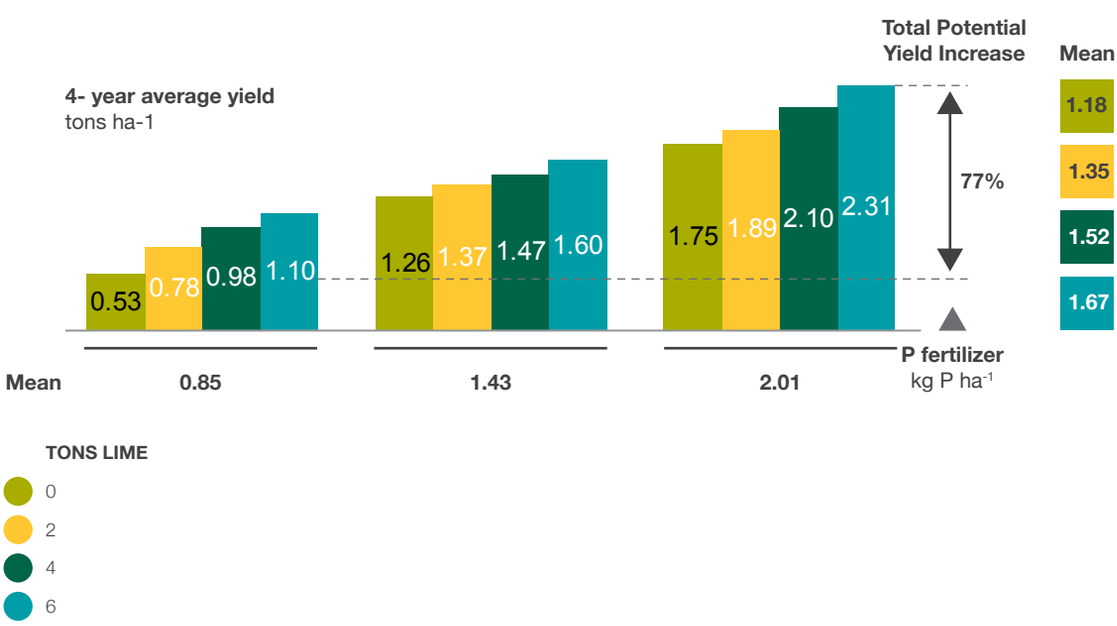
Applying **fertilizer and lime** to soils can **increase yield by ~77%.**

Soil testing and farmer training positively impacts the choice of fertilizer inputs and is one of the most significant opportunities to improve soil management in Kenya's most productive areas.

Acid soils in Kenya
Darker blue indicates that higher % of county has acidic soils



Effects of lime and P fertilizer on maize yield



SOURCE: Muindi et al, 2016, Soil Acidity Management by Farmers in the Kenya Highlands; Kanyanjua, S. M., Ireri, L., Wambua, S. and Nandwa, S. M."Acid soils in Kenya: Constraints and Remedial Options". KARI Technical Note, No.11, 2012

A restructured inputs support system could also be more inclusive of farmers and put the decision back into the hands of the farmer to utilize the subsidy for the inputs s/he prioritizes, instead of only focusing on fertilizers and maize seed. This would be most impactful if farmers could use the subsidy on inputs that increase efficiency or value of their produce, such as blended fertilizers to match soil needs, seeds for higher-value crops, livestock health inputs, livestock and fish feed and mechanization. The blended fertilizers would serve not only to avoid increasing acidity but also to provide for severe deficiencies in micronutrients such as manganese, magnesium, calcium, boron and others.

Currently, MoALFI procures from the international market and distributes most of the subsidized fertilizer through 180 NCPB depots around the country, compared to ~10,000 agro-dealers in the country.[123] Many farmers have to cover distances over 40 km at a cost of KES 300-600 per annual trip[124] to get to NCPB depots, but they may neighbour an agro-hub dealer. Since September 2017, subsidized fertilizer is sold at KES 1,200 per 50 kg bag of DAP, KES 1,500 per bag of CAN and KES 120 per 1 kg maize seed[125] compared with market rates of KES 3,000 and upwards for DAP, KES 2,250 for CAN and KES 700 for maize seed.[126]

Two unintended outcomes occur because these two sets of prices exist on the market:

1. Private sector cannot compete with the subsidized fertilizer prices, leading to low investment in retail outlets and higher commercial fertilizer prices[127]

2. Approximately one third[lxi] leakage occurs to non-targeted farmers, including cartels involved with purchasing subsidized fertilizer in bulk and selling it at market rates, nullifying the benefits to small-scale farmers.[128,129,130]

Redirecting the budget for purchasing fertilizer and maize seed to a subsidy given directly to farmers would eliminate the subsidized price which directly undermines the private sector business case and creates an incentive for leakage. In doing so, this stimulates the private sector ability to supply agro-dealers in increasingly rural areas around the country, reducing the distance farmers need to travel to collect their subsidized inputs.[131] There is also an opportunity to incentivize early ordering of fertilizer through the local agro-dealer such that logistics can be planned by the private sector to avoid late deliveries – an unfortunate occurrence under the current system owing to financing and procurement challenges, meaning farmers waiting for subsidized fertilizer and seed may miss the optimal planting time, adversely impacting yields.[132]

lxi Statistic is averaged across Kenya, Zambia and Malawi.

1.4 million SMALL-SCALE FARMING HOUSEHOLDS IMPACTED

KES 5,000 IN SUBSIDIES PER YEAR, ELIGIBLE OVER THREE YEARS

40% INCREASE IN INCOME PER SMALL-SCALE FARMER FROM IMPROVED PRODUCTIVITY AND EXTENSION SUPPORT

B. FLAGSHIP SOLUTION

Overview

To provide farmers with an increased ability to invest in the right inputs at the right time, this flagship proposes five main design elements:

1. Reallocate government procurement of fertilizer and maize seed to an e-voucher system that can serve farmers nationwide and allow them to purchase a range of inputs

2. Put the provision of inputs into the hands of the private sector, including registered agro-dealers

3. Establish a system that reliably disburses funds when the farmer uses the e-voucher, such that input suppliers are immediately paid and therefore not disadvantaged by participating in the programme

4. Roll out nationwide farmer registration to screen for eligibility, with verification by extension agents at every registered farm during the first three years, and develop a national farmer profile database

5. Integrate mandatory partial use of the e-voucher for extension services to inform farmers of soil needs (based on the national soil mapping initiative in flagship 9), with compulsory lime vouchers for farmers with acidic soils

Impact and investment

By year five of implementation, this flagship will have estimated impact of:

- Increase in small-scale farmer incomes (KES): ~54,000
- Total agriculture sector value created (agriculture GDP increase summed over five years): ~KES 210 billion
- Increase in agricultural GDP in year five: ~KES 75 billion
- Farmers impacted: ~1.4 million (assume single voucher per household, though a household can have two farmers, so affect a total 2.3-2.8 million farmers)
- Investment required over five years: ~KES 10 billion

To achieve this, the Government of Kenya will transfer the current KES ~5 billion allocated to procuring fertilizer and maize seed to this new system, which will provide mobile-based e-vouchers to registered farmers who meet certain eligibility criteria and complete a three-step registration process. Criteria for eligibility will include, for example, the size of farm (e.g. <0.5ha or 1.3 acres) and annual income (e.g. <KES 150,000).

To assess eligibility and monitor the registration process, a nationwide farmer profiling platform will be set up. This database service could either be provided by the private sector or by the national government. There have already been substantial efforts to set up such a farmer profile database and register farmers by private sector players and extension organizations. There is also an already existing e-subsidy programme and task force to register farmers. It is likely that utilizing such existing platforms will allow for a faster, more cost-effective launch than creating a new, government platform. In addition, it may be worth considering the synergies and opportunities to collaborate

with platforms such as the National Health Insurance Fund. However, one must first assess the ability of these platforms to evaluate farmer eligibility, protect farmer profile data and provide the government access and rights to the data, even beyond any termination of agreement. In addition, one needs to evaluate the realistic capability of the platform to be scaled up to national level, capable of allowing any eligible farmer to access the e-voucher, at a competitive price.

Historically, Kenya and other countries in sub-Saharan Africa have experienced challenges in ensuring subsidies reach the intended beneficiaries. With the aim of improving effective targeting of Kenya's most resource-constrained farmers, the new Kenyan e-voucher system will follow a three-step registration process:

- Step 1: Submit farmer profile details – Farmers will be required to register on the farmer profiling database via mobile phone (this will be encouraged in Year 1, but can occur at any time over the period of the initiative). Registration will be free of charge and involve a USSD question series including, e.g., name, ID number, size of farm, commodities farmed and annual income. The database will generate a geolocation for the farmer and will automatically evaluate eligibility based on pre-set criteria, triangulated with geolocation and telecom transactions (e.g., monthly expenditure and mobile money transactions). This will be audited by extension officers over three years, as per Step 3.
- Step 2: Submit three TV/radio extension service codes – Given that the above farmer registration details will be verified with a one- to three-year time lag (as explained in Step 3), Step 2 of the system is designed to filter out non-targeted farmers. Farmers will need to obtain three codes by answering questions announced in three TV/radio extension service programmes (see flagship 7 for extension programme details), which will be aired on a weekly basis and provide instructions for obtaining the codes via any mobile phone. Once obtained, the three codes (each code specific and non-transferable between phones/farmers) should be submitted free of charge to the e-voucher platform. Once a farmer has been confirmed as eligible on the farmer profiling platform and submitted the three radio extension service codes, s/he will receive the e-voucher on his/her mobile phone. It is expected that the commitment required to follow this step will only be completed by those who are most in need and willing to spend the time doing so. It will also have the added benefit of increasing transfer of best practice farming knowledge to farmers via radio extension programmes, which have been demonstrated to be highly effective.
- Step 3: Submit one extension service and eligibility validation code – This step will be rolled out over three years, given the burden on the extension service. Staggered over this period, all registered farmers will be sent an extension service code. Within two months of receiving the code, the farmer must book a visit with the local extension officer. As well as providing information on best practice farming for the commodities relevant to that farmer, the extension officer will translate localized results of the national soil mapping initiative (see flagship 9) to practical recommendations for crop farmers on the best inputs to use. The extension officer will also validate the profile information submitted by the farmer. The extension officer and farmer will exchange codes to verify the visit. The farmer will submit this code, closing the loop on the eligibility validation. At the end of three years, all registered farmers will have been validated.

The full value of the e-voucher will be uniform across all eligible farmers at approximately KES ~5,000 and can be redeemed at any registered agro-dealer. Agro-dealers will be able to register once vetted by a local extension officer. Farmers will be able to use the e-voucher to buy a range of inputs at the agro-dealer, inclusive of seed, fertilizer, feed, mechanization and animal health products and services. For farmers with acidic soils, according to the national soil map (see flagship nine, initiative one), it will be mandatory to procure lime, which will be the same amount regardless of farm size for ease of implementation (e.g., 265 kg assuming 0.5 tonnes per hectare application and average land size of 0.53 hectare) (Figure 25).

FIGURE 25: SAMPLE SUBSIDY CALCULATION FOR A FARMER

Sample subsidy breakdown with mandatory extension and lime

Subsidy component	Sample amount
Mandatory lime allocation, where soil acidity is a problem[lxii], or aflatoxin treatment where contamination risk is a problem[lxiii]	KES 1,600
Mandatory use of certified extension services to ensure that farmers have translated soil mapping results and information on ideal planting times and best farming practices, plus **small packets of sample seeds** to boost uptake of trialing higher-value crops	No price charged for service
Farmer chooses any other inputs	KES 3,400
Total subsidy per farm	**KES 5,000**

SOURCE : ASTGS Working Team Analysis, Expert Interviews

The concentration of acidic soils is in Western Kenya, whilst in Eastern Kenya, soils are more alkaline and suffer an acute persistent problem of contamination with aflatoxin as seen in the case below. For these areas, it is worthwhile for the government to consider mandating partial use of the e-voucher for Aflasafe, a safe natural solution to the problem of aflatoxin. The estimated value of a required mandatory e-voucher for aflatoxin would be KES 900-1,000, based on the average land ownership of 1.2 acres.[133]

CASE STUDY: Aflatoxin

Aflatoxins are toxic chemicals produced as by-products by fungi (moulds) that grow on maize, groundnuts and other food crops. These toxins also affect feedstuffs, which then contaminate milk, meat and eggs. The toxins occur everywhere in the world, but pose particularly high risks in tropical developing countries where certain staple foods, such as maize and sorghum, comprise a large part of the diets of the poor.

Kenya is one of the world's hotspots for aflatoxins, with what is believed to be the highest incidence of acute toxicity ever documented. Kenya suffered severe outbreaks of illness from aflatoxins in 2004 and 2010, poisoning more than 300 people in the 2004 event alone, and killing more than 100. Domestic animals that consume feeds contaminated by aflatoxins can also become sick and die.[134] The Kenya Agricultural and Livestock Research Organization (KALRO) has identified Makueni, Kitui, Tharaka Nithi, Lower Meru and Embu Counties in Eastern Kenya as particularly susceptible to infestations due to inadequate on-farm storage and limited preventive measures.[135, 136]

It will be crucial to ensure that the input providers are paid immediately once they have received the e-voucher to ensure their continued participation in the system. Funds will need to be ring-fenced by the government and e-voucher demand projected such that adequate funds are transferred ahead of time into the system. The government should also pursue financial agreements as appropriate (e.g. MoUs between suppliers and creditors) to ensure that inputs are available when the farmers present their e-vouchers.

In contrast to the current subsidy, which mainly targets maize and crop farmers (through subsidized maize seed and fertilizer), this system will have two key primary effects: 1) to correct Kenya's widespread soil acidity

lxii Common recommended rate is 0.5-1.0 tonnes/ha @ KES 6,000/tonne.
lxiii Common recommended rate is 10 kg/ha @KES ~200/kg. Both current prices in Kenya.

FIGURE 26: PROPOSED LIST OF INPUTS COVERED BY SUBSIDY PROGRAMME

The new subsidy system will allow crop, livestock and fish farmers to use the e-voucher to buy inputs they need most

Current system government subsidises only 2 inputs	New system – farmers can spend subsidy on a range of inputs that suit their priorities, according to what they farm				
	Inputs available under new subsidy	Inputs farmers prioritise if they farm… Maize	Potatoes	Poultry	Fish
DAP fertiliser	Fertilizer	✓	✓		✓
	Lime[lxiv]/aflatoxin treatment	✓	✓		✓
Maize seed	Seed	✓	✓		✓
	Pest	✓	✓		
	Mechanization	✓	✓		
	Animal health products and services			✓	
	Feed			✓	✓
	Extension[lxv]	✓	✓	✓	✓

✓ PRIORITISED BY FARMERS

✓ NOT PRIORITISED BUT HAS HIGH-POTENTIAL IMPACT ON YIELD OR INCOME

OPTIONAL

MANDATORY – FARMERS HAVE TO USE A CERTAIN AMOUNT OF THE SUBSIDY ON THESE INPUTS DUE TO HIGH IMPACT POTENTIAL ON YIELDS

SOURCE : ASTGS Working Team Analysis, Expert Interviews

problem, thereby unlocking the farmers' ability to increase yields by 77%; and 2) to extend the subsidy offering to include farmers focused on a range of crops, as well as livestock and fish, by nature of allowing the e-voucher to be spent on a variety of inputs (Figure 26).

From Year 2, to address the prevalent sale of counterfeit inputs, the Government of Kenya may wish to investigate the feasibility of setting up the necessary platforms and regulations to mandate a scratch coding system, as is being trialled for seeds. This would allow the farmer to directly confirm that goods are not counterfeit, through a USSD system, thereby reducing the risk of farmers purchasing counterfeit products, either through their own investment or the subsidy programme.

Finally, to better inform subsidy allocations, from Year 2 onwards, the government could track the use of subsidy for inputs through the digital platform, and continue to develop farmer profiles to increase the ability to target e-vouchers to the most resource constrained farmers. Using this data, the government may wish to consider introducing specific targeting to women, given the potential to close the gender gap and further contribute to national food security.

lxiv For areas where soil acidity is a problem, as identified by nation-wide soil mapping. Further details are in the sustainability flagship
lxv Extension is not paid for by part of the subsidy amount, but with tokens that the farmer will receive along with their subsidies.

CASE STUDY: Malawi's Farm Input Subsidy Programme

Since 2005/06, the Malawian government has provided over a million farmers with annual subsidized coupons for maize seed and nitrogen fertilizer under the Farm Input Subsidy Programme (FISP). Malawi has received wide recognition for the programme, and has been hailed as the site of the first African green revolution. Under this programme, receiving a subsidy for both seed and fertilizer increased the probability of modern maize cultivation by 222% for female household heads, suggesting the FISP has likely reduced the gender gap in adoption of modern maize in Malawi.[137]

To encourage graduation from subsidies, farmers will be eligible for a maximum of three claims (in three separate years) of the full subsidy. At Year 3 of the programme, productivity data will be analysed to inform how to proceed with the subsidy programme, with emphasis on assessing what inputs, as well as what geographies, would be most valuable to continue supporting. For example, take the case that the productivity data gathered from monitoring the programme shows that farmers experienced greatest yield increases because of the lime subsidy. Despite this, the data also shows they are unlikely to buy lime without the subsidy and they require soil testing and extension to support best practice lime use. This being the case, it would make sense to provide farmers with e vouchers for only extension and lime, and on the condition that farmers test their own soil. This would continue to build upon the national soil mapping initiative, as well as to support the continued uptake of both extension and lime application.

C. IMPLEMENTATION RISKS AND HOW TO MITIGATE THEM

Insufficient targeting of farmers

Despite the three-step registration process, the ability of the system to correctly target resource-constrained farmers will likely be insufficient at inception. However, rigorous annual monitoring will enable improvement of the system based on lessons learned. This is paramount to maximizing efficiency and impact of the subsidies.

Delayed payments to agro-dealers

Delayed payment to agro-dealers would strongly discourage them from participating in the voucher redemption system, with knock-on effects for farmers who will have to travel further to benefit from the subsidy. It is therefore crucial to ensure the system is designed such that the agro-dealer receives an instant account top-up when the subsidy code is used, to ensure their long-term participation in the programme.

Inadequate distribution of inputs by private sector

This model assumes that the current crowding-out of the private sector by the national sale of subsidized fertilizer and seed will be reversed and that the private sector business case will be sufficiently incentivizing to distribute inputs more widely and eventually at lower cost, owing to economies of scale. However, there is a risk that the private sector may not necessarily reach the farmers and provide agro-dealers with the right stock, at the right time.

Stock-outs at agro-dealers prior to planting periods

Agro-dealers may receive sudden demands of stock prior to planting period which, if unforeseen, may be impossible to meet due to logistical challenges. In designing the subsidy system, it would be worthwhile to consider integrating a tiered redemption structure whereby farmers receive full subsidy if they order their inputs two months prior to planting season, e.g., 75% if they order one month prior to planting and only 50% if they order two weeks prior to planting. This will allow

agro-dealers to plan their stock in advance and the private sector input providers to plan production and distribution accordingly.

Sale of non-agro-products in redemption for e-voucher

Agro-dealers may sell non-agricultural inputs to small-scale farmers in exchange for the e-voucher. To prevent or minimize this, over time, the government and implementing partners will need to integrate tracking of expenditure of the inputs, which could be achieved through mandating scratch codes on input packages, and registering mechanization providers to enable them to run a code exchange with the farmer.

Insufficient yield increases in three-year period

Finally, ASTGS hypothesizes that the use of lime and integration of soil testing results to input choices will improve soil fertility; that private sector will ensure increased availability and reduced cost of better inputs; and that these two factors will lead to increased yields. This intervention assumes that three years will be sufficient time to increase farmer incomes and change behaviours such that farmers can afford inputs without needing annual subsidies, hence the three-year limit on eligibility. Impact on productivity, cost and availability of inputs and ability of farmers to pay for inputs without further subsidy will need to be evaluated to inform the programme design from Year 4 onwards.

D. KEY MILESTONES

1. Design: Select a working team of multi-disciplinary experts and decision-makers (e.g., from MoALFI, a telecom company, input suppler). Syndicate and align current farmer registration, e-voucher and other similar mechanisms already in place with flagship 2 design. Draw up the detailed system design, including costing, targets, digital mechanism design and roll out plan.

– Responsibility: MoALFI

– Start date: Q3 2019

2. Preparation and pilot: Select service providers. Roll out pilot in selected counties. Work with extension team to ensure alignment on timing for release of radio and TV programmes with e-voucher codes.

– Responsibility: MoALFI

– Start date: Q4 2019

3. Roll out: Execute national roll-out, likely in a phased approach based on the capability to scale up the digital platform and lessons learned from the pilot phase, with a target to reach full scale over the course of 12 months.

– Responsibility: MoALFI

– Start date: Q1 2020

4. Monitoring: Draw up a monitoring plan, including frequency of monitoring and reporting system, e.g. monthly or quarterly. Agree on performance targets, e.g., number of farmers reached, cost and type of inputs bought, value for money of digital platform and other performance metrics of private sector players involved. Revise targets, strategy and costing of the programme (including M&E plan) annually as needed, taking into account lessons learned from the pilot and full country roll-out. Revise targets, strategy and costing of contracts with service providers every 3-5 years, as needed, based on lessons learned.

– Responsibility: MoALFI

– Start date: Q1 2020

Note: All flagships need to be further detailed to move from strategy to implementation, and achieve the milestones laid out above. See NAIP for conversation on immediate next steps.

4.2 ANCHOR 2 – INCREASE AGRICULTURAL OUTPUT AND VALUE-ADD

Kenya's agriculture sector has grown by 4.8% annually since 2012 – below its 6% CAADP target – with its share of GDP at ~33% as of 2016.[138, 139] At the same time, while Kenya's food deficit has decreased, it remains higher than the sub-Saharan Africa and world averages.[140]

To competitively grow agriculture's contribution to GDP and ensure greater food availability, Kenya should address two key opportunities.

First, the untapped potential for agriculture value addition to serve domestic, regional and international export markets. Kenya is highly dependent on imports of several crops and products, some of which could be produced and processed domestically.[141] For some value chains, such as wheat, palm oil, rice and their associated products, that have demonstrated local and regional demand of up to KES 250 billion, Kenya has an export-import ratio of less than 15%.[142, 143] In addition, only ~16% of agro-exports by value are processed, lower than the levels produced by regional peers such Uganda and Tanzania at 34% and 27% respectively.[144] Often, Kenya's agro-export ambitions are challenged by perceptions of lower food standards, poor product traceability, and ineffectiveness in delivery of large-scale industrial processing facilities on time and budget.[145]

Second, making full use of Kenya's intrinsic production potential. Conservative estimates indicate more than 2.5 million acres of unutilized, arable land lies dormant in Kenya.[146] What is more, the areas already under cultivation produce lower yields than Kenya's regional and international peers – around 75% lower for staples like beans and around 33% lower for dairy.[147] These low yields are often linked to insufficient use of fertilizer, poor seed and soil quality, and irrigation constraints. It is estimated that less than 1% of Kenya's land is irrigated, and only a handful of counties can irrigate more than 25,000 acres.[148] Furthermore, many value chains under production suffer from large post-harvest and cold chain storage losses and waste – up to 25% for some key staples.[149]

To boost agriculture's contribution to GDP and reduce Kenya's food deficit, two flagship interventions are proposed:

1. Establish ~6 large-scale agro- and food-processing hubs across the country through the Agro-Processing Accelerator – a one-stop shop for agro-processors targeting both domestic and export markets

2. Unlock ~50 large-scale private farms – each greater than 2,500 acres – through competitive bidding, protected land ownership, and government provision of basic infrastructure (e.g., power, roads, and sustainable water supply for more than 150,000 acres of irrigation)

FLAGSHIP 3: Establish ~6 large-scale agro- and food-processing hubs across the country through the Agro-Processing Accelerator – a one-stop shop for agro-processors

A. CHALLENGES

Kenya has an enormous opportunity to expand into a variety of agro- and food-processing and value-addition activities. Agro-processing accounts for 3.2% of GDP, 2.4% of employment and 8.5% of exports.[150]

Kenya's 35 operational Export Processing Zones (EPZs) house around 30 agro- and food-processing enterprises, employ ~6,000 workers, and generate around ~KES14.0 billion of annual revenue.[151] Agricultural inputs also contribute towards the processing of several other consumer segments in the EPZs, including beverages, chemicals and textiles. Collectively, these segments generate around ~KES 52 billion of annual revenue from ~53 established

enterprises employing ~48,600 workers.[152]

However, agro-processing levels remain lower than those of Kenya's regional and international peers. The World Bank estimates that Egypt's agricultural product processing ratio (defined as food manufacturing value added as a fraction of agricultural GDP) is around 19%; Kenya's ratio is 13%.[153]

Kenya's agro-processing levels are low in most product groups. While fruits and vegetables currently account for most processed exports by volume in Kenya, Tanzania and Seychelles both produce 3-4x more processed fish than Kenya.[154, 155]

Given the abundance and variety of raw agricultural inputs and favourable port access,[156] Kenya has the potential to increase its agro- and food-processing capacity dramatically. However, aspiring agro-processors will need to be supported to move fast and at scale to rival their regional competitors, who have benefitted from highly coordinated, large-scale agro-industrial interventions, leveraging national competitive advantage, to unlock agro-processing opportunities across many value chains and geographic locations.

For example, in partnership with the United Nations Industrial Development Organization (UNIDO), and using tailored country assistance packages (e.g., Programme for Country Partnership) (see Figure 27), Ethiopia is establishing four large-scale integrated agro-industrial parks (IAIPs) with a combined capital value of more than KES 67 billion.[157] These parks will process nine priority value chains (coffee, sesame, meat, dairy, poultry, honey, maize, tomato and potato – many of which Kenya will compete with), and complement Ethiopia's growing capacity in the processing and export of textiles, leather and cotton.

In Kenya, it is important to ensure an unbiased selection of the hubs and anchoring locations on the basis of the competitiveness of potential facilities' locations and value chain combinations. Therefore, four criteria are proposed for the location of the hubs within each of Kenya's economic blocs:

- Quality, volume and reliability of raw agricultural inputs
- Proximity of raw input supply to agro-processing locations and transport modes
- Distance to major domestic and export markets
- Competitiveness of proposed products when compared to non-Kenyan producers

The proximity of most main agriculture production zones to large domestic markets and key export locations suggests high potential for agro-processing across geographies and value chains (Figure 28).

Although the opportunity is compelling, many high-impact projects in the national pipeline do not materialize because they typically encounter five challenges:

1. Lack of early-stage funding to complete international standard feasibility studies

2. Limited inter-ministerial and county-level coordination

3. Sub-optimal procurement processes with complex requirements

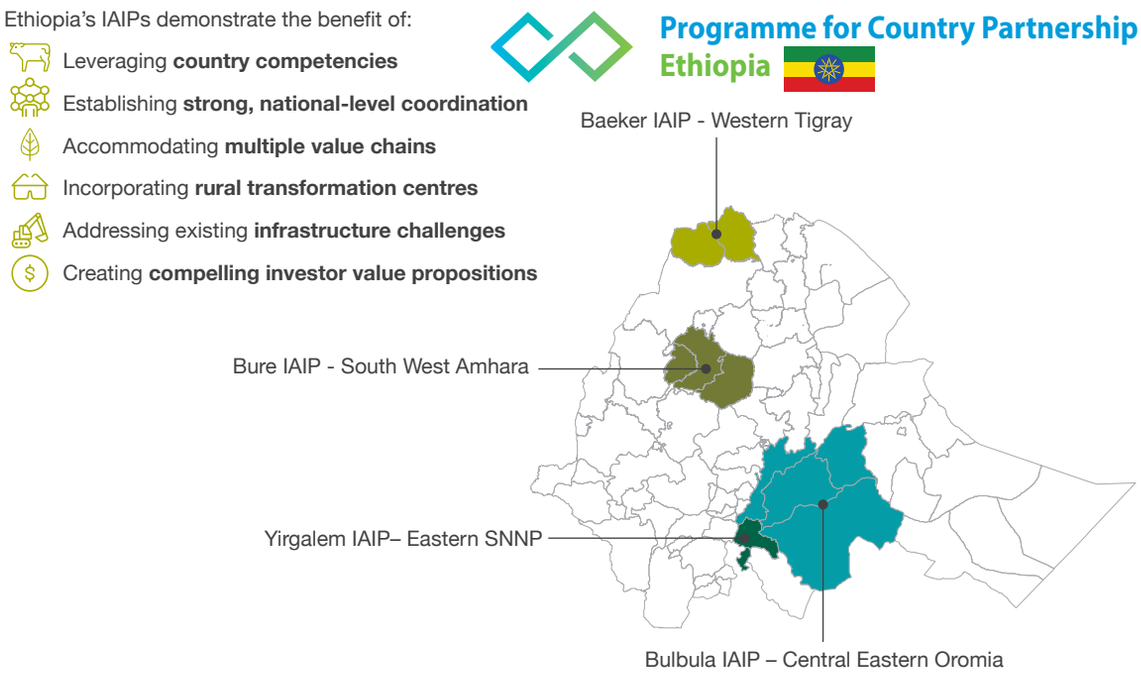
4. Lack of critical infrastructure (roads, power and water) at potential sites

5. Lack of incentives, e.g., transport and tax breaks to commercialise new facilities

The Agro-processing Delivery Team (APDT) aims to address these constraints and accelerate the efforts of pioneers such as Makueni County, which endured long development periods and required multiple funding rounds before being established (see Figure 29).

Based on the potential locations for agro-processing hubs, including potential locations along Kenya's EEZ on the Indian Ocean Coast as well as near inland fishing potential zones, including Lake Victoria and others on Figure 28, there are several opportunities to promote sustainable industrial fishing and the blue economy in these areas through this flagship.

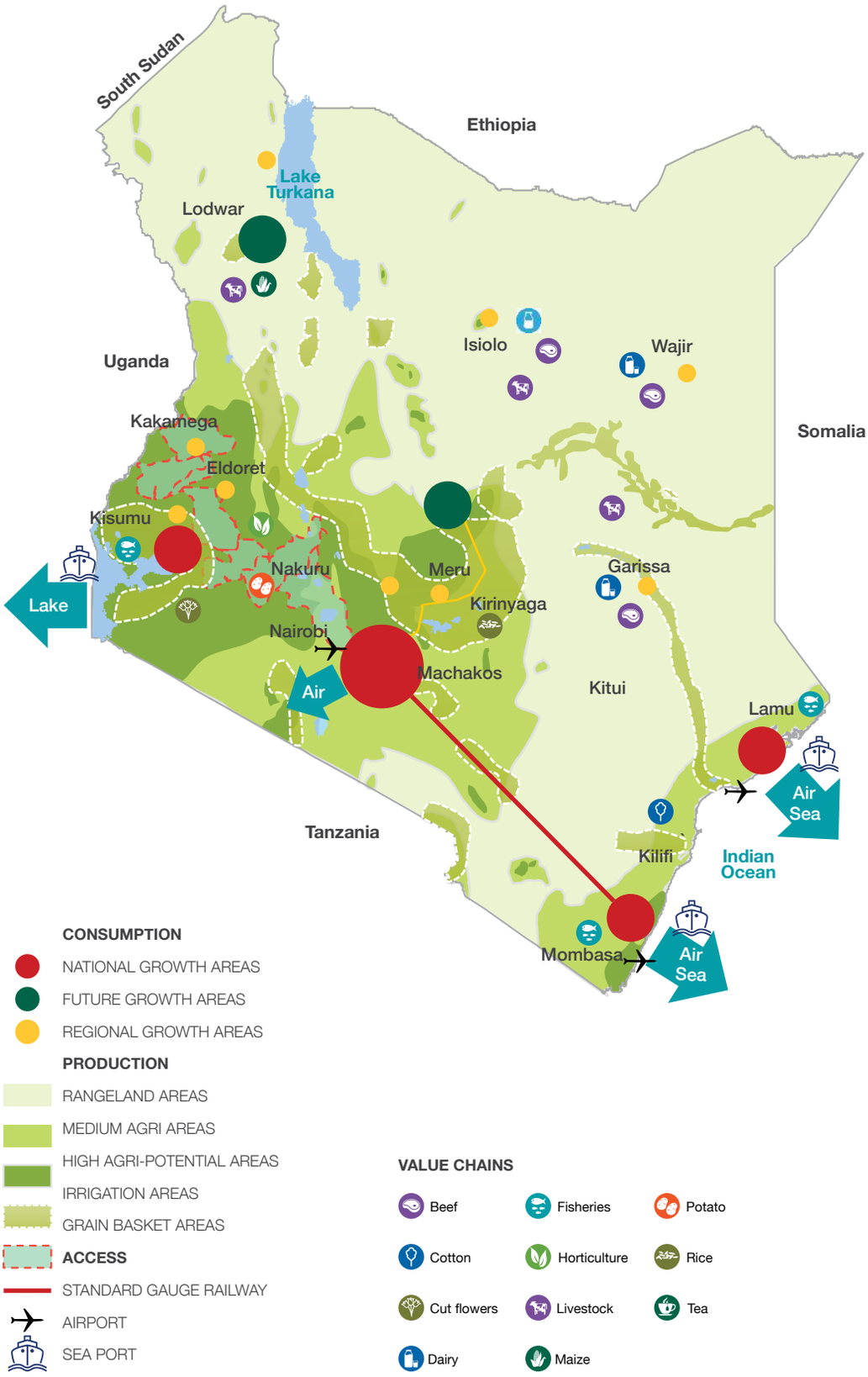
FIGURE 27: UNIDO – ETHIOPIA PARTNERSHIP FOR AGRO-INDUSTRIAL PARKS



SOURCE: Integrated Agro-Industrial Parks (IAIPs) in Ethiopia Booklet

Furthermore, ASTGS is fully supportive of the initiatives identified by the 2015 Kenya Industrial Transformation Plan (KITP) from the Ministry of Industry aligned with flagship 3. The Agro-Processing Delivery Team (APDT) as described in the next section will allow for collaboration between MoALFI and the Ministry of Industry on initiatives proposed, including a tuna-processing hub integrated into the planned Lamu fishing port for export to the EU market primarily, and EAC collaboration on sustainable fishing practices in Lake Victoria.

FIGURE 28: MAP OF POTENTIAL AGRO-PROCESSING HUB LOCATION IN KENYA



SOURCE: Ministry of Agriculture and Irrigation; ASTGS Working Team Analysis

FIGURE 29: MAKUENI MULTIPURPOSE FRUIT PROCESSING PLANT

Case example: Lengthy development timeframes endured by Makueni's Multipurpose Fruit Processing plant

Government of
MAKUENI COUNTY
Andu mbee ,O kila nyumba kalila

The Makueni Multipurpose Fruit Processing plant

Start date of development: 2013

Completion date: 2018

Processing target at full capacity: Mangoes (20,000 tonnes), citrus (20,000 tonnes), avocado (1,500 tonnes), and bananas (5,000 tonnes)

Feasibility: A business plan was completed by JKUAT, and validated by University of Nairobi in 2013

Financing: Budget of Makueni County, with further EU funding for reconstitution line

5 NEW AGRO-PROCESSING HUBS ESTABLISHED ACROSS THE COUNTRY PRODUCING >5 CROP, LIVESTOCK AND FISHERIES VALUE CHAINS

KES 18 billion PER YEAR IN GDP

KES 100 billion CAPITAL EXPENDITURE VALUE THAT CREATES CONSTRUCTION AND MANUFACTURING JOBS

B. FLAGSHIP SOLUTION

Overview

The Agro-processing Delivery Team (APDT) will solicit Kenya's highest-potential projects, and offer a one-stop solution for implementation of ~6 Kenyan agro-processing hubs with combined capital value of up to ~KES 100 billion, largely private sector-financed.

As a team, it will operate with a clear agro-processing mandate under the Agriculture Transformation Office (ATO), with measurable Key Performance Indicators (KPIs), performance-based budget allocations, and regularized reporting requirements. The APDT will embed six guiding principles for successful agro-processing delivery:

- Ruthless focus on project feasibility
- Uncompromising insistence on procurement best practice
- Structured process to maximize competition and private sector involvement
- Highly coordinated response to specific project bottlenecks
- Codified approach to minimize conflicts of interest

Impact and investment

By year five of implementation, this flagship will have estimated impact of:

- Total value created from agro-processing (GDP increase summed over five years): ~KES 150 billon
- Increase in GDP from agro-processing in year five: ~KES 18 billion
- Investment required over five years: ~KES 100 billion

To address the five common challenges faced by project champions, the APDT is composed of three components (Figure 30) and will work across project lifecycles to deliver high-impact, high-feasibility projects.

At inception, key stakeholders will be identified and nominated to the accelerator's leadership. The stakeholders will work collaboratively to unlock agro-processing solutions, and may include:

- Ministry line functions (including Industry, Agriculture, Transport and Treasury)
- County leadership (including Council of Governors)
- Key infrastructure parastatals (including Kenya Power and Kenya Railways with a view on Standard Gauge Railway partnerships)
- Key market-focused parastatals (including SEZ Authority)
- Key private sector representatives (including the Kenya Agribusiness and Agroindustry Alliance – KAAA, the Kenya Private Sector Alliance – KEPSA, the Agricultural Council of Kenya – AgCK)

The leadership will address key infrastructure challenges (as they arise on a project by project basis), undertake value chain and market development, and lobby for agro-processing incentives (for accelerator-sponsored projects and others), such as equipment import tax breaks or inter-county transport tax waivers.

FIGURE 30: COMPONENTS AND INTERVENTIONS OF THE APDT

The Agro-processing delivery team (APDT) has 3 components…	…which adds value across the project lifecycle
Delivery leadership Ministry & County leadership Infrastructure role players	**Pre-feasibility** Solicit high-impact projects Fund completion of ~10 feasibility studies
Approved service providers Independent bid evaluators, contractors and facility designers	**Post-feasibility** Support sponsors to competitively procure investors and contractors Deploy standardized contracts and 'pre-cooked' agreements Address infrastructure challenges Unlock agro-processing incentives including transport and taxation
Delivery tools Feasibility study grant programme Standardized project agreements	

SOURCE: ASTGS Working Team Analysis

Feasibility study process

WITHIN ONE YEAR FROM ACCELERATOR INCEPTION:

~10 successful grant applicants selected

Approved 3rd party service providers appointed

~5-7 highest impact project feasibility studies completed

SOURCE: ASTGS Working Team Analysis

Secondly, various project elements require contribution from independent service providers with specialized expertise, for example: conducting independent feasibility studies, developing world-class agro-processing master plans, and undertaking construction works to build large-scale agro-processing facilities. The accelerator will assemble a panel of approved, independent service providers with relevant international expertise, to inject independence and best practice at key junctures in the development process.

Thirdly, the APDT will deploy two delivery tools:

i. Through competitive tendering, a feasibility study grant programme will be launched to attract the highest impact agro-processing projects in Kenya, and provide funding for completion of independent third party feasibility studies.

The programme will be open to any project promotor (whether a private sector sponsor, county government, regional development authority, or consortiums thereof), and will be evaluated independently by approved bid evaluators.

Minimum eligibility criteria (such as site availability and size, ability to exceed a minimum job creation threshold, and willingness to process multiple value chains) will be set, and grant awards will be based on clear evaluation criteria (such as revenue and creation potential, infrastructure assessment, value chain and market assessment, and existing investor appetite).

The APDT will gift completed feasibility studies to grant recipients at nil cost, on condition that:

a. procurement of strategic co-investors is completed in transparent manner

b. a construction contractor is selected from the panel of pre-approved service providers

c. 5-10% minority shareholding (by way of "free carry") is allocated to strategic agriculture interest groups (women, youth, and community groups within a 50 km radius), amounting to ~KES 2-4 billion worth of beneficial shareholding and a share of annual dividend income

ii. To reduce negotiation timeframes and improve delivery quality, standardized agreements – such as EPC contracts, shareholders' agreements, and standardized design templates – are used. The APDT will establish pre-negotiated power supply agreements with Kenya Power, pre-filed SEZ applications with the SEZ Authority, and pre-negotiated transport arrangements with Standard Gauge Railway (where relevant). In addition, it will make available international standard facility master plans, which may accelerate the design phase and speed up the roll-out of new facilities.

C. IMPLEMENTATION RISKS AND HOW TO MITIGATE THEM

We have identified the main implementation risks that will need to be mitigated.

Raw input supply risk

Completion of third-party feasibility studies will provide strong indication of the level of supply risk, and whether to proceed with a proposed project. However, once implemented, a project's input supplies may be affected (through temporary or permanent failure to source materials, or inadequate quality), placing the project under pressure. The APDT will work with successful projects to continuously monitor the strength of its input supply chain, and seek out opportunities to conduct value chain development. Consider, for example, how several of Kenya's fish agro-processing plants have struggled, given the low fishing numbers that have been recorded: the APDT can work with fish processors to analyze regional fish supplies, and optimize the supply chain.

In addition, the APDT will catalogue a national database of new projects (both small-scale and large-scale) being considered in Kenya, with a view to pointing out early risks of over-concentration in one specific geographical area or value chain. The database will be made public and updated regularly.

Transport risks

Given Kenya's comparatively variable road networks in comparison with peers like Ethiopia and Rwanda, and given the distances some raw inputs and processed end products will likely travel, there exists significant transport risk, exacerbated by penalizing inter-county transport taxation. The APDT will use its role as a coordinating framework to seek to influence inter-county transport arrangements, as well as identify new and more reliable transport options for project APDT-supported projects. The APDT should also be mindful of locations that optimize transportation distances for workers and materials, so as to reduce pollution and emissions.

External market risk

Given the competitive nature of international food- and agro-processing markets, and given the efforts of regional peers to establish large-scale agro-processing capacity, the threat of substitution from local and international competitors remains constant. The APDT will continue to lobby for key incentives to remain in place to continuously strengthen the profitability of facilities, and will seek to work with key entities (such as Kenya's Export Promotion Council) to create long-term, international market penetration for Kenyan product.

D. KEY MILESTONES

1. Establish, fund and empower the APDT: Convene key leadership (ministries, parastatals and private sector representatives). Create clear performance objectives and metrics, with a regular reporting requirement. Establish a multi-year funding mechanism, subject to APDT performance.

– Responsibility: Ministry of Agriculture, Livestock, Fisheries and Irrigation

– Start date: Q4 2019

2. Assemble panel of independent service providers: Develop terms of reference for key private sector service providers, including bid evaluators, due diligence providers, architects, construction contractors and equipment providers. Solicit interest from long-list of service providers. Competitively evaluate interested parties. Appoint panel of preferred service providers.

– Responsibility: APDT

– Start date: Q4 2019

3. Develop and deploy APDT tools: Develop feasibility study grant programme materials, including clear evaluation criteria. Publish grant programme and invite "early bird" and regular timeline bids. Award ~10 grants to high-impact projects across the "early bird" and regular bid windows. In parallel, establish standardized contracts (e.g., Kenya Power supply agreement, feasibility master designs), and automated SEZ applications.

– Responsibility: APDT and independent service providers

– Start date: Q4 2019

4. Undertake ~10 feasibility studies: From panel of service providers, appoint due diligence provider to undertake ~7 comprehensive feasibility studies, leading to ~6 projects with independent feasibility reports. In coordination with ATO, transfer ownership of feasibility to project champions. Allocate minority shareholding in facilities to strategic agriculture stakeholder groups (women, youth and community groups) in consultation with ATO.

– Responsibility: Independent service providers

– Start date: Q2 2020

5. Construct ~6 large-scale processing facilities: Procure design specialists from panel of approved providers to complete facility design. Procure equipment providers and construction contractors to undertake construction of new facilities.

– Responsibility: Project sponsors and independent service providers

– Start date: Q3 2020

Note: All flagships need to be further detailed to move from strategy to implementation, and achieve the milestones laid out above. See NAIP for conversation on immediate next steps.

FLAGSHIP 4: Unlock ~50 large-scale private farms (<2,500 acres each) with ~ 150,000 acres under sustainable irrigation from existing projects (e.g., rehabilitate dams) with government-provided infrustructure (e.g., power, roads) and protected land ownership

A. CHALLENGES

For the period 1990-2014, Kenya's food production grew ~2.8% annually, while Tanzania's growth equalled 4.3% annually over the same period. In the latter years (2010-2014), Kenya grew at 0.6%, with Tanzania capturing greater share of East Africa's production increases, growing at around 8.9% annually.[158] Given Kenya's slowing production growth, coupled with population increases, Kenya will need to intensify crop based food production.[xxv]

When considering Kenya's overall agro-climatic potential, more than 15% of overall land mass (or ~21 million acres) is classified as high-potential agriculture zones, with a further 20% (or ~28,000 acres) classified as medium-potential zones, able to sustainably farm livestock and drought-tolerant crops. A further ~90 million acres is classified as marginal agriculture-potential zones, predominantly suitable for ranching and pastoralism, where land is available.

An opportunity exists to expand Kenya's agriculture production on available, arable land through large-scale commercial farming, and reduce Kenya's food deficit.

As it stands, Kenya has ~19 million acres under agriculture production. Of this number, only ~14% is farmed by larger-scale commercial growers with individual farm size of 250 acres or greater.[159]

However, given the existence of large portions of arid land across more than 23 ASAL counties, and given Kenya's low levels of irrigation – less than 1% of land mass is irrigated – the availability and reliability of water supply is of critical importance to Kenya's future ambitions to expand land use for agricultural purposes.[160] As of today, Kenya has only ~200 significant irrigation schemes with combined irrigation capacity of ~250,000 acres. The National Irrigation Board (NIB) operates the seven largest schemes, accounting for 63% of total national capacity. At a county level, only Tana River and Kirinyaga have capacity to irrigate more than 20,000 acres – above the average county capacity of around ~2,700 acres.[161]

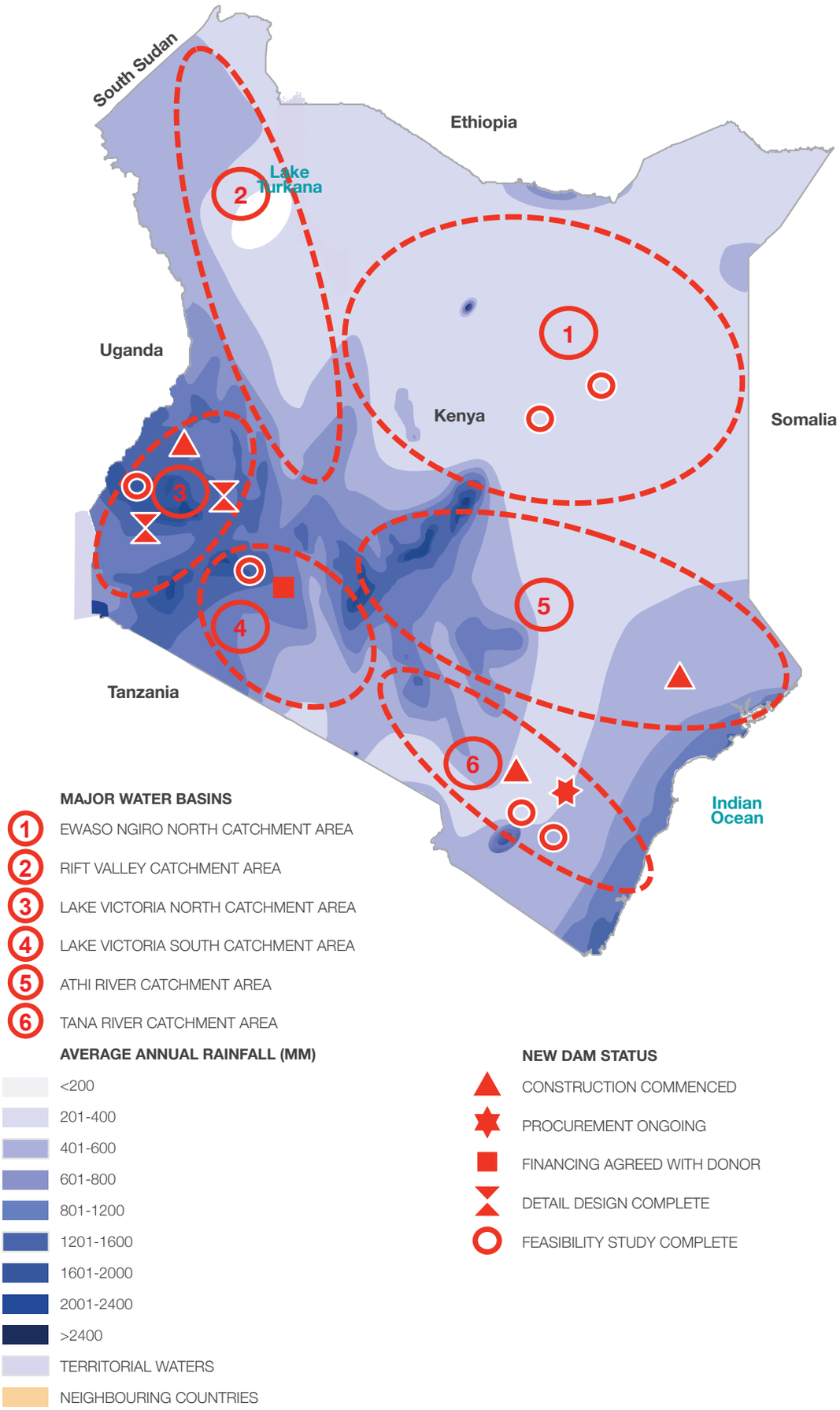
To successfully unlock available, arable land for agricultural purposes, the Kenya agriculture sector will:

1. Learn from early, pioneering projects: In Kenya, a range of initiatives has been undertaken to expand land use for agriculture production. The most prominent is the Galana Kulalu Food Security Project, a flagship effort to put around 400,000 acres of new land under production.[162] Past projects have taught us five important lessons:

- Completion of independent, international standard feasibility studies is critical
- Due diligence on land ownership queries must be completed
- Delivery of large farm projects should be decoupled from associated large dam build programmes
- Transparent governance structures with clear reporting and monitoring mechanisms are necessary
- The private sector's participation must be increased to ensure that the best technical solution is developed for every new farm

2. Optimize alternative water supply options: To increase water storage capacity and meet its irrigation needs, Kenya is planning to build up to 59 new dams *(Figure 31)*, only 10 of which are earmarked as "pure irrigation" water dams. The cost of building these dams will exceed KES 500 billion,[163] which will place strain on national infrastructure budgets. Assuming timely completion of the feasibility studies, many of the proposed dams will take a further 3-5

FIGURE 31: MAP OF KENYA'S MAJOR WATER BASINS AND PLANNED DAM PROJECTS



SOURCE: Ministry of Agriculture and Irrigation, ASTGS Working Team Analysis

years to build and 1-2 years to [lxvi] fill, implying as much as seven years before reliable irrigation can commence. In general, Kenya's new build dam programmes have an inconsistent delivery track record in terms of time, cost and quality. Given the above, Kenya should prioritize alternative water supply options:

- Complete new dams already under construction
- Fast-track the rehabilitation of existing, under-performing dams. Where feasible, include provisions for capture fisheries, aquaculture and recreational fisheries activities
- Where feasible, convert hydro-electric dams to dual-purpose dams. For example, Lower Turkwel may irrigate up to 60,000 acres if converted to dual-purpose use

Sustainability of these options should also be considered, including catchment conservation, use of renewable energy, use of efficient irrigation equipment, and maintenance of biodiversity within the irrigation scheme. More detail on these activities is found in flagship 9

3. Understand commercial grower preferences: Private sector growers continue to show interest in expanding production in Kenya on additional land that may be made available, but are constrained from doing so because of four main concerns:

- Short land tenures – Commercial growers desire lease tenures of 15 years or longer. Short-term leases do not allow growers to invest in soil enrichment, raise competitive finance, and earn sufficient equity returns
- Rigid cropping plans – If landowners require mono-cropping from commercial growers, soil health may suffer and land yields could be sub-optimal. Commercial growers are weary of potential "maize only" policies
- Lack of security – Given the complexity of Kenya's land rights framework, many farmers have expressed concern around exposure to illegal herding and pastoralists, and the effect on farm productivity
- Off-take uncertainty – Given fluctuations in price and volume purchased by state-owned off-takers, and uncertainty around storage capacity, growers require greater visibility of the off-take arrangements and enforceability thereof

[xxv] In particular, Kenya will need to increase maize supply by 27% over 2016-2023 to satisfy its 2023 domestic needs, Maize Value Chain Analysis, USAID-KAVES, August 2015; Kenya Economic Survey 2017, KNBS, July 2017; "Population, total", World Bank Development Indicators, http://databank.worldbank.org/data/home.aspx

50 NEW FARMS COVERING 500,000 ACRES OF NEW PRODUCTIVE LAND

150,000 ACRES OF ADDITIONAL IRRIGATION

>50% REDUCTION IN STAPLE DEFICIT (KES 65 BILLION ADDITIONAL OUTPUT FROM > 5 VALUE CHAINS)

B. FLAGSHIP SOLUTION

Overview

Over a five-year period, MoALFI will competitively procure ~50 large-scale farm concessions, between them unlocking up to ~500,000 acres of new farm production, collectively delivering more than KES 100 billion of annual agricultural output and addressing up to 50% of Kenya's staple deficit.

In addition, MoALFI will seek to sustainably unlock more than 150,000 acres of new irrigation through alternative water supply approaches, minimizing reliance on large dam construction programmes.

While much of the land will be state-owned, the new farm enterprises will be predominantly private sector-funded, owned and operated.

Impact and investment

By year five of implementation, this flagship will have estimated impact of:

- Total agriculture sector value created (agriculture GDP increase summed over five years): ~ KES 195 billion
- Increase in agricultural GDP in year five: ~ KES 80 billion
- Investment required over five years: KES ~ 80 billion (not including potential KES ~ 200 billion in agriculture-supportive costs for power and roads)

Design

The flagship distinguishes itself from previous new farming projects through:

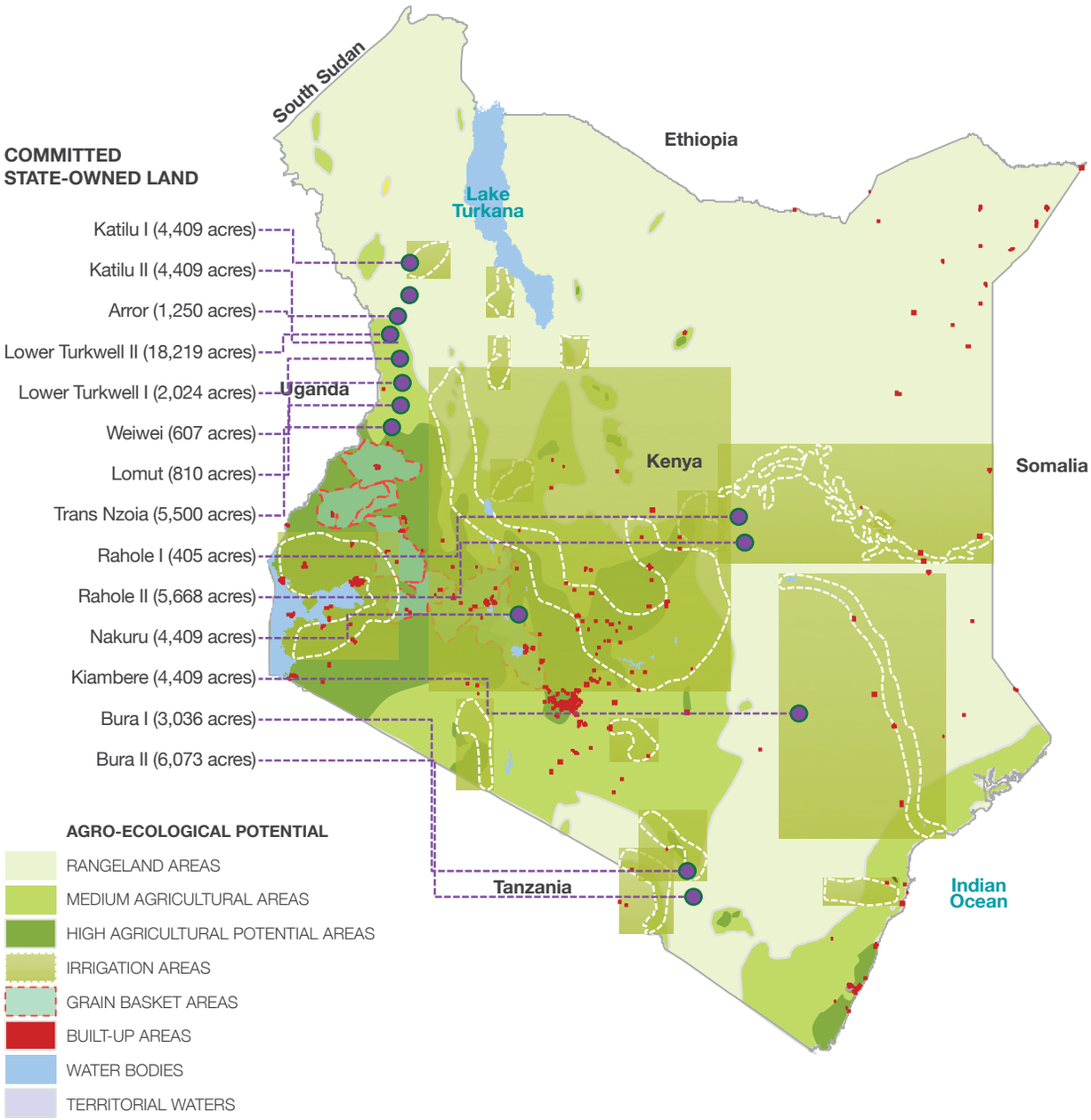
- Undertaking smaller unit size of projects in multiple locations (around 50 locations with average size of 10,000 acres, but with a minimum size of 2,500 acres
- Placing limited reliance on new dam capex programmes, which may restrict the roll-out of new production
- Delineating clear land ownership prior to commencing procurement
- Incorporating high levels of community participation (both as labourers and shareholders – the new farms will give community owners a 5-10% shareholding via a "free carry" scheme)
- Optimizing the cropping plan to fit the land characteristics – while a set level of staples will be produced, commercial growers are free to optimize production for the land, and rotate crops in a manner that also ensures soil sustainability and optimizes profitability of the land
- Ensuring high levels of private sector involvement, leaving government to focus on a limited number of project components, such as land provision, security and water supply (where appropriate)

From consultation with parastatal agencies, MoALFI has secured in-principle commitments from state-owned landowners to provide ~150,000 acres in 15 farming locations *(Figure 32)* for agricultural production over the next three years.[164] These locations provide the basis for the First Bid Window.

In the Second Bid Window, MoALFI will procure additional land from both public and private sector landowners, but also make provision for

FIGURE 32: MAP OF LAND AVAILABILITY FOR POTENTIAL ~50 FARM LOCATIONS

First bid window – approximate locations of new farms to be established



SOURCE: Ministry of Agriculture and Irrigation; ASTGS Working Team Analysis

FIGURE 33: POTENTIAL ELIGIBILITY AND EVALUATION CRITERIA FOR NEW FARM BIDDING

New farm procurement: minimum eligibility criteria and evaluation criteria

Potential minimum bid eligibility criteria
1. Minimum staple ratio: Commitment to devote at least 25% of land to the production of staples
2. Minimum local employment and income ratio: Commitment to employ at least 90% of Kenyan workers for duration of the concession, with minimum income aligned with national standards
3. Minimum Kenyan ownership ratio: Commitment to allocate at least 75% of shareholding to Kenyan shareholder, and provide a 'free carry' of 5-10% to strategic agriculture groups, including women, youth and local community
4. Minimum staple yield ratio: Commitment to produce at least 10kg/ha/mm of water: whether from rainfed irrigation or NIB-sponsored water supply
5. Track record: Evidence of previously operating a commercial farm of similar scale

Potential bid evaluation criteria
1.GDP impact (70%) allowing bidders to optimize production plans given farm's agroecology, and placing an emphasis on high-volume production of high-value crops
2. Job creation (10%) incentivizing bidders to view new farms as a crucial job creator within the communities they are operating in
3. Kenyan ownership (5%) incentivizing bidders to exceed the minimum Kenyan ownership requirement of 75%, ensuring greatest benefit and buy-in from local participants
4. Strategic groups participation (5%) above the 5-10% free carry to incentivize greater participation from these key agriculture stakeholders
5. Sustainability strategy (10%) measured by bidders strategy to maintain and increase key nutrient levels, to ensure long-term, sustainable farming operations

introducing livestock and inland fishing farming enterprises where feasible (e.g., integrated culture of fish in rice irrigation canals and the associated dams).

Farm concessions will be awarded through transparent procurement processes and competitive tenders. Following gazetting of the procurement programme, an RFP pack will be released containing minimum eligibility criteria, bid evaluation criteria, and standard concession agreements *(Figure 33)*. The inclusion of standardized concession materials is expected to make the procurement process more transparent (and consequently encourage greater involvement from leading financing institutions), and reduce the negotiation time before ground can be broken on site.

In addition, electronic data rooms for all farming locations will be released outlining historic rainfall data, committed water supply from NIB, and independently assessed soil measurements. Further, potential bidders will have an opportunity to conduct a one-day site visit to form independent perspectives on soil quality, relevant infrastructure (such as access roads and fencing), security situation, and whether large scale site rehabilitation is required (clearing, draining, and levelling).

C. IMPLEMENTATION RISKS AND HOW TO MITIGATE THEM

We have identified the main implementation risks that will need to be mitigated.

Land risk and security

Given the complexities of enforcing land rights in Kenya and widespread community settlement on both public and privately owned land, commercial growers and financiers will seek extra assurances to protect new farm enterprises against land and security risks. Through a Government Letter of Support, signed by National Treasury, the Government will assume land risk associated with the new farms established, in the event of disputes around ownership, interference by pastoralists, and illegal herders. Given the location of First Bid Window farms, additional security may be required.

Infrastructure constraints

Road access and power supply to First Bid Window farms will have to be tested, and if lacking, will need to be adequately addressed by government.

Soil quality

Depending on soil quality of First Bid Window farms, significant rehabilitation of soil may be required, which may be costly and time-consuming, before yields may recover to expected levels.

Off-take risk

Assuming an off-take agreement is reached between producers and state-run off-takers, commercial growers and their financiers will need price and volume certainty.

Procurement risk

Given the lengthy timeframes associated with procurement of new projects under Kenya's PPP framework, the ministry shall seek a waiver from PPP regulations to streamline the procurement of new commercial growers. In the event of not securing a waiver, standardized, international standard documents will be proposed to the PPP Unit to limit negotiation time after the selection of new farming concessionaires.

D. KEY MILESTONES

1. Prepare for procurement: Publish the new programme under Kenya's PPP framework. Create RFP pack and data rooms for the first wave of 15 projects.

– Responsibility: MoALFI and National Treasury

– Start date: Q4 2019

2. Procure 15 farm consortiums: Evaluate first wave of bidders for initial 15 farms. Select 15 preferred farming consortiums. Conclude negotiations and fulfil conditions for new farmers to mobilize on site.

– Responsibility: Ministry of Agriculture, Livestock, Fisheries and Irrigation and National Treasury

– Start date: Q2 2020

3. Identify further 35 locations from private and public land: Identify a further ~345,000 acres across ~35 locations to increase strategy impact.

– Responsibility: MoALFI

– Start date: Q2 2020

4. Procure 35 farm consortiums in second wave: Evaluate second wave of bidders for subsequent 35 farms. Select 15 preferred farming consortiums. Conclude negotiations and fulfil conditions for farmers to mobilize onsite.

– Responsibility: MoALFI and National Treasury

Start date: Q2 2020

Note: All flagships need to be further detailed to move from strategy to implementation, and achieve the milestones laid out above. See NAIP for conversation on immediate next steps.

4.3 ANCHOR 3 – INCREASE HOUSEHOLD FOOD RESILIENCE

Kenya's Constitution 2010 Article 43 (c) grants all citizens the right to be free from hunger and have adequate food of acceptable quality. While the first two anchors of the strategy focus on increasing production to provide adequate food and acceptable quality, this anchor focuses on the ability of households to deal with shocks to household consumption of this food. It is anchored in the belief that while national government can and must provide emergency relief for its people, it also has a role to play in increasing household food resilience all year round.

Properly diagnosing the barriers to building resilience requires an assessment of three elements at the household level, including: outcome indicators, food system performance and risks.

- Outcome indicators (i.e., affordability, availability and food quality/nutrition). Currently, ~40% of Kenya's population is poor and, on average, 25% suffer from chronic food insecurity and poor nutrition.[165] Food consumption currently accounts for 45% of Kenyan household expenditure.[166] However, the proportion of Kenyans reporting that they sometimes or often go without food dropped from ~60% in 2013 to ~42% in 2016.[167] Furthermore, the daily calorific deficit decreased from 213 to 135 kcal/capita/day in the same period.[168]

  When it comes to nutrition, ~90% of households have an acceptable level of dietary diversity and frequency; however, this varies by region, with >25% of Turkana and Baringo households having poor or borderline dietary diversity.[169]

- Food system performance (i.e. domestic production and markets, global and regional trade, and strategic food reserves). Crop and livestock yields are currently below potential, with yield gaps of 92% for maize and 33% for other cereals vs. regional top performers; 20-25% of cereal production is also lost post-harvest.[170, 171] Lack of investment in rural roads and high inter-county levies contribute to high food prices, hindering the ability of markets to supply food to the entire population.

  The strategic food reserve system, operated through the National Cereals and Produce Board, currently faces a number of outstanding challenges in its attempts to supply the entire population with food, including: delays in procurement payment, difficulty reaching reserve target size, spoilage of stock, and high cost of procurement.

- Risks (i.e., climate and environmental risks, political and geopolitical risks, and global and regional price volatility). Any changes in rainfall could significantly impact Kenya's food resilience as ~98% of crops in Kenya were rain-fed in 2005, with 50% of land experiencing rainfall variation of more than 20%.[172] Fall armyworm infestation damage has been increasing, affecting ~2 million acres of maize in 2016, and rising temperatures are expected to reduce maize yields further.[173,174] Research on new varieties of crops, e.g., drought-tolerant crops, insect-resistant maize, etc. and commercialization of certain value chains to areas at risk of material climate changes, e.g., indigenous chicken and fruits, can help mitigate some of these risks.

The two flagships in this anchor increase the ability of the country and individual households to respond to acute emergencies and pricing shocks with a mix of nutritious traditional staple crops, while building resilience to address systemic food system risks. At the national level, the value chains of focus are maize and beans, but at the household level, value chains are region-specific and can include other cereals and/or pulses, e.g., millet, sorghum, maize, beans, green grams, etc.:

1. Restructure governance and operations of the Strategic Food Reserve (SFR) to better serve ~4m high-needs Kenyans through:

i. reserves optimized for emergency responses only; ii. buy/sell guidelines published with pre-determined emergency release triggers for stocks and cash; ii. private sector warehousing; and iv. price stability managed through Treasury (i.e., minimum price controls and cash transfers)

2. Boost food resilience of ~1.3m farming and pastoralist households in ASALs through community-driven design of interventions and more active national and county coordination of development partner and private sector

FLAGSHIP 5: Restructure governance and operations of the nationwide strategic food reserve to focus on serving ~4 million high-needs Kenyans, not on price stability

A. CHALLENGES

To understand how to improve the strategic food reserve, one must understand how the system operates. A mapping of the current system is shown in Figure 35.

In a non-emergency period, it functions as follows:

- The Strategic Food Reserve Trust Fund (SFRTF) oversight board convenes and reviews reports from its technical committee, then decides on the price and quantity of commodities to be bought or sold from the reserves. The board passes these instructions to the NCPB or other government agencies, e.g., the new KCC for powdered milk.
- For commodities to be bought, the NCPB (as an agent to the board) publicly announces the price and producers bring their produce to NCPB depots. The produce is evaluated for quality (especially moisture content), weighed and bagged, and payment is made within the next few days.
- For commodities to be sold (for either price stabilization or stock rotation), the NCPB releases grain onto the market at a price specified by the board. The grain is bought mostly by millers or traders.

In emergency situations, an inter-ministerial committee instructs the SFRTF oversight board to sell grain to the Department of Special Programmes, which distributes it to vulnerable households through the NCPB.

In all of these interactions, the SFRTF plays the role of ultimate decision-maker for the operations of the Strategic Food Reserve. According to Legal Notice 15 of the Public Management Act, 2015, the SFRTF's mandate is to:

- Stabilize food supply and prices
- Arrange the procurement, storage and sale of food commodities
- Maintain adequate strategic food reserves in physical stock or cash equivalent at any given time
- Mobilize resources to support strategic food reserve-related activities

However, experts and stakeholder interviews indicate there are three major challenges the SFRTF oversight board faces. First, the current system creates added uncertainty in the markets (because decisions are not always easy to predict). Second, without a mandate for transparency in the evidence behind decision-making, accountability is more difficult. Third, the board often lacks sufficient budget to effectively carry out its mandate. Most of the money received is spent on buying stock, mostly maize, with very little left for cash reserves. With no cash reserves for the purchase of grain during emergencies and because of the bureaucratic process of requesting additional funds, there are sometimes delays in purchasing stock during emergencies. Lack of budget also results in the SFRTF board relying on the MoALFI's resources for its operations.[175]

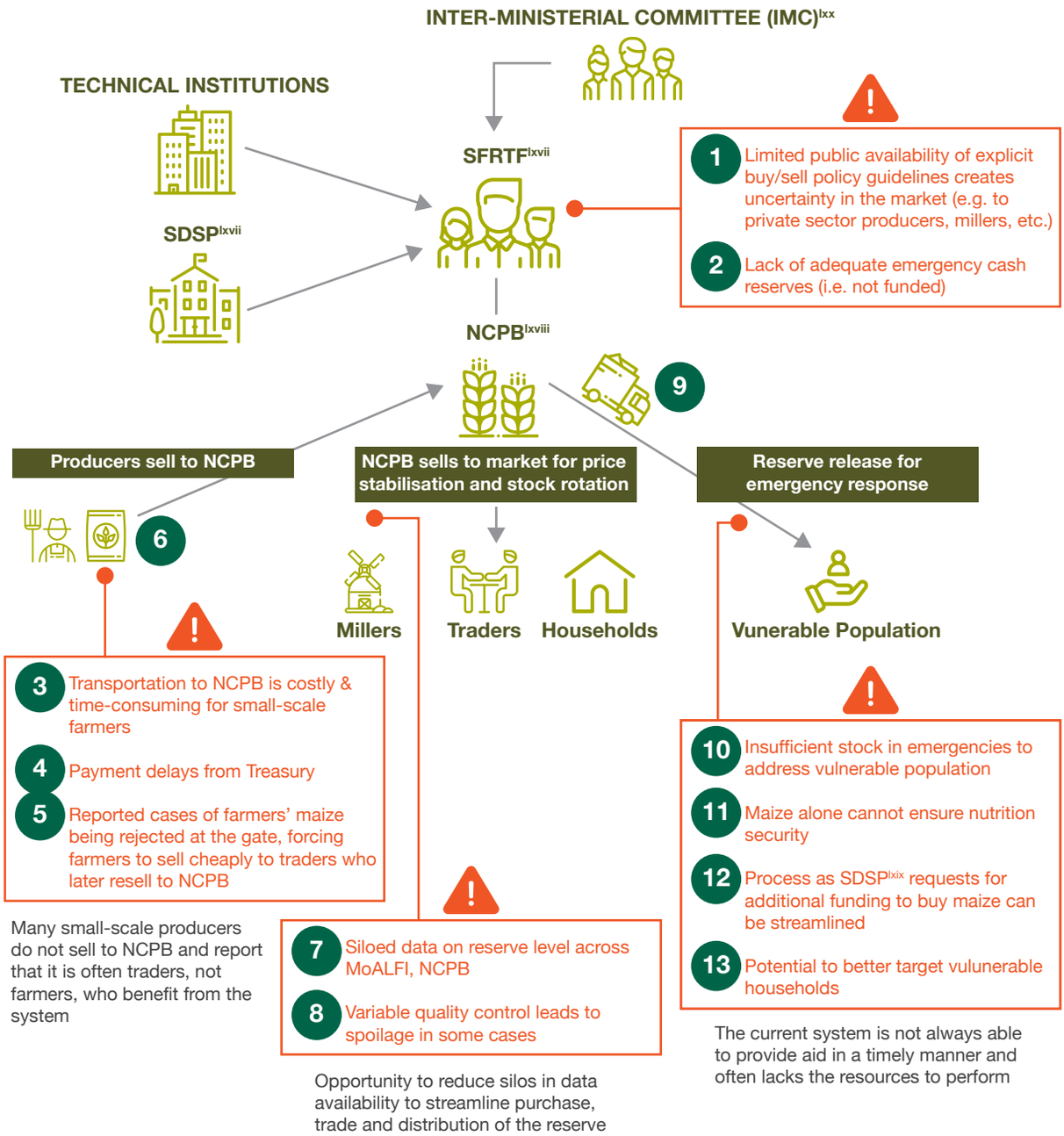
Additionally, other areas that have been identified as challenges and that have potential for improvement are:

- The oversight board also has no explicit policy/mandate that outlines the triggers for buying and selling. This has the effect of creating confusion and uncertainty among farmers, traders and importers/exporters in the market and hinders private markets' ability to predict and balance supply/demand. There are also no clear policies for emergency release triggers or targeting criteria during emergency periods.

- Producers/farmers also face certain challenges when interacting with the strategic food reserve. Analysis shows that most smallholder grain farmers do not benefit from the ~33% – 62% higher-than-market prices set by the reserve.[176] This is because, for it to be economically viable to transport grain to NCPB facilities, at least a truck full of grain is needed. This is often beyond the production capacity of most smallholder farmers. NCPB also has relatively long payment durations compared to traders and millers; for example, it may take weeks for NCPB to make payments compared to 24-48 hours of traders/millers.[177] It is also common for there to be long queues when delivering grain to NCPB depots. Given that most smallholders often have urgent needs after harvest, e.g. loan repayments, and need to purchase inputs for replanting, school fees, etc., most farmers would rather take a lower price for their grain with immediate payment as compared to selling to the reserve. There were also reports of rent-seeking with some farmers' grain being rejected at the gate, only for traders to offer to buy the same grain at discounted rates and resell to the NCPB.
- Currently, the SFRTF has a mandate that covers six commodities: maize, beans, rice, canned beef, powdered milk and fish. However, analysis of previous purchases by SFRTF shows that more than 95% of all purchases were of maize through NCPB, with the rest being primarily powdered milk and beans.[178]
- The reserve system also faces challenges with regard to food safety and quality control. In the past 10 years, there have been at least two contaminations of aflatoxin in NCPB and at least two reports of maize rotting in the reserve. This is despite the fact that SFRTF mandate (since 2015) prohibits storage of grain for more than two years.[179,180,181,182]
- Another opportunity for improvement lies in the availability of data on the quantity and quality of commodities in the reserve. During the ASTGS analysis of the reserve, the data received on budgets, reserve levels, reserve targets and quality of commodities in the reserve often varied indicating a need for centralized, up-to-date, reliable and easily accessible information regarding the reserve to facilitate decision making.

FIGURE 35: CHALLENGES OPERATING THE STRATEGIC FOOD RESERVE TRUST FUND

Strategic food reserve system decision making and operations



SOURCE: Strategic Food Reserve Trust Fund; stakeholder interviews

lxvii Strategic Food Reserve Trust Fund Board.
lxviii National Cereals and Produce Board.
lxix State Department of Special Programs.
lxx Inter-ministerial Food Security Committee that gives direction to the board in time of emergency.

4 million FOOD INSECURE KENYAN SUPPORTED DURING EMERGENCIES

2-3 ACTIVELY MANAGED COMMODITIES INCLUDING MAIZE, BEANS AND RICE AT NATIONAL LEVEL, WITH ADDITIONAL COUNTRY STORAGE FOR COUNTY NEEDS AND PREFERENCES

100% OF STOCKS MONITORED DIGITALLY AND IN REAL TIME

B. FLAGSHIP SOLUTION

Overview

Based on best practice and analysis of the Kenyan context, the ASGTS recommendation will support the strategic food reserve to better deliver on this mandate by: separating the price stability mandate and focusing the reserve on provision of food during emergencies; publishing explicit, predictable buy-sell policy guidelines and emergency trigger criteria and reducing lead time to get additional emergency funds; adding ~70,000 tonnes of legumes/pulses to the reserve and adjusting the total target size to reflect the expected vulnerable population; introducing competitive bidding to allocate reserves to the private sector and monitoring stocks digitally in real time.

Impact and investment

By year five of implementation, this flagship is estimated to impact:

- Reduction in food-insecure population: ~2.7 million (equivalent to the average size of drought-induced food-insecure population over the past 10 years – includes ~1.3 million chronically food insecure; actual number depends on future severity of droughts)
- Investment required over five years: KES 10 billion[xxv]

Design

I. Publish explicit, predictable buy-sell policy guidelines and emergency trigger criteria, and streamline the process of receiving funds from Treasury

Analysis of Kenya's current reserve system and benchmarking with best practice across the globe suggests there are three changes that would have significant impact in improving its governance structure: publishing explicit, predictable buy-sell policy guidelines; setting up emergency target criteria and release triggers; streamlining the process of getting emergency funds from Treasury.

Publish explicit, predictable buy-sell policy guidelines

An efficient strategic reserve system that is focused on emergency relief and not price stabilization (see Section IV of this flagship solution) releases food for only two reasons: (1) in an emergency; (2) to manage the rotation of stocks to ensure quality standards. Similarly, the strategic food reserve system only purchases grain for two reasons (1) to replenish after an emergency; (2) to manage the rotation of stock ensuring quality. These decisions to purchase or release (sell or give distribute) food should not cause major shocks to the market as an efficient strategic reserve system should not cause unnecessary uncertainty in the market when it acts. To achieve this, it is important that the governing structure has a set of public, explicit buy and sell policies. This creates predictability in the actions of the reserve by all the other actors in the market (e.g., traders, millers, consumers), leading to less uncertainty. More predictability reduces risk for the private sector, ultimately encouraging greater investment in the sector. The food reserve should also aim to buy or sell at prevailing market prices to avoid distorting market prices.[183]

Currently, there is no explicit policy for how the SFRTF should buy or sell commodities. The only buy/sell guideline in SFRTF's mandate in the gazetted notice of the Public Finance Management (Strategic Food Reserve Trust Fund) Regulations 2015 is "…ensure strategic food reserves at any given time shall be rotated on a "first in, first out" principle as well as timely manner to minimize quality deterioration and, in any event, shall not be held for a period exceeding two years…". Interviews with SFRTF indicate that the current decision-making process for determining the quantities and prices of stock to be bought or sold considers the prevailing market prices and the objective of the release/purchase (i.e., emergency release or price stabilization). However, the decision-making rationale is only known by members of the oversight board.

This flagship recommends that, as part SFRTF's mandate, the oversight board will create and publicly publish a policy on the decision-making guidelines with triggers for buying/selling (related to either rotation of crops to ensure quality in stored volumes, or to emergency release and restocking). These will aim to reduce market distortion by buying/selling at market prices and the decision-making rationale will be available for review by all market actors after any buy/sell orders have been made. The SFRTF will also publish an M&E framework that determines all sales and purchases (including for stock rotation) from the reserve.

CASE STUDY: Rwanda

Rwanda publishes all the guidelines for the releases from the reserve and uses a stop-out bidding system to buy/sell to the reserve, i.e., bidders are allowed to bid for any quantity above 50 tonnes and awards start at the lowest price for selling (or highest price for buying) from the reserve. Awards continue until the total allocation for the reserve buy/sell order is filled[184]

Set emergency target criteria and release triggers

To effectively reach the households that are vulnerable during emergencies, it is necessary to know how many of these households there are and where they are. The reserve should also have a process of automatic release, subject to certain approvals, to ensure timely response to emergencies.

Currently, the SFRTF does not explicitly use targeting data during emergencies but, instead, it relies on requests for support from county governments or relief agencies. There are also no explicit emergency triggers in the oversight board's mandate.

In this regard, the flagship recommends two changes to the SFRTF mandate:

- Set explicit, publicly available emergency trigger guidelines on release of stock by SFRTF during emergencies. These will include ((but are not limited to) definitions of and types of emergencies, trigger indicators, and automatic release criteria for different levels of emergency.
- Define proactive targeting criteria and process to work with relevant agencies that will be used to identify the location, number and severity of food insecurity for vulnerable populations. This will be used by the SFRTF to decide on the sufficiency of the reserve to meet the vulnerable population's needs, and for better targeting of food disbursement in times of emergency.

Once the vulnerable populations' severity, location and number are known, the SFRTF will then work with relief agencies, county governments, NCPB, private storage providers, etc. to facilitate the logistics of getting food to them.

CASE STUDY: Mali

Mali's reserve commission relies on an autonomous market information system and early warning system to make buy/sell decisions. This results in faster decision making and disbursement during emergencies.[185]

Streamline the process of getting emergency funds from Treasury

As part of the gazetted notice of the Public Finance Management (Strategic Food Reserve Trust Fund) Regulations 2015, the SFRTF should "… maintain adequate strategic food reserves in physical stock or cash equivalent at any one given time…". Since 2015, the SFRTF has received a budget allocation of between KES 1.3-2.2 billion per year, which on average is enough to buy 52,500 tonnes (583,000 90 kg bags equivalent) of maize annually.[186] However, due to budget constraints, most of the funds that have been received have been used to purchase (and to pay the associated storage/logistics costs) of physical stock.[187]

Ideally, cash reserves should be ring-fenced and kept aside for use in times of emergency. However, this often results in additional finance costs to maintain the cash reserve and associated risks and complications of trying to ring-fence the funds. There is also an opportunity cost in holding onto material amounts of cash reserves during non-emergency periods as these funds cannot be used for other high-impact agricultural projects.

This flagship recommends that the SFRTF oversight board will, in conjunction with Treasury, define a streamlined process to get additional funds during crisis/emergency. This process should reduce the lead time for SFRTF to get additional emergency funds to a maximum of one week from the date initial request. As such, the SFRTF will not necessarily have to hold material amounts of cash reserves but instead have a reliable method through which it can get additional funds quickly in times of emergency.

II. Add ~70-85,000 tonnes of legumes/pulses to reserve and estimate the total target size according to the expected vulnerable population

Add 70-85,000 tonnes of legumes/pulses to the reserve

Currently, as part of the gazetted notice of the Public Finance Management (Strategic Food Reserve Trust Fund) Regulations 2015, the strategic food reserve includes maize, beans, rice, fish, powdered milk and canned beef. However, since 2015, the majority of the purchases have been for maize (>95%) with the rest of the purchases consisting of beans and powdered milk.[188]

The flagship recommendation is that ~70,000-85,000 tonnes of legumes (e.g., beans, green grams) will be added to Kenya's current reserve system.[lxxi] This would have a significant impact on the improvement in nutritional diversity for relief food, as the current relief food distributed during crisis by the national reserve is largely cereals-based (predominantly maize). While this diet might be able to provide sufficient calories for vulnerable households during crisis periods, adding a pulse would provide other nutrients that would not be present in a fully cereals-based diet (e.g., proteins).

Beans are the recommended pulses/legumes because:

- They are already in the mandate of the SFRTF and hence would not require any additional policy changes.
- Their storage requirements are more similar to maize compared to other protein sources in the reserve's mandate, hence requiring less modification of pre-existing infrastructure and staff capabilities.

lxxi Based on the amount of vulnerable population and benchmarked per household consumption. ~70,000 tonnes covers ~4 million people while ~85,000 tonnes covers ~5 million people.

- Beans account for ~74% of all pulses produced by volume as of 2016. This is the largest of any pulse.[189]

Of all the efficient national food reserve systems that were analysed, none had six commodities, with most having two or three commodities (mostly staple foods) that they actively managed. It is recommended that a periodic evaluation of commodities be conducted to ensure they reflect the optimal mix for relief food, for nutrition and cost effectiveness. After the first two years additional commodities should be actively managed with primary consideration given to rice (which has similar storage requirements to maize and beans) and dried fish, some of which is already being currently exported. Rice can be considered as an alternative cereal to supplement maize as it is preferred by households in ASAL regions.[190]

However, this does not prevent county governments from keeping fit-for-purpose commodities in their county level reserves. These do not necessarily have to be part of the six SFRTF commodities nor are counties limited in the number of commodities they can contain. For example, counties near large water bodies may choose to store fish or counties in ASAL with a high population of livestock may choose to have feed reserves *(see flagship 6 for details)*.

CASE STUDY: Asia

India currently only stores wheat and rice in its strategic food reserve while Malaysia and Singapore historically (and currently) only store rice in their reserves. Japan stores rice, soybean, and wheat.[191]

Estimate the reserve size to be based on the vulnerable population

Currently, the reserve target is 270,000 tonnes (3 million 90 kg bags) of maize.[192] Interviews with stakeholders at the MoALFI indicate that this target is based on a previous gazette notice of NCPB. However, on average the reserve has been storing ~229,000 tonnes (~2.6 million 90 kg bags) since 2010 with storage capacity of up to 1.6 million tonnes of grain through NCPB.[193, 194] The current proposed target is 360,000 tonnes (4 million 90 kg bags) in commodities and an equivalent amount to be held in cash, which is based on the initial 3 million target, adjusted for population growth.[195]

This flagship recommends, based on best practice from other countries, that the Kenyan reserve target be based on the size of the vulnerable population during the emergencies. The amount of physical stock will aim to sustain the vulnerable population for the time needed between identifying the emergency and importing and transporting additional food aid to the areas likely to have the need. Stakeholder interviews indicate that this lead time is 90 days for Kenya.

Analysis of past droughts from 2008-2017 shows that about 1.1-3.7 million people experienced food shortages and were in urgent need of food aid.[196] If the reserve were to target this vulnerable population (with some additional buffers), then the reserve target would be ~112-143 tonnes of maize and ~67-85 tonnes of beans.[lxxii] This would represent up to a 38% drop from the current reserve target and 54% of physical stock decrease from the proposed target, with KES 0.6 billion in potential cost savings from current stock levels or KES 3.5 billion savings from the proposed target.[lxxiii]

lxxii Sizing done 4-5 million vulnerable population. Assumes per capita consumption of 114 kg/capita/year consumption for maize (data from MoALFI is 104 kg/capita/year – assumed 10% increase during stress periods) and 0.75 kg/household/day consumption for beans (data from benchmark of another East African country's food reserve estimation of legumes consumption for vulnerable population).
lxxiii Assumes current levels are the average reserve levels from 2010-2017 and that only maize is stored. Proposed reserve levels also accounts for the cost of beans.

CASE STUDY: Ethiopia

Ethiopia bases its reserve target on estimates of the size of the food-insecure population and the lead time taken to import additional relief food. It periodically revises its target based on new estimates of the vulnerable population.[197]

III. Use competitive bidding to allocate storage to private sector, and implement real-time digital monitoring of all stocks

The strategic food reserve should aim to fulfil its mandate as cost-effectively as possible. To improve the operational efficiency of Kenya's food reserve system, three changes are suggested: competitive bidding for reserve storage, use of real-time monitoring for stock, and increased quality control.

Competitive bidding and more private sector participation

Currently, all commodities for the strategic food reserve are stored by national government entities, with the largest share of storage and logistics being maize handled by NCPB (others include new KCC for powdered milk, and a proposal for KMC to handle beef). Analysis of costs suggests private sector storage and logistical costs can be up to 50% less than that of NCPB, an opportunity to improve the operational efficiency of the reserve by partnering with the private sector.[198]

The flagship recommendation is that there will be private sector participation in the allocation of commodities for storage and this will be done through a competitive bidding process to pre-qualified private sector storage players. The private sector player awarded will be the lowest bidder of the required type, quality and supporting infrastructure. The pre-qualification process should be open to all storage providers. However, given that food security is a national security concern and that private storage is only 26% of NCPB, a certain minimum nominal amount of storage will always be allocated to government facilities.[199]

CASE STUDY: Philippines

The Philippines agreed to an outright sale of its Post-Harvest Processing and Trading Centres (PHPTC), previously owned by local government units, to private parties. The PHPTCs are expected to operate as fully privatized entities with the government (under the DA and the Bureau of Agriculture and Fisheries Products Standards (BAFPS) quality accreditations system) playing a regulatory role.[200]

Improved operational efficiency through the use of real-time digital monitoring systems for monitoring of stock

To facilitate adequate and effective planning of reserve operations, there is a need for accurate and timely information on the location, quantity, type and quality of stock. Currently the reserve does not have a standardized real-time system to monitor stock levels.

To achieve this, the flagship recommends that all storage facilities that are part of the food reserve system be fitted with a real-time digital stock-tracking system (e.g., 2D barcode system) to monitor movements of stock into, out of, and within various storage facilities of the reserve. This standardized monitoring system will apply to both private and government-owned storage and will be able to be monitored centrally. The type of data collected and transmitted by the system will include (but is not limited to):

- Stock-related data such as weight/quantity, grain type, moisture content, age, temperature, grade, fumigant levels, losses, etc.

- Details on the people involved in each transaction. For example, details on the farmer, approver, transport provider, miller, etc.
- Other relevant data such as geo-location, time and price/invoice data, etc.

CASE STUDY: Zambia

In Zambia, The Food Reserve Agency (FRA) and World Food Programme (WFP) agreed to test innovative procedures aimed at improving the quality of the maize in the FRA's supply chain and ensuring the capture and real-time transmission of key data from the Satellite Collection Points (SCPs) to the District Main Depot. The pilot showed that the use of mobile technology improved real-time data collection and usage within FRA operations, resulting in 100% accountability of stocks, improved tracking of transport movements and a database of purchases.[201]

Increase quality control

The Kenyan reserve system has suffered a couple of incidences of aflatoxin and maize rotting in the last 10 years leading to losses of more than 2.5 million (90 kg equivalent) bags.[202, 203, 204, 205] To remedy this, as part of the mandate of the SFRTF, all stocks should be rotated and not kept within the reserves for more than two years.

In addition to this, the flagship recommends that there will be increased guidelines and resources allocated to ensure food safety at the operational level. Examples of this include (but are not limited to):

- Consistent periodic random sampling for pests and diseases
- Use of hermetic bags or bulking where applicable
- Mandated temperature and moisture control for all reserve facilities
- Adherence to an internationally recognised body's food quality/safety standards
- Increased awareness and capability building for quality standards
- Periodic maintenance and cleaning of grain handling, drying equipment and storage facilities
- Scheduling cleaning and disinfection of storage facilities, etc.

It will be the mandate of the oversight board to ensure that all reserve storage facilities follow the guidelines outlined.

CASE STUDY: Ethiopia

The Ethiopian Food Security Unit developed in-house capacity for pest management, and served both government and NGO reserves in monitoring reserves and treating infested stock.[206]

IV. Separate price stabilization from the food reserve and make emergency food supply its primary mandate

The SFRTF oversight board currently has two primary mandates: to stabilize food supply and prices and to maintain adequate reserves in physical stock or cash equivalent for use during emergencies. Ideally, stock for emergency would be ring-fenced, but it is not uncommon for emergency stock to be used to stabilize prices.

Analysis of this buffer stock strategy shows that it is a comparatively cost-ineffective method of stabilizing prices in the market.

The recommendation is that the SFRTF focus solely on the management of the strategic food reserve for supplying food during emergencies, and that the price stabilization mandate be moved to National Treasury for three reasons:

1. To effectively influence prices, a large amount of physical stock should be bought or sold. This means that the reserve has to be oversized compared to the size required to satisfy emergency food needs, resulting in higher costs and more logistical complications in running the reserve.

2. If the reserve is to be used for both emergencies and price stabilization and is not appropriately sized for both mandates, it exposes the country to risk in case of unforeseen emergencies. This is because if the stock is used for price stabilization, it is more likely to fall below the level required to support the vulnerable population.

3. Past price data analysis shows that the effect of buffer stocks on price stabilization has been minimal in the long term, as markets adjust to better reflect available supply and demand when the reserve does not intervene.

Studies of other countries' mechanisms of price stabilization reveal several options, ranging from market-driven policies to more direct government interventions, as shown in *Figure 36*.

Analysing the various options available to the Government of Kenya for price stabilization and best practice from various countries, National Treasury (after transferring the mandate from SFRTF), should aim to:

1. Protect farmers, especially small-scale, against low prices through conditional cash transfers

Currently producer price support is done through paying above-market prices for produce by the SFRTF through NCPB. This approach has a couple of limitations. First, most small-scale farmers do not benefit due to low volumes, rent-seeking, long queues and payment durations. Second, it distorts the market as it encourages farmers to hold on to maize in anticipation that the food reserve will raise prices even further in the event of a supply deficit. Both of these ultimately result in higher consumer prices.

Global best practice provides an alternative method of supporting producers:

- First, determine and publish a minimum price for maize by county, using a modelling exercise that is transparent, pre-determined, fully costed and run at least twice a year. Many countries model minimum prices. This model should, at a minimum, look county by county at production costs, average farm size and other relevant agricultural data, with the goal of determining a price that protects efficient small farmers from losses. From this, a county household production cost is determined.
- Farmers register for the producer price support programme. Registration is designed to target smallholder farmers, but the maximum price (see following paragraph) also provides targeting and controls for leakage. This can be done in conjunction with other subsidy programmes run by the government (see flagship 2 for proposed targeted registration).
- At harvest time (twice a year in the case of maize), the market prices derived from a reputable third-party source are compared to the predetermined minimum price. If the predetermined minimum price is higher than the prevailing prices for the county, then each registered household is entitled

FIGURE 36: PRICE STABILIZATION OPTIONS FOR KENYA TO CONSIDER

Governments use a variety of tools to achieve price stability

LESS DIRECT → MORE DIRECT

	Market-based approached Description and Case Example	Government enabling market approaches Description and Case Example	Direct government interventions Description and Case Example
SUBSIDY PROGRAMMES		Subsidizing cost of private storage Set-Aside programmes **Facilitate market-based agricultural subsidies**[lxvi]	Government-controlled agricultural subsidies Minimum price supports and price ceilings
INSTITUTIONS FOR TRADING OR STORING PHYSICAL STOCK	Set up futures and options markets Enhance market information, e.g. commodity exchanges Improve storage and facilitate private (e.g. Warehouse Receipt Systems)		Buy/sell buffer stocks, e.g. through strategic food reserve
OTHER INTERVENTIONS	Promoting insurance and credit **Create improved crop production forecasting system**[lxxiv]	Facilitate regional trade (e.g. through trade treaties	Export and import tariff controls

RECOMMENDED IN OTHER FLAGSHIPS

RECOMMENDED ALTERNATIVE

SOURCE: Expert interview, FAO

to a rebate through a cash transfer, up to a maximum limit of an average yield of maize grown on one hectare. Payment is done at the household level, and not linked to amount of production. This means all farming households in the same county would receive the same amount of price support, favouring smallholder farmers.

- The model is regularly revised with new data to more accurately reflect production prices on a periodic basis.[lxxiv]

This system also offers the potential for future conditional cash transfers, based on purchase of particular inputs or extension services, etc., and as a way of improving the targeting of subsidies and driving certain behaviour.

In addition to this, a second component of farmer support is provision of storage to farmers during surplus periods through subsidies to warehouse receipt system operators. Referring to the Warehouse Receipts System Bill (2019), the Warehouse Receipts System Council will maintain a registry of certified warehouse receipt operators (public and private warehouses). For certified warehouses, in any county where electronic transfers are made during a harvest season (as above, only if market price is below minimum price set by the government), the warehouse operator will offer customers a reduced price per 50 kg bag of maize that amounts to the cost of drying to 13.5% moisture, subsidized through a payment from the same fund allocating transfers directly

lxxiv Proposed in the data flagship in the enablers | 2 Proposed in the subsidies flagship in the improving small-scale farmer incomes pillar

to farming households. The warehouse will only apply this discount for maize that is certified to meet the correct standard of moisture content.

First, it incentivizes warehouses to register and become certified by the Warehouse Receipts System Council. Second, it incentivizes the storage of surplus maize during seasons where prices are low. This has the effect of further price stabilization on the consumer side, as those stocks are sold later in the year (rather than becoming unusable because they were not dried and stored). Lastly, the subsidy is designed to reduce post-harvest losses by increasing drying facilities (either independent services or within certified warehouses). Overall, the subsidy is designed to improve the supply and demand of warehouse receipt services among smallholder farmers.[lxxv]

2. Protect vulnerable consumers from high prices through multiple price stabilization measures

Whereas producer price support has historically been in place in Kenya, consumer price support is relatively new. The most prominent example is the 2017 maize subsidy, where the government spent at least ~7 billion to ensure that the price of maize flour does not exceed KES 90 per 2 kg maize flour packet.[207, 208]

Analysis of this programme reveals that the subsidy, while effective in keeping maize prices at the recommended government price in the short term, would be ineffective as a long-term strategy, as evidenced by the fact that prices jumped by 33% as soon as the subsidy was lifted.[209]

Instead a better approach to protecting consumers from high prices would be a multi-tiered approach:

- The government, through National Treasury, explicitly adopts a maximum price for maize. This maximum price is determined by a transparent, publicly available, predetermined model that is independently evaluated and re-examined periodically.
- Forecasts are run to estimate future market prices
- If the forecast market prices are expected to be higher that the predetermined maximum price, then import tariffs are lowered to a predetermined level. If imports are insufficient to cover demand in the short term, a conditional cash transfer programme can be run for vulnerable households through predetermined targeting criteria.
- If crisis hits and an emergency is declared in a region or in the entire country (by international body), food is distributed from the reserve as a means of last resort.

County governments may also choose to build up their own independent storage capacity. However, this storage should not be used for direct price stabilization, but instead be used to provide farmers capacity to store their surplus produce, either through leasing or warehouse receipts. This, along with encouraging on-farm, farmer organizations and community-owned storage, can be used to address post-harvest losses and also be used in aggregation of produce in order to sell to the market or participate in bidding to the strategic food reserve.

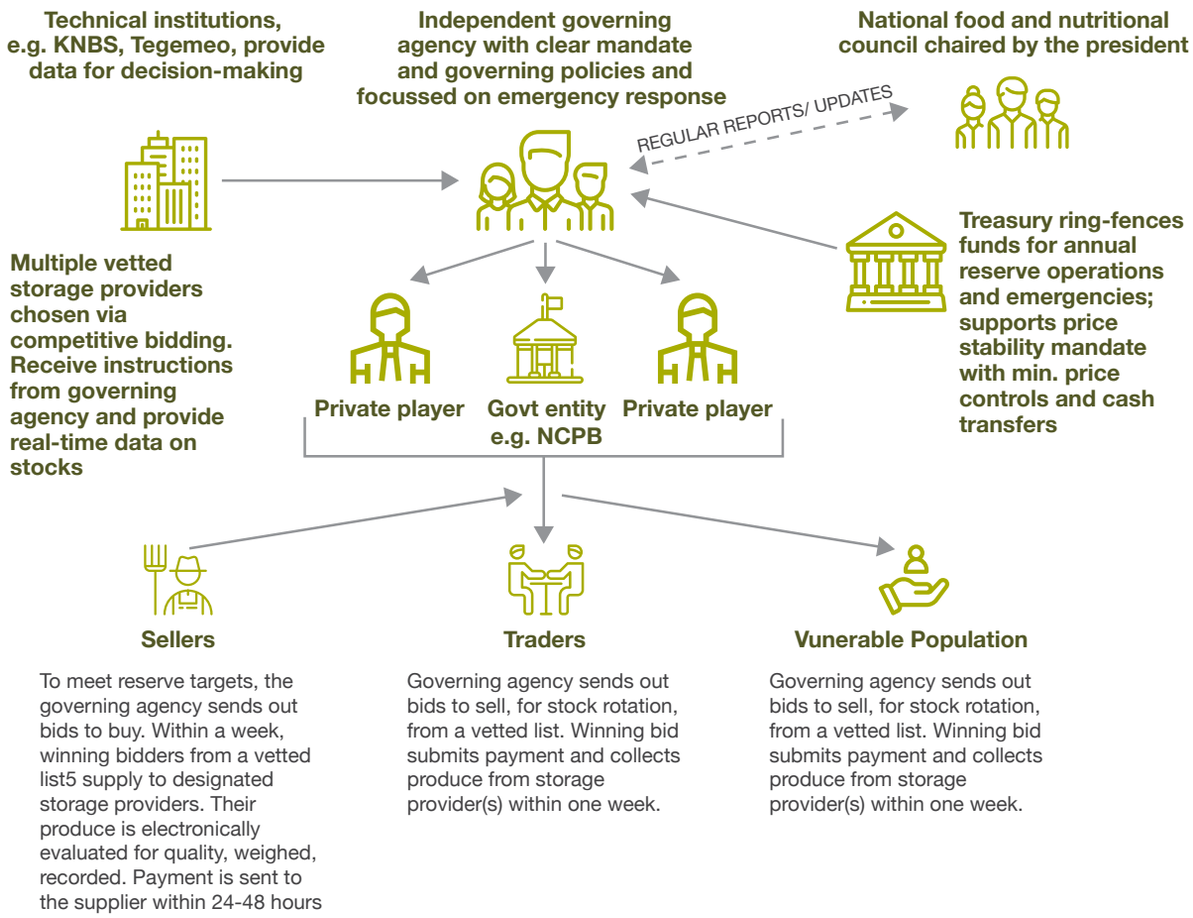
With all the proposed changes, the strategic food reserve system would be structured as shown in *figure 37*.

However, in order to achieve 100% food resilience during emergencies, transforming the food reserve system is not enough. The government will also need to expand upon currently running cash transfer programmes, e.g., Hunger Safety Net Programme, Chakula kwa jamii, etc. These can be used as more cost-effective and quicker methods of supporting vulnerable households in areas with good market access to food during emergencies (as opposed to sending physical stock), or to support chronically food insecure households during non-emergency periods..

lxxv Many warehouse receipts systems have suffered poor uptake from farmers, particularly smallholders growing staple crops. This is in part because farmers often have debts due at harvest time and cannot afford to finance the storage, and additionally because of the expense of drying costs. This warehouse receipt subsidy serves a number of purposes.

FIGURE 37: PROPOSED SCHEMATIC OF RESTRUCTURED FOOD RESERVE

The "ideal" food reserve system based on an analysis of the Kenyan context and global best practice



SOURCE: Expert interview

C. IMPLEMENTATION RISKS AND HOW TO MITIGATE THEM

Ensuring that Treasury is effective in protecting consumer and producers

One of the recommendations of the flagship is that the food reserve system will focus on the provision of emergency food and that the mandate of price stabilization will be moved to Treasury. To achieve the cost efficiencies that were envisioned in this recommendation, it is necessary to ensure that:

- There is adequate political will to move the price stability mandate from the food reserve system
- Treasury is insulated from political interference when determining price controls to ensure evidence-based decisions
- Treasury receives sufficient political, financial and capability-building support

Otherwise producers risk having low market prices for their commodities and/or consumers risk experiencing unreasonably high prices for food.

Ensuring proper targeting of vulnerable/in-need population

This flagship recommends targeting both the in-need producers and consumers for the price stabilization and proactive targeting of vulnerable households to identify needs and size the reserve. This targeting needs to be done correctly to ensure that the correct producers/consumers receive price support, the reserve is sized correctly, and the food is

sent to the most appropriate locations during emergencies.

It is also important that the expansion of currently existing cash transfer programmes to target the food-insecure in the whole country is phased appropriately. Because these programmes currently only operate in ASAL regions, there may be a need to refine their targeting criteria to accommodate the different needs of high-productivity and urban areas.

Ensuring fair, transparent allocation of reserves storage and quality control

The bidding for allocating the storage of commodities for the reserve needs to be done in a fair and transparent process that is open to public scrutiny. Given that some of the strategic reserve stock will be stored in non-government facilities for the first time in the reserves history, there is need to ensure a robust method of monitoring and evaluation by the SFRTF. Also, as a minimum requirement, all the non-government storage facilities have real-time tracking infrastructure that is interoperable with existing tracking systems at government facilities, to allow tracking all facilities by SFRTF

Climate change and other unforeseen environmental factors

One of the recommendations of the flagship is that the size of the reserve should be based on the number of vulnerable population and lead time to import food aid. Because of climate change and other unforeseen environmental factors, the number of vulnerable population could increase significantly compared to previous years. Also, any large unforeseen variances in the lead time to import (e.g., occasioned by a global food crisis as was the case in 2008) could expose the country to food shortages during the emergency.

D. KEY MILESTONES

1. **Pass necessary legislation and enact policy changes to support recommended governance changes:** These include changes in legislation to move the price stability to Treasury and policy changes to SFRTF to allow for private storage and new buy/sell policies, and emergency targeting/trigger criteria

   – Responsibility: Treasury, MoALFI, SFRTF oversight board

   – Start date: Q3 2019

2. **Add a material amount of beans to the reserve:** Creating batches/phasing, bidding process, transport, and import if necessary

   – Responsibility: SFRTF oversight board

   – Start date: Q2 2020

3. **Streamline operation of NCPB and other storage facilities for the reserve:** Involves installing real-time systems, pilots, stricter quality procedures, capability building of staff

   – Responsibility: NCPB, SFRTF oversight board

   – Start date: Q1 2020

4. **Introduce private storage participation to the reserve:** Involves defining terms of engagement and monitoring and evaluation procedures, as well as determining bidding process, pilot roll-out and batch sizes

   – Responsibility: SFRTF oversight board

   – Start date: Q1 2020

5. **Formally transfer price stability mandate from SFRTF to Treasury:** Includes formal handover once legislation is passed

   – Responsibility: Treasury, SFRTF oversight board

   – Start date: Q2 2020

Note: All flagships need to be further detailed to move from strategy to implementation, and achieve the milestones laid out above. See NAIP for conversation on immediate next steps.

FLAGSHIP 6: Boost food resilience of ~1.3 million farming, pastoralist and fishing households in ASAL regions through community co-created design, and more active coordination of development partner, government and private sector resources

A. OPPORTUNITY

Arid and Semi-Arid Lands (ASAL) regions cover ~90% of Kenya's land area, and are home to ~35% of the population (~17 million).[210] Vision 2030 Development Strategy for Northern Kenya and other Arid Lands defines 30 counties in ASAL;[lxxvi] in the first five years the ASTGS focuses on the 16 most arid that require specific food resilience interventions. They are: Embu, Garissa, Isiolo, Kajiado, Kitui, Laikipia, Machakos, Makueni, Mandera, Marsabit, Samburu, Taita Taveta, Tana River, Turkana, Wajir, and West Pokot (*see Figure 38*).

These areas lag behind on multiple social and economic development indicators. Women's empowerment is low with women farming crops while men manage the livestock.[211] Cereal yields are 50% lower, with over 60% of the population living below the poverty line, and the majority of the counties' nutrition situation ranges from Phase 2 "alert" to Phase 5 "very critical" in the Global Acute Malnutrition, Weight for Height Z-Score (GAMWHZ).[212,lxxvii]

In the past decade, Kenya has launched multiple ASAL-focused strategies and policies designed to raise ASAL food security and development to levels generally enjoyed across the rest of the country. These include: Vision 2030 Development Strategy for ASALs, 2011; Sector Plan for DRM and EDE – 2013-17; Sessional Paper on National Policy for Development of ASALs; Vision 2030 Development strategy for ASALs; and Constitutional Provision of Equalization Fund for marginalized counties. The interventions in these documents have centred on peace and security, climate-proofed infrastructure, human capital, sustainable livelihoods, drought risk management, institutional development and knowledge management.

The counties also have multiple policies and strategies to address their specific challenges, such as the Draft Wajir County Feed Policy 2017, the Wajir County Rangeland Management Bill, 2016, Makueni County Sand Conservation and Utilization Act, 2015 (No. 1 of 2015), Machakos County Agricultural Development Fund Act, 2014 (No. 6 of 2014), and various efforts to customize policy and legislation for effective rangeland management in Marsabit County.

At the same time, national organizations and bodies have been created to coordinate ASAL resilience and emergency initiatives including National Drought Management Authority (NDMA), the Council of Governors ASAL Committee, the development partner-led ASAL Donor Group, and the ASAL Stakeholders' Forum. In the past five years, the government and development partners have funded agricultural projects worth ~KES 17 billion in the 16 counties.[213]

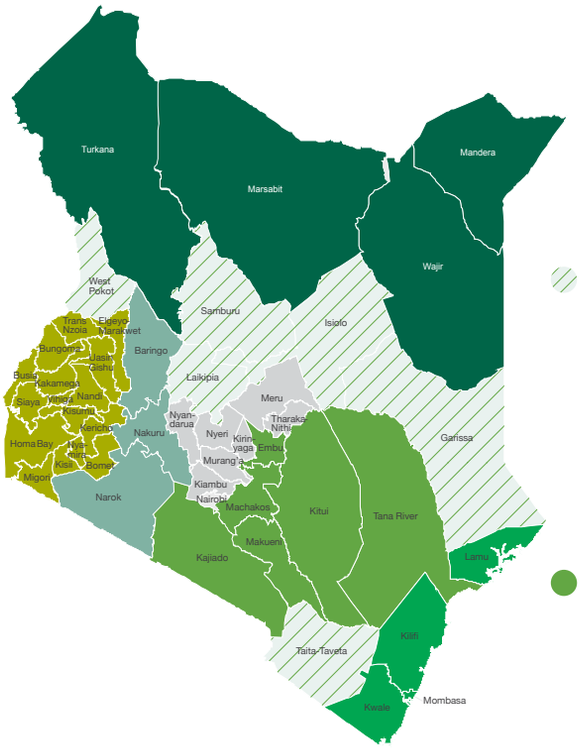
Despite all this, ~1.3 million ASAL households (~7.2 million people) in these communities remain chronically food-insecure and highly vulnerable to drought. [lxxviii]

For example, despite potential to exploit the highly productive ecosystem of the world's largest alkaline and permanent desert lake, ~94% of people in Turkana live below the national poverty line and a 'Very Critical' nutrition situation persists (Phase 5; GAMWHZ≥30%).[212] As a result, Turkana receives the biggest proportion of EDE-related development partner funding, with over KES 22 billion worth of projects invested in the

lxxvi Turkana, Mandera, Marsabit, Wajir, Garissa, Tana River, Taita Taveta, Makueni, Kitui, Embu, West Pokot, Samburu, Laikipia, Isiolo, Kajiado, Kilifi, Kwale, Lamu, Baringo, Narok, Meru, Tharaka Nithi, Nyeri, Kiambu, Homa Bay, Migori, Nakuru, Elgeyo Marakwet, Mombasa, Machakos.
lxxvii Phase2; GAMWHZ≥5 to 9.9% , to very critical. Phase 5; GAMWHZ≥30% | Kenya nutrition situation overview Arid and semi-arid areas, Kenya Food and Nutrition Security Seasonal Assessments, July 2017.
lxxviii People are chronically food-insecure when unable to meet their minimum food requirements for a sustained period due to extended poverty, lack of assets and inadequate access to productive and financial resources - An Introduction to the Basic Concepts of Food Security FAO.

FIGURE 38: TYPES OF FARMERS AND PASTORALISTS IN THE 16 ASAL COUNTIES

The ASAL region is home to 1.2mn farming households with practices aligned to the specific region's climatic conditions



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NORTH ASALS

Pastoralist, camels
Soil: sandy, saline, shallow, low fertility
Rainfall: <200-600mm, 1 season, November
Income (KES/month): <10,000
Farm size: group ranches

RIFT VALLEY ASALS

Mixed staples, cash, livestock
Soil: mixed shallow/low with deep/highly fertile
Rainfall: 600-1,200mm, 1 season, March
Income (KES/month): 30,000
Farm size: 2-60 acres

0.3m

CENTRAL ASALS

Pastoralist, cattle
Soil: saline, weak, low fertility
Rainfall: 400-800mm, 1 season, November
Income (KES/month): <10,000
Farm size: group ranches

COAST

Coast – mixed staples & cash
Soil: mix of sandy, deep, low and high fertile
Rainfall: 600-1,200mm, 2 seasons, Apr-Jun, Oct-Dec
Income (KES/month): <10,000
Farm size: 1-10 acres

0.5m

SEMI-ARID UPLANDS

Dryland crops
Soil: red, acid, low to moderately fertile
Rainfall: 600-1,200mm, 1 season, November
Income (KES/month): 15,000
Farm size: 2-5 acres

1.0m

CENTRAL HIGHLANDS

Cash crops
Soil: deep red highly fertile with some clay
Rainfall: 1,600->2,000mm, 2 seasons, March and November
Income (KES/month): 30,000
Farm size: 2-5 acres

1.6m

WESTERN

high population density, mixed staples & cash
Soil: mix moderate-deep red of medium-high fertility
Rainfall: 1,200-1,800mm, 2 seasons, long season in March, short season in November
Income (KES/month): 15,000
Farm size: 0.5-5 acres

 # ESTIMATED FARMING HOUSEHOLDS[lxxix]

SOURCE: ASTGS Working Team Analysis, Expert Interviews, Climate Hazards Group Infrared

region between 2011-2015.[214]

However, development partners allocate just a small portion (~4%) of the KES 22 billion to climate-smart agriculture, on-farm enterprise development and agricultural-related infrastructure.[215] It is the same at the county level where less than 2% of Turkana's 2013-14 budget is allocated to the pastoral economy, even though 70% of the population are pastoralists.[216] There is also very little mention of interventions geared to improve fishing in the county.

Interviews with development partners and county leaders articulate the interventions required to reverse these trends and achieve food resilience in the ASAL region, which include drought-tolerant crops, animal feeds and health, water availability and management,

lxxix An average of 6 people per household.
lxxx Total households = 1.2mn, members per household = 5 according to the Kenya Integrated Household Budget Survey. We further assume that each household has two farmers (male and female), giving a total of ~2.4mn farmers in ASALs. Other household members are assumed to be outside of working age

FIGURE 39: CATEGORIES OF ASAL FOOD RESILIENCE INITIATIVES

	Current Initiatives	Examples of current projects/programmes
Promote drought-tolerant varieties	Promote growing of traditional drought-tolerant crops Promote rearing of non-traditional livestock (e.g., poultry, drought-tolerant breeds of cattle)	Commercialising traditional staple crops
Improve feed and feedlot availability	Improve grazing management Increase feed/fodder production Promote low-cost forage conservation and storage Use crop residues as fodder to reduce waste	Drought Resilience and Sustainable Livelihood Programme
Improve water and natural resource management	Promote water harvesting, conservation and small-scale irrigation Promote soil rehabilitation and conservation Promote climate-smart and sustainable use of natural resources Implement Institutional and policy reforms	Kenya Climate-Smart Agriculture Project
Reduce risk though insurance	Monitor vegetation index Issue government-subsidised insurance for livestock	Kenya Livestock Insurance Programme

SOURCE: ASTGS Working Team Analysis; Expert Interviews

index-based insurance on crops and livestock (*see Figure 39*).

The interviews also reveal two challenges to identifying, developing and implementing these interventions: community involvement in intervention design and implementation, and coordination of all national, county and development partner stakeholder (*see Box 9*). Kenya can learn from its own experience and that of others (e.g., India coordinated stakeholder participation to bring about transformation in agriculture in an arid state – *see Box 13*) to address these challenges and even improve these regions' food productivity levels.

BOX 12: CHALLENGES IN ASAL INITIATIVE IMPLEMENTATION

The two major challenges hindering food resilience in ASALs as articulated by stakeholders

Community involvement

"There are so many boreholes in areas where the pastoralists will never go, the drilling was based on availability of water and not people" – *Council of Governors*

"We had some development partners in this county running capability-building programmes for six years. The communities started declining to attend these and pushed for implementation support, that was a turning point for the county" – *County Agriculture Executive*

"There are abattoirs spread all over the ASAL regions, partly this is our fault as development partners. We did a poor job of convincing the local communities why selling their livestock while still healthy is good" – *Development Partner*

"Cultural shift is required for the real transformational projects to succeed, the best way to do that is to involve the community…for herd management to work, model farmers have to share their success stories on how they have reduced livestock losses through proper management of herds. This can be done on the local radio stations or at the markets" – *Former ASAL resident*

Coordination

"One of the biggest challenges we face is advancing conflicting programmes in the same regions; while we are developing market systems the government/other development partners offer the same solutions for free" – *Development Partner*

"County Executives [CECs] need to know all the resilience projects in their counties and understand where gaps exist– right now some do not know which development partners and NGOs are operating within the county" – *Head of a Department, Counties Economic Bloc*

"Through a coordination mechanism, development partners need to be held accountable to give a thorough report on impact of their resilience interventions and projects" – *Development partner*

BOX 13: INDIA CASE STUDY ON ASAL COORDINATION

CASE STUDY: Coordination delivers 8.2% growth in agriculture in India's arid state of Gujarat

Gujarat – semi-arid lands touching the Thar Desert do not have the look of an agricultural powerhouse. The drought of 1999–2000 was felt severely in the state.

The hallmark of the Gujarat agriculture transformation has been prioritization at the top echelons of the government and a high degree of coordination of government interventions at the state and grassroots levels. Since 2005, the state government has brought together farmers, scientists, officials, and ministers at the annual krishi mahotsav (agricultural conclave). This is followed by a month-long mass contact programme, in which krishi raths (agricultural department vehicles touring the state) visit every village to share knowledge and distribute kits to select farmers to promote new technology adoption through demonstration. Since functionaries from different departments visit the village at the same time, farmers receive holistic extension services.

To create an enabling environment for agricultural transformation, necessary agricultural infrastructure has been developed, including feeder lines to deliver electricity to farms and roads to connect almost all villages. Water management is at the centre of agricultural policy in Gujarat, including creation of canal irrigation potential through the Sardar Sarovar Project as well as a focus on community-based decentralized sources; and micro-irrigation has been promoted through subsidies.

The results of this coordinated effort are impressive. The area under micro-irrigation increased from nearly 50,000 acres 2003–04 to ~345,000 acres in 2009-10. Agriculture and allied sectors have grown by an unprecedented 8.2% annually.

1.3 million ASAL HOUSEHOLDS IMPACTED

6 ALREADY COMMITTED TO THE 16 ASAL COUNTIES BY DEVELOPMENT PARTNERS UNTIL 2025

USD 220mn MAJOR STAKEHOLDER GROUPS EFFORTS COORDINATED INCLUDING COMMUNITIES, COUNTY GOVERNMENT, REGIONAL ECONOMIC BLOCS, NATIONAL GOVERNMENT, DEVELOPMENT PARTNERS, PRIVATE SECTOR

B. FLAGSHIP DESIGN

Overview

The ASAL resilience flagship will involve communities in initiative design and implementation, and coordinate national, county, private sector and development partners. The interventions will be tailored to the needs of the communities to form a prioritized list of interventions to increase drought-resistant crop production, improve animal health and feeds availability, increase water availability and management, and increase the uptake of index-based insurance.

Impact and investment

By year five of implementation, this flagship is estimated to impact:

- Total agricultural sector value created (agriculture GDP increase summed over five years): ~KES 2.4 billion
- Increase in agricultural GDP in year five: ~KES 0.9 billion

- **Farmers impacted:** ~2.5 million farmers (~1.3 million farming households)
- **Investment required over five years:** ~KES 0.5 billion[xxxv]
- **Counties impacted:** 16 selected counties of Embu, Garissa, Isiolo, Kajiado, Kitui, Laikipia, Machakos, Makueni, Mandera, Marsabit, Samburu, Taita Taveta, Tana River, Turkana, Wajir, and West Pokot in first wave, expand to the other ASALs in second wave

Design

The counties and stakeholders should follow a five-step process to determine the community-driven interventions required, and coordinate stakeholders for implementation

Step 1: Profile the communities

ASAL communities vary greatly in terms of economic activities, cultural practices and demographics, and often cross-county borders. County governments should seek to create farmer/pastoralist/fisherfolk profiles by getting granular community-level data. These profiles should include the demographics and economic practices of the farmers, whether agro-pastoralists, pastoralists or fisherfolk, and where relevant, pastoralist migration and stock routes across counties.

Step 2: Involve the community in co-creating food resilience interventions

Each county should form resilience committees at each administrative level (village, ward, sub-county) comprising opinion leaders, women representatives, youth representatives, role model farmers and self-help group representatives.[lxxxi] The interventions from village, ward and sub-county levels will be consolidated to form the county-level representatives.

County governments will then facilitate a gathering of representatives from these resilience committees, development partners and private sector. The development partners should provide technical expertise and practical know-how to augment existing county-level expertise, and jointly support the profiled communities to co-create a demand-driven menu of interventions for funding and implementing stakeholders (development partners, county government and private sector) to select. These tailored interventions will include (as relevant): drought-tolerant crop farming, animal feeds and health, water availability and management, and index-based insurance (*see Figure 40* for an example of tailored menu of interventions and *Figure 41* for deep dives on livestock feed). They should also be prioritized based on demand, impact potential and ease of implementation. This will ensure that only community-driven interventions are implemented.

Step 3: Develop the operational plan

The next step is for counties to develop operational plans for all prioritized interventions and projects. The operational plan will determine feasibility and drive implementation. It should cover location profiles (including productivity and access to infrastructure), cost (operational and capex), KPIs (number of households impacted), milestones (including start and end dates), a map of the stakeholders involved and cross-cutting multi-project enablers (see Appendix 2).

Step 4: Set up coordination and governance mechanism for selected projects

To address coordination issues articulated by stakeholders in *Box 9*, the interventions and projects identified will be coordinated at national level through the Agricultural Transformation Office *(see Chapter 7)*, and at county level through the agriculture CEC.

Coordination will improve stakeholder activities at every project stage *(Box 12)*. The coordination structure is detailed in *Figure 42*. In summary, coordination in the ASAL regions must be led by decision making from the county and economic bloc levels, supported by development partners and national government as relevant. The ATO food resiliency team

lxxxi Farmers who defy harsh climatic conditions through drought-tolerant crop farming, keeping their own feed reserves, and irrigation.

(~four people, one per economic bloc, and one coordinating development partner across the blocs) will have no formal decision-making responsibility, but will facilitate decision making at the economic bloc level (e.g., with data, problem solving, liaising with the NDMA), and escalate decisions to the ASTGS Steering Committee as necessary.

FIGURE 40: SAMPLE MENU OF INTERVENTIONS TAILORED BY THE COMMUNITY

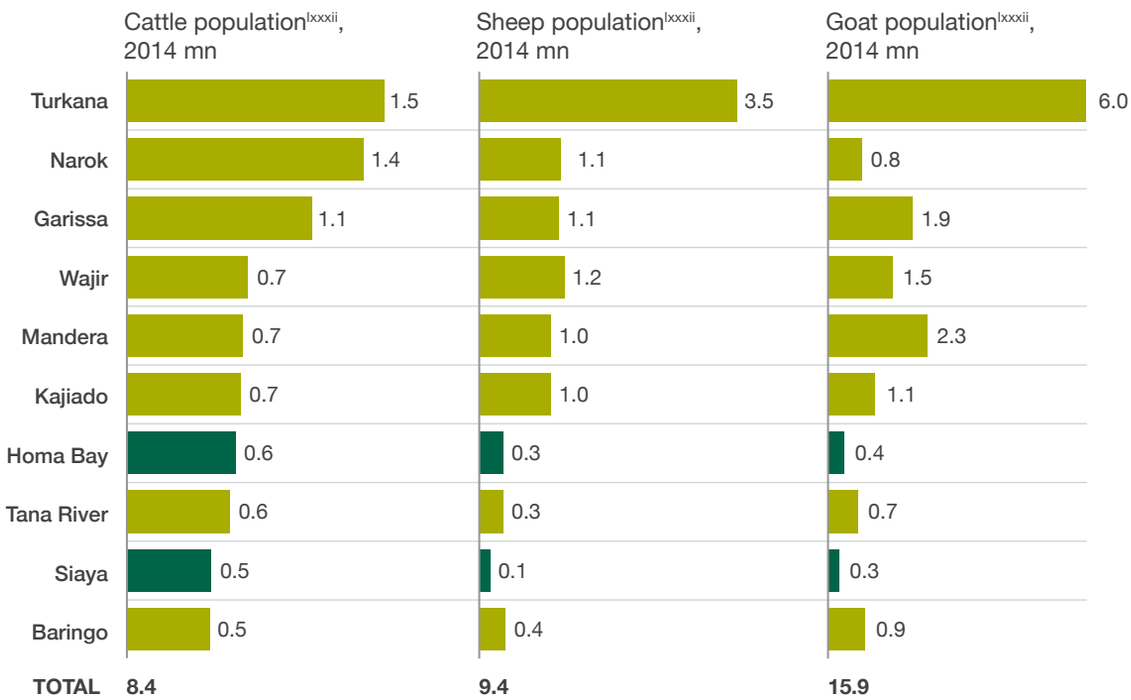
Menu of interventions	Proportion of communities with demand for intervention	Priority	Current status
drought-tolerant varieties – production to market			
Establish sorghum growing on 12,000 acres at location A	●	High	Planned
Establish drought resistant varieties of indigenous fruits on 10,000 acres at location B	◔	Medium	Ongoing
Identify a self-help group to re-establish cow peas on 5,000 acres at C	◔	Low	Fix current project
Livestock and fisheries – production to market			
Educate local community on herd management for maximum productivity and optimal use of resources	◔	Low	Ongoing
Develop communal grazeland management on 10,000 acres – including reseeding	●	High	Ongoing
Establish 100 aquaculture ponds and provide 5 tonnes of fish feed p.a. and fingerlings in area A	◔	Medium	Ongoing
Create feed reserve for each community with a capacity of 9 months' supply to cover for maximum drought months	●	Medium	Failed
Set up 5 feedlots to supply the abattoirs with a total annual capacity of 500,000 heads of cattle	◔	Medium	Failed
Provide fishing boats and monitoring to support security	●	High	Not started
Natural resource management and water availability			
Establish 20 boreholes with human consumption-quality water required in allocated area A	◑	High	Ongoing
Develop 2 major rain/surface water harvesting projects with Israel technology support	●	High	Not started
Establish 16 water pans required for livestock in village center	◑	Medium	Failed
Soil rehabilitation of 2500 acres in A county	●	High	Not started
Build youth capability to construct farm ponds	●	High	Not started

● HIGH
● LOW

SOURCE: ASTGS Working Team Analysis; Expert Interviews

FIGURE 41: DEEP-DIVE ON LIVESTOCK FEED

ASAL livestock populations are concentrated in goats around Turkana, Narok and Garissa



Cattle and sheep are more susceptible to drought than goats as they are forage mostly on grasses, which reduce more during droughts, compared to goats, which mostly forage on shrubs and trees

70-90% of employment and family income in the ASALs comes from livestock

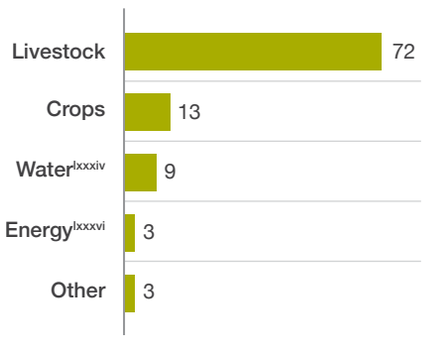
SOURCE: Economic Review of Agriculture 2015, Expert Interviews

lxxxii Includes livestock used to produce both milk and meat.

continued FIGURE 41: DEEP-DIVE ON LIVESTOCK FEED

Several interventions have the potential to reduce livestock loses during droughts, with feed being particularly impactful

Drought losses
Losses by sector for 2008-11 drought, %



Between 2008-11, drought cost an estimated **KES 64bn** in losses, with **KES 56bn value lost in livestock** mostly due to animal death

In the past 10 years, there have been at least 4 droughts with an estimated 10-30% of livestock lost due to death during each drought

Interventions to reduce livestock losses during drought

Intervention	Description	Pastoralist value saved[lxxxiii]	Scaleability[lxxxiv]
INCREASE FEED AVAILABILITY DURING DROUGHTS	Feeds to be **stocked up** at the county/community/on-farm level **during surplus periods** and **used during drought** Feed sized to meet demands of **core breeding and lactating herd**. This can be used to replenish the herd and produce milk during the stress period	● Scaleable as pastoralists retain their herd	● Herd can be rebuilt as only the non-core herd is vulnerable
SELL BEFORE DROUGHT STARTS	Involves **selling most or all livestock** in anticipation of drought **Cultural challenges**, e.g. cattle are viewed as a sign of wealth, prohibit this from being scaled	● Pre-drought value retained	● Unlikely to sell whole herd
SLAUGHTER DESTOCKING	Government/traders buy severely malnourished animals for **slaughter (up to <1% of pre-drought price)** Relief programmes sometimes use the slaughtered meat to **feed the vulnerable population** from whom the cattle was purchased Milk production can be up to **80% less** compared to pre-drought levels	● Low value of livestock sold post-drought	● At this stage almost all pastoralists are willing to sell

DETAILS TO FOLLOW
● HIGH
● LOW

SOURCE: Expert Interviews, NDMA, REGLAP secretariat, Kenya Post Disaster Needs Assessment 2012

lxxxiii Measures the reduction of loss of livestock value of the intervention in case of a drought compared to the baseline (where nothing is done).
lxxxiv Measures the short-term (less than 5 years) feasibility of the intervention to be scaled up from their current sizes to all ASAL counties.
lxxxv Includes water and sanitation.
lxxxvi Loss in energy production.

continued FIGURE 41: DEEP-DIVE ON LIVESTOCK FEED

Recent piloted models of livestock feeds intervention in ASAL show potential to scale up through better coordination

Piloted models	Description	Challenges	How coordination will help scale up
Community-owned forage/ranching	Local community sets **aside land for grazing** to be used during droughts or feed deficits	**Cultural barriers** and beliefs that no one should own grass	Have cultural barriers identified for each country and **targeted sensitization interventions** concurrently as the feed infrastructure is built
Community-owned storage	Local smallholder feed producer groups **aggregate production** in **feed banks/hay sheds**; non-members can **rent storage** space at a fee	**Small stored quantities** cannot sufficiently serve all the livestock	**Build and distribute** all feed storage according to **anticipated demand** during stress periods
Private feed farming and storage	Private producers with on-farm storage use local community to harvest and use **part of the harvest feed as payment**	**Lack of quality seeds** for drought-resistant feed varieties	**Coordinate seed and feed production** initiatives to meet anticipated demand
Private feed storage traders	Traders set up central stores where **they buy and sell feed** from/to the local community	Insufficient feed during droughts and little demand during surplus	Counties to **identify market gaps** to allow traders to have larger access to markets
County government purchases	Some **county governments buy directly from producers** to redistribute to drier areas	**County has no storage** of its own – little control over supply; small individual quantities stored/produced complicates logistics	Each county identifies needs and plans initiatives to scale up fodder production and **institutes county level storage**

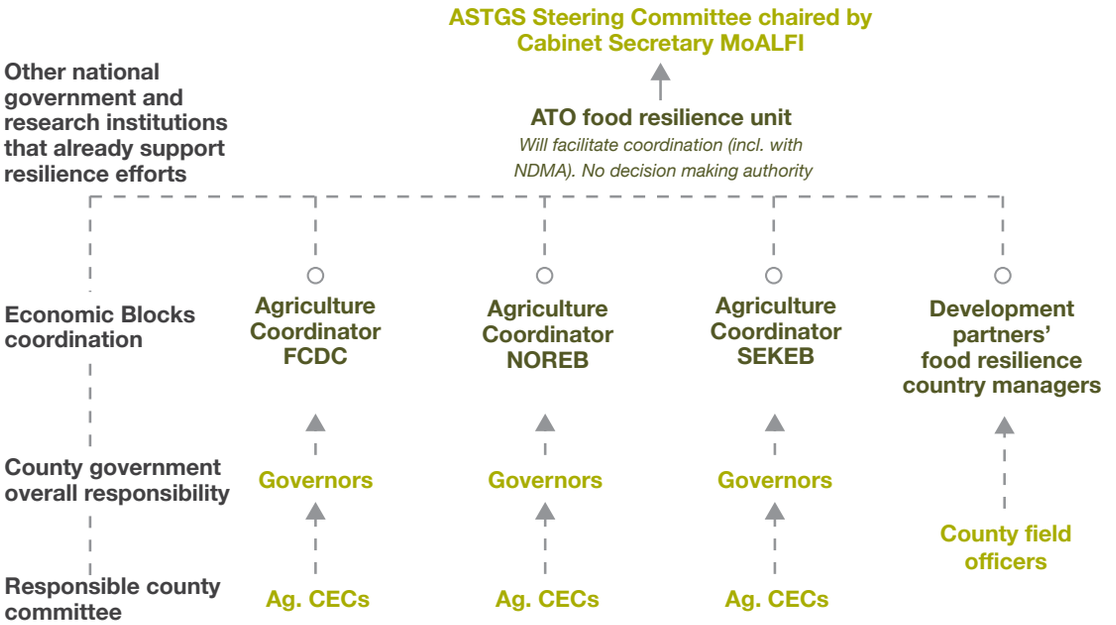
SOURCE: Expert interviews

BOX 14: SAMPLE ACTIVITIES BY PROJECT STAGE TO IMPLEMENT "MENU"

Project stage	Coordination unit responsibilities
Origination	Bring alignment on the definition of food resilience in ASALs Maintain national (consolidated from the economic blocs) menu of food resilience interventions for stakeholders to choose from Ensure all intervention and project design are end-to-end Facilitate development of exit strategies for stakeholders in the design stage Coordinate sharing of best practices and lessons learnt
Development	Facilitate formation of consortia for large-scale projects which require multi-country and multi-county involvement Set procurement standards that implementing stakeholders should observe Coordinate joint efforts between national and county government, e.g., creating enabling environment for private sector participation
Implementation	Drive rapid ramp-up of projects between phases Facilitate resolution of bottlenecks especially where other government ministries are involved Coordinate problem-solving sessions to turn around off-track interventions and projects
M&E	Structure M&E for implemented projects against KPIs; this will inform next round of project origination

FIGURE 42: STRUCTURE OF COORDINATING MECHANISM FOR FLAGSHIP 6

Coordination in the ASAL must be led by decision making from the county and economic bloc levels



ILLLUSTRATIVE
SOURCE: ASTGS Working Team Analysis

Step 5: Build local community capabilities to drive existing and new interventions sustainably

Flagship 9 broadly covers agricultural transformation sustainability. In this section, the focus is on ensuring the implemented food resilience interventions and project's sustainability and ability to scale. Local community capability to drive this will be enhanced through:

- Building local community capabilities throughout implementation to engender a sense of ownership and belief that it is possible to improve food resilience.
- Identifying community champions to share success stories on local radio and at marketplaces. These will include pastoralists who have reduced livestock losses through animal feed reserves, commercialising livestock herds (selling at the right time) and ensuring access to animal health services, and women and youth groups that have reaped harvests in all seasons by planting drought-tolerant crops.
- Establishing mass contact programmes through which county and development partners running the project visit communities to share knowledge and sensitize communities on how the programme could solve their biggest resilience problems.
- Structuring and scheduling community-centred M&E to discuss overall project performance and take corrective action where necessary.

Makueni has achieved a lot through community involvement and coordination and provides a model for other ASAL counties to emulate *(see case study below)*.

The roll-out of this flagship will be broken into two phases. Phase one will be a pilot and will be in four counties for the first two years of implementation. The mix of the first four counties will consider the county governments' capacity in carrying out the five steps, the estimated potential impact, and geographical location/representation. Phase two will then be an expansion of the flagship to the other

12 counties, incorporating lessons learnt while implementing phase one.

At the beginning of the process, the MoALFI, in conjunction with county governments, will meet with development partners already carrying out interventions in the ASAL regions before the launch of the flagship, or as soon as possible afterwards.. This will be used as a platform to gather data on the impact achieved of past interventions across different metrics and used establish a baseline against which flagship 6's impact will be measured. Metrics to be shared include (but are not limited to): amount spent, intervention duration, households affected, key area of focus for the intervention. This data will then be handed over to the food resilience unit of the ATO once this has been set up.

CASE STUDY: Makueni agricultural transformation through community involvement and coordination

Makueni county government made a deliberate decision to improve food resilience of its people and agricultural production. **County officials at each administrative level engage community to design and prioritize interventions.** The people get to decide on project locations, e.g., mango processing factory in Kalamba and dairy processing factory in Kikima. **The county also coordinates all the stakeholders working in the county to focus on the identified resilience needs. This helps in reducing duplication and prioritizing high-impact interventions. Through this coordination the county switched from capability building that had limited demand, to more demand-driven implementation.**

The county political leadership is keen to govern the resilience agenda. Each project is **approved through a cabinet paper and signed by the governor.** The **governor makes impromptu visits** to the project sites to ascertain correctness of progress reports and offer input to implementation teams.

On sustainability, the county is open to community ownership though selling shares to cooperative societies. The idea is to institutionalize projects and transform them to business entities to ensure continuity even after county involvement. Further, county is putting in place legislations and policies to guarantee continuity of process and practices even with change of political leadership. There are also multiple model farmers in each selected food chain who offer training to the communities. The county has undertaken massive rainwater harvesting campaigns through farm ponds, these are now incorporated on all infrastructure projects. For example, the county government requires road contractors to collect all run-off water into farm ponds along the full stretch of new roads.

The result has been **increased implementation of community-driven interventions and reduction in poverty level from 65% to 63% within five years** (county measurement).

C. IMPLEMENTATION RISKS AND HOW TO MITIGATE THEM

Ensuring responsible bodies have sufficient resources and capacity

It will be critical to combine existing current coordination bodies through a dedicated food resilience team within the ATO and ensure all the data needed from the development partners to coordinate existing and new food resilience programmes is available. Development partners interviewed expressed support for a coordination unit that helps reduce duplication of effort and sub-optimal deployment of scarce resources. There is also a need to ensure that coordination does not become a bureaucratic hurdle, i.e., the ATO should have sufficient authority not only to act upon agreed interventions, but it should be flexible enough to respond to evidence-based feedback or unexpected changes in implementation.

The county governments will also need support (both financial and technical expertise) to ensure they are properly equipped as they go through the five steps recommended by this flagship effectively.

Aligning with current projects and priorities

The government and development partners have already committed funds to multi-year projects; these will need to align existing projects to community-prioritized interventions.[lxxxvii] Also, development partners' country requirements may be a bottleneck to forming consortia required in delivery of projects of scale; this can be solved through the coordination mechanism, which will provide a forum for all stakeholders to share views on how best to collaborate.

lxxxvii e.g., Red Cross' Ndengu revolution to be focused on counties that have this as their priority, JICA water for livestock project – EcoRAD 2 – to be focused on counties with this need.

D. KEY MILESTONES

1. **Set up the national food resilience coordination unit at ATO,** with the responsibility for communicating new intervention identification processes, coordinating stakeholders' actions across the five steps of flagship design, and running performance monitoring across the community interventions to share with the rest of the ATO office. The food resilience unit will need to have fully set up a functional coordination unit by the time steps 1-3 are completed as stipulated on the flagship design. It will need to structure a governance and coordination mechanism among national government, county, development partners, private sector and the community; develop a meeting cadence for the ASAL economic bloc representatives and development partners; develop a yearly M&E schedule for initiatives/projects implemented in the year and communicate it to stakeholders; coordinate capability building to enable counties to drive community involvement and feasibility studies; establish a mechanism to disseminate lessons learned and apply best practices to transfer knowledge; and provide any additional services required.

   – **Responsibility:** MoALFI

   – **Start date:** Q3 2019 with biannual progress reports to the national government

2. Finalize community mapping and profiling for the first 4 counties to determine the number of communities, cultural practices, economic dynamics, demographics and stock routes. Undertaken in conjunction with the development partners operating in county, and extension officers. Exercise repeated every five years to give time for implementation.

   – **Responsibility:** County governments

   – **Start date:** Q4 2019

3. Develop a list of community-driven interventions. Establish resilience committees at each administrative level. Hold community involvement sessions and develop a list of most-demanded interventions. Develop menu of intervention and prioritize food resilience interventions in order of demand, impact and ease of implementation. Develop an inventory list of all the ongoing, completed or stalled projects and interventions. Compare this list against the prioritized menu of interventions and identify gaps. Refresh interventions every four to five years.

   – **Responsibility:** County governments with coordinating support from ATO and development partners

   – **Start date:** H1 2020

4. Roll out phase two to the rest of the 12 counties: incorporating lessons learned from phase one, and go through the five steps of the flagship

   – **Responsibility:** County governments with coordinating support from ATO and development partners

   – **Start date:** H1 2021

Note: All flagships need to be further detailed to move from strategy to implementation, and achieve the milestones laid out above. See NAIP for conversation on immediate next steps.

4.4 ENABLERS

The enablers sets of initiatives required to transform Kenya's agricultural sector cut across all flagships and provide the conditions required to implement them. Three in particular are important for the ASTGS: building knowledge and skill for those at the forefront of the transformation; investing in research and data platforms; and monitoring food system risks in sustainability, climate-resilient and crises management (i.e. for diseases, climate and global price shocks).

The three enablers are highlighted because they focus specifically on the six flagships in very clear ways. Other enabling initiatives, such as private resource mobilization, that have more specific implications for specific flagships have been covered within the respective flagship.

These enablers should be reviewed and updated as the needs of the anchors evolve and they begin to deliver the desired results.

FLAGSHIP 7: Launch three knowledge and skills-building programmes for ~200 national and county government leaders and flagship implementers (including 1,000 farmer-facing SMEs), and establish a digitally enabled extension programme led by ~3,000 county-based youth extension agents

A. CHALLENGES

According to two institutional assessment studies – the 2016 Capacity Assessment and Rationalisation of the Public Service (CARPS), and the 2017 Institutional Architecture Assessment (IAA), the Ministry of Agriculture and, notably, county-level agriculture departments face capacity-building needs.[217, 218] These assessments indicate capacity shortage in both technical skills (e.g., fact-based policy analysis and M&E) and non-technical skills (e.g., incorporating public participation and national-county consultation into policy design and implementation). These observations are corroborated by interviews with Ministry and county-level officials during the ASTGS development process.

This capability gap is expected to widen as current Ministry officials retire and there is limited succession planning. According to the CARPS report, half the staff at the Ministry of Agriculture are over 50 years old and due to retire over the
next 10 years.

The ASTGS provides an opportunity to address these needs. The agricultural transformation implies changes in the way that agriculture-related ministries, departments and agencies work, at both the national and county levels, and calls for knowledge and skills building to strengthen these institutions. The transformation will also require knowledge and skills building for other implementers, such as change agent SMEs and PPP officers. Also, crucially, extension service providers in the counties will need significant knowledge and skills building to spread knowledge of new agricultural practices and technologies to small-scale farmers and fisherfolk.

200 NATIONAL AND COUNTY TRANSFORMATION LEADERS TRAINED

3,000 YOUTH EXTENSION WORKERS HIRED, TRAINED AND DELIVERING RESEARCH AND DATA DRIVEN IT-ENABLED SERVICES

1:600 EXTENSION WORKER TO FARMS RATIO

B. FLAGSHIP SOLUTION

This flagship has three components: a leadership programme to build transformation-critical skills for national and county leaders and strengthen MoALFI for transformation delivery; a training programme to build relevant skills among operational-level implementers; and a programme to build capacity and revitalize extension services in the counties.

(i) Field-and-forum curricula for ~200 national and county government leaders

To succeed, transformations require strong leadership and implementation capabilities. Given limited resources, knowledge and skill building will first be focused on national- and county-level leaders who will be responsible for driving the transformation. The capability-building programme aims to equip Kenya's leaders and implementers with the knowledge, skills and mind-sets needed to drive and accelerate the transformation.

A transformation changes the way an organization works and requires shifts in people's behaviours and mind-sets. As the driver of Kenya's agricultural transformation, the MoALFI needs to optimize the structures, processes and practices that will drive these required changes, i.e., launch a change management programme.

The first step is to understand what needs to change by assessing how effectively the Ministry performs on strategy; leadership; work environment; talent and performance management; coordination and control; and innovation and learning. The Ministry should also identify new functions that might be needed after the transformation. It should then design the appropriate initiatives with the relevant stakeholders and develop an implementation plan.

The 2016 CARPS report suggests that succession planning should be a focus area given the high proportion of MoALFI staff expected to retire within 10 years. Currently, there is no clear plan to replace this talent. The Ministry will therefore identify key positions for which succession planning is needed, potential successors (internal and external), and individual development plans (including coaching and mentoring from retiring staff to maintain their knowledge). The gender ratio will be considered at all levels of the organization to address barriers to women's participation and advancement. The Ministry will also aim to attract youth into the agricultural sector to drive the shift towards more digital operations. Succession planning is crucial to sustain all improvements made during NAIP implementation.

The following leaders should be the first people to run a baseline assessment of their performance on strategy, leadership etc., before embarking on the proposed programme described below:

- National transformation leaders
  - MoALFI Principal Secretaries
  - Agriculture Secretary
  - MoALFI Directors
  - Agriculture Transformation Office Director and Manager
  - Heads of the PPP Unit, the Agro-Industrial Park Delivery Unit and Regional Development Authorities

  - Chair and members of the Council of Governors' Agriculture Committee
- County transformation leaders
  - Agriculture County Executives
  - County Chief Officers for Agriculture
  - County Chief Officers for Finance
  - Chairs of the County Assemblies' Agriculture Committee

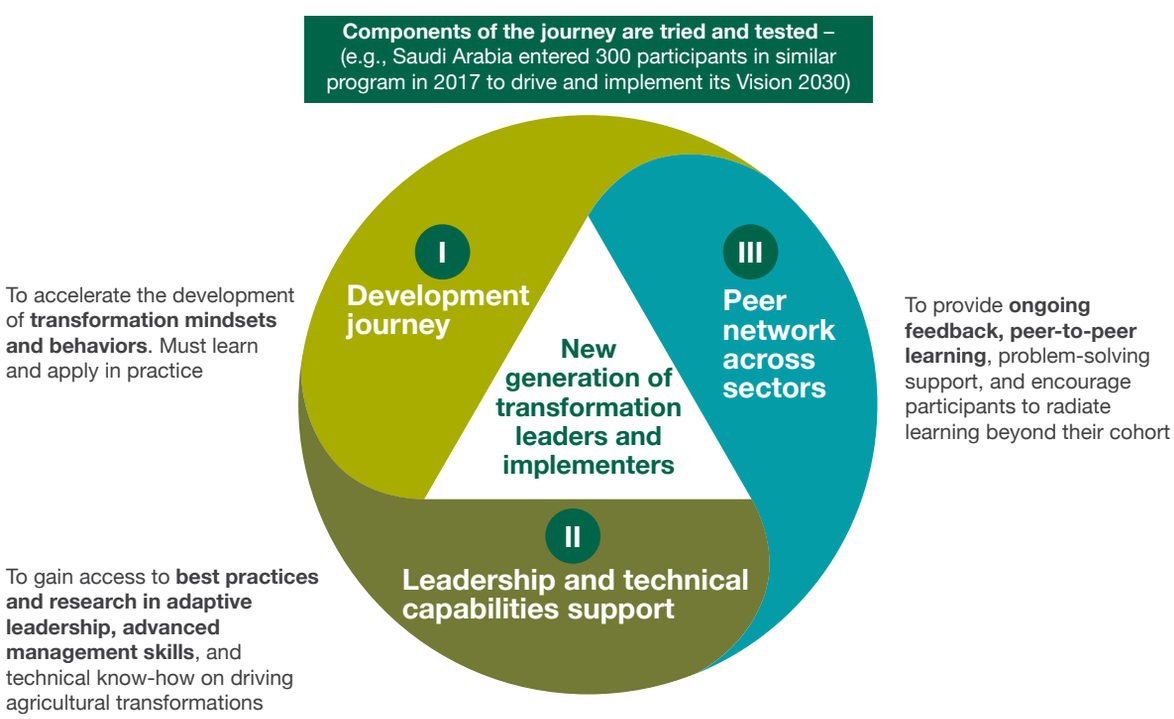
Their leadership training will focus on three components that work together to reinforce skill building *(see Figure 43)*.

The development journey will provide a real-world context (the "field") in which to apply the learning from the formal training (the "forum"). This "field-and-forum" approach builds on best-practice principles of adult learning and is used by private and public sector organizations across the world to build transformation capacity. The peer network reinforces the benefits of this approach by sharing skills developed and lessons learned across the transformation, and linking them to problem-solving bottlenecks that affect multiple areas.

- Development journey: Formal assignment for a leader to lead or implement a component of the transformation, (e.g., deliver a flagship or provide services to small-scale farmers in a specific area). For national and county leaders, the development journey will be to deliver a major component of the transformation, for example a flagship, for the entire country or a particular county. Performance will be tracked nationally by the ATO or at the county level by the relevant implementation

FIGURE 43: FIELD-AND-FORUM TRAINING FOR NATIONAL AND COUNTY-LEVEL LEADERS

Overview of knowledge and skill building programme components for national and county government leaders



Research indicates that only 30% of transformations succeed. The critical constraint is organizational behavior and capabilities, so a holistic approach to addressing these capabilities is critical.

SOURCE: ASTGS Working Team Analysis

management body, to ensure that progress is on track and help is given when needed. This will be done through flagship scorecards for transformation leaders to ensure incentives are aligned. Performance will be tied to financial and non-financial rewards. The objective of assigning these development journeys to particular leaders and implementers is to foster accountability for delivery and provide a learning environment in which they can apply the skills learned in their formal training curricula.

- Formal leadership and technical training: A training curriculum designed to impart critical skills to national and county transformation leaders and implementers. The training for national and county leaders will be in person with expert faculty, and will build on the skills specific to the transformation. To develop the curricula, the Ministry will partner with an organization experienced in building transformation capabilities for public sector organizations, which will co create the programme with experienced domestic educational institutions such as the Kenya School of Government, the Kenya School of Agriculture, or the Centre for Training and Integrated Research in ASAL Development (CETRAD) *(Figure 44)*. The on-demand building platform will leverage existing solutions or be developed in-house by the government.

  Training curriculum for the top ~200 leaders as well as the implementers should include content on the promotion of sustainability along specific value chains, climate change and natural sustainable resource management.

- Peer network across sectors: A cross-sectoral, international network of leaders who are leading or have successfully led agricultural transformations around the world and are available to stress-test ideas, share lessons learned and engage in person problem-solving. The network will supplement the formal training and transformation journey by introducing peer feedback and coaching, sharing lessons learned remove implementation obstacles. For national and county leaders, the network will be cross-sectoral and cross-country, providing access to leaders of agricultural transformations in other countries, e.g., Ethiopia, Indonesia, Brazil. They will be able to leverage these peers one on one on an ad hoc basis for coaching and feedback. Relevant leaders in related sectors, e.g., Ministry of Health officials who work on nutrition and food security, and leaders from the Ministry of Public Service, Youth and Gender Affairs, will also be part of the network.

  Another potential use of the network is to convene “mini-labs” — in-person problem-solving sessions involving transformation leaders, implementers and international peer network members, to debottleneck issues and accelerate implementation. Given its wide geographic scope, an implementation partner with extensive experience and contacts in agricultural transformations around the world will be needed to build the network.

  While not as formal, implementors within the country are encouraged to reach out to their local peers promote knowledge sharing across the country.

(ii) Skill building for public and private sector flagship implementers (including 1,000 change agent SMEs)

The following implementers will participate in the programme:

- Transformation implementers (focus of training curriculum)
  - ATO officers (project management and delivery, general management)
  - Change agent SMEs (business management, especially accounting, planning, inventory management)
  - Data officers (collection and preparation, database management, analytics, visualization)
  - Potential in future years to include: Planning officers (budget negotiation; resource disbursement M&E), PPP officers (procurement; M&E; feasibility assessment), project coordinators (budget

FIGURE 44: SAMPLE FIELD-AND-FORUM FORMAL TRAINING CURRICULUM

Field-and-forum curriculum content will vary depending on participant role

	Standardised curriculum for national and county leaders	Tailored curriculum for transformation implementers[xc]
LEADERSHIP	For all ~200 national and county leaders: **Personal leadership:** : Lead self and inspire others to breakthrough change **Adaptive leadership:** Foster innovation and risk-taking amongst followers **Transformation management skills:** Drive change forward with proven management tools; national-county transformation integration **Deliverology:** Ensure actual implementation on the ground **Financing:** Ensure continued funding for transformation; project financial management **Cross-sectoral coordination:** Ensure coordination on multi-sectoral issues, e.g. with Ministry of Health on nutrition issues	NATIONALLY-STANDARDIZED **ATO officers:** Transformation delivery skills **Change agent SMEs:** Business management training (e.g. bookkeeping, business planning, managing teams, inventory management) and assessment required in order to qualify under the scheme **New Farms Programme performance management officers:** Data collection and management skills **Project coordinators:** Project management and M&E skills **Strategic food reserve officers:** Quality control and stock tracking (e.g., with 2D barcode tools) **PPP officers:** Procurement, M&E, feasibility study analysis, grant-making, financing
TECHNICAL EXPERTISE	**Agricultural transformation analytics,** incl. evidence-based decision making **Policy analysis and impact** assessment **Private sector engagement** **Agricultural financing** and insurance **Frontline capacity-building** **Effective and efficient monitoring** and evaluation (M&E) frameworks	PROJECT SPECIFIC **Extension officers:** Area-specific best practices on input use and farming practices; digital extension apps management; gender-based differences in agricultural production and decision-making **Data platform personnel:** Use-case-specific data management **New Farms Programme performance management officers:** Region-specific agroecology and production best practices
	Curricula can be developed in partnership with KSG[lxxxviii], KSA[lxxxvix], etc.	**Nationally-standardized programmes - developed in partnership with private sector and NGOs - can be on web-based, on-demand platforms**

SOURCE: ASTGS Working Team Analysis

control; project management; M&E), strategic food reserve inventory personnel (use of reserve volume tracking system)

The implementers' skill training will be a more technical and narrower scoped version of the transformation leaders' one *(see right-hand side of Figure 38)*:

- Development journey: A formal assignment for a leader to lead or implement a component of the transformation. The implementers, i.e., the operational staff driving on-the-ground implementation in the private and public sectors, will be assigned a narrower scope of work within a flagship. An agro-dealer, for example, will be tasked with providing a reliable supply of inputs to farmers in a specific zone. Performance will be tracked nationally by the ATO or at the county level by the relevant implementation management body, to ensure that progress is on track and help is given when needed.
- Formal leadership and technical training: Implementers will receive web based training via on-demand curricula based on audio, videos and text that can be accessed by new implementers or existing implementers who want to refresh their skills. All implementers will be required to take the relevant training and pass an online assessment prior to operating in an ASTGS flagship. Similar to the training programme for transformation leaders, MoALFI could develop the curricula by partnering with organizations experienced in building transformation capabilities for public sector

lxxxviii Kenya School of Government
lxxxix Kenya School of Agriculture
xc Combination of nationally-standardized and county/location-specific content

organizations, which will co-create the programme with experienced domestic educational institutions such as the Kenya School of Government, the Kenya School of Agriculture, or the Centre for Training and Integrated Research in ASAL Development *(Figure 38)*. The on-demand building platform will leverage existing solutions or be developed in-house by the government.

(iii) Revitalizing and digitizing the extension system through ~3,000 trained government youth extension agents

Extension services will be a major focus of the ASTGS's knowledge- and skills-building efforts. Providing high-quality, affordable extension services at scale to smallholder farmers, pastoralists and fisherfolk is a difficult challenge faced by many governments – and one that lies at the heart of agricultural transformation. Governments and development partners in many countries have tried to engage private sector companies to provide extension. This works for tighter value chains in high-value crops, but typically does not serve large numbers of farmers growing staple crops. Therefore, many are turning back to the provision of extension through public sector avenues, but focusing on achieving cost reduction and scale through the smart use of new digital tools.

The ASTGS programme to revitalize Kenya's extension service has four main components to ensure the provision of both demand and supply drive service to farmers:

- Existing extension officers receive access to the training and resources of IT-enabled extension (alongside new youth hired as described below), to make their existing work more efficient and farmer interactions more productive.
- County governments will partner with local extension provider organizations to hire and train youth to deliver extension services using digital tools for agricultural diagnostics, best practice knowledge access, and knowledge provision – a model that has been successfully adopted in Nigeria's N-Power Agro programme.
- The youth extension workers will share agricultural and digital knowledge and skills. The rolling programme of new youth workers enables improved access to extension by farmers and is also a catalyst to drive digital transformation across the entire extension workforce. Over the course of five years, ~3,000 youth extension volunteer positions will be created to supplement the current estimated workforce of 4,000-4,500 extension officers. This will reduce the ratio of extension officers to farmers to 1:600 from an average of 1:1000 today, and even as high as 1:5000 in some locations where extension services are now on-demand.[219]
- County governments will be responsible for hiring these youth extension workers and contracting with area-specific implementation partners to train these workers. These partners are expected to be companies and non-governmental organizations that have existing agricultural extension experience, either on the ground or in the digital provision of agricultural knowledge. County governments will partner with these organizations to design the curriculum and training for the youth workers.

The youth workers will be trained in agricultural best practices specific to their agro-ecological zones (e.g., through Agricultural Technical Vocational Education and Training – ATVET) and in using digital tools, including accessing digital agricultural extension resources on the internet and agriculture-specific apps to provide farmers with information such as crop disease and pest diagnostics, weather information, soil testing and interpretation of results, best agronomic practices, availability of seeds and marketing. The youth workers will be trained in communication and gender-specific skills by the implementation partners to ensure extension services are sensitive to gender and PWD differences in agricultural value chains and decision making.

These youth extension officers will deliver this information to farmers via on-farm visits as well as area-specific and value chain-specific WhatsApp groups, SMS messages, and phone communication. They will work

with successful farmers in the area to develop model farms from which other farmers can learn best practices suited to their agro-ecology and value chain. The youth workers will also have access to digital decision support tools where relevant, such as Rice Doctor and Crop Manager, that will help them with crop diagnostics and provide recommendations to specific farmers. To supplement these local-level extension services, MoALFI will also produce and broadcast national television and radio extension programmes that provide weather, prices and other information to farmers throughout the country, as well as give advice on agricultural best practices for Kenya's major value chains. The programmes will also publicize the new youth-led digital extension services to farmers throughout the country.

This four-part partnership is intended to integrate: (1) deep expertise of county extension workers; (2) digitally enabled youth volunteers; (3) local private or NGO expertise; and (4) providers of improved agricultural research and training from Kenya's educational institutes.

In addition to agriculture-related information and best practices, the county extension workers will be tasked with providing nutritional best practices to households so that income gains also improve nutritional outcomes, particularly for mothers and children. As nutritional challenges vary by county, implementation partners will be responsible for training each extension worker on the interventions that will have the highest impact. The implementation partner and county agricultural department will also need to coordinate with county health officials to ensure interventions work hand in hand to improve nutritional outcomes.

Since agriculture is a primarily constitutionally devolved function, the national government will not mandate that county governments implement this youth-led extension programme. Rather, MoALFI will provide a blueprint for the programme, funding for county support from national agricultural research organizations (e.g. KALRO), and supplements to county budgets to support the implementation costs of the programme. This is intended to support any county which decides to engage in, and benefit from, this youth-led extension programme.

Specifically, MoALFI will provide: sample contracts that outline possible modes of engagement with local partners; sample employment contracts for the youth extension workers, performance-based metrics framework on which supplementary county financing for youth workers' stipends and digital devices (smart phones or tablets) is financed; funds for programme implementation and funds to KALRO for specific support to counties in linking best-in-class extension practices to the new partnerships in counties. All counties are eligible to participate in the programme and establish their youth-led digital extension service, and receive these supports from MoALFI.

The Ministry will also ensure that county-level extension programmes have access to a wide range of knowledge resources and tools to use for agricultural diagnostic and knowledge dissemination to farmers. This will involve making latest research from organizations such as KALRO available for county extension services, and providing the counties with access to digital decision support tools with nationally negotiated discounts. The Ministry will also negotiate procurement discounts for bulk purchases of smartphones and other extension equipment and will make these available for participating counties.

To access extension services, small-scale farmers, pastoralists and fisherfolk need to register in the nationwide farmer profiling database via mobile phone *(see flagship 2 for details)*. Registration will be free of charge and involve a USSD question series including, e.g., name, ID number, size of farm, enterprises and production on the farm and annual income. The nationwide extension television and radio programming described above will provide instructions for registering, as well as publicize the list of counties in which the youth-led extension programme is available.

Once registered, the farmers will periodically receive extension token codes via mobile phone (each code being specific and non-transferable between phones/farmers); these

codes can then be redeemed with the county extension officers for services including in-person visits, model farm demonstrations, SMS push notifications or WhatsApp group access. The counties can then submit these codes to the national-level MoALFI, which will keep a record of the number of farmers served by each county's extension services and tie these to the programme's performance-based rewards for the county – the more farmers served through visits, demos, WhatsApp, and SMS, the greater the performance rewards the county government receives.

Participating county governments will therefore receive supplementary extension funding through two different avenues: (1) programmatic costs tailored to support the four-partner model of extension linking digitally enabled youth volunteers, county extension agents, local private and NGO extension providers, and research institutes; (2) additional performance-based payments over time based on the numbers of farmers served. Counties' cost-effectiveness and performance on both avenues will need to be verified by the independent evaluator, as described below.

To verify that farmers are truly receiving high-quality extension services and reported performance achievements reflect realities on the ground, MoALFI will send survey questions to the farmers based on registration in the farmer profiling database to ask about service satisfaction and improvements in agricultural production on the farm. The flagship's independent evaluator (see Section 6.3 of accompanying NAIP) will also cross-check this information via random visits to beneficiary households, to ensure that information received from the counties and through the mobile-based surveys reflects actual performance. This will be critical to ensuring that this programme's performance-based incentive system rewards counties objectively based on actual outputs and outcomes achieved. Well-performing counties will be highlighted in the extension TV and radio programmes, and supporting budgets – including the performance-based payments – will be renewed and disbursed based on this performance.

C. IMPLEMENTATION RISKS AND HOW TO MITIGATE THEM

Risk of implementation misalignment with other flagships

Knowledge and skill building is a key enabler for many other flagships and should be prioritized. At the same time, the scope of this programme is ambitious, both in terms of the number of participants and the range of capabilities it aims to build. Careful prioritization and sequencing are therefore needed to make implementation manageable and ensure that the right capabilities are built at the right time for the other flagships. Hence, planners of the knowledge- and skill-building programmes need to coordinate with owners of other flagships to ensure that the relevant skills are developed in time to implement the other flagships.

Risk of capability loss through personnel departure

Much of the capability-building cost will be invested in leaders who will drive the transformation at the national and county levels. Reappointment or departure of these leaders will mean that the skills built will be lost. To avoid implementation delays and additional costs to train new leaders, changes and reappointments should be minimized during the transformation.

Resistance to organizational change

Transformations are disruptive, and those invested in the status quo of the organization may resist the change management component of this flagship. To maximize alignment behind the strategy, monitoring that incorporates feedback channels needs to be built into the change management programme. The Ministry will contract an implementation partner experienced in facilitating transformations (particularly in the public sector), to incorporate best practices in overcoming resistance and rallying the organization behind the transformation's vision.

Alignment between national and county governments on extension delivery

The youth-led digital extension programme will be designed by the national government but adopted and delivered by the counties. This raises several alignment risks – capacity, incentives and implementation. On capacity, MoALFI will need to work with participating county governments to ensure that county-level capabilities are in place to successfully manage and deliver the programme. The knowledge- and skill-building programmes for the county-level transformation leaders will also help address this. On incentives, MoALFI will structure and calibrate the pay-outs of the funding support and performance-based incentives based on rigorous analysis of costs that the counties will incur in delivering the extension services, so that the system will provide sufficient funding support and the optimal level of incentives for the counties. On implementation, there is a risk that actual on-the-ground delivery deviates from the programme's blueprint design. Monitoring by the independent evaluator in collaboration with the ATO will provide visibility into implementation progress and results, and be used to mitigate against this risk.

D. KEY MILESTONES

The action plan consists of four steps:

1. Design training curricula for transformation leaders: Determine priority needs for leaders at the national and county levels based on consultation with partner organizations that have experience in agricultural transformation. Define the curriculum timeline based on this prioritization. Identify faculty and develop content for each module.
   - Responsibility: MoALFI
   - Start date: Q1 2020
2. Design training curricula for public and private sector flagship implementers: Determine priority needs for implementers of early flagship interventions, based on consultation with flagship sponsors and partner organizations that have experience in agricultural transformation. Define the curriculum timeline based on this prioritization. Identify faculty and develop content for each module.
   - Responsibility: MoALFI
   - Start date: Q1 2020
3. Design and launch an organizational effectiveness diagnostic for the Ministry of Agriculture, Livestock, Fisheries and Irrigation, including organization-wide surveys and interviews with top leaders. Analyze results to identify and prioritize the outcomes that need to be addressed in the change management programme.
   - Responsibility: HR Department, MoALFI
   - Start date: Q2 2020
4. Develop youth-led digital extension programme blueprint for counties: Identify, engage and shortlist potential implementation partners to train extension workers in different areas of the country. Design templates for performance contracts between county governments and implementation partners. Design templates for youth-led extension workers' employment contracts. Structure and calibrate performance-based incentive system for county governments.
   - Responsibility: MoALFI
   - Start date: Q3 2020

Note: All flagships need to be further detailed to move from strategy to implementation, and achieve the milestones laid out above. See NAIP for conversation on immediate next steps.

FLAGSHIP 8: Strengthen research and innovation as launch priority digital and data use cases to better drive decision making and performance management

A. CHALLENGES

Vision 2030 recognizes the role of research in generating new and innovative knowledge that is vital for national development. The agricultural research system in Kenya includes several public and private organizations focused on research, analysis, technology generation and dissemination of information on the sector. The primary public sector institutions in this space include the Centre for Training and Integrated Research in ASALs (CETRAD), KALRO, the Kenya Industrial Research and Development Institute (KIRDI), the Kenya Forestry Research Institute (KEFRI), Kenya Marine and Fisheries Research Institute (KMFRI), and the Tegemeo Institute. In addition, there are several universities with faculties of agriculture and allied sciences that carry out agricultural research independently or in collaboration with other agricultural research institutions. They cover a wide range of research areas including crops (food, horticultural, industrial); livestock and range management; fisheries, land and water management; forestry genetic resources; and biotechnology.

Threats to Kenya's food and nutrition security will continue – with climate change, especially drought, increasingly floods, diseases and pests such as Fall Armyworm and Maize Lethal Necrosis Disease (MLND), and other emerging pests and diseases. The need to grow more abundant and nutritious crops and boost production of livestock and fish within an uncertain environment means Kenya, like every government around the world, faces key questions about the role of modern biotechnology in tackling these challenges. As the assessments of Kenya's benefits from using biotechnology evolve, its seed system will also need to evolve. Kenya has one of the highest-performing conventional seed systems in Africa, but for new traits like Bt cotton, traits resistant to a variety of challenges (e.g., disease, pests, drought or water stress and salt tolerance, weeds infestation, the seed system will need innovation, which will likely be achieved through research in bodies like KALRO, local universities and CGIAR Centres.

There are many instances where research has transformed agriculture around the world. Farmers who have tried Monsanto's FieldScript system, which is based on precision agriculture and prescriptive planting, observed ~5% increase in yields over two years.[220] China employed advanced analytics for market price forecasting and sourcing/timing optimization which saw margins in dairy increase by 3%.[221]

The link between research and data cannot be understated; data gets better with higher quality research and innovation, and vice versa. To better understand the challenges of Kenya's data environment, it is important to acknowledge the impact of data on decision making in agriculture. Improved data can help farmers and the ecosystem supporting them, including agribusinesses, extension officers, input vendors, traders and all levels of government, to better optimize inputs for production, increase production forecasting accuracy and realize many other benefits.[222] Given the complexity of agricultural food systems, it is important to make data easy to visualize and use to identify the root causes of problems and their solutions.

There are three big challenges that must be addressed for the ASTGS flagships to have the right data for decision making, continuously informed by better research: First, catalysing the research and innovation space in agriculture, including around use of Big Data and Advanced Analytics (AA). Second, more reliable access to useable and shareable data. And finally, demand for quality analyses to support evidence-based decisions on performance management, M&E,

research and policy. If these three challenges are addressed, then real-time operational and strategic improvements can be made to the flagships. For example, one can identify which farmers, SMEs or regions are increasing yields and therefore eligible for additional participation in the flagships (e.g., award more lots to high-performing SME accelerators).

Catalysing research and innovation in agriculture, including the use of Big Data and Advanced Analytics (AA)

Adopting modern research methods, tools and developing new technologies

- The potential of research and development (R&D) in Kenya is significant. Although Kenya has a well-developed agricultural research system when compared to regional peers, the use of modern science and technology in agricultural production is still limited (e.g., development of drought- and pest and disease-tolerant seeds).[223] All research organizations engaged in the ASTGS process cited insufficient funding for research, modern research and reporting tools, and personnel as key constraints, with government spending on agricultural research by KALRO and its predecessors decreasing by over 17% between 2009 and 2014.[224] In addition to financing for research, KALRO needs to increase agricultural researcher numbers by ~40%; but capacity is expected to decline in the next 15 years with over 50% of the staff being over 50 years of age, of who 21% of those are PhDs.[225]
- According to the Science, Technology and Innovation Act, 2013, the country is expected to commit two percent of GDP to research and innovation, but currently commits ~0.5 percent (~KES 20 billion), of which two percent is entrusted to the National Council of Science and Technology (NACOSTI) under the Ministry of Education.[226] The rest of the funds (~98%) are held by research institutions mandated to deal with public policy issues.[227] NACOSTI advises the national and county governments on science, technology and innovation policy, and liaises with the National Research Fund (NRF) to administer research and innovation funds to public institutions, universities and individuals.[228] NACOSTI and NRF are not always able to disburse all the funds received, representing a potential opportunity for agricultural R&D.

Creating linkages between research and productivity

- Currently, there are weak linkages between research and productivity – particularly of small-scale farmers, in large part due to the missing research extension linkages. A more direct research-productivity link could help these institutions make a stronger case for resources based on the impact they create. Many more developed countries' agricultural transformations were catalyzed by tight links between universities, research institutions and farmers. For example, in Brazil, the National Rural Extension Department (DATER) re-established links with and allocated funding to the national and state agricultural organizations, universities and farmer-based organizations to promote training of extension agents on agricultural technology innovations. This DATER reform was a national priority and helped raise ~20% of the rural population out of poverty over five years.[229]

Promoting system-wide coordination and dissemination of knowledge

- In 2012, the National Agricultural Research System policy (NARS) established an integrated national agricultural research system to guide system-wide knowledge management, ICT policy, strategy and infrastructure for increased information sharing. However, limited monitoring and evaluation of research in Kenya has constrained the effectiveness of NARS, whose provisions do not fully address the unique implementation environment of devolution.[230] Under devolution, there are many opportunities to better coordinate between and within public research institutions, MoALFI and universities on matters of research to harness the large number of skilled scientific staff engaged in the space.[231]

- Research is a national function and agriculture as a whole is devolved; as such there should

be clear coordination of national research and information dissemination to counties.

- Unclear mandates between regulatory bodies in research is a further challenge to system-wide coordination and dissemination of knowledge. For example, the Biosafety Act, 2009 that vests authority for biosafety in the National Biosafety Authority (NBA) minimizes risks that may be posed by biotech crops, by ensuring adequate levels of protection in the development, transfer and handling of these crops. It also tries to create transparent, science-based and predictable processes for reviewing and making decisions on the development and use of biotech crops.[232] However, as new technologies are tested, these mandates can come into conflict as is the case with biotech crops.

- Finally, Big Data and Advanced Analytics (AA) have the potential to create significant step changes in performance from R&D to farm operations, downstream processing, and sales & marketing. There are three major ingredients for playing successfully in Big Data and Advanced Analytics: having the right data and the right analytical capabilities. Some of the opportunities will require new capabilities and data through partnerships and/or acquisitions. Even when the quality of data is poor, Big data and AA can give backward- and forward-looking perspectives that turn the insights that would be impossible to gain using conventional methods at the same speed, scale or accuracy into real-time decisions and actions. The MoAFL&I agricultural census will generate a lot of data which can serve as a starting point for Big Data and Advanced Analytics undertakings. The objective of the census is to provide baseline data on the national structure of agricultural holdings disaggregated to lower administrative units, provide benchmark statistics to improve crop and livestock statistics and provide sampling frames for agricultural surveys.[233]

More reliable access to useable and shareable data

The right to open data is enshrined in the Constitution (Article 35) and in the Access to Information Act (2016), which states that every citizen has the right to information held by the government. The Kenya Open Data Initiative (KODI) website was launched in 2011 as an avenue to make government data readily available for scrutiny and use by the public, the first such programme in sub-Saharan Africa. As of June 2016, there were 849 datasets that had been uploaded to the site. The portal received approximately 1.1 million unique visits in 2013, while more than 5,500 datasets were downloaded and embedded into various websites and blogs.[234]

However, submission and updating of data on the KODI website is not consistent as different ministries, departments and agencies do not regularly submit data to KODI, citing two main issues: limited incentives to invest the time to convert their data into an open and shareable format, and no provisions for monetizing the data through KODI, as can be done through other platforms.[xci] As a result, there are significant gaps in data availability on the platform. Box 15 details the existing web-based GoK information systems that could provide data into KODI. Box 16 details the regional and global platforms that Kenya can access.

Create demand for evidence-based research and analysis to support performance management, M&E and policy-making

Many of the highest-performing agricultural food systems are very evidence-based in their approach to M&E, research and policy. Not only is access to data a challenge in Kenya, but as a result of the data gaps and limited use of data by top decision-makers in the decision-making process, it can be difficult to determine if a significant transformation programme is on track to achieve the desired outcomes and inform decisions in policy-making and budget analysis (e.g., to link public investment to specific flagships and determine

xci E.g. GroIntelligence, Agro-know etc

which interventions were most impactful). Questions of policy-making are addressed in *Chapter 3*, and the matter of M&E is covered extensively within the NAIP addendum to the strategy. However, it is important to highlight the unique challenges in pursuing evidence-based research in Kenya.

The potential of research and development is well understood – R&D can push Kenyan agriculture to the next level (e.g., mapping the best agro-ecology for various value chains, development of drought- and pest and disease tolerate seeds, effect of various fertilizers on soil health). But the current quality and resources available for agricultural research in the country varies significantly with agriculture research spending as a share of agriculture GDP falling from 1.33% to 0.79% between 2011 and 2014.[236] In 2012, the National Agricultural Research System policy (NARS) established an integrated national agricultural research system to guide system-wide knowledge management, ICT policy, strategy and infrastructure for increased information sharing. However, weak monitoring and evaluation of research in Kenya has greatly limited the effectiveness of NARS, whose provisions do not fully address the unique implementation environment of devolution.[237]

BOX 15: OVERVIEW OF EXISTING GOK WEB-BASED INFORMATION SYSTEMS

There are several government organizations in Kenya that have created web-based information systems, but most of them operate in isolation and many duplicate data efforts. Some of the online databases are:

1. Kenya Agricultural Information Network (KAINet), which was focused on the development of an electronic repository as part of a Kenyan national agricultural science and technology information system to the Strategy for Revitalizing Agriculture

2. National Farmers Information Service Kenya (NAFIS) provides agricultural information on major crop and livestock production, inputs and output markets

3. Agricultural Information Resource Centre (AIRC), which works by collecting and disseminating research results from research institutions, universities and other organizations

4. Kenya Plant Health Inspectorate Service (KEPHIS), which is a government parastatal whose responsibility is to assure the quality of agricultural inputs and produce to prevent adverse impact on the economy, the environment and human health

5. National Horticulture Market Information System (NaHMIS) provides market information system in the horticulture sub-sector

6. Livestock Information Network Knowledge System (LINKS), which provides regular livestock prices and volume information on most of the major livestock markets in Ethiopia, Kenya and Tanzania along with information on forage conditions, disease outbreak, conflict and water supply to support decision making at multiple scales

7. National Livestock Marketing Information System (NLMIS), which is based on the short message service (SMS) to report on weekly livestock volumes and prices from a network of markets in Kenya, in form of near-real-time information[235]

The information in some of the databases is old e.g., websites last updated several years ago; others have incomplete data or do not work at all. This poses a challenge when current data is needed e.g., pricing data.

3.3 million SMALL-SCALE FARMERS REGISTERED FOR MORE EFFICIENT SERVICE DELIVERY (E.G., SUBSIDIES, EXTENSION)

1,000 FARMER-FACING SMES ON-BOARDED TO DIGITAL PLATFORMS TO PROVIDE SERVICES TO FARMERS, INFORMED BY THE LATEST RESEARCH AND DATA

1 AGRICULTURE OPEN DATA POLICY OPERATIONAL, SETTING STANDARD FOR AFRICA AND ALLOWING ON-DEMAND ACCESS TO DATA FOR ALL

B. FLAGSHIP SOLUTION

Given the breadth, complexity and significant work required for this flagship to succeed, the flagship's solution has been separated into three categories of activities: first, creating an enabling research and innovation environment; second, setting up an open data platform for national- and county-level data; and finally, detailing the use cases for the flagships. Completing the first two activities in parallel with the third will be important to build and maintain momentum of change across Kenya's data and research needs.

The planned agriculture census will provide a wealth of new data which should be used in line with the strategy. The agriculture census is a large-scale government undertaking geared towards the collection and compilation of basic information on the agriculture and fishery sector in a country. It entails complete enumeration of all farm holdings data and information.[241]

At the same time, existing data is fragmented and will need to be consolidated.

I. Creating an enabling research and innovation environment

Kenya can increase her agricultural resource base through research and innovation to develop diversified, demand-driven crop varieties, intensively apply appropriate technologies, and improve current agricultural methods based on stronger research-extension links (e.g., irrigation systems).

There should also be focus on research in areas such as:

i) drought-resistant/tolerant crops and livestock
ii) commercialization and development of indigenous crops and livestock which may be better adapted to the areas which are at risk to climatic issues
iii) pest-and-disease tolerant animals and crops to be used in combating pest and disease resistance to address the issue of resilience, etc.
iv) special crops for human nutrition

Data on soil type, land use, human, crop and animal population density, productivity, etc., once collected, can be used to supplement and complement data from GIS systems such as the Africa Regional Data Cube, also known as the Open Data Cube (ODC). The result will be location-tagged and mapped data that will make visualization of data easier as well as allow for better monitoring of farm activities. The ODC satellite imagery can be used for a real-time visual representation of the situation on the ground and, with improved resolution of images and faster data uploads, more accurate information can be downloaded for analysis, e.g., acreage of land under a certain crop, water levels in water bodies, etc.

ASTGS proposes three primary activities to address the challenges raised above, and support broader data and research investments required in the sector:

- [KALRO, ATO and implementation partners] Vet and curate relevant research including home grown research for extension officers and change agents in flagships 1 & 2 (e.g., agri-businesses, agro-dealers). Using

research data that KALRO has access to, all the data use cases described below, open data platforms Kenya is party to, and insights from the knowledge and skills building in flagship 7, KALRO should highlight latest innovation and research available to implementation partners. Some examples include: push messages on digital tracking tools, connecting struggling performers to strong performers, and providing digital access to relevant KALRO and university research.

Rather than create yet another platform to host existing data, KALRO should leverage and improve the vast number of web-based platforms available in *Box 15* to consolidate a variety of research and training manuals, etc. already available, and curate content required for implementation as needed. Such a portal has the potential to include specific data on registered extension workers (including public, private and NGO-based) to support better curation, and even interactions between these extension officers. The power of linking research data with real-time, on-the-ground extension data is that it can be used as a system for early warning on disease and pests and crop failures, as well as to share of knowledge and information for real-time feedback. Once the farmer registration efforts are underway as part of flagships 1 and 2, KALRO and the ATO should consider expanding access direct to farmers. There are challenges with doing this before having clear farmer profiles (e.g., wrong information can be disseminated for their soil type).

The Brazil case described above illustrates where Kenya can aspire to; but we are currently at a very different starting point (e.g., ~14% rural population, compared to ~75% in Kenya).[242] Nonetheless, the big lesson for Kenya is this – provide extension officers with as much information as possible. Over time, as Kenya rebuilds its extension services under devolution, it can create stronger research extension-farmer linkages. In so doing, KALRO can facilitate demand-driven research and create feedback loops between research and increases in agricultural productivity at the farm level.[243]

- [MoALFI, KIPPRA, Tegemeo] **Support evidence-based policy development (policy planning, prioritization and monitoring)**. Data collected should be used for policy modelling and forecasting by research organizations such as KIPPRA and Tegemeo. The relevant research organisations should be developed and modelled as centres of excellence for evidence-based policy development. Policy modelling will be used in prioritizing policies both at national and county level; capacity development needs to be done to both national and county actors on how to do evidence-based policy development.
- [MoALFI, Treasury] **Mobilize investments for R&D from private sector (e.g., tax breaks), development partner and NGO for MoALFI relevant research agencies**. Government organizations mandated with research, such as KALRO and KMFRI, need additional support in terms of financing for research and capacity building, but lobbying for funding can be challenging as they report to or are associated with multiple ministries (e.g., education). The private sector and NGOs should also be encouraged and facilitated to invest in R&D that benefits the country through:
  - *Incentives such as tax breaks*
  - *Clarified regulatory mandates and research certification processes* – particularly for non-food biotech. Launch of a biotech crop will require investment in KEPHIS, for example, to upgrade core functions related to certification, seed standards, quality monitoring, phytosanitary requirements, monitoring of transboundary movement of seed, processing of grain by-products and services provided to smallholder farmers to support their adoption of new technologies
  - *Mobilization of investments into* i) value-addition technologies for product development to enhance Kenya's competitiveness ii) mechanization technology to increase work efficiency
  - *A demonstrated MoALFI openness to Big Data and Advanced Analytics:* Big Data and Advanced Analytics have had significant impact in various industries, e.g., a ~30% improvement in delivery reliability when applied to supply chain management, and a ~25% decrease in operational costs for

BOX 16: OVERVIEW OF MAJOR REGIONAL AND GLOBAL AGRICULTURE OPEN DATA INITIATIVES KENYA CAN ACCESS

Global Open Data on Agricultural Nutrition (GODAN)

Kenya, which is already a member of the Open Government Partnership, also joined the Global Open Data on Agricultural and Nutrition (GODAN), an initiative launched in 2013 to promote the use of open data for innovation in agriculture and nutrition to combat world hunger and food security.

The Open Government Partnership (OGP) is a multilateral initiative that aims to secure concrete commitments from governments to promote transparency, empower citizens, fight corruption, and harness new technologies to strengthen governance. So far, over 70 participating countries and 15 sub-national Governments have made over 2,500 commitments to make their governments more open and accountable. To become a member of OGP, participating countries must endorse a high-level Open Government Declaration, deliver a country action plan developed with public consultation, and commit to independent reporting on their progress going forward.[232]

GODAN membership helps Kenya further pursue its aims of achieving transparency and fostering an innovative ecosystem of accessible open data as a national asset that can improve social and economic welfare for the country. In 2017, the Government of Kenya and 15 African ministers from countries including South Africa, Congo, Sudan, Kenya, Uganda, Sierra Leone, Rwanda and Ghana and GODAN agreed to a declaration for comprehensive open data collaboration in the nutrition and agriculture sectors, to combat the global food security crisis.[233]

Africa Regional Open Data Cube (ODC)

Launched in March 2018 at the Global Partnership for Sustainable Development Data's inaugural Data for Development festival in the United Kingdom, the Open Data Cube (ODC) will harness the latest earth observation and satellite technology to help Kenya, Senegal, Sierra Leone, Ghana and Tanzania tackle food security challenges as well as issues relating to agriculture, deforestation and water access. ODC is an open-source project to increase the impact of satellite data by providing an open and freely accessible exploitation tool and to foster a community to develop, sustain and grow the breadth and depth of applications. It has evolved to support interactive data science and scientific computing. It has potential to streamline data distribution and management for providers while simultaneously lowering the technical barriers for users to exploit the data to its full potential.[234]

a manufacturing company.[244] Big Data and Advanced Analytics have the potential to revolutionize the agriculture sector in Kenya in a similar way and, as such, Kenya should begin exploring and investing in Big Data and Advanced Analytics solutions for gains such as improved forecasting, better cropping recommendations, infrastructure optimization, etc.

– *Transforming* KALRO to provide knowledge products, including data, and knowledge services needed to support all the flagship projects. KALRO should work with research centres like the International Maize and Wheat Improvement Centre (CYMITT) and the International Livestock Research Institute (ILRI), which, with fully established and well-equipped campuses in Kenya, should be able to contribute to the issue of knowledge products and knowledge services in the shortest time possible. KALRO should hire more MScs and PhDs, etc. in agriculture-related areas and push for more young people to study agriculture in universities and technical colleges so as to cover their current and future capacity needs. The latter is crucial to extension. It might also mean modernizing the extension curricula to address farmers' needs (production, post-harvest technologies and marketing, climate resilience)

II. Setting up open data platform for agricultural data at national and county levels

Nonetheless, the following overarching recommendations should be implemented within the first year of the ASGTS – not only will

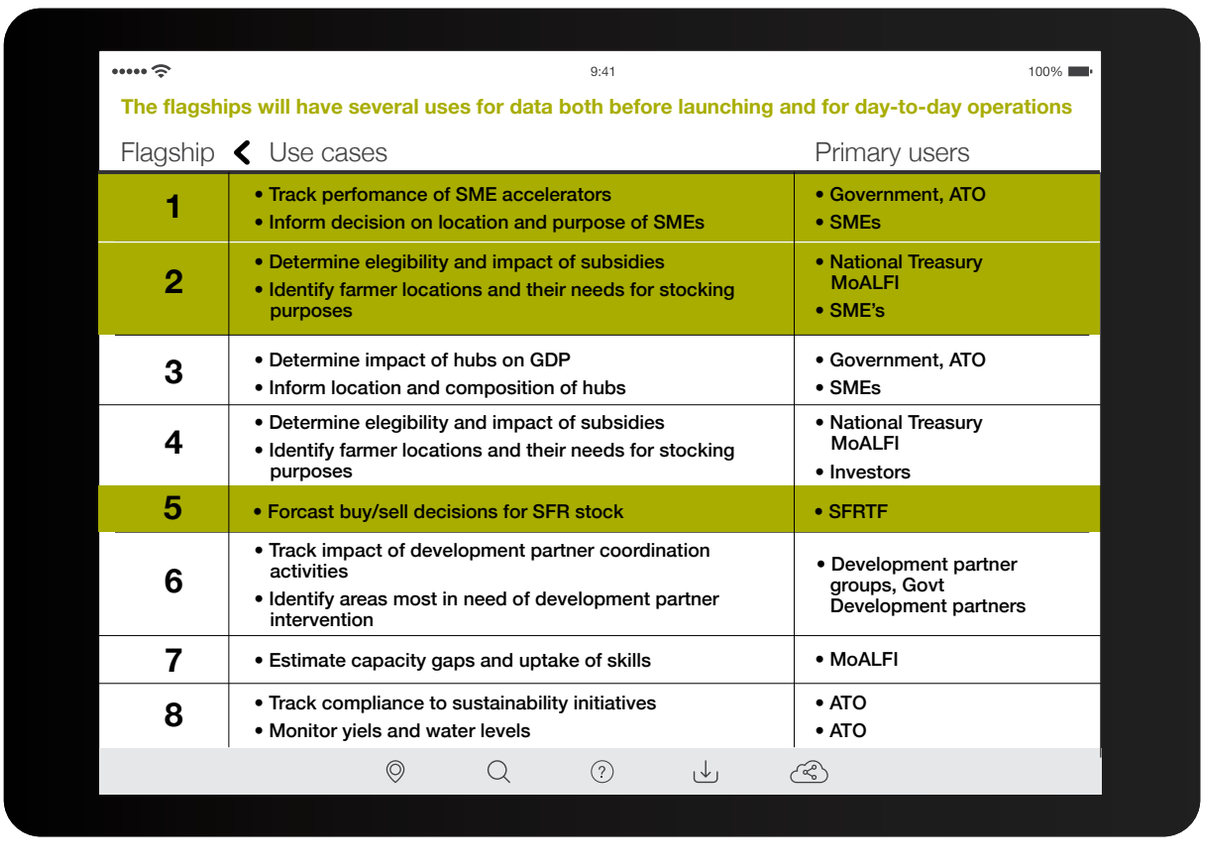
they support the flagship use cases, but they will also facilitate the data needs for research, policy and other areas that do not currently have dedicated use cases outlined in ASTGS. The leading implementers of these ideas sit outside of MoALFI:

- *[Office of the Deputy President, Ministry of ICT, MoALFI]* **Create an open data policy and platform for the agricultural sector** *(including all the constituent Ministries in Chapter 3.1 plus any other relevant ones as per diagnostic)* that will accelerate the launch of this flagship, and allow data to be fully plugged into KODI or the platform deemed most suitable at the time, once the infrastructure is ready. This policy should:
  - Be stewarded by the Legislative and Intergovernmental Liaison Office (LiLO) at the Office of the Deputy President, to ensure that clear direction is given on frequency of data uploads, the quality and standards of the data, interoperability to other open data platforms and security of the data. To address historic issues of compliance with policies like this one, LiLO should encourage codifying this direction in performance contracts of key agency heads.
  - Partner with major data companies to provide solutions (e.g., cloud computing, high-throughput computing capacities) to host the aforementioned platform, support data retrieval and storage, and ensure interoperability with KODI. Ministry of ICT, Kenya Research and Education Network (KENET)
- *[Ministry of ICT]* **Codify data collection formats and standards for KODI upload, and institute legal penalties for non-compliance:** The government should define standards for data collection and analysis as well as the format for open data to be shareable for seamless KODI updates. The Access to Information Act does not clearly set out penalties to those who do not conform, limiting compliance.
- *[Ministry of ICT, MoALFI]* **Link KODI to GODAN, ODC and other open data sources** with organizations such as Consultative Group on International Agricultural Research (CGIAR). As a member of the GODAN initiative, Kenya should be at the forefront of open data for agriculture through MoALFI's own collection initiatives, but making these links will reduce the cost of data collection and hosting.
- [Ministry of ICT] **Identify incentives to motivate institutions to convert their data into open and shareable format for the public to use** (e.g., royalties, subscription models).
- [County governments] **Enforce guidelines from the County Integrated Monitoring and Evaluation System (CIMES) developed by the COG and Ministry of Devolution** to assist counties in the design and implementation of M&E plans for the policies, projects and programmes in the County Integrated Development Plan (CIDP). For this to be successful, the system will need regular and timely updating of data on project implementation at the county level.
- [County governments] **Domesticate the NARS policy** so that R&D endeavours support county needs (e.g., drought-resistant seed development in ASAL regions). Once county data is collected by government agencies, it needs to be made available in a useful and easily accessible format for the public.

III. Launching data use cases for ASTGS flagship implementation

Below, three priority use cases for immediate launch are detailed and focus on: (i) tracking the performance of the SME accelerators to determine which ones should continue to operate and potentially receive additional lots; (ii) tracking performance of subsidies awarded for renewal to farmers or re-certification of vendors; and (iii) automating buy/sell decisions of the SFR during emergencies. The decision to focus on performance of the flagships with the first set of use cases is driven by the need for the transformation to show early but sustainable results against the outcome metrics detailed in *Chapter 3* – increase in small-scale farmer incomes, increase in agricultural GDP, reduction in the number of food-insecure

FIGURE 45: SAMPLE FLAGSHIP DATA USE CASES DASHBOARD



The flagships will have several uses for data both before launching and for day-to-day operations

Flagship	Use cases	Primary users
1	• Track perfomance of SME accelerators • Inform decision on location and purpose of SMEs	• Government, ATO • SMEs
2	• Determine elegibility and impact of subsidies • Identify farmer locations and their needs for stocking purposes	• National Treasury MoALFI • SME's
3	• Determine impact of hubs on GDP • Inform location and composition of hubs	• Government, ATO • SMEs
4	• Determine elegibility and impact of subsidies • Identify farmer locations and their needs for stocking purposes	• National Treasury MoALFI • Investors
5	• Forcast buy/sell decisions for SFR stock	• SFRTF
6	• Track impact of development partner coordination activities • Identify areas most in need of development partner intervention	• Development partner groups, Govt Development partners
7	• Estimate capacity gaps and uptake of skills	• MoALFI
8	• Track compliance to sustainability initiatives • Monitor yiels and water levels	• ATO • ATO

NOT EXHAUSTIVE

SOURCE: ASTGS Working Team Analysis

DEEP DIVE AHEAD

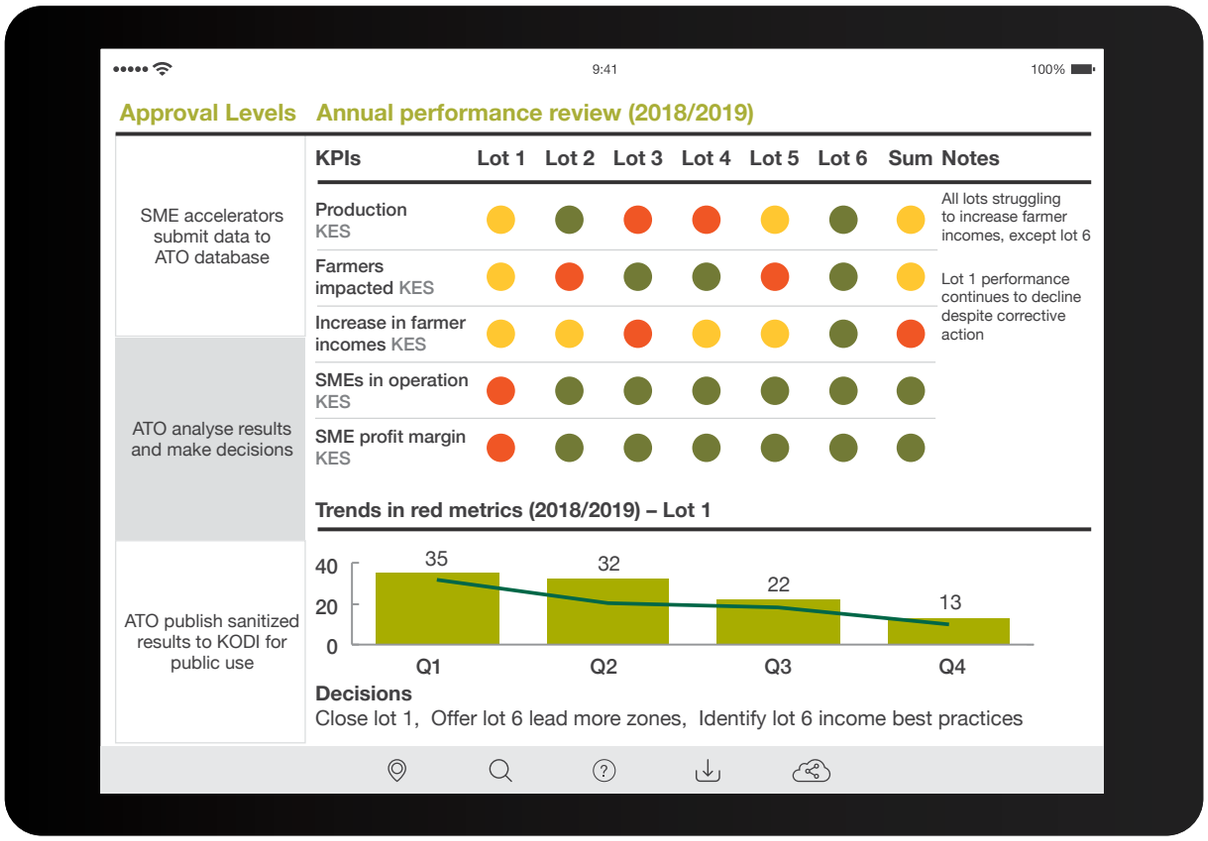
Kenyans, and an increase in the number of farmers benefitting from the transformation. However, these data use cases are complementary to research underway with institutions like KALRO, KMFRI and others, as well as the policy analysis that requires data within the MoALFI policy teams. As priority use cases are expanded after the first two to three years of implementation, broader use cases in research and policy should be considered.

TABLE 1: OVERVIEW OF KPIS FOR USE CASE 1 – SME ACCELERATOR PERFORMANCE

Recent piloted models of livestock feeds intervention in ASAL show potential to scale up through better coordination

Data Type	Source	Frequency
# of farmers reached by SMEs	Extension officers and voucher use data	Biannually
Farmer production volumes and values	Extension officers, SME records, farmers	Biannually
Increase in income	Farmers, SMEs	Biannually
Operating capacity of SMEs operating per area	Audited SME records	Annually
SME profitability	Audited SME records	Annually

FIGURE 46: SAMPLE SME ACCELERATOR PERFORMANCE DASHBOARD



NUMBERS ILLUSTRATIVE

- ON TARGET
- IN RANGE OF TARGET
- BELOW TARGET
- SMEs IN OPERATION (#)
- SME PROFIT MARGINS (%)

SOURCE: ASTGS Working Team Analysis

The priority performance data needs across all the flagships are identified in *Figure 45*. The top three were selected for their complexity, given the need to track small-scale farmer data and the potential for impact from a digital solution (e.g., harder to do in remote ASALs).

Implementation of these use cases will be driven by the ATO unless otherwise stated. The ATO will verify data inputs from the various stakeholders, and host the database to run requisite analysis before sanitizing the data and submitting it to the KALRO managed shared research platform and KODI. The ATO will also need to facilitate the additional performance needs of all nine flagships, not just the priority use cases – see M&E discussion in the NAIP for further detail.

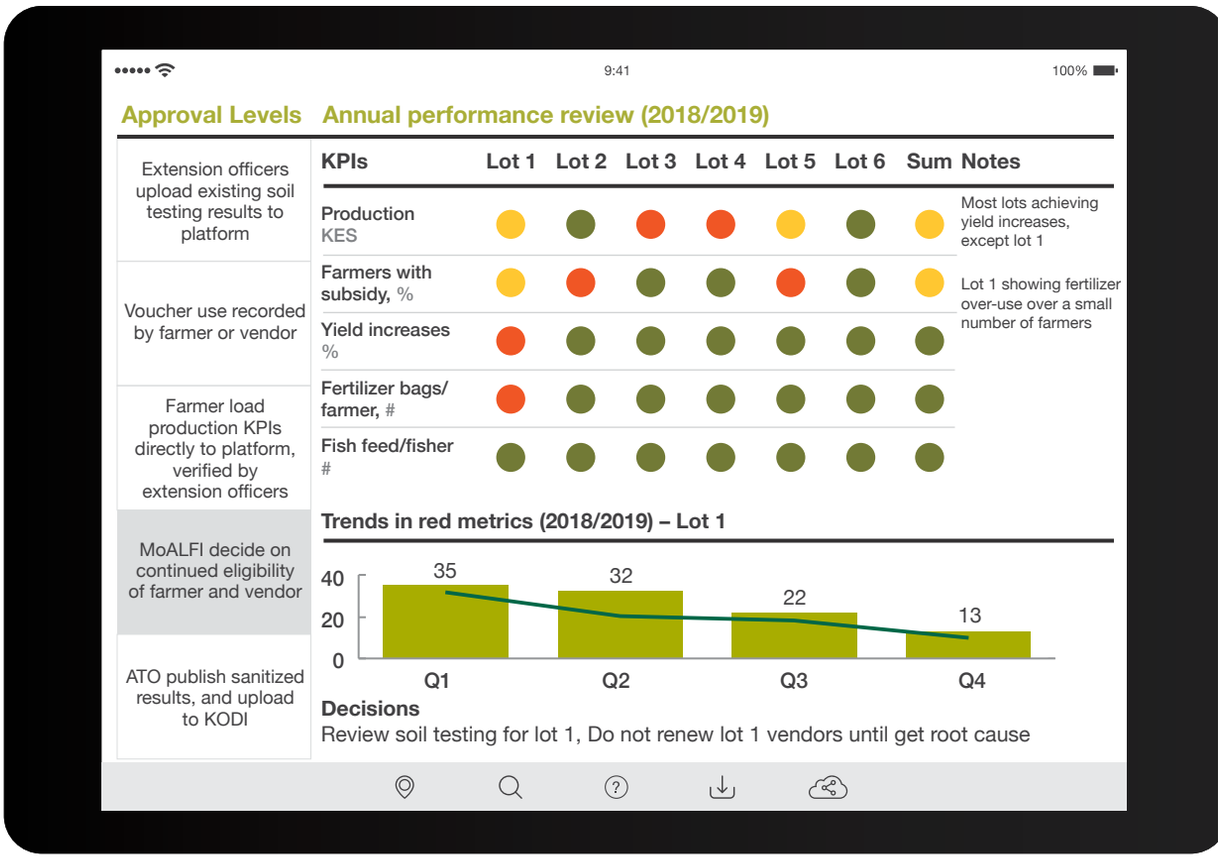
Flagship 1 use case: Track performance of SME accelerators, and determine eligibility to bid for additional lots

Table 1 provides an overview of the type of data required for this use case. SMEs and extension officers should directly submit the data required through a digital ATO-hosted platform.

TABLE 2: OVERVIEW OF KPIS FOR USE CASE 2 – SUBSIDIES' PERFORMANCE TRACKING AND RENEWALS

KPIs	Source	Frequency
# of farmers reached by SMEs	Extension officers and voucher use data	Biannually
Farmer production volumes	Extension officers, SME records, farmers	Biannually
Demand, by product	Farmer orders and request	Biannually
Supply, by product	SMEs	Annually
Location data	Extension officers	Biannually

FIGURE 47: SAMPLE SUBSIDY PERFORMANCE TRACKING AND RENEWAL DASHBOARD



NUMBERS ILLUSTRATIVE

- ON TARGET
- IN RANGE OF TARGET
- BELOW TARGET
- YIELD CHANGE (%)
- FERTILIZER USE (KG/FARMER)

SOURCE: ASTGS Working Team Analysis

The ATO will use the data to evaluate the effectiveness of the SME accelerators by assessing performance against the key KPIs for the flagship, as illustrated in *Figure 46*. SME accelerators that are working successful will qualify for more lots, while those underperforming will have their lots re-assigned. Furthermore, based on root cause analysis, the ATO can share best practices across lots, to support better outcomes for all farmers within these lots.

The ATO will then – once sanitized – upload the data on KODI for the accelerators themselves or other interested parties such as SMEs that may want to better project demand for inputs or farm outputs to more efficiently stock their supplies.

Flagship 2 use case: Track performance of subsidies for renewal

Table 2 provides an overview of the type of data required for this use case. To ensure the subsidies are having the desired impact of increasing farmer choice in input selection and therefore farmer productivity, the government will need to track subsidies' performance against estimated yield improvements that can be better calibrated over time from the tool collecting this data, as visualized in *Figure 47*.

This use case is anchored on farmer registration through existing platforms (e.g., DigiFarm) and then orders for inputs being placed through the e-vouchers with pre-certified SMEs. DigiFarm is currently the only farmer registration scheme operating at scale in Kenya; should others arise that meet the required registration standards, they should be competitively considered to partner with the MoALFI on this initiative. The SMEs providing the subsidized products will pre-register on the platforms as suppliers accepting the e-voucher codes. Extension officers are critical to verify soil quality, use of farmer outputs and uptake of subsidies.
The SMEs should be required to submit the e-voucher codes, accompanied by a unique farmer code, for them to be reimbursed for subsidy by the government. Once the ATO makes the sanitized data available, the SMEs and other implementing partners, including the private sector, can use the information for supply forecasting of stock and output, identification of demand and supply gaps, etc.

Flagship 5 use case: Forecast buy/sell decisions for SFR stock

Table 3 provides an overview of the type of data required for this use case. Unlike the first two use cases that should be managed by the ATO, this use case should be managed by the SFRTF, with a copy of the ATO conducting periodic assessments of the decisions made by the SFRTF using this data.

Real-time warehouse data should be available to the SFRTF as bags are scanned in or removed from their warehouses – the scanning systems should link to the SFRTF digital stocks database. Warehouse managers should conduct an audit every ~3 months to confirm the numbers of bags, except during emergency periods when this verification should happen weekly before submission to the SFRTF digital database. Data on populations in need should be compiled by NDMA and sent straight to the SFRTF digital database.

TABLE 3: OVERVIEW OF KPIS FOR USE CASE 3 – AUTOMATE BUY/SELL DECISIONS FOR SFR DURING EMERGENCIES

KPIs	Source	Frequency
Real-time volume of maize in stock	Warehouse managers	Every 3 months
Stock quality (age, moisture, etc.)	Warehouse managers	Every 3 months
Farmer production volumes	Extension officers	Biannually
Population in need	MoALFI, NDMA	Biannually

FIGURE 48: SAMPLE SFR BUY/SELL AUTOMATION TOOL

NUMBERS ILLUSTRATIVE

- ON TARGET
- IN RANGE OF TARGET
- BELOW TARGET

SOURCE: ASTGS Working Team Analysis

Once all data has been received by the SFRTF, the tool will determine a buy/sell instruction based on inputs, as illustrated in *Figure 48*. SFRTF then has the option to approve or override the decision before it is forwarded to NCPB for execution and made public to suppliers of grain, who can then arrange their operations to competitively bid for the requirements. Any overrides triggered by the SFRTF are automatically forwarded to the ATO and the chair of the NFSC for approval. Over time, the decision-making tool can become more precise and not only anticipate when overrides are likely to be declined, but also better predict shortages/surplus and issue buy/sell orders in advance to ensure reserve stocks are sufficient throughout the year.

C. IMPLEMENTATION RISKS AND HOW TO MITIGATE THEM

High cost of data collection, analysis and hosting

Research, data collection, preparation and analysis are expensive undertakings requiring time, expertise and financial commitment. MoALFI with support from MoICT should run a data diagnostic to identify critical research and data gaps. The government should then partner with the private sector and development partners for financing and data collection. The data will belong to the government and the output should be in open source shareable format ready for uploading to the KALRO managed research platform, KODI and any other appropriate locations when these platforms ready.

Reducing expertise in research and data analysis

Insufficient expertise in modern data analysis methods is a need that must be addressed so the Ministry can hire expertise in data analytics, statistics, data science, geo-spatial analysis and other required skills. Over 50% of KALRO staff are over 50 years of age and most will be retiring in the next 10 years. There needs to be clear succession planning as well as training and recruiting for the right expertise with the help of the private sector and development partners on these flagships.

Poor resourcing of research and data departments

Insufficient resource allocation to research organizations and data departments has been a major hindrance to growth of data use in Kenya. KALRO saw the contribution of the government to research decrease by over 17% between 2009 and 2014. This is usually because research and data are not highly regarded or used as an input to decision-making. Requiring policy formulation and decision making to be based on reliable data will improve the perceived status of data departments. Increased resource allocation in terms of finances, equipment and talent will help the departments provide reliable and useful data in a timely manner.

No incentive to submit data to KODI

Introducing penalties such as fines for organizations that do not submit data to KODI and other relevant platforms should increase the submission rate, together with the creation of a royalty system that will serve as an added incentive for conversion of data to a shareable format and submission to the open data portals.

Data fragmentation

Data in Kenya sits in a variety of fragmented databases. Clear definition of data input and output standards, especially for government organizations, will help users collect data from different sources and combine it for analysis with less effort. Submission to KODI and other relevant platforms also allows the MoALFI data department and MoICT to provide additional support to ensure compliance with data standards.

Private sector sharing the data

More financially able private sector players who invest in collecting data may not want to share data. The government should work with the key private sector players to understand data-sharing requirements. Large private sector players consulted during the ASTGS process are willing to share data, on condition that they host it.

D. KEY MILESTONES

1. **Policy:** Different stakeholders will need to come together and develop policies to govern open data for agriculture in line with international and GODAN standards. The sector is defined as including the Ministries of Agriculture, Industry, Transport, Water, Devolution, Lands and Treasury. The open data policy should include:

- Clearly outlined guidelines on frequency of data uploads, quality and standards of the data, interoperability with other open data platforms and security of the data
- Regulations for sale of data and financial incentive schemes
- Penalties for defaulters and clear standards for open data
- Compliance with policy by writing it into the performance contracts of the participating Cabinet Secretaries of the relevant Ministries

A data diagnostic for the country should be carried out by the government in collaboration with the private sector and development partners to identify data gaps.

In parallel, a research diagnostic should be carried out to identify the areas where research is necessary and what the best research methodologies are to bridge the gaps.

- Responsibility: Legislative and Intergovernmental Liaison Office (LiLO) at the Office of the Deputy President with support from MoALFI, MoICT KALRO
- Start date: Q4 2019

2. **Data collection and sensitization:** Once the data and research gaps are identified in the diagnostic, and policy and standards and methodologies are formulated, different partners who are interested in research and data should be identified and incentivized to undertake the research and collect and process the data into a usable format, with the agreement that the research outcomes and data collected are owned by the government through the different ministries. The different organizations within government need to be sensitized and trained on the importance of research and data, and informed that all policy decisions will need to be backed by reliable data and credible research.

Some of the clear data gaps such as farmer information can be started in parallel to the data diagnostic.

- Responsibility: National government, MoALFI
- Start date: Q4 2019

3. **Roll-out:** This would involve the creation of a royalty programme and an online payment capability for KODI and other relevant platforms. In parallel, a costing mechanism for data should be created to prevent exploitation of the process by organizations that want to overcharge for data.

- Responsibility: MoALFI
- Start date: Q1 2020

4. **Monitoring:** There should be periodic monitoring of research methodologies to ensure high standards are met. In addition, there should also be constant monitoring of data submissions to KODI and other relevant platforms by the different government organizations. The Open Data Policy should clearly outline penalties for non-compliance. In addition, this will involve the expansion of KODI's mandate and should incorporate avenues to address non-compliance.

– Responsibility: KALRO, MoALFI, KODI

– Start date: Q2 2020

Note: All flagships need to be further detailed to move from strategy to implementation, and achieve the milestones laid out above. See NAIP for conversation on immediate next steps.

FLAGSHIP 9: Actively monitor two key food system risks in sustainability and climate, and crisis management for disease and global price shocks

A. CHALLENGES

Actively managing Kenya's natural resources is at the heart of Kenya's ability to respond to two key food system risks that threaten our ability to achieve 100% food and nutrition security: first, poor use of water, soil and land; and second, crises arising from pests and diseases, climate and global price shocks. Addressing these challenges will not only sustainably increase agricultural production and put food on the table today, but it will also ensure that future generations of Kenyans can continue to benefit from agriculture.

Kenya's many natural resource management challenges include: insufficient water basin management and unsustainable irrigation practices, declining soil fertility, limited support for climate-smart agriculture, insufficient stewardship of fishing grounds, poor conservation and use of genetic resources, and insufficient modern disaster management systems to plan for food emergencies.[245]

Each of Kenya's agro-ecological zones has its own sustainability challenges, but the themes resonate across the country because many of them are cross-boundary (e.g., Fall Armyworm), and require a response from agencies across government. Therefore, interventions in this flagship require close coordination across stakeholders at both the national and county levels.

Insufficient water basin management and unsustainable irrigation practices

Water is a key input in all farming practices and as such it is worrying that currently six of seven water catchment areas in Kenya will be under severe stress by 2030, and therefore will not be able to match Vision 2030's proposed target of putting approximately three million acres under irrigation.[246] This is mainly due to uncontrolled abstraction of water and under-exploitation of ground, storm, used and saline waters. Most of the used water can be recycled and tapped for use, but the incentives to do so are weak. Furthermore, the mechanisms for participatory water level monitoring, evaluation and integrated information management are nascent. Stronger policy and dedicated funding could help support enforcement of water level monitoring and controlled abstraction, in order to maintain minimum flow.

Water availability is projected to drop to ~230m^3 by 2025 in part due to climate change that has contributed to the increasing incidence and severity of droughts in Kenya. There is urgency for better utilization of water resources such as groundwater and used water otherwise the consequences could be serious.

Kenya, as at 2010, had approximately seven to eight million acres of land under agriculture but only ~345,000 acres (five percent) of that was under irrigation. ~70% of this irrigation was surface irrigation which is very inefficient in increasing productivity. This has the potential to more than double by 2030 and as such there is significant potential to increase acreage under irrigated agriculture in Kenya.[247, 248] The high cost of high-tech irrigation systems and developing water resources is prohibitive and limits the adoption of such irrigation systems.

Some of the key challenges to water availability and irrigation are:

- **Environmental degradation** where there is rapidly increasing degradation of rivers, lakes, wetlands, and aquifers and their catchments due to frequent droughts and environmental degradation. This particularly applies to the major water towers that sustain Kenya's rivers during the dry season.
- **Inadequate sector financing** with very low levels of investment in water resources management, including storage, improved water use efficiency, data management, irrigation development, etc.
- **Insufficient capacity** at the county and community levels. The county-managed water supplies suffer from neglect of operation, inadequate revenue collection, corruption, over-extension of water supply systems and lack of renewal construction.
- **Inadequate regulatory environment** for abstraction where inadequate permitting, water allocation and compliance practices led to over exploitation and illegal abstraction of water.
- **High cost of irrigation equipment,** which reduces the motivation of farmers to engage in efficient irrigation practices.

There have been several projects launched by the government and development partners in the irrigation space that the transformation effort can learn from. Some of the major implementation challenges these projects have faced include:

- **Delays due to other unforeseen factors** at project design and inception such as poor road network and socio-cultural issues within the irrigation schemes.
- **Delays in approval** by NEMA and WRMA for drilling of boreholes and digging of shallow wells.
- **Weak working relations** between national government and devolved units or similar projects.
- **Conflicting county by-laws** that limit implementation
- **Delays in disbursement** of GoK counterpart funds.
- **Irrigation water shortage** particularly during the dry season.
- **Lack of foresight** in the design of schemes where infrastructure (such as canals) does not support agricultural mechanization.[249]

With the increasing frequency of climate-related disasters, e.g., drought and flash floods, it is important to allocate adequate attention to sustainable and efficient irrigation to improve yields and subsequently meet food security needs.

Primary responsible government stakeholder: Ministry of Water and Sanitation through local water management bodies and authorities has mandate to manage national water needs. MoALFI is responsible for national irrigation policy.

Declining soil fertility

Soil health is declining due to lack of appropriate nutrient management and poor farming practices. Poor soil fundamentally constrains productivity, so without improving soil fertility, other productivity-enhancing technologies (e.g., improved seeds) will not deliver their potential impact.[250] Improper use of fertilizer has resulted in increased soil acidity, which has in turn resulted in reduced yields. In addition, instilling behaviour change among farmers to encourage better soil fertility practices is challenging, slow work and thus uptake of the soil improvement measures is below optimum levels. A good soil map will be necessary to inform local blending rations and advise extension officers on fertilizer blends to recommend to the farmers.[251]

Primary responsible government stakeholder: KALRO's mandate is to ensure soil health in the country

Limited support for climate-smart agriculture

There are currently ~1.3 million Kenyans chronically food-insecure due to drought conditions, primarily in ASALs. This number increases to 3.4-3.7 million Kenyans during severe droughts (e.g., 2008/9, 10/11, 16/17).[252] It is further estimated that 9 out of 10 crops will experience reduced growth rates (10-20%) with dramatic price increases (45-90%) by 2030 in part due to climate change; and Kenya has ~50% rainfall variability, which

is among the highest in Africa, making drought and flooding periods more severe.[253]

This shows that Kenya as a country needs to rethink how it manages agriculture and invest in climate-smart agricultural practices to match the changing environment and increase food production.

Climate-Smart Agriculture (CSA) is 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 main objectives: sustainably increase agricultural productivity and incomes; adapt and build resilience to climate change; and reduce and/or remove greenhouse gas emissions, where possible.[254]

Primary responsible government stakeholder: MoALFI is responsible for encouraging climate-smart agriculture practices through the Climate-Smart Programme

Insufficient stewardship of fishing grounds

Fishing volumes have been decreasing over time and there is a new threat to farmer incomes from cheaper imported fish. Fish levels can be maintained at a sustainable level with proper fishing control but insufficient funding for monitoring, control and surveillance for capture fisheries from both fresh water bodies and the ocean have led to overfishing and inappropriate fishing practices, such as use of illegal nets that trap fingerlings and fishing in breeding areas, etc.[255] Pollution from household and industrial waste has also been observed to have a negative effect on fish levels.

The EAC capture fishery guidelines have yet to be domesticated, which makes follow-up and enforcement difficult.

Primary responsible government stakeholder: MoALFI for policy and enforcement and the Kenya Marine and Fisheries Research Institute for research

Limited conservation and use of genetic resources

Biodiversity is declining and there is a need for effective policy frameworks to balance the protection of biodiversity as agricultural systems modernize. While national and international gene banks are expensive to manage, they are critical to conservation of genetic resources and, as such, additional resources will be needed for this undertaking. Farmers need access to crop varieties more tailored to their needs. While Kenya has increased the number of local seed companies, these companies struggle to access resources and licences.[256]

Primary responsible government stakeholder: MoALFI through research institutions such as KALRO, which has the mandate for genetic material research and conservation

Insufficient modern disaster management system to plan for food crises

Kenya is prone to slow-onset natural disasters like droughts and famine, and rapid-onset disasters like floods, land/mudslides and pest and disease outbreaks. The ASAL regions are regularly affected by droughts resulting in food insecurity, high levels of malnutrition-related illnesses, deaths, and disruption of livelihoods. The western lowlands around Lake Victoria, the coastal lowlands around the Indian Ocean and other areas with poor surface water drainage are prone to flooding, resulting in loss of life and property, as well as outbreak of waterborne human and animal diseases like cholera and Rift Valley fever. Pests like the Fall Armyworm, American bollworm, aphids and false coddling moth are also a huge threat to food security across the country.[257]

Losses from pests like Fall Armyworm, which has been reported in 40 counties, and diseases like Maize Lethal Necrosis in crops or East Coast Fever in cattle pose a continuing large-scale threat for Kenyan food security. Pest and disease management systems require multi-country cooperation, efficient surveillance systems, improved regulations and enforcement of practices. It is clear that for some potential threats the solutions are not

yet widely available and, as such, continued investment in research and development is needed to stay ahead of potential agricultural disasters.[258]

When losses do occur, farmers would benefit from insurance compensation so they are able to continue production, but insurance systems for crop and livestock losses are not yet well developed for widespread use.

Primary responsible government stakeholder: MoALFI is responsible for crops, fisheries and livestock management, and Ministry of Devolution through organizations such as NDMA for other national emergencies

If nothing is done to address these challenges today, achieving 100% food and nutrition security sustainably in five years and beyond may not be possible as the illustrative case study below demonstrates.

CASE STUDY: Kenya's Doomsday Scenario if food system risks persist unabated

If overall sustainability of natural resources such as soil and water is not prioritized, Kenya's ability to support its food systems will be severely compromised. Future generations will suffer from increased rainfall variability leading to more severe drought, severe water shortages, reduced crop yields and subsequently reduced productivity from livestock, and increased food insecurity.

TODAY: Many farms across the country have moderately good soils and sufficient water availability from both water reservoirs such as rivers and dams with good yields and healthy livestock. Typical small-scale farmers plant and harvest using the same methods used by their parents. They will use only certified seeds from the agro-dealer at the nearby shopping centre, because they have seen clear immediate improvements in yields. They will use DAP and top-dressing fertilizer on their crops and will often get decent yields. They let their animals graze and, because the area has been having sufficient rains, there is enough grass and shrubs to keep the animals well fed and healthy.

Many small-scale farmers live a relatively comfortable life on their farms. The farmers feel they know what works best for their farms. They have noticed that dry seasons are getting longer each year but this has not yet had a huge impact on their farms. They do notice yields going down but most will attribute that to the nature of farming and so do not worry. The solution to this usually is to increase the amount of fertilizer. Most farmers feel that modern farming methods are for farms in dry places with low yields.

If the fundamentals of farming do not take into consideration sustainability initiatives, then the situation in the future will be grim.

POTENTIAL FUTURE: The farms will have very poor soils as a result of increased acidity due to excess and incorrect use of fertilizer as well as poor farming methods. As such, yields will have dropped from current levels and the livestock will be malnourished. Farmers will be barely able to produce enough food for the family, let alone for sale. Consequently, the

farmers will have reduced incomes, and will have to resort to extreme measures to survive, such as selling of land and livestock to meet daily needs. The situation will worsen when disasters such as the Fall Armyworm strike, further reducing yields.

Water availability will be low due to misuse and uncontrolled abstraction. Longer drought periods will be harder to handle on reduced incomes and output. Malnutrition and human disease outbreaks will also become prevalent and this could result in deaths, especially to the vulnerable populations (infants and the elderly).

To prevent this outcome, farmers need to invest in sustainability through better farming methods, heed the climate change warning signs and be well prepared. The government will be a significant player in the sustainability interventions through enforcement and support.

11% OF SMALL-SCALE FARMERS AND PASTORALISTS WITH ACCESS TO IRRIGATION (FROM ~5%)

1 RAPID RESPONSE TEAM COORDINATING EARLY WARNING FOR FOOD SYSTEM RISKS (E.G., PESTS, DISEASE, CLIMATE AND GLOBAL PRICE-SHOCKS)

100% SOIL TESTING FOR ALL FARMERS RECEIVING SUBSIDIES

B. FLAGSHIP SOLUTION

The mandate of the above stakeholders to address Kenya's food system risks is codified in many of the laws, policies and regulations outlined in *Chapter 1*. However, implementation has often fallen short due to insufficient capacity and in some cases capabilities, limited data and research funding, and limited mutual accountability across these stakeholders to deliver on their mandates. Therefore, in its role as the leading coordinating force for the ASTGS, the ATO can perform the necessary tracking, compliance monitoring and early emergency response work across the relevant stakeholders to help them address some of these shortcomings in implementation.

Two teams within the ATO will do this work *(See Figure 60)*.

1. *Enabler manager and team:*

- Track compliance of all projects to sustainability interventions annually, including ongoing projects under Sustainable Land Management and Climate Smart Agriculture. The manager and team should support the MoALFI Climate-Smart Programme to produce an annual sustainability report highlighting top performers and lessons learned
- Require all projects receiving a material amount of MoALFI funding or other support to meet the requirements of the sustainability checklist – *see Figure 49* for a sample. The sustainability checklist sample will need to be updated to reflect the most pertinent changes facing agriculture and projects. This checklist will need to be updated annually by the ATO
- Review annually the list of compliance areas and climate risks that should be addressed in the sustainability checklist and additional green indicators developed by MoALFI

2. *Rapid response crisis team addressing pests and diseases, climate and global price shocks:* This team operates as a first response team for food system-related crises, by using county data collected by the ATO and research from MoALFI partner institutions to monitor potential crises. The team will be working with the SFRTF on when to override decisions from the buy/sell tool *(Figure 48)* and facilitate

rapid procurement/bid processes with the relevant private sector producers and storage providers, and facilitate access to technical experts across government, private sector and the development partner community to provide on-the-ground support within days of an emergency.

There are several existing agencies and platforms responsible for disaster preparedness in Kenya to which this rapid response team will have to transition its work. These institutions are in charge of disaster preparedness, response and coordination. There are also disaster risk reduction representatives in various ministries *See Box 17*.

For the first 2-3 years of the strategy, the sustainability and crisis operations of the ATO will be focused on areas most relevant to the flagships. These areas highlighted in *Figure 50* were prioritized for need, based on a consultative stakeholder process.

The prioritized interventions include the following. The ATO should ensure that the sustainability checklists for programmes that stem from these flagships are tailored to address the flagship food risk system needs as identified above. Given the importance of irrigation to the strategy as a whole, we address it separately first.

Sustainable irrigation and water basin management

Irrigation is key to sustainability and productivity increases; as such it features strongly in four areas of the strategy:

- Flagship 1, improving farmer incomes through SME change agents, includes supporting the number of farmers with access to irrigation equipment suppliers, with the aim of increasing small-scale farmland under irrigation by 50% to reach a total of 10.5% farmers, newly irrigating ~40,000 acres of farmland
- Flagship 4, unlocking arable land for commercial farming, includes government provision of sustainable water supply, proposing a ~60% increase in the public scheme irrigation capacity, by adding up to ~150,000 acres under irrigation
- Flagship 6, building food resilience in the ASALs, includes championing water management best practices and coordinating rainwater harvesting interventions, such as developing major rain/surface water harvesting projects
- Flagship 9, the sustainability enabler, includes sustainable and climate-smart digital water basin management, with water abstraction monitoring and control, promoting water management practices and rehabilitation of water resources

Kenya's agriculture remains predominantly rainfed, with important constraints on the rate and path that the country can drive rural economic development. Kenya's agricultural transformation depends on improving irrigation for both small and large farms. For small-scale farmers, irrigation can enable shifts to higher value crops as well as increases in yield. Small-scale farmer irrigation can increase access to food crops year round and improve incomes and nutrition, thereby softening farmer risk profiles, and providing them with access to financial services.

Water storage is essential to increasing resilience in arid and semi-arid regions that similarly need water for livestock. For larger farms, irrigation is essential for crops, improves yield and is seen as a critical enabler to unlocking growth in private sector investment in agriculture. For both smallholders and larger farmers, Kenya's irrigation issues revolve around water use efficiency. Kenya's food security and future growth depend on integrating new technologies to build increased access to irrigation with improved water management and water use efficiency.

Success in this approach requires two primary resources. First, any new irrigation infrastructure development plans, whether public or private, should pass an independent review based on key criteria including demand, water table depth, rainfall, water basin abstraction capacity and downstream effects. Second, existing infrastructure (including dams, boreholes and rivers) also needs an independent review to

assess water management issues and the potential for deploying the water to better use in surrounding agricultural areas. Where there is substantial demand and sufficiently managed water, the review should propose costed plans to link small-scale farmers to these water sources.

To achieve water sustainability, it will be necessary to have Integrated Water Resource Management (IWRM), in conjunction with other Ministries. A thorough analyses of the different catchment areas needs to be done, taking into account the effects of climate change, long-term water usage planning, and strong governance by strengthening of the respective Water Resources Authorities (WRAs). WRAs need to have all the necessary data to make informed decisions when giving and declining water permits.

Moreover, WRAs need to be involved in any major irrigation project right from the project planning stage. The ATO should bring together any other relevant stakeholders to exchange, collaborate, and find the best way to develop and implement IWRM.

The MoALFI will ensure that any plans to develop new infrastructure, whether public or private, will be based on rigorous and independent analysis of key criteria, in addition, the proposed irrigation scheme will be assessed according to some guiding principles. Evidence suggests that:

- Irrigation systems where farmers engage in management (either alone or in some combination of non-government or government co-management) can perform better and generate higher economic returns than solely government-managed systems (such as the Yatta and Njoro Kuwa Furrows).[259]
- Smaller schemes often produce better performance. An illustration of this is

BOX 17: DISASTER MANAGEMENT ORGANIZATIONS ATO INTERACTS WITH

The Kenyan Humanitarian Partnership (KHPT) is a platform that brings together the UN agencies, donor agencies, NGOs, private sector, local organizations, national and sub-national government. The main role of the KHPT is to ensure strategic coordination and coherence of humanitarian action by the Government of Kenya, and coordinate national and international humanitarian actors towards better humanitarian preparedness and response.

Ministry of Agriculture, Livestock, Fisheries and Irrigation (MoALFI) is responsible for disaster response and preparedness related to crops, livestock and fisheries, whether pest or diseases. Through organizations such as KMFRI, KALRO, etc., the government should work to create early warning systems for the disasters and create SOPs for response

National Drought Management Authority (NDMA), which was established in 2011 through the State Corporations Act following the 2011 drought, and takes the lead on drought preparedness and response in the ASALs. It is an authority under the Ministry of Devolution and ASALs.

National Disaster Operations Centre (NDOC) was established in 1997 following the El Niño floods and sits within the Ministry of Interior and Coordination of National Government. It is responsible for coordinating all disaster response operations in the country – and was leading the country's El Niño flood response in 2015. It does this through partnering with other actors such as the National Police Service and the Kenya Red Cross. It also plays a preparedness role by managing the country's disaster loss database.

National Disaster Management Unit (NDMU) was established through a presidential directive in 2013 and sits within the Ministry of Interior and Coordination of National Government. It is seen as the government unit responsible for disaster risk management in the country, but also carries out some response activities. Led by the National Police Service, its operations cut across both natural and man-made disasters. NDMU has established the country's emergency response plan and standard operating procedures (SOPs).

FIGURE 49: SUSTAINABILITY CHECKLIST TO MONITOR FOOD SYSTEM RISKS

In addition to specific interventions addressed as part of the flagship, MoALFI will implement a sustainability **checklist as a prerequisite for all programmes to submit** before they can be approved by the JAS-IGS committee

	Checklist for agri-related implementing partners when designing programmes	Programme Description	MoALFI Assessment (Pass, Fail)
FEASIBILITY	**1** Measures that incorporate social and environmental costs in production process – also having incentives for sustainable production practices	.....	.....
	2 Systems of environmental impact assessment/environmental audit	.....	.....
RESILIENCE	**3** Mechanism to strengthen resilience (e.g. diversified production system, adoption of climate smart practices, eco-friendly technologies)	.....	.....
	4 Mechanism to protect genetic resources and biological diversity	.....	.....
WATER	**5** Mechanism for enhanced water management, touching on water consumption, water abstraction and water stress	.....	.....
LAND	**6** Mechanism for enhanced land management: use of sustainable process index in agri-production, measures to prevent land degradation, soil restoration, flood management	.....	.....
PRODUCTIVITY	**7** Resource productivity measures (e.g. application-sustainable development index, such as per capital area)	.....	.....
RESTORATION	**8** Initiatives to maintain and expand agroforestry interventions including protection and re-establishment of forests	.....	.....
	9 Enhanced system intensification via reclaiming degraded lands and reducing encroachment on protected areas	.....	.....
ENABLERS	**10** Training manuals that focus on sustainable resources management	.....	.....
	11 A sustainability regulatory framework/policy instruments that govern use of resources – to help reposition sustainable production and consumption.	.....	.....
	12 Connected to strong networks and partnership for knowledge sharing on sustainable use of resources	.....	.....

SOURCE: ASTGS Working Team Analysis; Green Growth Team at MoALFI

that pump irrigation from groundwater and surface water is far more productive and financially viable compared to public irrigation systems and several times more productive compared to canal irrigation, as well as being more financially viable and self-governing.[260]

- Environmental impact is often undervalued in the short-term, and government has a key role to play in improving regulation of water management and the promotion of methodologies with low environmental impact.[261]

The MoALFI will therefore support Kenya's water-secure future by:

- Improving the integration of environmental impact criteria for better water management into all irrigation planning
- Reviewing the current implementation of water regulations and exploring national government's role in improved coordination across counties for data-driven permits and water management
- Exploring ways to incentivize water-use efficiency (e.g., using newer technologies) across all irrigation

Specifically, for small-scale farmer irrigation, MoALFI will support advancement by:

- Promoting investments in, and seeking

opportunities to support, small-scale, farmer-developed and managed irrigation systems through, for example, grants or zero-interest loans

- Offering tax breaks and subsidies for rainwater harvesting and small-scale pump systems

The other challenges listed above are addressed in various ways across all the strategy flagships as shown below:

- **Flagship 1 stimulates local agricultural markets and businesses for crops, livestock and fish**, with farmer income increases driven by increased yields from better soil quality, use of irrigation and sustainable fish farming/capture. This requires interventions in soil fertility through proper farming practices, soil testing and rehabilitation. *Appendix 1* details a proposed approach to soil testing.

  Sustainability of fish levels will require investment in monitoring, control and surveillance of capture fisheries, and promoting sustainable fish farming. This will reduce overfishing and fishing in prohibited areas such as breeding grounds. The government should also look into protecting farmer incomes by reducing losses from human-animal conflict. Animals, e.g., monkeys, elephants, etc. have been known to ravage crops in various parts of the country, and the government should step in and help protect the farmers by employing deterrents such as fences, and, in case of destruction, the government should have an insurance scheme for reimbursement.

  Research organizations such as the KALRO and KMFRI are responsible for providing information and guidance on sustainable use of resources (crops, livestock and fish). KALRO will need to increase access to early generation seed for small-scale farmers to ensure maximum yields, and invest in research to handle disasters such as the Fall Armyworm more proactively and develop locally available and affordable solutions where possible. Improved crop varieties have the potential to increase farm output significantly. For example, several tea clones capable of yielding over 5000 kg per hectare annually have been developed and commercialized. In order of magnitude this is almost three times the yield of unimproved tea in Kenya.[262]

  The Ministry of Environment will work with MoALFI on identifying and mitigating cases of human-animal conflict.

- **Flagship 2 shifts nationwide subsidy programme focus** from only fertilizers to multiple more affordable inputs. Provision of blended fertilizers and lime post-soil testing will go a long way in soil rehabilitation and overall crop yield increase. Provision of subsidies for irrigation materials will make the equipment affordable to more farmers, but increase the need for the water monitoring described above.

- **Flagship 3 sets up five agro-processing hubs** to meet domestic and regional demand. Large industries use a lot of water and so their consumption will need to be tracked with smart water meters and payment on abstraction required. During minimum flow of water reservoirs, the smart meter will help in rationing. Further, investing in post-fishing handling such as landing ports and agro-processing facilities can reduce waste by providing handling and value addition of fish.

- **Flagship 4 scales up commercial farms** by unlocking publicly owned land for contract farming. This may need investment in soil management and rehabilitation and provision of water and management of water resources, for which data should be made available to investors as soon as possible. Disaster preparedness especially for pests such as the Fall Armyworm will be critical for investors to protect their investment.

- **Flagship 5 is directed at restructuring governance and operations of the nationwide strategic food reserve.** The recommendations of the flagship mitigate for "business as usual" emergency drought management, but there is a critical role for the rapid response team in supporting disaster management in response to pests and diseases both on farm and off farm. Further, global price shocks can escalate the cost of providing food very quickly.

FIGURE 50: LIST OF PRIORITIZED FOOD SYSTEM RISK INTERVENTIONS

List of prioritized sustainabbility interventions

Sustainable natural resource management practices	How	Potential Owner	FLAGSHIP 1	FLAGSHIP 2	FLAGSHIP 3	FLAGSHIP 4	FLAGSHIP 5	FLAGSHIP 6
IMPROVE SOIL FERTILITY	1 Invest in **soil fertility increases** through **better farming practices**, access to blended fertilizers and lime	Extension officers KALRO		●		●		
	2 **Improve information** about soil through coordinated soil testing and mapping			●		●		
MANAGE WATER RESOURCES	3 Support and empower counties to **coordinate water management undertakings**, such as reservoir monitoring	MoW Department of Irrigation Private sector supplying irrigation material (e.g. Davis and Shirtliff	●					●
	4 Incentivize **water harvesting and storage and efficiency technologies** (e.g. drip irrigation) through tax breaks and subsidies		●			●		
	5 Enforce use of **digital water basin management** systems for transparent information of water levels and use for planning purposes (e.g. rationing)		●		●	●		
SUPPORT CLIMATE SMART AGRICULTURE	6 Improve strategies for **early warning and response**, and ensure preparedness to extreme weather events (e.g. drought, floods), including insurance	MoALFI						●
	7 Increase the research, development and release of **drought-tolerant varieties available to farmers**			●				●
	8 Improve **rangeland management and support coordination** of grazing systems across counties							●
CREATE STEWARDSHIP OVER FISHING GROUNDS	9 Invest in **remote sensing capabilities** (e.g. sensor that allows us to see # of boats in a certain areas) and monitor vessels	MoALFI KMFRI	●					
	10 **Map potential landing sites, ports, agro-processing/EEZ facilities, inland fisheries**, and marine fisheries to ensure no area is 'over-covered', and areas that require more monitoring, control and surveillance receive it.		●		●			
IMPROVE THE CONSERVATION AND USE OF GENETIC RESOURCES	11 Improve governance and performance management at KALRO to **increase access to early-generation seed**	MoALFI KALRO KEPHIS	●			●		
	12 Continue support for KALRO and KEPHIS as critical stewards of the **conservation and use of genetic resources**		●					●
CREATE MODERN DISASTER MANAGEMENT SYSTEMS TO PLAN FOR CROP FAILURE EMERGENCIES	13 Invest in **research to determine FAW[xcii] infestation levels**, resultant yield losses and control and eradication mechanisms (natural predators, pesticides)	MoALFI KALRO KEPHIS Tegemeo	●			●	●	
	14 Sensitize the public on first responses for disaster management (e.g.signs of FAW)		●			●	●	●
	15 Develop a **monitoring and early warning system** for various threats (e.g. pests and disease)					●	●	●

NOT EXHAUSTIVE
SOURCE: Expert Interviews, Sustainable Management of the Fall Armyworm in Africa (FAO Programme for Action)

The disaster response team can and should facilitate the disbursement of emergency stock and cash as needed, with data use to predict emergency needs.

- Flagship 6 makes farming and pastoralist households more resilient in ASAL regions. One of the major problems in ASAL regions is water availability; therefore, an intervention that would have significant impact on water availability would empower the local leadership to champion and conduct water management practices such as reservoir monitoring and maintenance. Other water efficiency uses such as water harvesting will help offset some of the need for water once the rains end. Productive drought-resistant crops and suitable livestock species need to be developed for ASAL regions to reduce vulnerability of the communities in those regions. Climate change mitigation and resilience measures such as an early warning and response system for adverse environmental effects such as drought are also critical to this flagship.

xcii Fall Armyworm

C. IMPLEMENTATION RISKS AND HOW TO MITIGATE THEM

Continued challenges coordinating implementing stakeholders

It has always been a challenge to coordinate the various actors responsible for managing risk in the food system. If the ATO that reports to the CS MoAFL&I is mandated to monitor compliance and mobilize first-response resources to crises, this challenge should lessen, as the ATO will have the backing to secure concrete actions from the different players. The various stakeholders in government should also have a KPI on food security, specific to their role, in their contracts. This will create the need for the various implementers to work together and thus coordination will be necessary for each of them to meet their contract terms and requirements.

Community buy-in

Unless there is sufficient buy-in from the various stakeholders, particularly the communities involved, most interventions will struggle to succeed. The ATO will ensure the criteria for measuring community buy-in captured on the sustainability checklist are sufficient to guarantee community engagement (e.g., water basin management is reliant on the communities around the water source accepting that there is a problem). Sensitization of communities to the benefits of engaging in sustainability and climate-smart practices will be necessary to ensure buy-in.

Limited legal recourse on issues of land use and encroachment into water catchment areas

In addition to the monitoring and compliance provided by the ATO, ratifying the Draft Land Use Policy (2016) in accordance with the recommendations made in Box 4 – ASTGS perspectives on Land Use and Land Reform is essential. The Ministries of Lands, Planning and the county governments should control the spread of urban areas and commercial developments into water catchment areas and high-potential land through zoning, as recommended in the National Spatial Plan, which identifies and apportions land to various uses to protect prime agricultural land, prioritizing grain basket and export crop areas (e.g., protecting coffee- and tea-growing areas).[263] There should be clear penalties and enforcement for incorrect land use and the policy should make it difficult for land use change to be effected from protected land to any other use. Periodic land use assessment should be carried out and those found in contravention of the land use policy should be penalized, e.g. through fines.

D. KEY MILESTONES

1. **Design of action plan:** A team of multi-disciplinary experts (e.g., from government, private sector, development partners, research organizations, academia) will need to work together with the ATO to draw up detailed designs of the sustainability and disaster management interventions, including costing, targets, digital tools needed, roll-out plan, training programmes, monitoring and evaluation mechanisms, and data collection and monitoring systems

   – Responsibility: MoALFI

   – Start date: Q1 2020

2. **Preparation and sensitization:** The ATO will engage various stakeholders on the value of sustainability and conduct training activities for the communities and farmers on the same. This would also include the start of interventions like the soil-mapping exercise in 10 pilot counties and roll-out of a pilot for smart meters for water level monitoring

   – Responsibility: MoALFI

   – Start date: Q1 2020

3. **Scaling up:** The ATO, together with the relevant stakeholder, will develop a phased approach for implementation of interventions, based on the capability to scale up the piloted interventions such as smart water meters to other water bodies, incorporating lessons learned from the pilot phase, with a target to reach full scale over the course of 18 months. The ATO will also oversee the start of the other interventions identified at the beginning of the process.

   – Responsibility: MoALFI

   – Start date: Q2 2020

4. **Monitoring:** A specific cadence, e.g., monthly or quarterly monitoring and reporting system, would need to be drawn up and implemented such that analyses could be conducted on the efficiency and impact of the intervention, including e.g. number of smart meters installed, remote sensors disbursed, communities trained, etc., and other performance metrics of the interventions launched.

   – Responsibility: MoALFI

   – Start date: Q4 2020

Note: All flagships need to be further detailed to move from strategy to implementation, and achieve the milestones laid out above. See NAIP for conversation on immediate next steps.

05

TRANSFORMING THE COUNTIES

While the ASTGS is a national strategy, its implementation will be carried out by the counties, in line with the Constitution's provision that agriculture is a devolved function. Hence, it will be crucial that the strategy is domesticated by the county governments, and that the planning, funding and implementation of the flagships are carried out at the county level. In addition, all this will need to be done in alignment with the county priorities, as outlined in sector plans and County Integrated Development Plans (CIDPs). To assist the county governments with these processes, this chapter of the ASTGS outlines steps they can take to domesticate the ASTGS and develop their own county-specific agricultural implementation plans *(Figure 51)*.

Working closely with MoALFI, the Joint Agricultural Sector Coordination Mechanism (JASSCOM) will be responsible for supporting the counties and county economic blocs in these processes. This means ensuring that the critical capacity building needs are addressed so the counties can effectively domesticate the ASTGS, and link their development plans and longer-term agriculture strategies to

FIGURE 51: FIVE STEPS COUNTIES CAN FOLLOW TO DOMESTICATE THE ASTGS

Steps involved in developing a county-level agriculture transformation plan

A **Map out your agricultural sector priorities**	Map your county's **identified flagships and value chains** from the National ASTGS against your Sector Plan and CIDP goals to check for alignment with your county's strategic priorities in agriculture If required, identify any additional **priority value chains** based on the ASTGS prioritization matrix
B **Rank your priorities**	Rank the **National ASTGS flagships and your existing projects** based on implementation feasibility and potential impact on your strategic priorities Select the **priority value chains** within each flagship
C **Create an implementation plan aligned with your CIDP**	Develop your **county-level implementation plan**, basing the phasing of different interventions on the prioritization of your flagships and other interventions Assign **milestones** on the implementation plan to responsible owners Coordinate implementation plan with **your regional bloc and national-level plans**
D **Estimate funding requirements and identify funding sources**	Estimate **required investment funding** for the flagships and other interventions in your implementation plan Locate **funding sources** based on consultation with other stakeholders through the ATO[xciii]
E **Execute implementation plan and performance management**	Assign **county-level delivery** team to drive delivery of your flagships and interventions Liaise with the ATO throughout implementation to ensure **on-track delivery**

SOURCE: ASTGS Working Team Analysis

national priorities and outcomes, and develop the policies required to support county-level implementation (e.g., climate-smart).[xciii]

The steps involved in developing county-specific agricultural transformation plans are as follows:

- Map out the county's agricultural sector priorities: Based on the strategic priorities identified in the county Sector Plan and CIDPs, the county government should select value chains and ASTGS flagships that are of top strategic importance for them. As part of the stakeholder consultation process in ASTGS development, these county-level priorities have already been identified by county representatives in agriculture. These are shown below in *Figure 52*. If additional value chains are required, the county can use the ASTGS value chain prioritization matrix *(Figure 54)*, which provides criteria against which value chains can be evaluated and prioritized. While these criteria have been used specifically in ASTGS value chain prioritization, they have a high degree of overlap with those used by different international organizations, e.g., USAID, World Bank and UNIDO in their own value chain prioritization exercises.
- Rank the agricultural sector priorities:

  Once a county's top ASTGS flagships have been selected, they need to be ranked against each other and against existing or other planned interventions, to establish order of priority; one way to do this is through the impact-feasibility matrix, which can be used to rank interventions based on their potential ability to deliver impact in the county's priority areas and their ease of implementation *(Figure 55)*. Crucially, one important aspect of ease of implementation is the likelihood of obtaining funding from the national government, which depends to a large extent on the intervention's alignment with national priorities such as CAADP and national agriculture priorities (e.g., the Big Four for the first five years of this plan).

  In this ranking exercise, counties are strongly encouraged to consult with other counties in their regional economic blocs to identify opportunities for joint interventions, e.g., an agro-processing hub that sources inputs from several counties in the region. Pooling

xciii Agricultural Transformation Office.

resources into one inter-county flagship can help flagships become more cost-effective through economies of scale, and improve feasibility of implementation by aggregating capabilities and resources from multiple counties. In addition, the county government should involve relevant stakeholders from their constituents in the decision-making processes. In particular, farmers and their communities should be part of the process to ensure that the benefits from the transformation align with their needs, and that local community interests are sufficiently taken into account in negotiations with other parties, e.g., during the signing of contracts with large investors.

- Create an implementation plan: Once the top-priority interventions have been identified, an implementation plan with action milestones, milestone timing and milestone owners needs to be drawn up. The phasing should be based on the results of the value chain prioritization and intervention prioritization exercises: high impact, high-feasibility interventions and priority value chains should be targeted first. If applicable, the roll-out of each intervention across sub-counties should also be phased similarly, with the sub-counties that have greater impact potential and greater ease of implementation targeted for early-stage pilots or first wave implementation. During the implementation planning process, plans for interventions that have been identified for joint implementation across counties need to be synchronized between the implementing counties. An example of an implementation plan is shown in *Figure 56*.
- Estimate funding requirements and identify funding sources: Once the implementation plans have been completed, the county government needs to estimate the annual investments required to execute the plan. These costs will also need to be classified based on likely funding source – government, development partners and NGOs, or the private sector. Once cost classification has been made, the counties can then work with other stakeholders, including the MoALFI and other national government stakeholders to identify funding sources to close any funding gap that exists.
- Execute implementation plan and performance management: Once funding has been located, the county can then start the implementation phase of its agricultural transformation plan. During the implementation process, the county needs to track the progress and target metrics of each intervention, to quickly identify any delays and problems and work to debottleneck any issues. This M&E process should cascade up from individual implementers, such as extension workers, to the village, ward, sub-county and county levels, with the Agriculture CEC responsible for tracking overall implementation progress across the county. In turn, the county should share its progress and performance outcomes with the ATO and the flagship's independent evaluator to provide national visibility of implementation across the counties, so that national resources can be used to problem-solve specific issues in implementation and help share best practices in similar interventions across different counties.

See Appendix 3 for additional tools including a draft letter to the county treasury to support budgetary requests

FIGURE 52: RECOMMENDED COUNTY FLAGSHIPS AND VALUE CHAINS (1/2)

COUNTIES *are the* BEDROCK *of* IMPLEMENTATION

		1 FLAGSHIP	2 FLAGSHIP	3 FLAGSHIP	4 FLAGSHIP	5 FLAGSHIP	6 FLAGSHIP	TRANSFORMATION PRIORITIES	TOP 3 ADDITIONAL OPPORTUNITIES IDENTIFIED BY THE COUNTIES
NORTHERN REGION ECONOMIC BLOCK (NOREB)	Baringo	●	NATIONAL PROGRAMME, ALL COUNTIES ELIGIBLE			NATIONAL PROGRAMME, ALL COUNTIES ELIGIBLE			
	Elgeyo Marakwet				●				
	Nandi	●		●					
	Samburu						●		
	Trans Nzoia	●		●	●				
	Turkana	●			●		●		
	Uasin Gishu	●		●					
	West Pokot	●			●		●		
LAKE REGION ECONOMIC BLOCK (LREB)	Bomet	●	NATIONAL PROGRAMME, ALL COUNTIES ELIGIBLE	●		NATIONAL PROGRAMME, ALL COUNTIES ELIGIBLE			
	Bungoma	●							
	Busia	●		●	●				
	Homa Bay	●		●			●		
	Kakamega	●			●				
	Kericho	●							
	Kisii	●		●			●		
	Kisumu	●		●	●				
	Migori	●							
	Nyamira	●			●				
	Siaya	●		●	●				
	Vihiga			●					
MT. KENYA AND ABERDARES ECONOMIC BLOCK	Embu	●	NATIONAL PROGRAMME, ALL COUNTIES ELIGIBLE	●		NATIONAL PROGRAMME, ALL COUNTIES ELIGIBLE	●		
	Kiambu	●		●					
	Kirinyaga								
	Laikipia	●					●		
	Meru	●		●					
	Murang'a	●							
	Nakuru	●		●	●				
	Nyandarua	●		●					
	Nyeri	●		●					
	Tharaka-Nithi	●		●					

FIGURE 53: RECOMMENDED COUNTY FLAGSHIPS AND VALUE CHAINS (2/2)

COUNTIES *are the* BEDROCK *of* IMPLEMENTATION

		FLAGSHIP 1	FLAGSHIP 2	FLAGSHIP 3	FLAGSHIP 4	FLAGSHIP 5	FLAGSHIP 6	TRANSFORMATION PRIORITIES	TOP 3 ADDITIONAL OPPORTUNITIES IDENTIFIED BY THE COUNTIES
FRONTIER COUNTIES DEVELOPMENT COUNCIL (FCDC)	Garissa	●	NATIONAL PROGRAMME, ALL COUNTIES ELIGIBLE			NATIONAL PROGRAMME, ALL COUNTIES ELIGIBLE	●	Beef, Horticulture	Camel milk, Tomato
	Isiolo	●					●	Beef, Horticulture	Camel milk, Tomato
	Mandera						●	Fish, Horticulture	Camel milk, Chevon, Tomato
	Marsabit						●	Beef, Fish, Horticulture	Camel milk, Chevon, Sukuma wiki
	Wajir	●					●	Beef, Horticulture	Camel milk, Poultry, Water melons
SOUTH EAST KENYA ECONOMIC BLOCK (SEKEB)	Kitui	●					●	Cotton, Beans, Horticulture	Poultry, Citrus
	Machakos	●					●	Cotton, Dairy, Beans, Horticulture, Poultry	Vegetables
	Makueni	●		●			●	Cotton, Beans, Horticulture	Beans, Vegetables, Poultry
JUMUIYA YA KAUNTI ZA PWANI (JKP)	Kilifi	●	NATIONAL PROGRAMME, ALL COUNTIES ELIGIBLE	●		NATIONAL PROGRAMME, ALL COUNTIES ELIGIBLE	●	Fish, Horticulture, Poultry	Cassava, Chilli
	Kwale						●	Fish	Chilli, Citrus, Poultry
	Lamu	●		●	●		●	Fish, Horticulture, Poultry	Cashew nuts, Fish, Poultry
	Mombasa	●		●				Fish, Horticulture, Coconut, Poultry, Rice	Vegetables
	T. Taveta	●			●		●	Beef, Dairy, Horticulture, Poultry	Bananas, Poultry
	Tana River			●	●		●	Cassava, Cow pea, Rice	Beef, Fish, Vegetables
UNASSIGNED	Nairobi	●	NATIONAL PROGRAMME, ALL COUNTIES ELIGIBLE	●		NATIONAL PROGRAMME, ALL COUNTIES ELIGIBLE		Dairy, Horticulture, Poultry	Sukuma wiki
	Kajiado						●	Beef	Dairy, Tomato
	Narok	●						Beef, Dairy, Potato	Cassava

Conversations with key county executives and stakeholders, an analysis of agro-ecology, transformation readiness, and the end-term ASDSP evaluation informed this initial flagship and value chain recommendations. These recommendations are subject to change during implementation, as counties (re)prioritize to best meet their objectives

Bananas, Cassava, Cotton, French beans, Horticulture, Potato, Sorghum, Tomato
Beans, Chevon, Cow pea, Green grams, Maize, Poultry, Sugar, Vegetables
Beef, Chilli, Dairy, Groundnut, Mango, Pyrethrum, Sukuma wiki, Water melons
Camel milk, Citrus, Fish, Goat meat, Palm oil, Rice, Sweet potato, Wheat
Cashew nuts, Coffee, Fisheries, Honey, Passion fruit, Snow Peas, Tea

SOURCE: Interactions with County CECs of Agriculture, CO's Agriculture and Directors Finance between Feb - Mar 2018

FIGURE 54: COUNTY GUIDE FOR VALUE CHAIN PRIORITIZATION

Tool A: ASTGS value chain prioritization approach

Considerations for value chains to drive transformation

- Aligned with **agro-ecology**; current production value in county can be used as a proxy for suitability to the county's climate, soil and water availability
- Aligned with **government priorities** articulated in Vision 2030, Big Four, MITP III, CIDP, etc.
- Consistent with extensive value chain analysis conducted by other parties, e.g. World Bank, USAID, Grow Africa and KAAA **for competitive advantage**[xciv]

Value chain prioritization criteria

All Pillars

Production value (KES b)	**Import consumption share** (%)	**Regional demand** (KES b)
Competitive Advantage (unit)	**Potential yield increase** (%)	**Nutritional value** (KES b)
Smallholder income	**Commercial agriculture**	**Food/nutrition security**
Smallholders involved (%)	**Agroprocessing potential** (scale)	**Calorific value** (kcal /100g)

PILLAR RELEVANCE:

- ALL
- AG-PROCESSING
- SMALL-SCALE
- FOOD SECURITY

SOURCE: KAAA, "Value Chain Selection Report", 2015; World Bank, "Kenya Value Chain Competitiveness report", 2015; USAID-KHCP report, 2015, Government of Kenya, Grow Africa reports, 2014, UNIDO

xciv While these studies all use slightly different criteria, there is a general consensus that maize, dairy, beef, potatoes, horticulture (incl. exports and juice processing) are of high priority. More specifically, the studies quoted include World Bank (dairy, animal feed, juice, meat, fish); KAAA (dairy, beef, maize, potatoes, sugarcane); Grow Africa (dairy, rice, sugarcane, livestock, mangoes).

FIGURE 55: COUNTY GUIDE TO PRIORITIZING INTERVENTIONS

Tool B: ASTGS prioritization approach for flagships and other projects

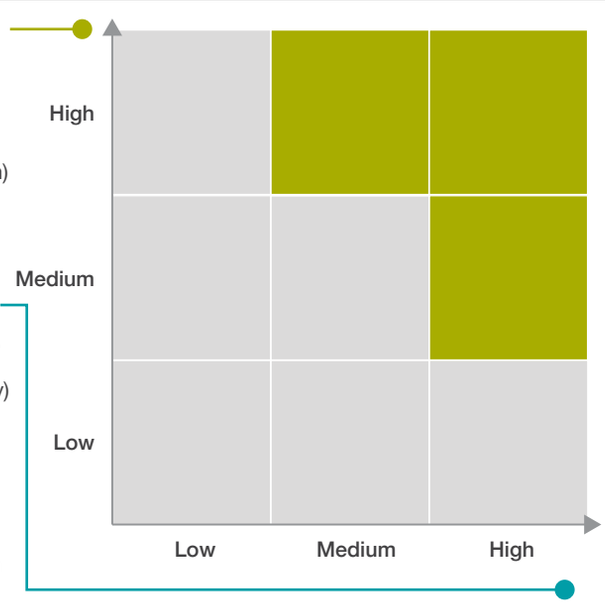
Prioritization matrix for ASTGS flagships and other county-level projects

Potential impact on strategic objectives of the Vision 2030, Big Four, MITP III, CIDP and other relevant strategies:

- Agriculture GDP
- Incomes
- Job creation (esp. for youth and women)
- Food and nutrition security
- Etc.

Implementation feasibility based on:

- Likely difficulty/ease of obtaining funds, e.g. based on alignment with national priorities (to access funds from Treasury) or donor priorities (to access donor funding)
- Capacity-building required
- Time to implement
- Political acceptability
- Potential for joint implementation within regional economic bloc

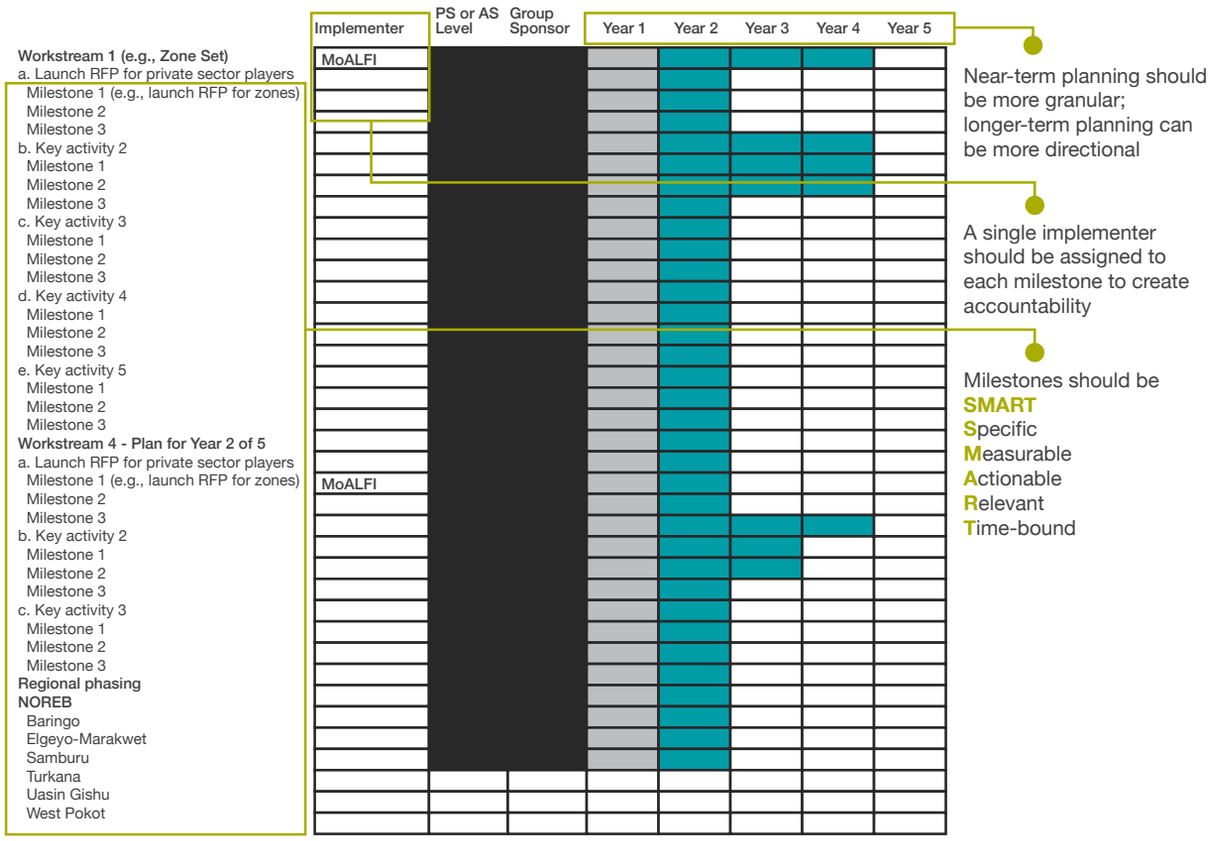


SOURCE: ASTGS Working Team Analysis

FIGURE 56: COUNTY GUIDE TO DEVELOPING AN IMPLEMENTATION PLAN

Tool C: Approach for developing county-level implementation plans

County-level implementation plan



SOURCE: ASTGS Working Team Analysis

06

FINANCING AND IMPLEMENTING THE PLAN

ASTGS will support transformation of the sector over the next 10 years. The accompanying National Agriculture Investment Plan (NAIP) covers the first five of these years. Throughout this period, it is essential for the accountable ministries to be specific enough about the proposed interventions, clearly define a sustainable path to impact and make informed trade-offs about short-term results.

Figure 57 outlines the roadmap for the first five years of the transformation.

Year 1 is designed to deliver quick wins and begin the structural transformation to set Kenya on a trajectory for 100% food and nutrition security in five years. All initiatives with multiple phases should be launched and staggered for dependencies (e.g., begin legislative processes to separate the price stability mandate from the SFRTF in Year 1, so this can be implemented fully in Year 2. Years 2-4 embed the structural transformation and delivery at the counties. Year 5 takes a

step back to reflect on lessons learned, and to design innovative interventions for the next five years of the strategy.

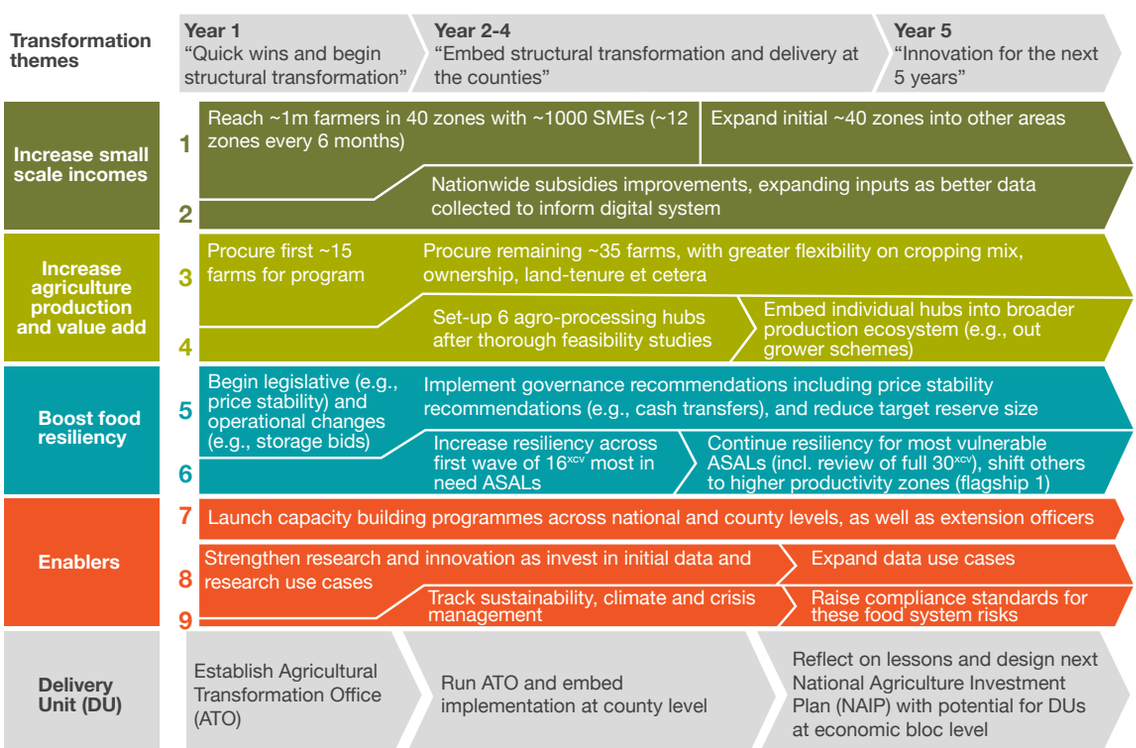
As a results-oriented transformation, it must deliver quick wins. *Figure 58* illustrates the expected milestones within the first year across each of the flagships. These milestones are indicative.

The programme is estimated to deliver an incremental KES 480 billion cumulative agricultural GDP impact over five years with ~KES 180 billion delivered in year five in pursuit of increasing GDP to KES 3.9 trillion, as outlined in *Figure 16: Outcome metrics for ASTGS*. The biggest driver of GDP impact is the creation of ~50 new farms (~40% of total agriculture GDP impact), with small-scale farmer incomes growing ~40% in the same period, and the number of food-insecure Kenyans reducing to below 1.3 million.

The transformation is expected to cost KES 440 billion over its first five years: ~KES 230 billion in agriculture-specific costs *(see Figure 59)*, and ~KES 210 billion in agriculture supportive costs including power, roads and price stability within National Treasury. Engaging with the private sector to provide commercial loans and partner on PPPs is critical to financing ~80% of the agriculture-specific costs. The remaining ~20% should come from government and development partners. To support the government funding contributions, both national and county governments are encouraged to allocate at least 10% of their budgets to the agricultural sector, in line with the Maputo Declaration to which Kenya is a signatory.

Monitoring and evaluation (M&E) is critical for accountability and for learning at both the national and county levels. The key outcomes of the strategy – increasing small-scale farmer, pastoralist and fisherfolk incomes, increasing agricultural output and value addition, and increasing household food resilience – are aligned with Kenya's Agricultural Sector Results Framework. This results framework identifies the key outputs, outcomes and impact the sector is committing to, keeping in mind the realities of devolution, regional, national and

FIGURE 57: HIGH-LEVEL ROADMAP FOR FIRST FIVE YEARS OF TRANSFORMATION



SOURCE: SOURCE: Team Analysis

xcv These 16 include: Embu, Garissa, Isiolo, Kajiado, Kitui, Laikipia, Machakos, Makueni, Mandera, Marsabit, Samburu, Taita Taveta, Tana River, Turkana, Wajir, West Pokot. The 14 for consideration in wave 2 are all semi-arid: Baringo, Elgeyo Marakwet, Homa Bay, Kiambu, Kilifi, Kwale, Lamu, Migori, Nakuru, Narok, Nyeri, Meru, Tharaka Nithi.

FIGURE 58: YEAR 1 MILESTONES FOR DELIVERY ACROSS THE TRANSFORMATION

YEAR 1 TRANSFORMATION MILESTONES

2019

MONTH 1

FLAGSHIP **8**

Launch open data policy for the agricultural sector, and pilot first data use case on small-scale farmer production forecasts

MONTH 4

FLAGSHIP **5**

Register the 1,000,000th farmer from joint registration effort between Ministry of Agriculture, the Counties, and private sector partners. Begin pilot for new digital e-voucher subsidy scheme

MONTH 8

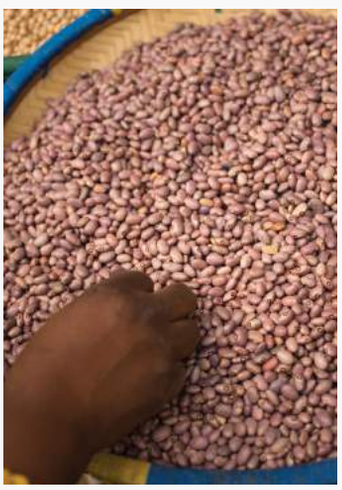
FLAGSHIP **6**

Host development partner summit focused on transformation and coordination of ASAL household food resilience efforts. Development partners to demonstrate results from their work to date

MONTH 2

FLAGSHIP **4**

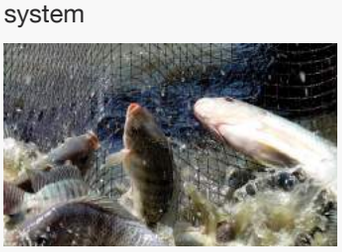
Start first fully funded agro-processing hub feasibility study and launch roadshow with global and local investors



MONTH 9

FLAGSHIP **4**

First produce available from one of the proposed 50 farms under irrigation.
Showcase real-time data on water use on this farm, and how it is supporting sustainable water use through the national digital water basin management system



MONTH 4

FLAGSHIP **1**

Target ~180,000 farmers, pastoralists and fisherfolk as well as ~150 farmer-facing SMEs with launch of first wave of high productivity zones. Zones will be operated by business accelerators who will be jointly selected with the Counties

MONTH 6

Procure first batch of ~70,000 tonnes of beans to better focus Strategic Food Reserve (SFR) stocks on ~4 million most in-need Kenyans

MONTH 10

FLAGSHIP **2**

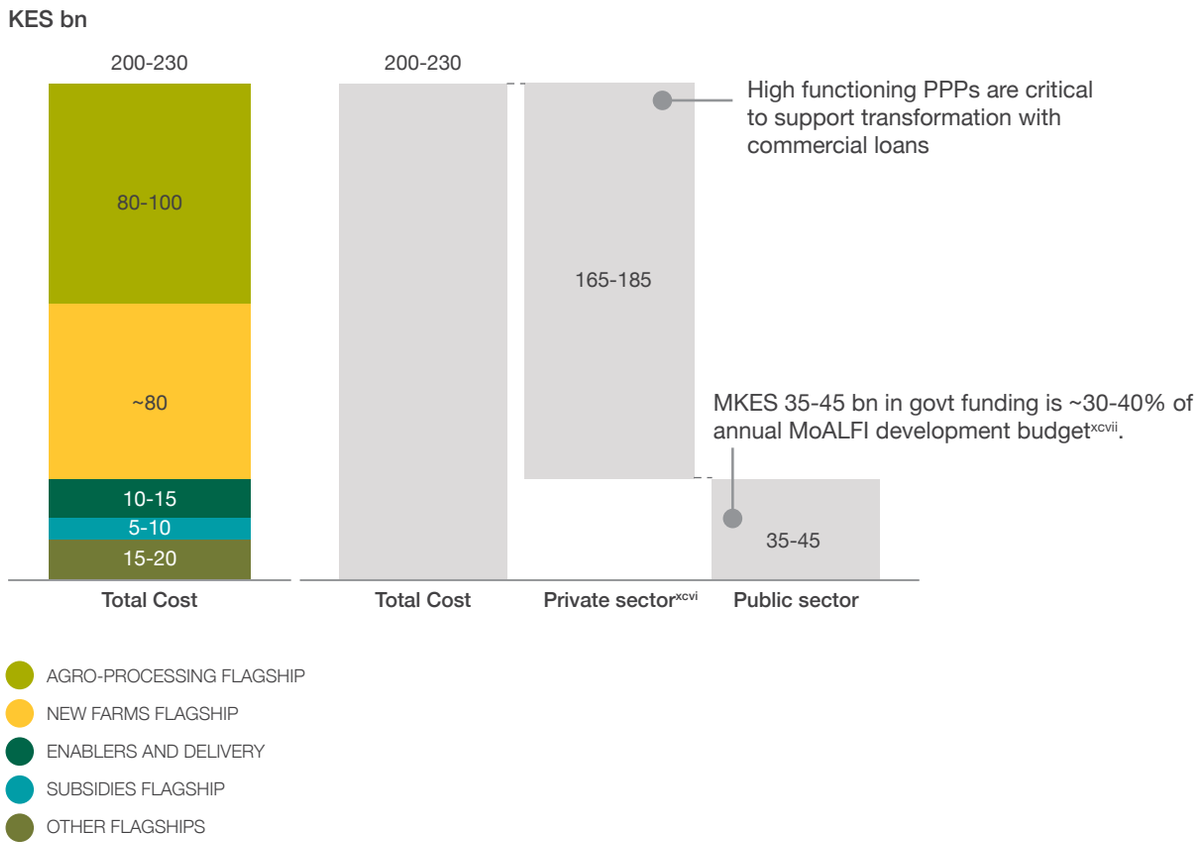
Launch new nationwide e-voucher subsidy programme to target ~1.4 million small-scale farmers, pastoralists and fisherfolk over five years. New programme gives farmers choice of a range of inputs from a variety of private and public providers

SOURCE: ASTGS Working Team Analysis

FIGURE 59: FINANCING NEEDS FOR FIRST FIVE YEARS OF THE TRANSFORMATION

With the right approach, up to 80% of transformation costs can be funded through PPPs, with the remaining 20% by government

Transformation costs over five years, require up to KES 35-45 bn in government funds with support from development partners (~an annual increase of 30-40% in MoALFI development budget)



SOURCE: GoK, 2018/19 Budget Policy Statement; Deloitte Kenya Economic Outlook 2017; USAID.

global agreements including the United Nations Sustainable Development Goals (SDGs) and the Comprehensive Africa Agriculture Development Programme (CAADP) outcomes.

The Agriculture Transformation Office (ATO) will support national and county-level implementors to digitally track and monitor these top-line metrics on a quarterly basis, and work with these implementors to implement real-time changes to improve these metrics. Third-party validation of the performance results with research and academic institutions will be built into the quarterly performance tracking process to ensure mutual accountability, and sharing of best practices. The ATO will also support these implementors to design, define, track and monitor the operational-level input and output metrics for individual flagships on a more regular basis.

For further discussions on M&E – including alignment to CAADP targets, detailed flagship implementation plans, and a deeper discussion of funding and budget needs, please refer to the NAIP.

xcvi Includes financing for most capex requirements including new farm rehabilitation, agro-processing feasibility studies and construction
xcvii Excludes already budgeted annual subsidies of KES 5 bn, extension workers cost of KES 2.6 bn

07

DRIVING RESULTS THROUGH THE DELIVERY MECHANISM

Execution and delivery are critical to the success of the transformation. The delivery unit – the Agricultural Transformation Office (ATO) is a government entity under the Cabinet Secretary of the MoALFI and managed by the Chief Administrative Secretary (CAS). The ATO is responsible for instituting a systematic approach to delivering results across the flagship priorities by:

- Partnering with line ministries to track and follow up on performance, remove bottlenecks, and take corrective actions to address poor performance
- Enabling fast decision making by cutting through government bureaucracy
- Creating transparency and mutual accountability for delivery by consolidating accurate and timely data and communicating fact-based, non-politicized outcomes to key decision makers

Global best practice suggests that well-functioning delivery mechanisms can greatly increase the chances of setting up a successful large-scale transformation. Based on these global lessons,

ASTGS proposes a delivery unit design centred around four primary principles:[264]

Flexibility in terms of design and approach to quickly and easily adapt to the changing needs of the strategy

The delivery mechanism should be responsible to the evolving implementation needs of the strategy, therefore:

- Design, in terms of approach and strategy to realize mandate, should be adaptable and support delivery under conditions today (e.g., 5-year NAIP, 5-year Big Four), but also for the prevailing and changing needs as they evolve
- Challenge the status quo on resource mobilization. For the delivery unit to be attractive to external sources of funding, bureaucracy should be minimal. The ATO should draw its budget directly from the Treasury. Disbursements should be done electronically and audited every three months internally and by the Office of the Auditor General, with an external audit conducted every two years. External audit of the ATO finances of the ATO will attract additional funds from the international donor community and development banks
- Of the ~22 ATO staff *(Figure 60)* who draw a salary from the ATO, six will be senior management, and ~10 will be pooled, and allocated based on the needs of the various flagship implementation arms, with the performance and M&E arm tracking outcomes across the other arms and writing the reports. Four will be dedicated to the ASAL coordination requirements detailed on *Figure 42*, and two will be dedicated to the rapid response disaster management team detailed under *flagship 9*. In addition, there will be three liaisons to help with coordination and implementation, one from JASSCOM, one from the counties – likely an appointee from the CEC Caucus or CoG Agriculture Committee, and a health nutrition team liaison. The liaisons will be appointed by their respective organizations and will draw salaries from their appointing organizations
- To maintain flexibility and responsiveness to implementation needs, the delivery unit should keep outcome and accountability lines the same, even as the overall structure changes
- Establish clear unchanging and focused mandate on priority outcomes, and keep the unit small. Flexibility and responsiveness to implementation needs can be ensured in the delivery unit by keeping outcome and accountability lines the same, even as the overall structure changes

The delivery unit should only source the best talent for successful implementation of its mandate

- The delivery unit should attract top talent from public and private sectors with strong problem-solving and influencing capabilities. This includes a transformational leader who has previously delivered big, fast results; can problem-solve delivery; influences effectively; attracts top talent; and has some familiarity with the public sector. Subject matter expertise not required
- Compensation for employees should be competitive and in line with peers in the industry
- An internal secondment system whereby top talent can join the delivery unit for 1-2 years and gain exposure to other divisions and leadership should be considered to further attract talent

A successful launch of the delivery unit and early quick wins will create credibility and generate momentum for the implementation of the strategy

- The delivery unit should launch as close to the strategy handover as possible to maintain momentum. Getting a number of things in place before the office is recruited/ set up can accelerate this process (e.g., clear and dedicated funding lines, clear roles and mandates)
- There should be visible support from the top leader. The delivery unit should sit in the Office of the CAS.
- It problem-solves delivery of outcomes with real discipline, detail, leverage and intensity. Meeting cadence should be strictly

adhered to. The delivery unit should not just monitor activities and initiatives but push for implementation and tangible results.

- Organization structure, governance and linkages to key external leaders/agencies must be tailored to specific mandate and government context. The delivery unit will need to liaise with county governments (at a regional bloc level), and work to build capacity of the counties to push for implementation at a county level
- Non-government players such as development partners and the private sector should sit on the National Food Security Council as visiting members. They will be required to organize themselves and second someone to the Council for a defined period, e.g., six-month rotational basis. The purpose of this is to ensure all interests are covered during the implementation of the strategy and to help remove any bottlenecks that may be escalated

The delivery unit should be focused on outputs and impact generated by its activities

- Accountability for the delivery of each outcome will fully rest with relevant line agency/department or the private sector, not the delivery unit. The delivery unit's function is to help the different organizations deliver impact but not to take on the responsibility for impact delivery
- Delivery will be region and market-oriented. The delivery mechanism will have direct formal relationships with all the county governments through JASSCOM. These linkages will be used to assess implementation traction at the county level.

7.1 PROPOSED DELIVERY MECHANISM STRUCTURE

The delivery mechanism for ASTGS is detailed below *(Figure 60).*

The ASTGS Steering Committee, chaired by the Cabinet Secretary MoALFI

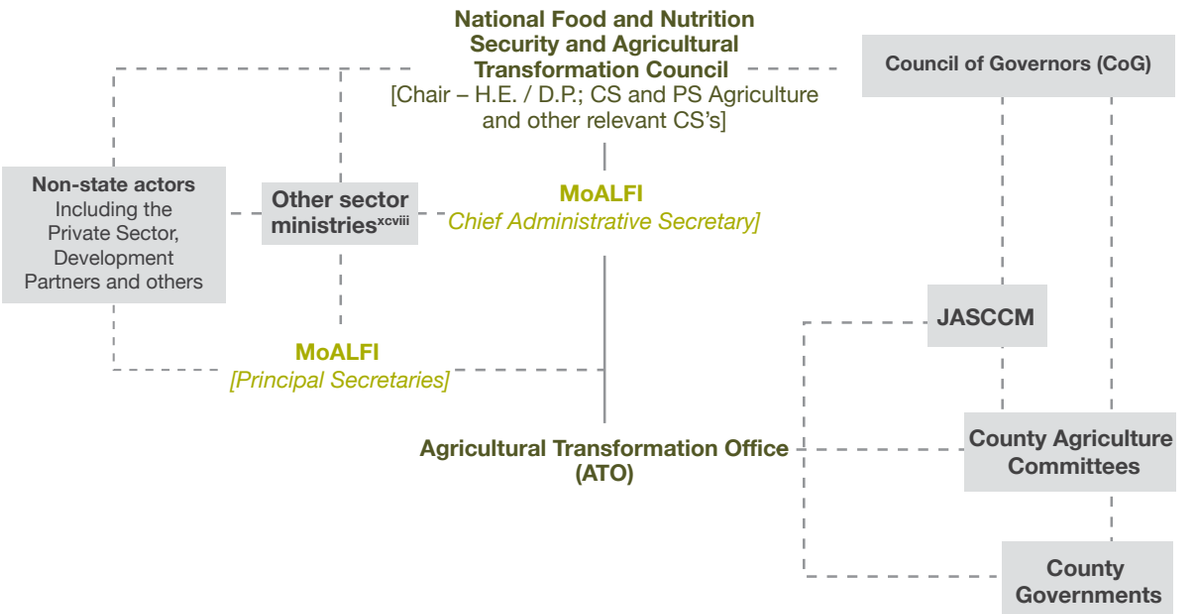
The ASTGS Steering Committee is the top governing body of the ASTGS, with the following guidance for operations:

- Mandate is to ensure implementation of the ASTGS, and coordination with the NFSC on NFNSP areas that overlap, which will include activities to:
  – Drive ASTGS implementation and mutual accountability, at the highest level, across the private sector, government and development partners
  – Oversee commitment of national resources for effective implementation of ASTGS
  – Provide policy direction, guidance and oversight on food and nutrition security matters
  – Facilitate knowledge and skill building, research and cross-sector collaboration to drive implementation and performance management across the ASTGS
  – Facilitate cross-sectional collaboration and cooperation between government ministries, development partners, civil society, the private sector and academia in addressing Food and Nutrition Security matters[265]
  – Approve the ASTGS annual status report prepared by the ATO

- Chaired by the Cabinet Secretary MoAFL&I, permanent members include the Chief Administrative Secretary and Permanent Secretaries in MoAFL&I, the ATO Director, and representation from CoG and JASCCM. Attendance will be requested as relevant from the Secretaries of the eight defined Sector Ministries (MoALFI, Devolution, Environment, Industry, Lands, Transport, Water and Treasury), with the addition of Interior during planning for disasters and emergencies

FIGURE 60: HIGH-LEVEL STRUCTURE OF THE DELIVERY MECHANISM

Delivery of the ASGTS builds on the institutions established by the NFSC, with the addition of a multi-sector Advisory Sub-Committee



SOURCE: ASTGS Working Team Analysis

- Meet approximately four times per year
- An additional~10 slots on an Advisory Sub-committee composed of non-state actors including industry players, development partners, commercial lenders, implementers and knowledge experts. The sub-committee will be self-funded and arrange to meet around the Steering Committee meetings to discuss key issues relevant to non-state actors for the agenda, and the subsequent actions to be taken to remove the bottlenecks raised during the meetings. The sub-committee will nominate ~5 people to attend the Steering Committee meeting, depending on the agenda and expertise needed by the Council, to ensure that implementation is funded and policies created are in line with the priorities of all stakeholders

The Ministry of Agriculture, Livestock, Fisheries and Irrigation

MoALFI will formulate, implement and monitor agricultural policy and regulation, while developing and coordinating programmes to support crops development, livestock, fisheries, irrigation and research that are critical to delivering the ASTGS.

The Cabinet Secretary MoALFI is ultimately responsible for delivering the targets for the agricultural sector, and will work with the CAS MoALFI to ensure high-level national strategy coordination and implementation across both MoALFI state departments and the sector ministries. The CAS is also responsible for all the activities of the Agricultural Transformation Office.

The Principal Secretaries MoALFI will coordinate implementation at the state department levels of the Ministry, drawing on support from the CAS, the ATO, other sector Ministries, and non-state actors as need be.

Other sector ministries and non-state actors

Sector Ministries and non-state actors should provide an enabling environment for the ASTGS, through partnership, collaboration and technical support as required at all levels of government for implementation.

xcviii Sectoral ministries include National Treasury; Industry; Trade and Co-operatives; Transport; Water and Sanitation; Devolution and ASAL areas; Environment and Forestry; others as relevant to specific issues including Education, Science and Technology, Health, EAC Labour amd Social Protection, ICT

The Agricultural Transformation Office (ATO)

The ATO is the national secretariat for inter-ministerial coordination, performance management and mutual accountability for the sector in implementing the ASTGS. The ATO will operate under leadership of CAS, in consultation with the Cabinet Secretary.

Key functions of the ATO will include:

- Facilitate and coordinate broad, multi-sectoral collaboration for effective implementation of the ASTGS with the CAS, in consultation with the CS

- Provide technical support to the Steering Committee by preparing progress reports using a database the ATO will maintain on the status and key issues affecting all ongoing transformation and food and nutrition security interventions

- Provide an independent perspective on transformation performance management and monitoring and evaluation, validating data on implementation provided by MoALFI state departments and the counties, and assessing these against the flagship KPIs

- Provide guidance on how to embed sustainability across all flagships, and track the incorporation of sustainability interventions. The ATO will further monitor and enforce compliance to sustainability policies and recommendations

The Institutional Architecture Assessment (IAA) For Food Security Policy Reform in Kenya identified the need for monitoring and evaluation in the agricultural sector. It recognizes that the agricultural sector has effective strategies and implementation plans. "However, there is insufficient budgetary provision, weak analytical systems, poor alignment of expenditure to priorities, weak monitoring and evaluation systems, and staff capacity on M&E is limited…"[266]

To address this the ATO will support MoAFL&I to:

- Establish and strengthen evidence-based mechanisms to support budgetary allocations and policy development
- Strengthen technical and administrative capacity for policy implementation at the national level, working with JASSCOM and other partners to do the same at the county level

- Conduct capacity and tools needs assessment and capacity building for all staff

See Appendix 4 for sample job descriptions for key roles within ATO

Council of Governors (CoG), JASCCM, and county agriculture leadership

The MoALFI CS will work closely with the Council of Governors at the highest levels of decision making on the ASTGS. On more operational and interim strategic matters between seating of the ASTGS Steering Committee, the ATO will collaborate closely with the Joint Agricultural Sector Consultation and Cooperation Mechanism that will take the lead in supporting the counties to domesticate ASTGS and with implementation on the ground, as part of their mandate to provide an interface between national and county governments on all intergovernmental matters related to agriculture. It is recommended that JASSCOM will second a liaison to the ATO to work with the ATO on day-to-day activities that affect counties.

The county-level delivery functions should be embedded within existing structures in the CoG, JASCCM and county-level leadership, with the CoG encouraged to domesticate ATO activities at the county level within the County Agricultural Committees as necessary. Additional resources and capacity building will likely be required for county leaders including CoG Agriculture Committee, agriculture CECs and COs to domesticate ASTGS as part of their CIDPs.[267]

7.2 PROPOSED CADENCES

To support real-time implementation and coordination of the ASTGS, it is recommended that the ATO follow a rigorous meeting cadence to review progress and address bottlenecks. Weekly touch points should be short, scheduled and focus on areas that require the most attention. Monthly touch points are an opportunity to take a step back and address issues that require multiple state departments and/or sector Ministries to collaborate. As a problem-solving organization helping to remove any bottlenecks as they arise, the ATO is responsible for escalating issues all the way to the Cabinet Secretary (who may choose to escalate further) as necessary for a higher level of intervention *(Figure 61).*

The main area of focus in the first year of the delivery unit should be to set up the office, including recruitment, role allocation, resource mobilization and so on, and then further detailing out the design of the flagships (e.g., operational KPIs, monthly activities and targets).

In Years 2-4, the ATO should be in full delivery mode, implementing strategic interventions across the country with increased focus on the counties. The county CECs/COs should be the implementation partners to monitor traction and champion implementation at the county level, working at the economic bloc level where it makes sense.

Years 4 and 5 should see the delivery unit become an architect of lessons learned over the past few years, on what worked well and what needs improvement. The delivery unit will take the lead in writing the next five-year NAIP, and proposing adjustments to the delivery mechanism going forward.

FIGURE 61: PROPOSED CADENCES FOR THE ATO

The ATO will follow a rigorous meeting cadence to review progress and address bottlenecks

WEEKLY	WEEKLY	BI-WEEKLY	MONTHLY	6 WEEKS
Team check-in Develop/review plans and track progress of activities Identify bottlenecks and prioritize	**Problem-solving meetings** Identify underlying cause of prioritized bottleneck of each focus area Identify and problem-solve bottlenecks Identify bottlenecks that need escalation	**Transformation meeting** Share initiative progress with managers Forum for escalating issues not solved in weekly PS Opportunity for direction and advice on direction by CEO Identify bottlenecks that need further escalation	**CS update** Share progress with the CS on full transformation programme Opportunity for direction and advice on direction by CS on overall programme and coordination between priority areas Raising wider issues which may impact delivery	**H.E/DP update** Update H.E/DP on progress: targets, key actions and give early warning of risks Ensure delivery through involving DP in problem-solving Remove bottlenecks and support cross-governmental collaboration
ATTENDEES ATO team All initiative teams	All Initiative owners Sub-Initiative owners (as needed) ATO managers	ATO Director ATO managers	Sponsor CS Associated PSs ATO Director ATO managers	CS CAS Associated PSs ATO Director Others by invitation

UNRESOLVED ISSUES

APPENDICES

APPENDIX 1: DETAILED LIST OF NON-STATE ACTORS FOR ACKNOWLEDGEMENT

S/N	Stakeholder Name	Category
1	AAA growers	Private Sector (Institution or Association)
2	Acre Africa	NGO / Not-for-profit
3	Agriculture Development Corporation (ADC)	Other
4	Agricultural Industry Network (AIN)	Private Sector (Institution or Association)
5	African Breeders Services Total Cattle Management Limited	Farmer Organisation
6	African Fertilizer and Agribusiness Partnership (AFAP)	NGO / Not-for-profit
7	Agri Experience	NGO / Not-for-profit
8	AgriCo EA – Migocho Plantations	Private Sector (Institution or Association)
9	Agricultural Market Development Trust (AGMARK)	NGO / Not-for-profit
10	Agriculture and Food Authority (AFA)	Other
11	Agro-Chemicals Association of Kenya (AAK)	Private Sector (Institution or Association)
12	AgVentures	Private Sector (Institution or Association)
13	Alpha Foods	Private Sector (Institution or Association)
14	APA Insurance	Private Sector (Institution or Association)
15	Aquaculture Association	Farmer Organisation
16	Athi River Mining	Other

17	BASF East Africa	Private Sector (Institution or Association)
18	Bayer East Africa	Private Sector (Institution or Association)
19	Bomet Sacco	Farmer Organisation
20	Brookside	Private Sector (Institution or Association)
21	Buffet Foods	Private Sector (Institution or Association)
22	Cargill	Private Sector (Institution or Association)
23	Cereal Growers Association	Farmer Organisation
24	Chai Sacco	Farmer Organisation
25	CIC	Private Sector (Institution or Association)
26	Copia	Private Sector (Institution or Association)
27	Dairy Traders Association	Farmer Organisation
28	Davis & Shirtliff	Private Sector (Institution or Association)
29	Delamere	Private Sector (Institution or Association)
30	East African Breweries Limited (EABL)	Private Sector (Institution or Association)
31	East Africa Grain Council (EAGC)	Farmer Organisation
32	Eldoville Dairies	Private Sector (Institution or Association)
33	Empire Digital	Private Sector (Institution or Association)
34	Equity Bank	Private Sector (Institution or Association)
35	Export Trading Group (ETG)	Private Sector (Institution or Association)
36	Export Processing Zones Authority (EPZA)	Other
37	Farmers Choice	Private Sector (Institution or Association)
38	Fish Processors and Exporters Association of Kenya (FiPEAK or AFIPEK)	Farmer Organisation

39	Flamingo Horticulture	Private Sector (Institution or Association)
40	Frigoken	Private Sector (Institution or Association)
41	Future Pump	Private Sector (Institution or Association)
42	Githunguri Dairy	Farmer Organisation
43	Green land Fedha	Private Sector (Institution or Association)
44	Gro Intelligence	Private Sector (Institution or Association)
45	Innovations for Poverty Action	NGO / Not-for-profit
46	International Centre for Research in Sustainable Development (ICRSD)	NGO / Not-for-profit
47	Internatonal Livestock Research Institute (ILRI)	Other
48	iProcure	Private Sector (Institution or Association)
49	Jambo Fish Western Limited / Skretting Fish Feed	Private Sector (Institution or Association)
50	John Deere	Private Sector (Institution or Association)
51	Jomo Kenyatta University of Agriculture and Technology	Other
52	Kenya Agribusiness and Agroindustry Alliance (KAAA)	NGO / Not-for-profit
53	Kenya Agriculture and Livestock Research Organisation (KALRO)	Other
54	Kenya Association of Manufacturers (KAM)	Private Sector (Institution or Association)
55	Kenya Cereal Growers Association	Farmer Organisation
56	Kenya Livestock Producers Association	Farmer Organisation
57	Kenya Marine and Fisheries Research Institute (KMFRI)	Other
58	Kenya Markets Trust (KMA)	NGO / Not-for-profit
59	Kenya National Farmer's Federation (KENAFF)	Farmer Organisation
60	Kenya Private Sector Alliance (KEPSA)	Private Sector (Institution or Association)

61	Kenya Seed Company (KSC)	Other
62	Kevian Mangoes	Private Sector (Institution or Association)
63	Kickstart	NGO / Not-for-profit
64	Kisima Farm	Private Sector (Institution or Association)
65	KVDA	Other
66	LBDA	Other
67	Mau Mara Serengeti Sustainable Water (MaMaSe)	NGO / Not-for-profit
68	MEA	Private Sector (Institution or Association)
69	M-Farm	Private Sector (Institution or Association)
70	Milly Food Processors	Private Sector (Institution or Association)
71	Monsanta	Private Sector (Institution or Association)
72	NAFICS grain trading	Private Sector (Institution or Association)
73	National Potato Council of Kenya (NPCK)	Farmer Organisation
74	New Kenya Cooperative Creameries Ltd (New KCC)	Farmer Organisation
75	Nguku Products Ltd	Private Sector (Institution or Association)
76	Nightingale Farms	Private Sector (Institution or Association)
77	Northern Rangeland Trust	NGO / Not-for-profit
78	One Acre Fund	NGO / Not-for-profit
79	Pamat Foods	Private Sector (Institution or Association)
80	PEMBE FLOUR MILLS	Private Sector (Institution or Association)
81	Pest Control Products Board	Other
82	Quality Meat Packers	Private Sector (Institution or Association)

83	Raanan Feeds – Samaki Express Limited	Private Sector (Institution or Association)
84	Safaricom	Private Sector (Institution or Association)
85	Seed Trade Association of Kenya (STAK)	Farmer Organisation
86	Shamba-Shape Up	NGO / Not-for-profit
87	Sochon Farm	Private Sector (Institution or Association)
88	SOYAFRIC	Private Sector (Institution or Association)
89	Syngenta	Private Sector (Institution or Association)
90	Technoserve	NGO / Not-for-profit
91	Tegemeo Institute	Other
92	The African Fertilizer and Agribusiness Partnership (AFAP)	NGO / Not-for-profit
93	The World Agroforestry Center (ICRAF)	NGO / Not-for-profit
94	Toyota Tsusho	Private Sector (Institution or Association)
95	UAP Insurance Kenya Ltd	Private Sector (Institution or Association)
96	Unga Group	Private Sector (Institution or Association)
97	VegPro	Private Sector (Institution or Association)
98	Victory Farms	Private Sector (Institution or Association)
99	Water Services Trust Fund	Other
100	World Food Program (WFP)	NGO / Not-for-profit
101	Yara	Private Sector (Institution or Association)

APPENDIX 2: DETAILED PLAN FOR SOIL TESTING

Improving and maintaining the required soil fertility level will go a long way in improving yields. This can be achieved at both the national and county levels by improving information about soil quality through coordinated soil testing and mapping. Successful implementation of this intervention will then be used to support application of integrated soil fertility management systems (ISFM), e.g.:

1. Site-specific soil analysis and fertilizer selection

2. Precision application of fertilizer

3. Increased use of lime, blended and customized fertilizer

4. Increased use of manure to improve organic content of soils

At present, there is little information on the soil (fertility) status in most counties. In order to get information to select the best five fertilizer types (classes) for each county and estimate required quantities, it is necessary to have baseline information. To get this information in a timely and accurate manner it is recommended that investments are made in laboratory and soil sampling infrastructure as well as knowledge and skills building at farm/extension level. The ideal set-up will be a combination of government and private sector-operated services (PPP), where government will cover the collection of samples and disseminating information, and the private sector will operate laboratories at county level and supervise the project as a whole.

It is proposed that the soil testing and mapping initiative start with a pilot targeting 10 counties (spread over Western, Rift and Central Kenya). These counties will have to meet certain criteria in terms of agricultural production, availability of extension staff, facilitation on mobility and availability of smart phones at extension level. Selected counties would be required to provide space for a laboratory at a central and safe location. A selected private sector partner should operate these laboratories. Funding would be required for the facilitation of sampling as well as the set-up of the labs. The data should be clearly stated as being owned by the Government of Kenya.

Once a soil map has been generated, the next step should be investing in soil fertility through better farming practices, which will be supported by access to the appropriate blended and lime fertilizers to increase yields and control soil pH through flagships 1 and 2 supporting SMEs and subsidies for small-scale farmers. Farming and soil management practices such as improving organic matter content of the soil using manure will improve soil health and moisture retention capacity of the soil, as enabled by extension in *flagship 7*.

The private sector partner should be selected based on clearly defined robust criteria.

PROPOSED PROCESS TO PILOT SOIL TESTING PROGRAMME [268]

Timing	Proposal
At Start	Set up similar labs in all 10 counties with a minimum capacity of 25,000 samples/yr or higher (at capacity perhaps linked to 10-20% of the farming population (as early adopters)); these labs can scale up volumes if demand grows by adding some equipment. Lab facility should be private sector-owned and run but be based at a county centre or linked to the county (PPP).
1st Year	In the first year a baseline soil map will be created that will indicate the best “classes” of fertilizers that should be available (with subsidy) in the county the next season or year. ASTGS proposes a map based on 15,000 samples per county divided equally over the different constituencies and wards, involving extension at ward level to assist in the sampling. The sampling will be coordinated (training provided) by the private sector partner. All predefined sample points will be geo-referenced and will produce soil maps and recommendations at county level. This would create a new type of “blanket recommendation” perhaps per crop type that would have to be updated every few years. The data collected should then be made available to the public, e.g., by having it hosted by another organization (e.g., ARSIS). It should also be overlaid on existing GIS data. The data collection should start with any data that already exists on soils. Farmers who are eager to have their own soils tested should receive an incentive and be allowed to use the laboratory at a subsidized rate (amount to be defined).
2nd Year	In the second year there should be a set of fertilizer classes available in the county as well as lime (to be organized by the county government). In this year farmers will be invited to have a sample taken by the extension officer (at a cost) or do it themselves following an instruction provided by an app or perhaps USSD. Doing a soil test (at a subsidized cost) should unlock access to more subsidized or higher subsidized inputs than those available to farmers unwilling to test their soils and choosing instead to remain with the blanket recommendation. The soil test report should act as an e-voucher that gives access to soil correction inputs such as lime and best fertilizer class. The soil test should be subsidized as it should be an incentive to generate farm-specific information.
3rd Year	In the third year and onward more farmers should be drawn into the personalized testing scheme and receive incentives on the recommended inputs or correction factors. As farmers test more often, the subsidy level should drop. By doing this gradually, one should be able to start realizing a change in habits/practices.
Ideas	Subsidy on fertilizer to be split into a soil correction part (attacking the acidity and low organic matter content) and a plant growth part (nutrients). The soil correction part and soil test should remain the longest subsidized. Farmers should perhaps have to test once every three years (to keep access to subsidies).
Knowledge and Skills Building	Capacity-building campaigns should start in Year 1 on the importance of "knowing your soil" and how to sample for testing (extension and farm level).

SAMPLE CRITERIA TO SELECT A PRIVATE SECTOR IMPLEMENTING PARTNER

Quality Assurance of the lab	ISO 17025-accredited with a scope covering soil analyses. In case of spectral analyses (infrared) the classic analyses (wet chemistry) used to set up calibration databases that feed the spectral predictions have to be done by an ISO 17025-accredited laboratory using accredited methods. (This is a well-accepted international quality standard.)
Proven experience	Minimum 5 years' proven track record in large soil sampling/mapping and analyses projects. Minimum 5 years' existing, experienced team of agronomists in the field for training of trainers.
Capacity of lab	Laboratory experience in handling high-volume throughput (>200 samples/day).
iT	Robust data management system (IT) system to track sampling, analyses and reporting.
Scope of lab/ technology	Minimum set of parameters to be analyzed. Acidity – lime (pH, calcium, magnesium, CEC, aluminium) Soil health/water retention – organic carbon (compost, manure) Plant growth macronutrients (total nitrogen, plant-available phosphorus, exchangeable potassium/calcium/magnesium) Plant growth micronutrients (such as sulphur, boron, manganese, etc.)
Data interpretation	Produce lime and fertilizer recommendations and ability to produce soil maps.
Knowledge and skills building	The partner should have a team of experienced agronomists in the field to train stakeholders and coordinate sampling activities as well as coordinate the awareness campaign at farm level.
Independent	The lab should be an independent private sector service provider (not related to selling inputs).

APPENDIX 3: SAMPLE OPERATIONAL PLAN COVERAGE FOR ASAL FLAGSHIP 6

OPERATIONAL PLAN NEEDS TO COVER AT A MINIMUM: LOCATION, COST, RESILIENCE KPIS, KEY MILESTONES AND STAKEHOLDERS TO BE INVOLVED

LOCATION

Determine intervention and programme location based on:
- Productivity levels
- Access to infrastructure e.g., water, electricity, roads
- Proximity to production areas or markets
- Local community dynamics
- Migration and stock routes

COST

Develop full project cost estimates, including:
- Equipment
- Building
- Capability building
- Extension services
- Marketing and distribution
- Infrastructure

STAKEHOLDERS

Determine the stakeholders required for the project to be successful:
- County government for infrastructure part
- Community representatives
- Private sector for markets development e.g., provision of extension services, agrovets…
- Donors with technical expertise in specific areas

KEY MILESTONES

Create a milestone tracker with dates for the following:
- Appointment of overall responsible person
- Agreement among stakeholders (community, county govt, private investors, donors)
- Complete implementation team set-up
- Project start date
- Completion of quick wins (where applicable)
- 25% completion mark
- 50% completion mark
- 75% completion
- 100% complete
- Complete first round of M&E

KPIs

Determine the impact expected from the project e.g.,:
- Number of households
- Increase in incomes
- Increase in land use
- Increase in yields
- Increase to clean water access
- Months of supply stored (feeds, staples, water)

MULTI-PROJECT ENABLERS

Supportive legislation
Infrastructure – electricity, water, roads
Coordination and Governance
Security

SOURCE: McKinsey analysis

APPENDIX 4: SAMPLE TALKING POINTS TO SUPPORT COUNTY LOBBYING FOR MORE AGRICULTURE BUDGET ALLOCATIONS

Currently, budget allocation to agriculture in many counties is in the range of 2-3% of total county budget. This is well below Kenya's aspiration to allocate 10% of its total public expenditure to agriculture, in line with its CAADP commitments. To facilitate an increase in this allocation in the context of ASTGS, the CECs of agriculture can make a case for investment in agriculture to the county Finance Directors and other stakeholders by tailoring their requests as appropriate using the below tool as a guide. All content below is illustrative, and the exact numbers, wording and structure will need to be tailored to the unique county context.

- Importance of agriculture and past expenditure performance: Agriculture currently contributes <X%> of the county's GDP and employs <X%> of the population. Despite this large contribution to the county's income and employment, the sector received less than <X%> of our county government's budget allocation over the past five years. Even within this low allocation, only <X%> has been disbursed on average. This low investment in agriculture has impeded the ability of the sector to grow, and to expand its contribution to the well-being and living standards of our population.
- Regional commitments and national priorities: Kenya signed the Comprehensive Africa Agriculture Development Programme (CAADP), committing to allocate 10% of total public expenditure to agriculture. In addition, food and nutrition security – which are heavily influenced by agricultural production and food systems – is a national priority under the Big Four and the Agriculture Sector Transformation and Growth Strategy (ASTGS), which highlights the importance of the sector to the national growth agenda. ASTGS aims to increase smallholder incomes by ~30% and grow agriculture GDP by between 5-6% p.a. in five years.

  To ensure delivery. the ASTGS will adopt a monitoring and evaluation mechanism, which will track and publicize each county's contribution to these goals. If our low budget allocation to agriculture continues, we are unlikely to achieve these goals and targets and lag behind the rest of the country in our progress on these national priorities.
- We know that budgets are severely constrained, and there are several competing priorities for the county government to resource. Nevertheless, there are several barriers that prevent agriculture from receiving fair-share allocations given its importance to our county:
  - Low visibility of agriculture as a county priority: We should ensure that priorities of agricultural development are highlighted in the current County Integrated Development Plan and in our Annual Development Plans. They should also be reflected in the County Treasury Circular, to emphasize the importance of investment in the sector to our county as a whole
  - Misalignment of project dates and release of funds from the National Treasury: Projects in agriculture should be planned with timelines based on funding release from the National Treasury. By aligning spending timeline with funding availability, we can increase the disbursement rate
  - Rigid procurement processes: Some current procurement regulations, such as the need to pay vendors up front, i.e., no use of credit, causes delays since projects have to wait for funds to be disbursed before they can start. Regulatory amendments that allow use of credit or bank guarantees will help overcome this, speed up project implementation and increase budget utilization and disbursement rate.
- Expected returns from investing in agriculture: If budget allocation to agriculture is raised from the current <X%> to <X%> to finance our prioritized flagships from the ASTGS, the additional KES <X> million annually will primarily be spent on <X>. This additional investment in the sector is expected to create KES <X> in agricultural sector output over the next five years, raise our GDP by KES <X> million, directly impact <X> small-scale farmers, pastoralists and fisherfolk, and create <X> jobs for our people. These benefits provide a compelling case

for increasing our investment in agriculture, not only for economic benefits in terms of GDP, but also for the benefits of improving food and nutrition security for our population.

APPENDIX 5: SAMPLE JOB DESCRIPTIONS FOR KEY ROLES WITHIN THE ATO

THE AGRICULTURAL TRANSFORMATION OFFICE (ATO) BACKGROUND

The primary aim of the Agricultural Transformation Office (ATO) is to support execution and delivery of the Agriculture Sector Transformation and Growth Strategy (ASTGS) by:

- Partnering with line ministries to track and follow up on performance, remove bottlenecks, and take corrective actions to address poor performance
- Enabling fast decision making by cutting through government bureaucracy
- Creating transparency and mutual accountability for delivery by consolidating accurate and timely data and communicating fact-based, non-politicized outcomes to key decision-makers

The ATO Director will report directly to the Chief Administrative Secretary (CAS) and expected to overcome a wide variety of complex implementation challenges, including initiative roadblocks or failure, reprioritization and identifying additional impact where current projections fall short.

The ATO will be a role model across the sector of committed, results-oriented, and successful delivery practice. It will be structured around the nine ASTGS flagships, which are subject to change pending implementation progress and performance review of the National Agriculture Investment Plan (NAIP).

DIRECTOR

The role

The Director of the ATO is responsible for supporting the Ministry of Agriculture, Livestock, Fisheries and Irrigation (MoALFI) and associated ministries to deliver on the ASTGS, mindful that the primary KPIs for the transformation as detailed in chapter 4.4 are owned by the Cabinet Secretary of the MoALFI.

The Director will report to the Chief Administrative Secretary (CAS), and work with the Cabinet Secretary (CS) and Principal Secretaries (PS) of MoALFI as directed by the CAS. S/he will lead the ATO team, staffed with top-quality professionals.

S/he will be responsible for removing bottlenecks at an operational level within the ASTGS implementation structure, escalating issues that cannot be resolved within any individual Ministry.

Essential duties and responsibility

The ATO Director will manage the ATO and ensure team alignment, high performance and delivery on priority objectives.
Major duties include:

- Acting as a thought partner to the MoAFL&I CAS on strategy implementation
- Taking responsibility for overall direction, value and culture of the ATO
- Assuming responsibility for all processes to identify, problem solve and escalate bottlenecks within scope of role to implementation as they arise

- Providing "the last line of defence" on the initiative implementation progress before escalation to the ASTGS Steering Committee
- Providing regular updates to the CAS on progress and advising on matters that require escalation
- Managing relationships with CAS, CS MoALFI and advisory group members
- Ensure activities are coordinated with the NFSC

Qualifications required

- Master's degree/PhD in Economics or Masters in Business Administration or related field
- At least 10 years in a senior leadership role in government or the private sector (organization with >1,000 employees), with past operational leadership experience
- A proven track record of successfully driving transformation and/or operational priorities
- An understanding of Kenya including established relationships and a network in Kenya with the public and private sectors
- An ability to operate within the existing system while driving its transformation, and an informed perspective on the role of the ASTGS in achieving food security
- Exceptional people leadership abilities and acute cultural awareness
- Excellent data-driven problem-solving skills
- Demonstrated passion for the public sector
- Desired but not mandatory: familiarity with agricultural sector

Terms of employment
Candidates must be willing to join the ATO for a minimum five-year commitment.

Compensation is dependent upon qualifications and is competitive with comparable positions for international staff at similar government and non-government organizations.

ATO MANAGER

The role
The ATO Manager role will work directly to support the ATO Director to ensure the success of the ASTGS implementation. S/he will be expected to manage and support the growth of the ATO as it hires and onboards new team members.

Responsibilities and duties will include:

- Acting as the "right hand" of the ATO Director as they establish the ATO, define roles and interaction with other bodies within the Government of Kenya.
- Supporting and managing the teams to support the implementation of the initiatives
- Coordinating across flagships to sequence work and avoid duplication
- Organizing the tracking and reporting of initiative progress, including supporting a Monitoring & Reporting unit to generate dashboards and reports for the ATO Director, and the Chief Administrative Secretary
- Providing problem-solving support to teams and flagship owners
- Coaching, training and supporting professional development for teams
- Managing upward reporting and escalating implementation issues of initiative progress

- Setting up and designing new flagships and initiatives as the ATO grows to encompass new change areas within the agriculture sector

What the role offers:
The Manager will join an organization driving fundamental change in Kenya. The successful candidate will join the ATO from the outset and have a unique chance to shape and empower the ATO from the very beginning. Ultimately the role will be an opportunity to ensure the success of an organization and delivery of a programme that is a crucial component in the future of Kenya.

S/he will be given the opportunity to manage and coordinate multiple teams running impactful projects; support others and play a role in their development, both for local and international staff and be expected to be comfortable independently growing and managing projects to shape the success of the ATO going forward.

The ATO will be the engine driving a large transformation, offering exposure across the organization, beyond specific areas of change initiatives. In addition, due to the prominence of agriculture in the Government of Kenya's priorities, the role will offer a chance to work with high-level officials, not only within the MoALFI but also within the county and national governments.

Qualifications required
Candidates will be outstanding individuals with excellent professional and academic credentials, including managerial experience.

Of particular interest are candidates with experience in:

- Management level (3-5 years) in a top-tier, global management consulting firm, with demonstrable analytical and problem-solving skills, communication and managing and coaching others
- Experience transforming the processes of an organization; of particular value is a background in driving organizational change through collaborating on initiatives with stakeholders.
- Implementation design and delivery in an emerging market

In addition, all potential candidates should demonstrate these core competencies:

- Excellent project management skills
- Stakeholder and people management skills
- Proven ability to inspire, coach and develop others from different backgrounds
- Mental toughness, resilience and the ability to cope in demanding environments
- An entrepreneurial, can-do attitude to overcome barriers and enact change
- Developing country experience desirable but not essential
- Candidates should be willing to commit to 3 years at a minimum, and preference will be given to candidates who can commit for 5 years

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