FUTURE OUTLOOK ON IRRIGATION DEVELOPMENT IN KENYA UNDER THE BIG FOUR AGENDA

Role of public irrigation schemes in drought resilience

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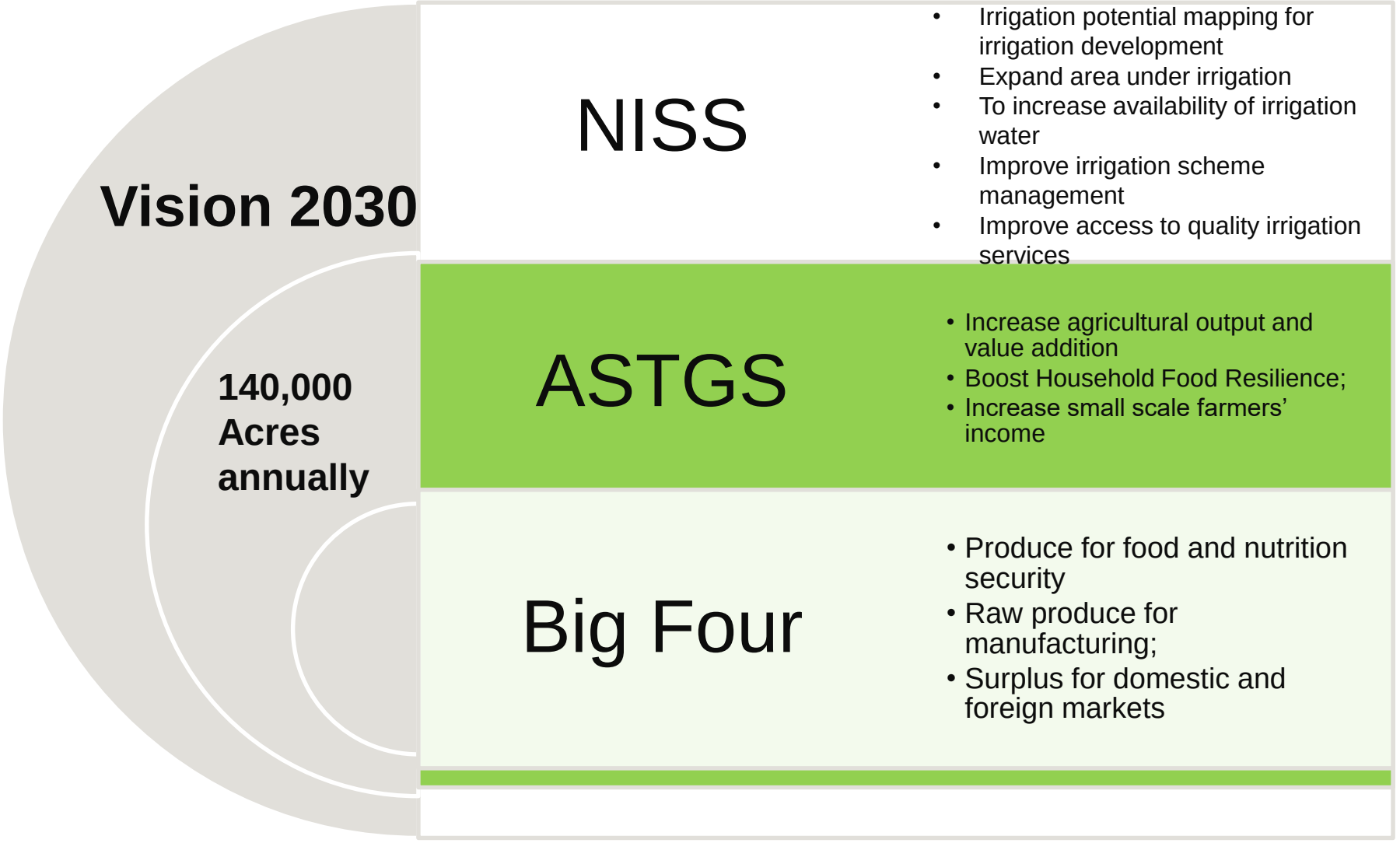
1. Facts and Figures

Agriculture set up in Kenya.	Agriculture contributes ~34% to Kenya's GDP 3.5 million smallholder farmers. Farmers with **1.2-12 acres** produce over 65% of Kenya's agricultural produce.
Climatic Setting	Kenya is 80-89% Arid (physical and economic **water scarcity**)
Total Irrigation potential With Enhanced water Storage	**Three (3) million Acres** as per the National Water Master Plan 2030. Potential to increase to **6.75 million acres** using local runoff water harvesting.
Total Irrigation potential Without Storage	**1.913 million Acres** as per the National Water Master Plan 2030
Total Acreage achieved by 2010	**354,831 acres**
Total Acreage achieved To date	**551,000 acres** include, smallholder irrigation schemes **(306,034 acres**), public schemes **(56,222 acres**) and private owned **(189,600 acres)**
Kenya Vision 2030 Target	**To develop 140,000 acres annually** to bridge the gap of the remaining potential of **1.4 million** (without storage) in the **next 10 years**

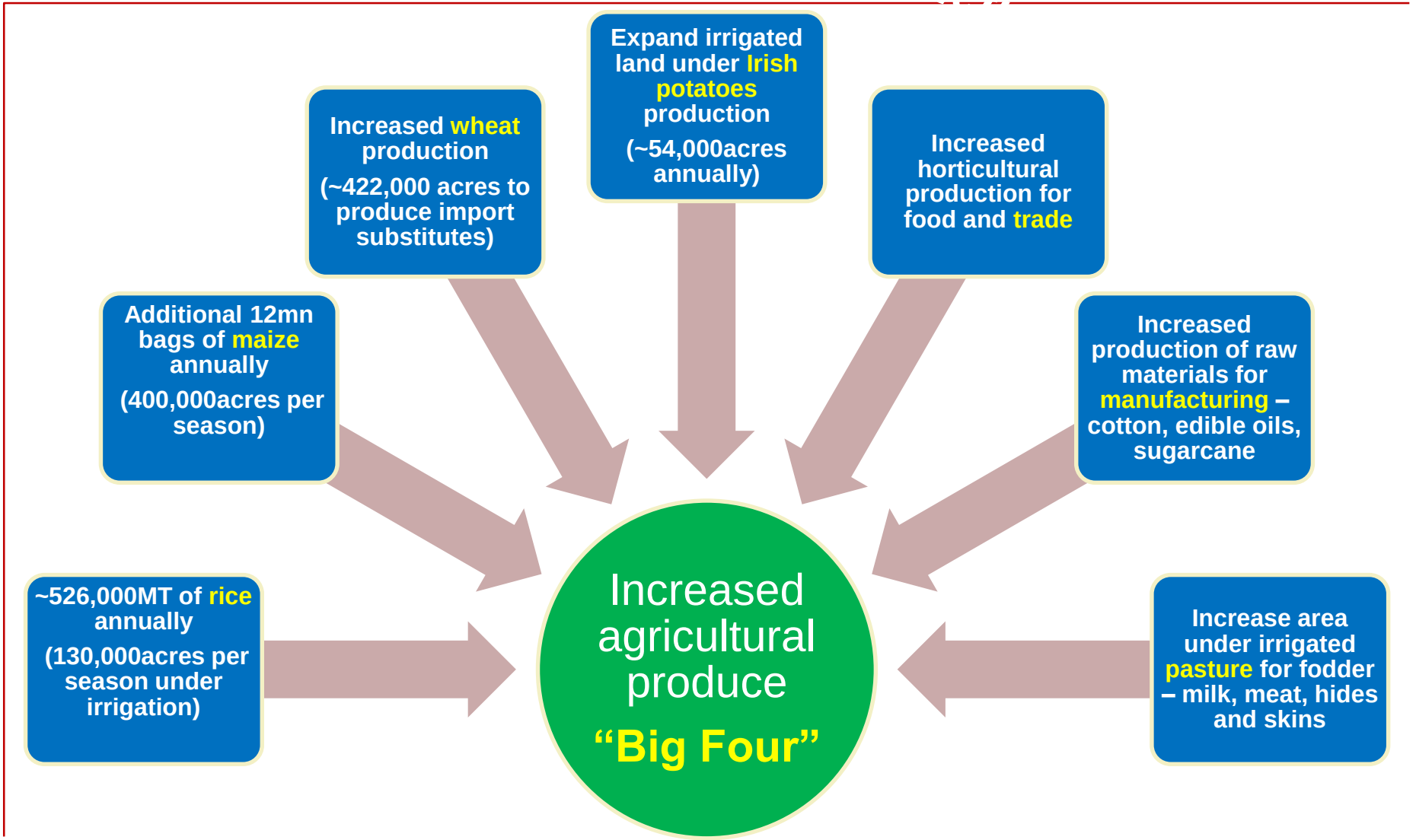
1.1 Irrigation and National Development Agenda



1.2 Object of Irrigation

Development, management and regulation of irrigation, to support **sustainable food security** and **socio-economic development** in Kenya

- Irrigation Act 2019



1.3 Irrigation Legal and Policy Environment

Development, management and regulation of irrigation, to support **sustainable food security** and **socio-economic development** in Kenya

- Irrigation Act 2019

Highlights

i.Provides for sustainable irrigation project identification, design, finance and implementation for **small, medium, and large scale projects.**

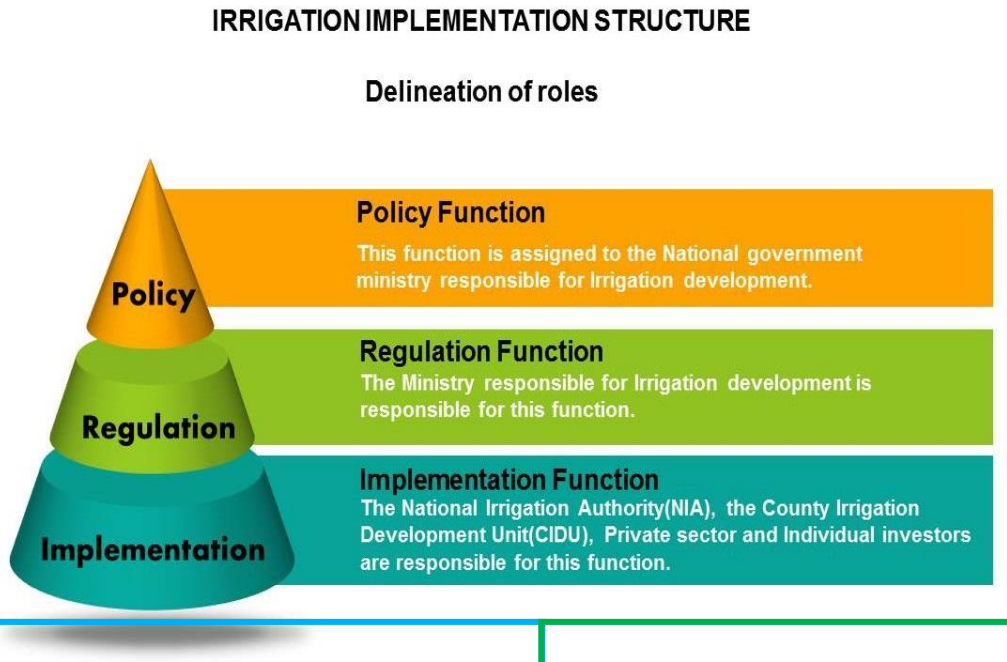
ii.Provide irrigation technical and advisory services to **all** farmers

iii.Increase **reliability** of irrigation water through **water harvesting and storage**

iv.Recognizes **farmers organizations** mainly IWUAs, Scheme management and dispute resolution committees;

v.provides a mechanism for effective **coordination, linkage, collaboration and partnership for the promotion, development, with all stakeholders** particularly county governments

vi.Provides a mechanism for **irrigation sector information management** for effective decision making and coordination

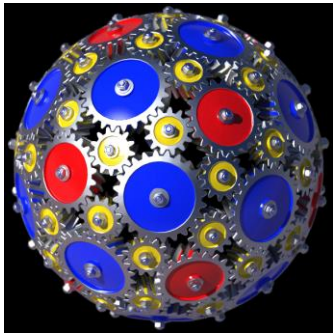


Over 100 acres spear headed by National Irrigation Authority in collaboration with County governments

100 acres and below spear headed by County Irrigation Development units.

1.3 Irrigation Legal and Policy Environment

Need to have a **robust** collaboration framework



Multiplicity of legal, policy and institutions bearing on Irrigation in Kenya, *Mati Bancy, 2021*

2. Irrigation Strategies

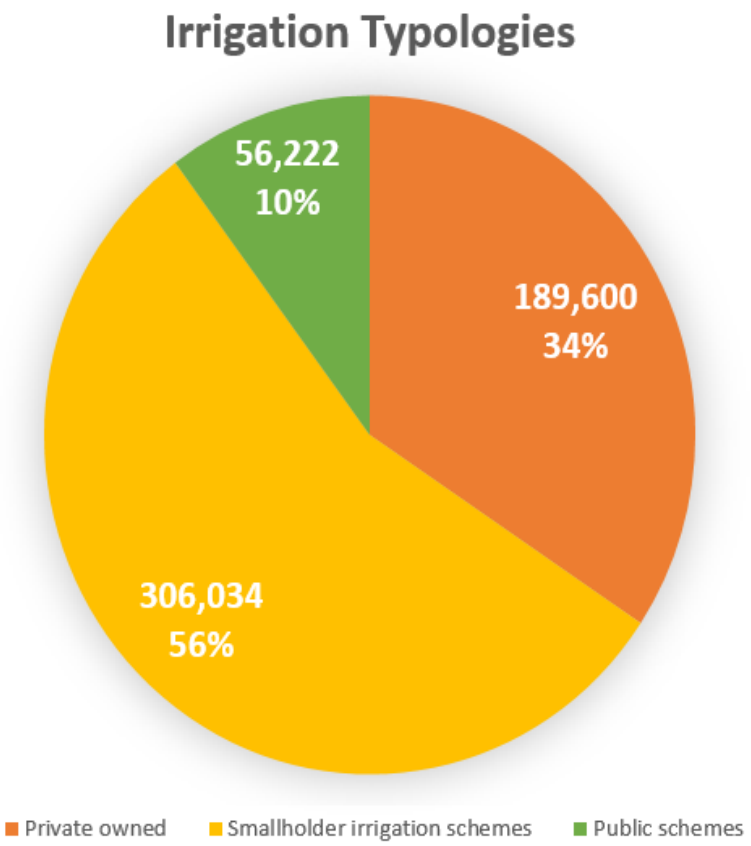
Irrigation Potential - National Water Master Plan (2030)

Smallholder irrigation projects

- Irrigated using water from perenial rivers
- Small to medium irrigation infrastructure
- Mainly for horticulture productio
- Purely community managed irrigation projects

Groundwater for irrigation

- Least utilized water source for irrigat
- Collaborate with Groundwater instit and WRMA to map ground water so
- Combined with mordern irrigation technologies of drip and center pivo
- Provide a real solution for regions wi aquifers but limited surface water flo



Large Dams for large scale irrigation

- To ensure reliability of irrigation water
- The true climate resilience structures – mitigate against floods and provide water during droughts
- Current water storage capacity is 124M m^3 against a requirement of to 4.5B m^3
- Provide water for large scale irrigation for production of cereals and industrial crops
- Large scale irrigation will promote mechanization to lower the cost of production

Small dams and water pans

- ASAL areas have an elaborate newtork of ephemeral streams
- These provide a new opportunity of developing water resources for irrigation
- Small dams and water pans will be used to harvest water during the rainy season
- Provide water for micro-irrigation and livestock in the arid areas

2.1 Achievements

Large Scale Irrigation projects

- new large scale projects under construction – Lower Nzoia, Lower Kuja, Galana Kulalu model farm
- Public irrigation schemes operationalized and expanded in area to 56,000 acres
- Source of water is large perennial rivers
- Focus majorly on production of cereals – rice, maize

Community managed – smallholder scheme

- Community based and National Expanded Irrigation programme
- Over 200 projects completed increasing area under irrigation by 176,000 acres
- Small and easy to implement
- Mainly farmer initiated and managed
- Uses diverse water sources
- Majorly for production of horticultural crops

Groundwater for irrigation

- Boreholes combined with greenhouses and micro irrigation for schools
- .68 schools have benefited
- To meet nutritional needs as well as supplement income for the schools.

Water harvesting for Irrigation

- **Household water harvesting programme**
  - 20,861 water pans with total volume of 28 million M^3 to irrigate over 28,000 acres.
- **Rehabilitation of community water pans and small dams**
  - 188 pans and small dams with total volume of 14.8 million M^3 to irrigate 9,800 acres

2.2. Identified Irrigation Development Opportunities

Large Scale and Strategic Irrigation Projects

Lower Nzoia Irrigation Development Project (LNIDP), about 10,000 acres

Galana Kulalu 10,000 acre model farm

- Feasibility studies and detailed design for 22 project completed
- 398,731 acres
- Kshs 83.7billion estimated cost

1,068,350 bags of rice paddy annually valued at kshs 64 billion

8,502,760 bags of maize annually valued at kshs 19.6 billion

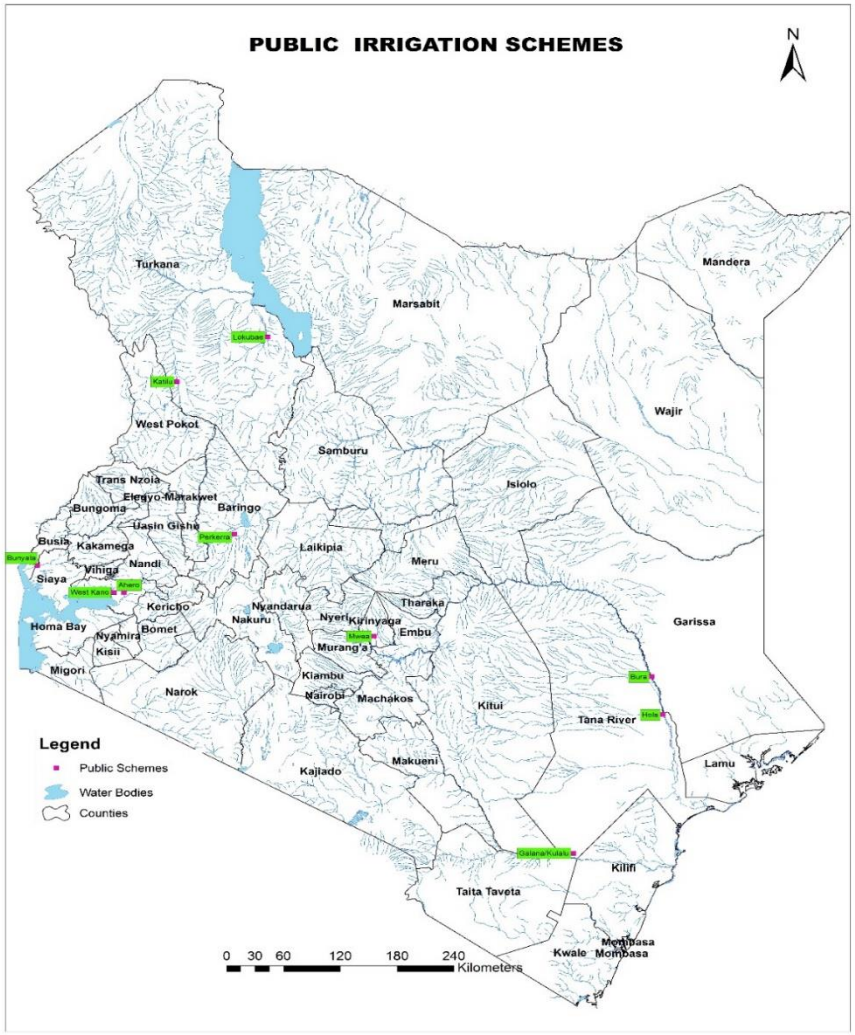
52,100 MT of cotton annually valued at Kshs 2.9 billion

Kshs 75 billion worth of horticultural crops

1.9 million jobs both directly and indirectly

2.2. Identified Irrigation Development Opportunities

Expansion of Public Irrigation Schemes



- Irrigation offers sustainable solution to drought resilience
- Increasing area in the 8 public irrigation schemes
- Increase by 12,500 acres from 55,108 acres
- Kshs 1.025 billion

Impact

14,400 MT of rice paddy annually: value – Kshs 864m

195,000 bags of maize annually: value – Kshs 448m

Kshs 3.13 billion worth of horticultural crops

62,500 jobs both directly and indirectly

2.2. Identified Irrigation Development Opportunities

Water Harvesting for Irrigation – Large Dams

15 MCM Thiba Dam for Mwea scheme

681 MCM Thwake Dam provide irrigation water for 100,000 acres

- Increase water storage capacity by 1.15 billion cubic metres
- 8 large dams nation wide Radat, Thuci,Gogo, Lowaat, Rwabura , Thiririka, Kyakivai and Kaiti Ngomano);
- Increase area under irrigation by 408,400 acres
- Kshs 135.45 billion estimated cost

Impact

120,000 MT of rice paddy valued at kshs 7.2 billion

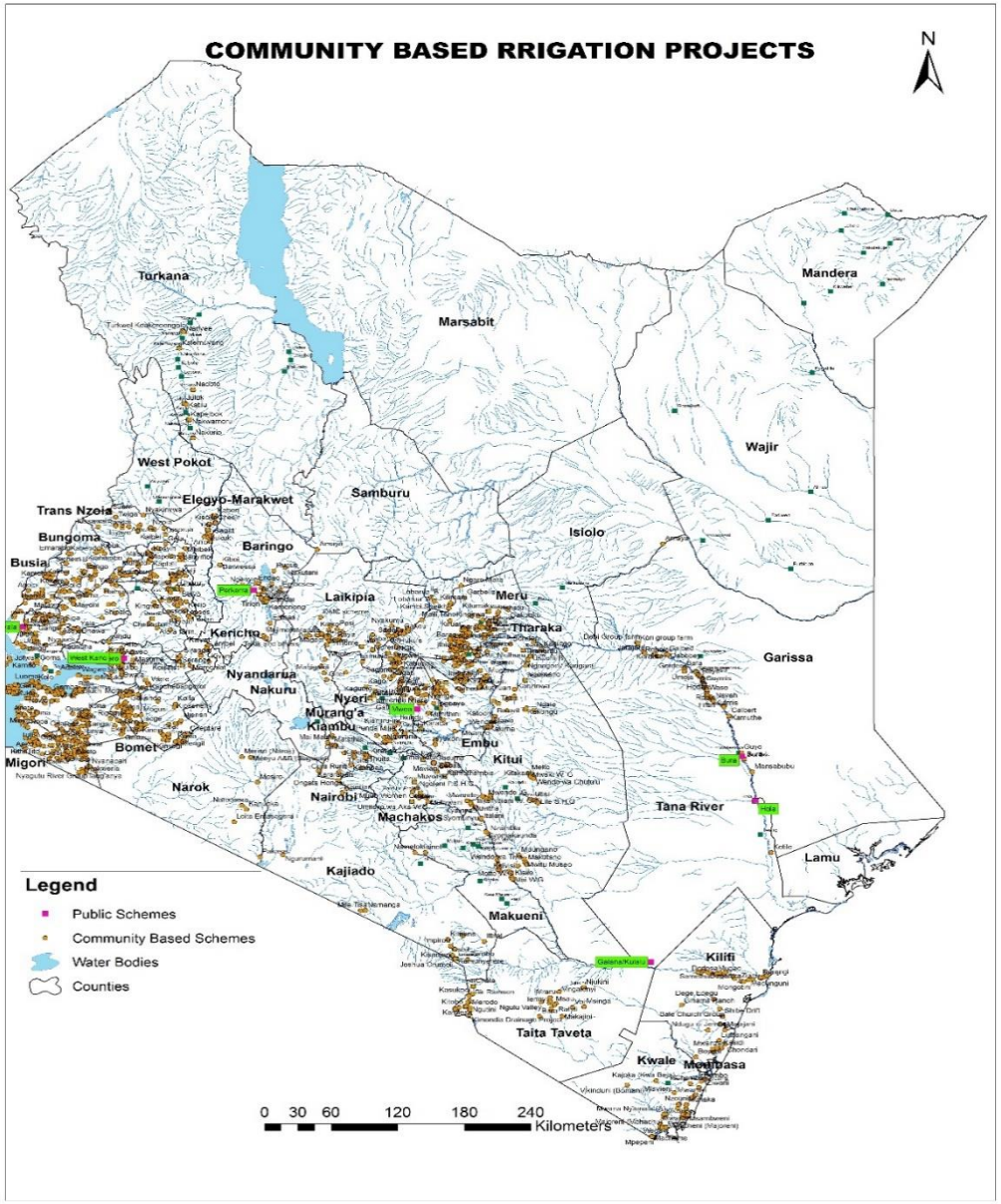
4.68 million bags of maize annually valued at Kshs 10.8 billion

Kshs 39 billion worth of horticultural crops

780,000 jobs both directly and indirectly

2.2. Identified Irrigation Development Opportunities

Community Based Smallholder Medium scale Irrigation Projects



- Projects initiated by the communities with an aim of boosting their agricultural production
- Projects range from 100 to 3000 acres. They are easy to build, operate and maintain
- 222 projects identified that are at different levels of implementation
- 171,500 acres
- Kshs 42.2 billion estimated cost

Impact

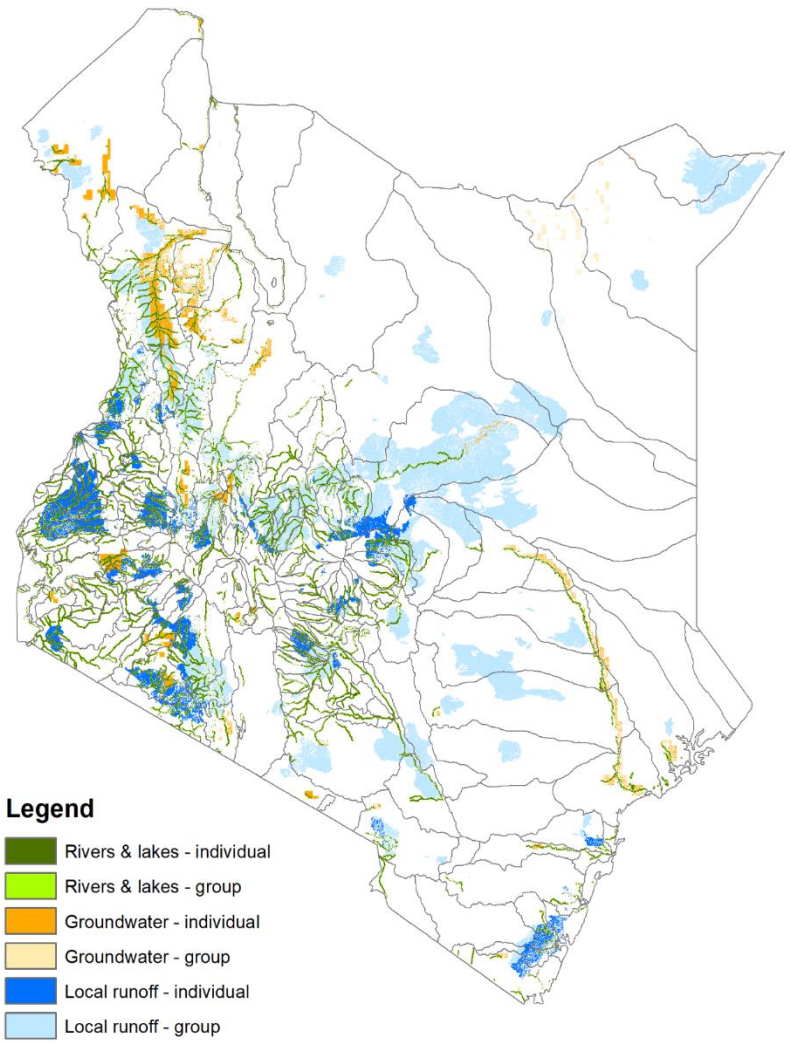
2,600,000 bags of maize annually valued at kshs 5.98 Billion

Kshs 43.7 billion worth of horticultural crops annually

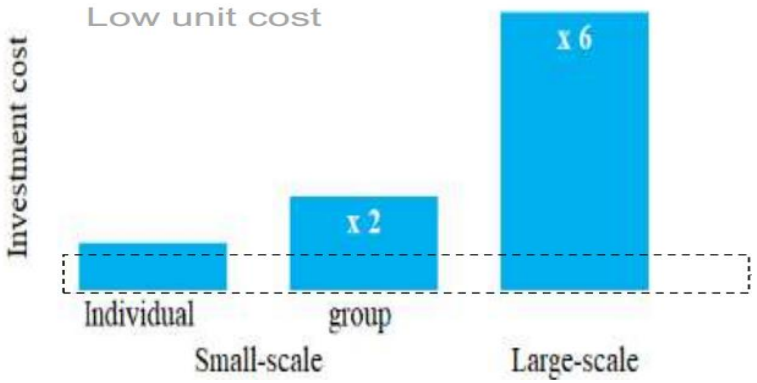
1.9 million jobs both directly and indirectly

2.2. Identified Irrigation Development Opportunities

Small Scale Irrigation Interventions



- This includes individual irrigators (<100 acres) and group irrigation schemes (<100 acres)
- Community managed irrigation schemes by CIDUs - below 100 acres
- Groundwater for Irrigation
- Household water harvesting programme
- Rehabilitation and construction of community water pans and small dams



2.2. Identified Irrigation Development Opportunities

Ground Water for Irrigation

- Increasing area under irrigation by 23,000 acres
- Kshs 8 billion estimated cost

Impact

690,000 bags of maize annually valued at 1.6 billion

Kshs 5.75 billion worth of horticultural crops

115,000 jobs both directly and indirectly

2.2. Identified Irrigation Development Opportunities

Water Harvesting for Irrigation – Household Water pans

- Increase water storage capacity with over 125 million cubic metres
- 125,000 HH water pans in 42 counties
- Increase area under irrigation by 125,000 acres
- Kshs14.9 billion estimated cost

Impact

3.4 million bags of maize valued at kshs 7.8 billion

Kshs 28 billion worth of horticultural crops

572,000 jobs both directly and indirectly

2.2. Identified Irrigation Development Opportunities

Water Harvesting for Irrigation – Rehabilitation of Existing Small dams and water pans

- Increase water storage capacity by 197 million cubic metres
- 3,945 colonial water pans and small dams rehabilitated in 42 counties
- Increase area under irrigation by 328,750 acres
- Kshs 59.2 billion estimated cost

Impact

4.9 million bags of maize valued at kshs 11.3 billion

Kshs 41 billion worth of horticultural crops

823,000 jobs both directly and indirectly

Olookil Community water pan in Kajiado County

2.3 Financial Requirement

Project	No of Counties	No of projects	Area (acres)	Volume M³	Cost (Kshs)	Value of produce annually (Kshs)
IRRIGATION			**605,767**		**135,013,462,582**	**167,033,782,517**
Large scale irrigation projects	20	22	398,731		83,733,615,000	113,999,984,017
Community managed Irrigation projects	37	222	171,536		42,204,847,582	42,884,100,000
Expansion of Public Irrigation Schemes	6	9	12,500		1,025,000,000	3,573,837,500
Groundwater for irrigation	23	23	23,000		8,050,000,000	6,575,861,000
WATER HARVESTING			**911,746**	**1,590,096,000**	**195,380,000,000**	**168,702,459,572**
Large dams	5	7	408,400	1,145,000,000	135,450,000,000	39,000,000,000
Rehabilitation of existing small dams and pans	42	3,945	328,750	394,500,000	59,200,000,000	41,093,750,000
Water for Household	42	881	114,596	114,596,000	14,900,000,000	28,649,000,000
Large pans on Ewaso Ng'iro North	6	600	60,000	60,000,000	9,600,000,000	15,000,000,000
TOTAL POTENTIAL			**1,517,513**		**330,393,462,582**	**335,736,242,089**

2.3 Financial Requirement

Capital Outlay for the next 10 years

Project	2019/20	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
		Kshs millions										
Investment Required per year	8,520	12,378	16,521	22,282	24,697	25,975	27,355	29,017	30,158	31,058	31,958	251,399
Acreage under irrigation per year	29,364	68,087	89,356	114,158	120,777	130,210	130,732	130,885	135,043	139,035	141,923	1,200,206

3. Resource Mobilization

Investment Analysis

KES 330.4 billion

- Total cost of identified irrigation projects;
- **KES 251 billion** - 10 year investment plan capital outlay.

KES 231 billion (70%)

- Total required Investment in large irrigation (public) infrastructure by Gok;
- **KES 176 billion** – 10 year capital requirement from Gok for large irrigation (public) infrastructure;
- **KES 170 billion** - average annual budget allocation to infrastructure

KES 99 billion (30%)

- Proposed total private sector investment in Irrigation for identified projects;
- **KES 75 billion** - 10yr Investment in production by private sector;

3. Resource Mobilization

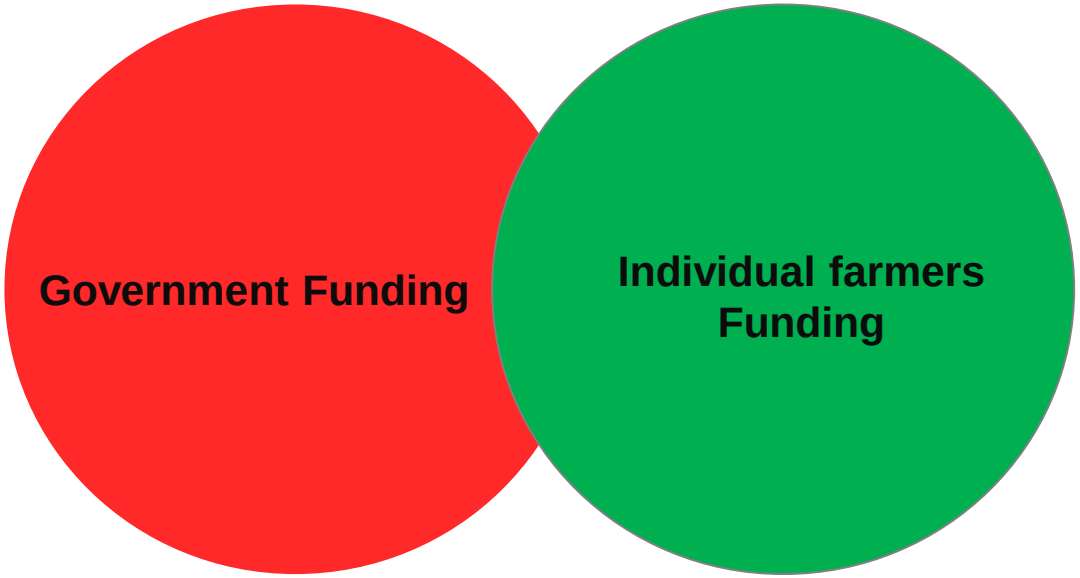
Traditional Funding Model

- Majority of government funded irrigation projects
- Farmers not required to contribute or payback
- Top down approach to irrigation development
- Creates a dependency syndrome – not operate optimally
- Will majorly be **applicable** for marginalized communities – exemptions by CS

- Minimum involvement of government authorities – non compliance issues
- 100% ownership – no dependency
- Intensive utilization of installed capacity
- Choice of technology limited to individual farmer's exposure – use of rudimentary installation
- Common in irrigation savvy regions – easy access to irrigation solutions service providers

3. Resource Mobilization

Cost Recovery and Co-financing Model – (suitable for group schemes)



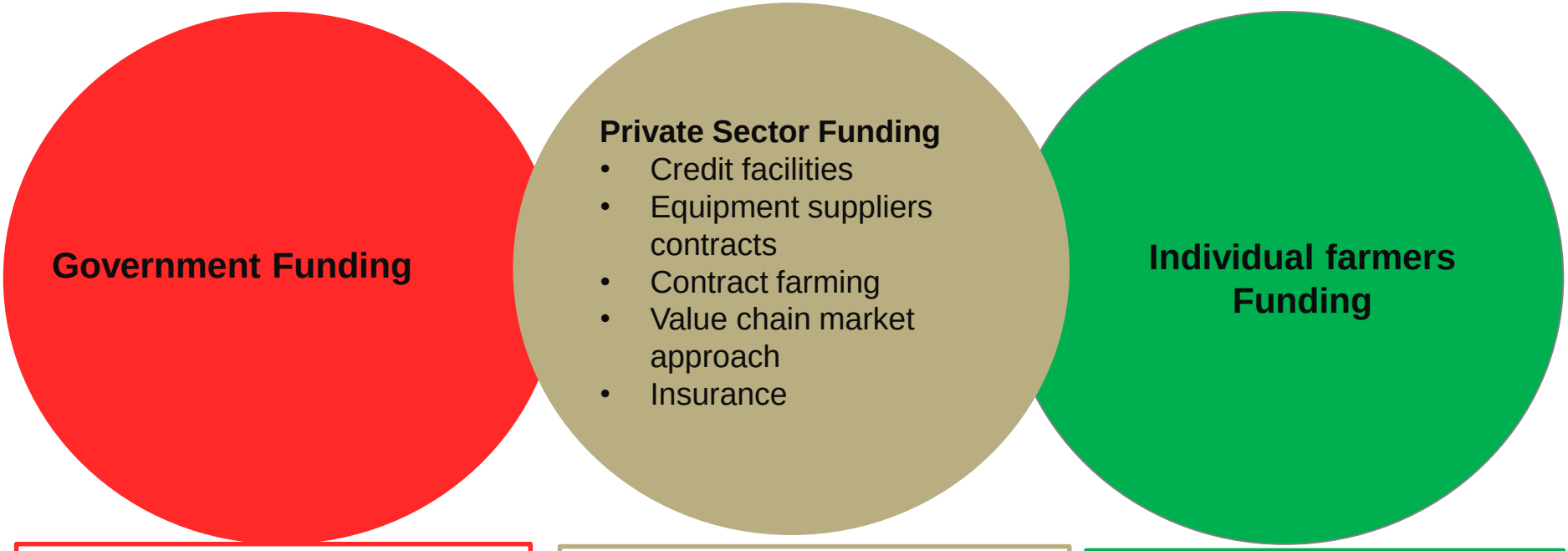
- Government provides the initial funding for the project especially the cost of large primary infrastructure
- Elaborate farmers participation during **identification, design and implementation**
- Establish mechanisms of cost recovery
- Facilitate formation of strong farmers organizations to enter into agreements

- Farmers contribute a percentage (30%) of the financing requirement
- Farmers payback a percentage of the construction cost
- Farmers contribute in kind towards development of infrastructure
- Form working farmers organizations
- Ensure compliance with obligations of farmers in agreements

Model successful for under Mt Kenya smallholder project by KFW

3. Resource Mobilization

Farmer Led Irrigation Development (FLID) model (suitable for small scale)



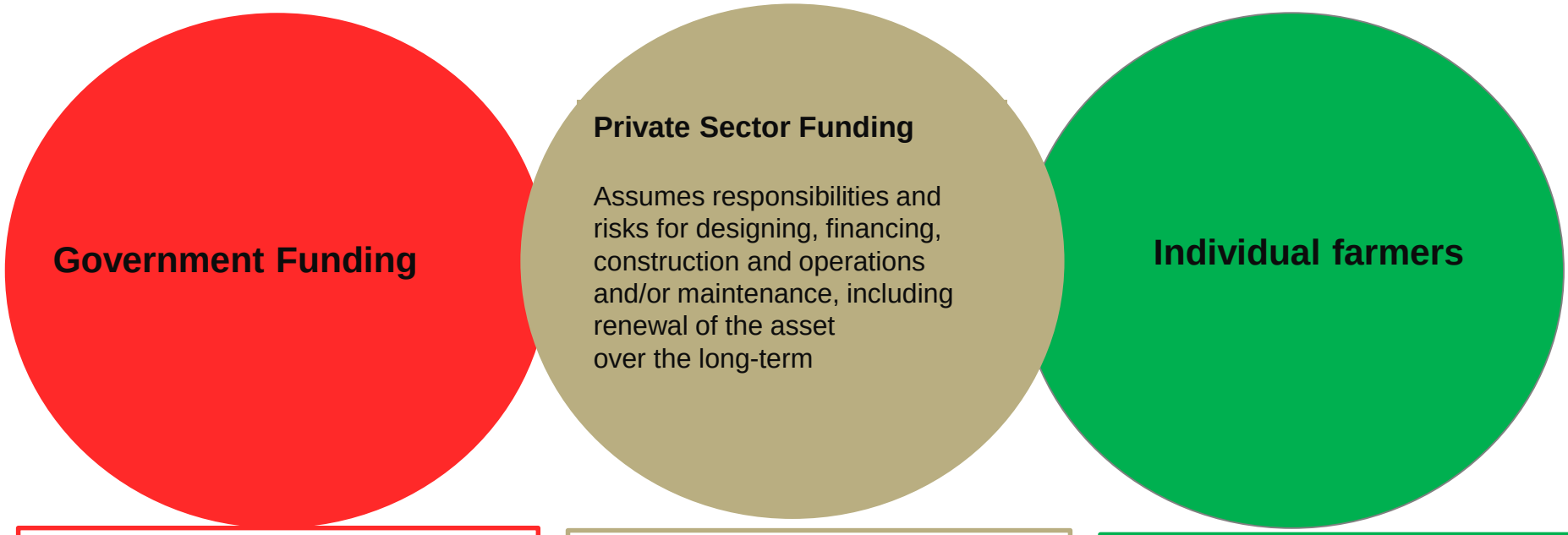
- Provide an enabling legal and institutional environment
- Establish irrigation acceleration platforms – information (technical and market)
- De-risk private sector lending to farmers
- Provide smart subsidies to farmers
- Tax incentives on irrigation equipments and growers

- Develop tailor made credit solution for farmers
- **Dissemination of information of affordable and sustainable irrigation technologies**
- Provide after sale services upon supply of equipments
- Guarantee markets for irrigated crop value chain through contract farming
- Build in extension services in the growers contracts

- Ensure compliance with obligations of farmers in agreements
- Keep farming records to facilitate credit evaluation
- Make use of information disseminated through various channels

3. Resource Mobilization

PPP model – farmer owned land (suitable for large scale)



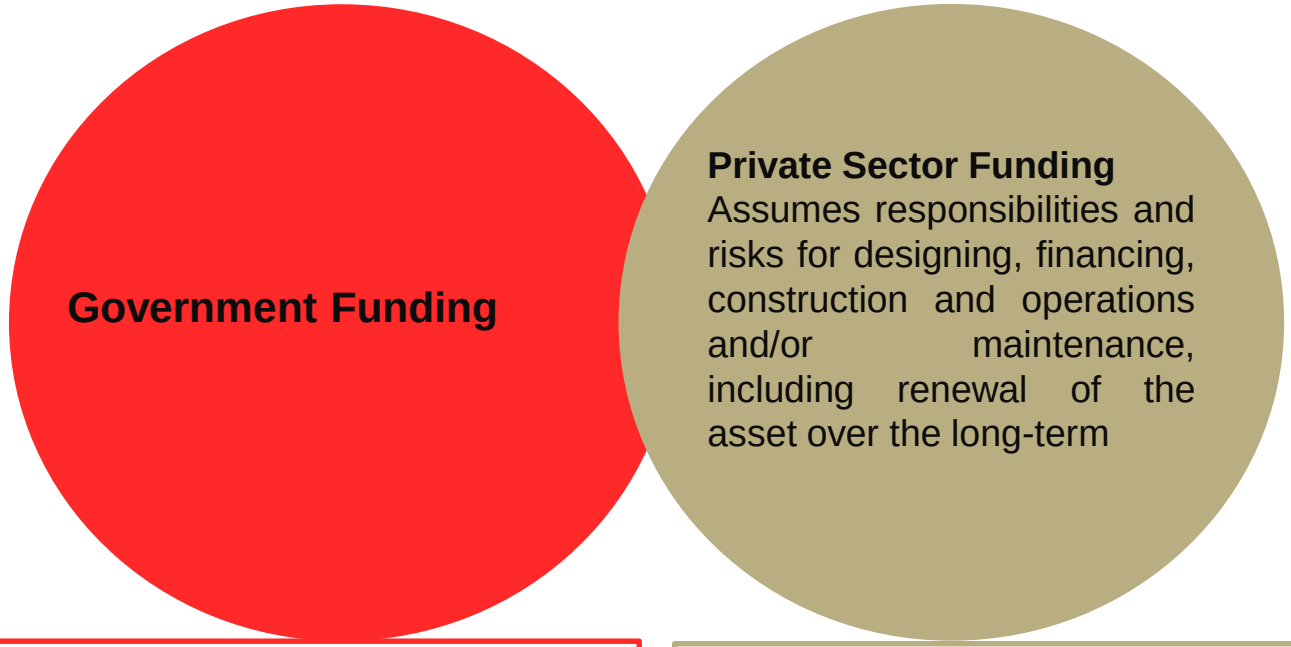
- Provide an enabling legal and institutional environment
- **Bankable Projects development that meets selection criteria**
- Project evaluation and approval
- Provide viability gap funding where necessary
- Ensure compliance with laws and regulations of the Country
- Acquire land for installation of facilities where necessary

- **Develops and operates irrigation infrastructure**
- Collects charges from farmers (directly or deductions from contract farming)
- Enters into contract farming agreements with farmers

- Ensure compliance with obligations of farmers in contract farming agreements
- Pay agreed upon charges to the private investor

3. Resource Mobilization

PPP model – Public land (government owned)



- Provide an enabling legal and institutional environment
- **Bankable Projects development that meets selection criteria**
- Project evaluation and approval
- Provide viability gap funding (e.g cost of dam) where necessary
- **Ensure compliance with laws and regulations of the Country**
- Acquire land for installation of facilities where necessary

- **Develops and operates irrigation infrastructure**
- Comply with relevant laws and regulations
- Undertakes production of value chains as per agreement with the Contracting Authority as repayment for the investment

Proposed for further investments in Galana Kulalu

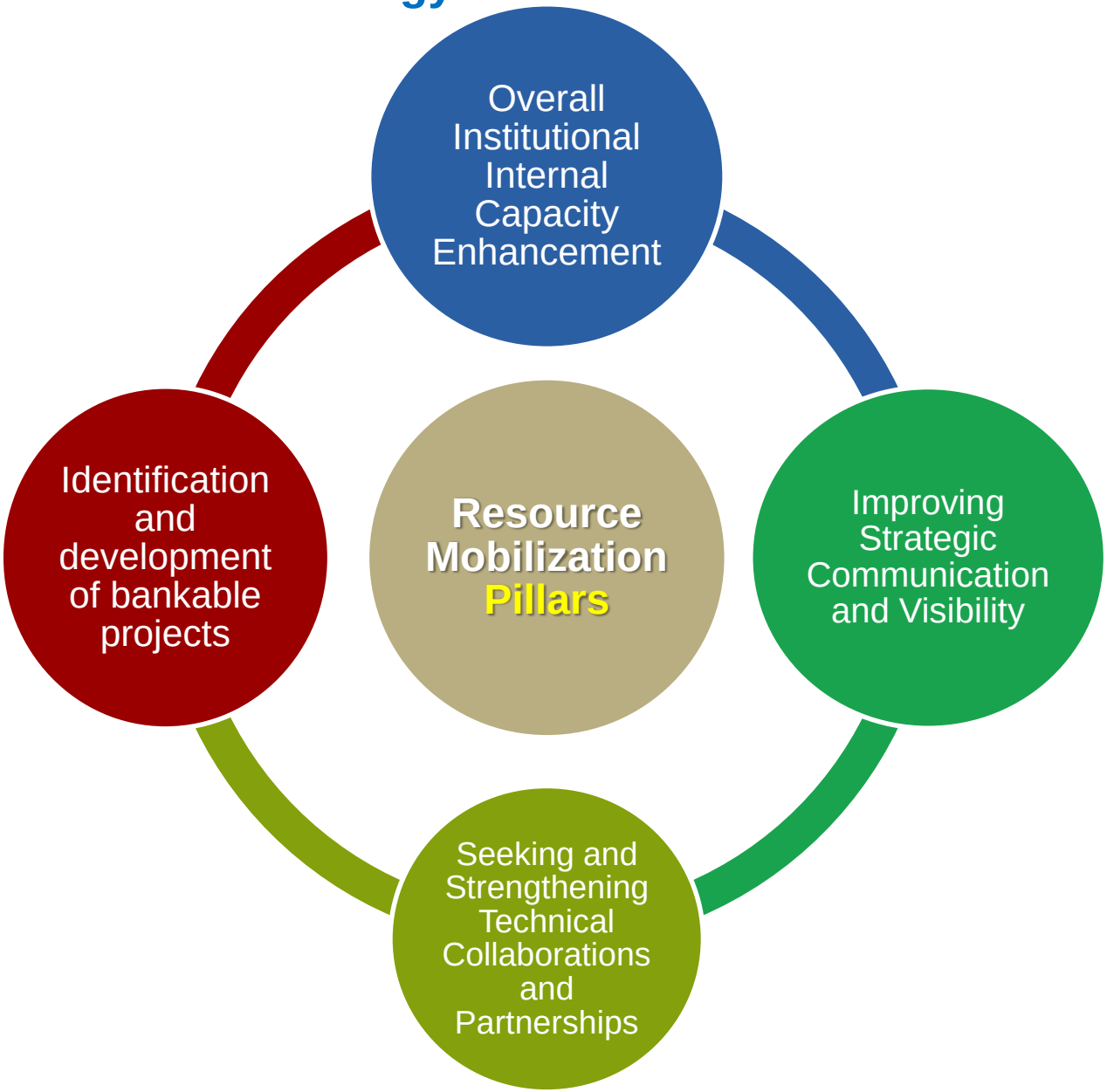
3. Resource Mobilization

Enhancing Government Funding

GoK development allocation	• Aggressive sector bidding and lobbying • Continuous monitoring and reporting of the key achievements • Continuous development and submission of project concept notes
Development partners	• Mapping of new donors and align with their strategic interests • Join relevant development partners working groups (DPGs): • Develop a donor specific solicitation campaign • Strategic communication for donor visibility
Climate financing	• Green climate funding project concept notes • Mainstreaming climate change adaptation and mitigation measures in irrigation project

3. Resource Mobilization

Resource Mobilization Strategy



4. Irrigation Enablers - Synergies

Ministry / State Depts	Area of Collaboration
Infrastructure	• Provision of a **public infrastructure** in irrigation projects e.g roads, bridges across rivers;
Crops & Agricultural Research	• Designate irrigation schemes as Agro-processing hubs / Staple Crops Processing Zones; • Facilitate in development of value chains, linkages in input supply and markets and access of information for irrigation farmers as well as fully operationalize the warehouse receipt system
Trade	• Data on crop trends for international Markets and SPS protocols; • Include the irrigation services MSMEs to benefit from the proposed interventions; • Expanded agricultural products in the commodity exchange platform;
Industrialization	• Quantify the annual required volume of agricultural raw materials; • Quantify the annual animal feed and fodder requirements for processing; • Develop a **contract farming** framework on supply of raw materials;

4. Irrigation Enablers - Synergies

Ministry / State Depts	Area of Collaboration
Environment & Forestry	• Memorandum of understanding to facilitate swift approvals for easements when presented;
Lands & Physical Planning	• Develop standard going rates for **compensation of assets** to be adopted in all projects across the country; • Engage NLC and undertake reforms that will ensure that land compensation is swift while respecting the rights of land owners or come up with **land compensation mechanism**; • Develop a legal framework to incentivize private large farm owners to adopt commercial farming through appropriate **tenancy agreements** that can be developed through PPP;
Livestock	• Quantify the **fodder and animal feed** annual requirements for pasture and processing;
Energy	• Provide grid power connection to ongoing and planned irrigation projects; • Introduce special Agricultural Electricity Tariff rates;

4. Irrigation Enablers - Synergies

Ministry / State Depts	Area of Collaboration
Devolution	• Establish **County Irrigation Development Units** as provided in the Irrigation Act; • Enforce Agricultural **extension services** by counties; • Develop mechanism for **county governments investment** in irrigation projects;
National Treasury and Planning	• Facilitate the irrigation sector tap into the **identified funding sources** for irrigation development. • Consider placing water and irrigation infrastructure under the **foundations for national transformation pillar of KV 2030** to facilitate enhanced investment to support economic growth and prosperity. • **Categorize** large irrigation infrastructure including dams as **public infrastructure** to accelerate investment by the private sector • Incentivize the private sector investment in irrigation through **smartly designed** tax breaks and exemptions on irrigation equipments and services. • Incentivize the insurance companies to offer **insurance solutions** for farmers. • Establish a **legal framework in contract law** that would facilitate compliance in contract farming agreements.

5. Conclusion

There is need to drive the irrigation sector growth for sustainable food security and economic growth in the era of water scarcity. In summary the interventions include: -

a. Government to continue **deepening** the irrigation reforms to create an **enabling environment** for irrigation sector growth.

b. Facilitate establishment of CIDUs to enhance **access to irrigation services** at the county level

c. Build a **robust irrigation acceleration platform** where farmers, technical experts, regulators, financing entities, commodity traders and irrigation equipment suppliers meet to **build synergies** in the sector

d. Continue to lobby government to **enhance** public funds allocation to the sector.

e. Engineers to **explore and adopt** innovative and sustainable and affordable irrigation infrastructure solutions for the farmers.


Thank You