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# ASDSP II VALUE CHAIN INNOVATIONS

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A SNAP SHOT



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## **Value chain Innovations with high prospects for women and youth economic empowerment**

### **1.0 Introduction**

The overall goal of Agricultural Sector Development Support Programme (ASDSP II) is to contribute to “transformation of crop, livestock and fishery production into commercially oriented enterprises that ensure sustainable food and nutrition security”. The programme targets four key challenges that hinder commercialization of agriculture i.e. low productivity along the entire priority value chains (PVC); inadequate entrepreneurial skills of the value chain actors (VCAs) and among service providers (SPs); low access to markets by Value Chain Actors (VCAs); and, weak and inadequate structures and capacities for consultation, cooperation and coordination within the Sector<sup>1</sup>. In order to address pervasive low productivity of agricultural value chains, the programme has focused on supporting implementation of innovations including CSA and GG technologies as a key approach of improving VC productivity especially amongst women and youth VCAs.

Generally, low productivity in agricultural value chains is characterized by low production levels and irregular supply of traded across the value chain nodes and low incomes and, has been identified as one of the key barriers to commercialization of the agricultural sector.

To address this issue, ASDSP II invested KES 1.15 billion ( KES 25 million per County over the programme period) to promote various innovations in the 29 value chains. The key objective of the innovations is to increase value chain productivity and especially, to catalyse women and youth participation in the value chains, for their economic empowerment. Within the context of the programme, an **innovation** means a technology or best practice (Technologies, Innovations and Management Practices) that has not been tried before by VC actors within a node in a specific value chain and has the potential of increasing productivity or efficiency of the entire value chain. Accordingly, innovations are therefore connected to VCA identified value chain opportunities and, are aimed at operationalising opportunities. The programme supported opportunities and associated innovations were identified through stakeholder consultative processes across the 47 Counties, and were meant to operationalize prioritized and were implemented through the programme’s innovation grant mechanism.

Consequently, the decision on which innovations to be implemented at the County level were based on the following criteria:

**i. Productivity:**

- Ability to increase the GM after implementing the innovation
- Contribution towards cost reduction
- Contribution towards reducing post-harvest losses
- Affordability of the innovation

**ii. Women and Youth economic empowerment**

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<sup>1</sup> ASDSP II Programme Document (PD)

- Women and youth participation
  - Levels of production (yields, per capita income before and after the innovation)
  - Potential of the innovation to provide decent work
  - Gender friendliness of the innovation
- iii. **Climate resilience and environmental sustainability**
- Potentiality of innovation to support VC adaption to CC effects
  - Evidence of measures to be put in place to mitigate (if any) green-house gas emission or any other harmful effects
- iv. **Market led** i.e. Likelihood of the innovation to attract other innovations in other nodes?
- v. **Sustainability** i.e. continuity of innovation beyond ASDSP II

## II. Objective of the report:

The aim of the report is to provide a snapshot of innovations that have been supported by the programme across the 47 Counties and some of the results that have been recorded. Only two value chains, Cashew nut and Sheep have been omitted from the report due to insufficient data.

## III. ASDSP II supported innovations

This section provides a list of some of the innovations that have been implemented across the 47 Counties and some of the immediate results that have been recorded in identified Counties. Some Counties have been omitted from the report mostly because they are at still early stages of innovation implementation and have therefore not collected sufficient data to warrant their documentation.

### 1. African Bird Eye Chilli (ABEC)

Name of innovation	Short term results	County
Solar dryer	Previously average monthly income per farmer stood at KES 10,000 from harvest of 50 Kgs of chili from quarter acre (200 kg/month). Currently the average monthly income per farmer stands at KES 40000, resulting from an increase in frequency and amount ( 800Kg /month)of chili harvests taken for drying before being sold to the processor (800 kg/month). The processor has reported reduction in post-harvest losses from 25% to 4% The dryer has created employment for 4 women who are engaged as casuals in the chili drying process	Kwale

	(Source of data: Matokeo women group, kubo south ward)	
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## 2. Banana Value Chain

Counties: Kiambu, Muranga, Embu, Nyamira, Kisii, Tharaka nithi

Name of innovation	Short term results	County
Tissue culture (TC) banana hardening nurseries	<p>The TC hardening nurseries innovation involve the use of TC tissue culture technology in ensuring provision of clean banana planting material to producers. The TC banana invitro are raised under shade nets with a rain water roof harvesting component which enhances resilience banana plantlets to climate change by ensuring that the nursery production activities are done throughout the year.</p> <p>The TC hardening nurseries have reduced the costs of accessing clean planting materials by an average of 16%. The cost of 1 TC banana plantlet has gone down from KES 135 at baseline to KES 115 - 14% decrease. Gross income from sale of TC banana plantlets averages KES 50000 per month which translates to KES 5000 per month/ member. The per capita income (PCI) translates to KES 150 as opposed to KES 66 at baseline ( Source of Data: Zett women group, Makenene ward)</p>	Nyamira
Banana Aggregation Shades	<p>Reduction in banana post-harvest losses from baseline of 10% to 2% An increase in quantity of bananas aggregated from average of 35 tons to an average of 40-46 tons per month. As The banana aggregation shades have led to creation of jobs i.e. 15 transporters namely 7 motorcycle riders, 7 ox cart transporters and one pick-up transport which are charge a fee of KES 30 per bunch or KES 200 per trip. In addition, 2 casuals and three graders are engaged during marketing of bananas. earning KES 600/day. Introduction of saving culture among members through Kivako financial services SACCO. Members usually save Kshs 1.00 per kg sold and they are paid as bonus at the end of the year. Last year (2022) members received a bonus of KES 358,427. ( Source of data: Kibana Self Help Group, )</p>	Embu

## 3. Beef value chain

Counties: Kajiado, Garissa, Isiolo, Narok, Tana river

Name of innovation	Short term results	County
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Establishment and conservation of Boma Rhodes and desmodium	5 acres of <i>Boma rhodes</i> and 1 acre of <i>Desmodium</i> has been established out of which 1000-1200 bales of hay are harvested every 4 months. The group has sells 1000 bales@ KES 250 per bale earning the group gross revenue of KES 1,000,000 every 4 months. VCAs feeding their cows on Rhodes and <i>Desmodium</i> mix have reported an increase in milk yields from 5 litres/cow/ day to 10 litres/ cow/ day with average net income of KES 9000/ month. The innovation is implemented both women and therefor has high prospects for women and youth who within the community have restrictions in owning bovines. (Source of data; Intomonok Women Group, Kilgoris central ward, Narok County)	Narok
Beef feedlotting	Initially the group used to fatten 20 steers over a 2 year period under natural grazing system with average entry weights live weights ranging from 200-250kg. Under the beef feedlot system the groups fattens 30 steers over a period of to 3-4 months and is able have 3 fattening cycles per year with average live weights at exit of 350Kg. . The feedlot has created permanent employment for 2 male youth while 5 female youth are employed on temporary basis. Based on its attractive prospects, an investor an investor has put up a feedlot with a capacity of 300 steers. (Esukuta Self Help Group, Narok County)	
Motorized Brush cutters	The motorized brush cutters have been employed direct employment to 11 youth ( 10 male and 1 female) who are offering hay harvesting services @ KES 3000/ acre. Net profits after deduction of cost ranges from 1200 -2000/acre. The innovation has high prospects for youth (male and female) who do not own land but can offer hay cutting services at a fee.	Samburu

#### 4. Broiler

Implementing County: Nairobi

Innovation name	Short term results	County
Defeathering machine	The defeathering machine has reduced the cost of slaughtering from 15/= per bird to 2.30/= per bird hence a cost saving of 12.7/= per bird. Has increased the processing of birds from 25 birds/hr/person to 250 birds/hr per person. The equipment can be operated by both men and women.	Nairobi

## 5. Camel milk

**Implementing Counties: Garissa, Isiolo, Marsabit, Wajir, Mandera**

Name of innovation	Short term results	County
Motor bike mounted with pocketed canvas bags	In a day a motor bike makes around 6 trips transporting milk from the interior to collection centres, each trip carrying 120 litres and charging Kshs.20 per trip which amount to Kshs.14,400 per day. Cost of fuel, maintainance and rider totals to Kshs.2,500 translating to net daily income of Kshs 595 per member. The innovation has created part time job for 15 riders. ( Ishakata Self Help Group,Saka ward)	<b>Garissa</b>



## 6. Cassava

**Implementing county: Kilifi**

Innovation name	Short term results	County
<b>Cassava harvester</b>	The cost of harvesting one acre of cassava manually is KES20,000/ acre while with the harvester, the cost reduces to KES 5,000/- therefore the net profit realized from one acre increases from Ksh.145,500 to KES. 160,500.  (Source of data: Malanga aggregation centre, Sokoke ward)	<b>Kilifi</b>

## 7. Cotton

**Implementing Counties: Kisumu**

Name of innovation	Short term results	County
<b>Bt Cotton</b>	Yields per acre have increased from 350kgs to 700kgs translating in simple gross margin of 35,000 KES/acre. Post-harvest losses from pest related damages and cotton-degraded lint has reduced to less than one (1%) from over 5% with conventional variety. As a result of yield increases, the Cotton cooperative has aggregated 120 tonnes of cotton (2023) from 30 tonnes in 2022. Households adopting Bt cotton have recorded incomes of KES 42, 802 as opposed to those using conventional variety who earned KES 2200. ( Salawa Cooperative, )	<b>Kisumu</b>

## 8. Cow milk

**Implementing Counties:** Baringo, Bungoma, Bomet, Elgeyo marakwet, Embu, Kajiado, Kakamega, Kiambu, Kirinyaga, Kericho, Kirinyaga, Kisii, Laikipaia, Machakos, Meru, Migori, Muranga, Nandi, Narok, Nakuru, Nyamira, Nyeri, Taita taveta, Tharaka nithi, Trans Nzoia, Uasin gishu, Vihiga

Name of innovation	Short term results	County
<b>Sexed semen</b>	Increased conception of heifer calves (from 50 to 90%) thus minimizing unwanted male calves in the herd for more rapid genetic progression. The innovation has also enabled herd replacement at a faster rate from within their herds thereby minimising biosecurity risks associated with bringing in animals from different herds. In addition, heifer calves have resulted to an increase in the value of herd since heifers are tripple the value of bulls. The two cooperatives supported initiated the Artificial Insemination programme resulting to employment creation	<b>Nyeri</b>

	of 3 inseminators earning Kshs 20,000 monthly. (Source of data: Slopes dairy, Karatina; and Mweiga Dairy . Mweiga)	
<b>Total mixed ration (TMR)</b>	At Marinda Dairy Cooperative Society, the own formulated TMR feed by the cooperatives is sold to member farmers at a subsidized fee of KES 45 /Kilo. The member farmers who feed their dairy cattle on the TMR feeds have recorded an increase in milk produced by their animals by an average of 4.04 litres/day. This has also tremendously increased the volume of milk bulked by the cooperative from an average of 4,439.5kg per month during peak seasons and 894.7 kg per month during off peak seasons to 6236.1kg per month during peak seasons and 1595.84kg during off peak seasons. ( Source of data; Marindas Cooperative, Kapomboi ward)	<b>Trans Nzoia</b>
<b>Bulk Milk pasteurizer</b>	The use of the pasteurizer has reduced post production losses from 10% to 2%. Additional enterprise of value addition of pasteurized milk to yoghurt and mala (fermented milk) Employment creation for 4 youth (1 M and 3 F) at the production and sales units. The group earns a gross income of KES. 510,000 and a net income of KES. 255,000 per month which translates to a per capita income of KES. 755 from gross income of KE.52,000 and net income of KES.21,000 in 2018. (Source of data: Kishon women group, Lolgorian)	<b>Narok</b>
<b>Protein rich fodder</b>	Protein fodder crops bulking sites were established in 9 VCOs leading to improved nutrition and increase in milk yields from 5-7 litres/cow/day to 7-10 litres per cow day. (Source of data: Kangaru Dairy Cooperative)	<b>Muranga</b>

## 9. Fish

**Counties implemented:** Homabay, Kisumu, Siaya, Busia, Mombasa, Lamu, Tana river, Nyandarua, Nandi

<b>Name of innovation</b>	<b>Short term results</b>	<b>County</b>
<b>Predator net</b>	Decreased pre-production losses from 64% to 7% through fish net innovation. Through the use of the net, fisher folks harvest 1,115 (93%) out of 1,200 stocked fingerlings; the previous harvest was only 430 pieces. In uncovered fish ponds, the key fish predators are snakes, birds, otters, monitor lizards. Through this innovation, the income has increased from KES 66,000 to KES 223,000 per year and with 5 % cost of production resulting in KES 211,850 profit. This translates to a daily per capita income increase from KES 177 to KES 580 per person per day for group members.	<b>Siaya</b>

	Source of data (Mwang Women Goup, Sigomere, ward)	
<b>Deep freezers</b>	Reduction of in post-production losses from 60% to 10%.The cost of fish preservation has been reduced from KES 60 / day to KES 15/ day.  The innovation has created employment for women who are engaged in cleaning and descaling fish before being kept in the deep freezer. An offshoot of this process is the establishment of 4 compost pits at designated points for decomposition of fish waste which generates an additional income of KES 400 per week.	<b>Homabay</b>
<b>Solar powered fingerling hatchery unit and a modern fish pond for dumping.</b>	The Hatchery produces 50,000 fingerlings per month selling at 5Ksh translating to a total gross Monthly income of Kes. 250,000. The cost of producing a fingerling is KES 2/- hence the net margin income is KES 150,000 monthly. The use of solar power has resulted in reduction of production costs leading to a Gross Margin of 60% as compared to a baseline of 40%. Source of data: Senetwo Fish Farm, Songor/Soba ward)	<b>Nandi</b>

#### 10.French beans

Implementing counties: Muranga

Name of innovation	Short term results	County
<b>Hydraulic ram pumps ( solar powered )</b>	The innovations have reduced the cost of production from KES 42 to 33 per Kg of fresh beans (21% cost reduction). The innovation has resulted in an increase in acreage on french beans by 11 % resulting in job creation for 19 youth (12 MY, 7FY) who are engaged mainly in planting, harvesting, transport and grading of the beans.	<b>Muranga</b>

#### 11. Green gram

Counties: Makueni, Kitui

Name of innovation	Short term results	County
<b>Community green gram seed multiplication</b>	In MAM 2023 season 21 Metric tons of community green gram seeds ( KS20) was realized from 250 acres earning the 50 farmers a grand total KES 4.2 Million. In addition, 10 individual farmers from the group multiplied seed in their individual farms and earned KES 200,000 from the sale of green gram seed. The planted seed yielded 4 bags per acre as opposed to 2 bags /acre using recycled	<b>Makueni</b>

	seeds. (Source of data: Makueni Seed Producers Cooperative Society Ltd, Makindu ward)	
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## 12. Ground nut:

County: Busia

Name of innovation	Short term results	County
<b>Certified ground nut seed , lime and aflasafe</b>	Availability of quality groundnut seed increased from 1.5tonnes to 7.4tonnes. Ground nuts yields have increased from 500kgs to 800kg per acre due to a combination of quality seed and soil liming – soil liming Improved soil PH from 3.5 to 5.5. The use of Aflasafe improved quality of groundnut harvested, reducing the levels from 13parts per billion to 4 parts per billion resulting in reduction, in groundnut rejection at market from 50% to 5%.	<b>Busia</b>

## 13. Honey

Counties: West pokot, Samburu, Baringo

Name of innovation	Short term results	County
	The innovation offers protection of the hives from Honey Badgers and has reduced honey pre-harvest losses by 80%. Due to siting of many hives under one location, the cost of hive inspection has been reduced from 25 from 3-man days to one (1) man day for 25 hives. Due to regular inspection of hives, the bee hive occupation has increased from 30% ( normal apiary ) to 70% in bee house. The technology is friendly to women VCAs. Youths trained on honey harvesting and inspection have gained income earning opportunities as honey harvestors and earn KES 200 per hive for their services. 12 youth are engaged as hive inspectors and honey harvestors . The inspection cost has reduced by 67%. ( Irong bee products SHG, Mochongoi ward,)	<b>Baringo</b>
<b>Centrifugal honey extractors</b>	The equipment has led to efficient extraction of quality honey that fetches more revenue i.e. KES 500/Kg as opposed to KES 250/Kg to using traditional methods. The equipment enables the VCAs refine more crude honey within a shorter period than traditional methods i.e. 250kgs /day as opposed to 75Kg/ day under traditional methods.( Kapchok farmers Cooperative, Kapchok ward, North Pokot)	<b>West Pokot</b>

<b>Kenya Top Bar Hive (KTBH)</b>	The honey yields from KTBH hives in hotter areas of West Pokot are higher than in both Langstroth and traditional hives by on average 10kgs and 5 Kgs respectively In West Pokot, women are allowed to use the KTBH but not the traditional log hive hence it is a gender friendly technology. (Greepto Se help Group, Lomut ward)	
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#### 14. Indigenous chicken

Counties implemented: Bomet, Bungoma, Busia, Elgeyo marakwet, Embu, Homabay, Kakamega, Kericho, Kiambu, Kilifi, Kisii, Kisumu, Kitui, Kwale, Lamu, Machakos, Makueni, Migori, Mombasa, Nandi, Nyeri, Nyamira, Siaya, TaitaTaveta, Tharaka nithi, Vihiga, Wajir, West pokot,

<b>Name of innovation</b>	<b>Short term results</b>	<b>County</b>
<b>Motor cycles and vaccine cool boxes</b>	The Value Chain Organizations issued with the motorcycle were linked to KEVEPAPI and make bulk procurement of New castle, Fowl Typhoid, Fowl pox vaccines generating on average Ksh 30,000/= per month (Kshs 1,000/= per day). The VCO has employed 8 youths community-based chicken vaccinators. As a result, chicken mortality rates as reduced 25% to 8 %, due to better disease control. On average chicken offtakes for month old chicks has increased from 75 to 92 (17% increase); Gross income to 22% i.e. from Ksh 18,750.00 to Ksh 23,000/ month. ( Data Source : Great Wang Chieng Farmers' Cooperative)	<b>Homabay</b>
<b>Fabricated chicken carriers</b>	Prior to the innovation, 30 live chicken would be transported via motorbike either in gunny bags or with heads hanging down hand handles of the motorbike. On average 6 birds would de dead-on arrival (DOA) in destination markets (22% PPL). With fabricated cages, a maximum of 50 birds can be carried per trip with zero DOAs ( 0% PPL). Beneficiary VCOs have engaged 12 youth who ferry live chicken to markets twice a week. Each youth earns a commission of KES 10/- for every live bird that arrives at destination markets.	<b>Kakamega</b>

#### 15. Kale

Implementing counties; Nairobi, Marsabit

<b>Name of innovation</b>	<b>Short term results</b>	<b>County</b>
<b>Hydroponics</b>	Increased kale yields from 2,054Kgs/ ¼ of an acre/month to 6,740 kgs per ¼ acre with resultant increase in incomes from KES 61,620 to KES 202,200/ month/¼ of an acre	<b>Nairobi</b>

	(Source of data: PIGOHEVECO, Matopnei)	
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## 16. Local vegetables

**Counties implemented:** Mombasa, Nyamira

Name of innovation	Short term results	County
<b>Solar dryer</b>	The innovation has reduced post-harvest losses of vegetables from a baseline of 40% baseline to 5%. Dried vegetable are packaged and sold within and outside the County. A kilo of fresh local vegetables sells KES 100 but sells at KES 600 Kg after drying and packaging. The PCI of group members has increased from 65 KES per day to Kes189 per day.( Source of data: Mapema Women SHG)	<b>Nyamira</b>
<b>Vermi composting</b>	This innovation involves the b use of redworms to breakdown waste matter and produce organic manure. The organic manure produced serves as an alternative to the inorganic fertilizer that have a negative environmental impact when used for production of local vegetable and, enhances soil structure and water retention ability of the soil thereby improving the adaptability of the local vegetables to changing weather. Use of vermi compost on local vegetable has increased gross margins of local vegetables from local vegetable from their farms from 19% at baseline to 30% mainly attributed to reduced cost of production after replacing inorganic fertilizer with vermi compost. Aggregate local vegetables production capacity of the group has increased from 3 tonnes every 6 weeks compared to the 1 tonne every six week when using the convectional heap compost method. The group has to diversified to vermicompost liquid fertilizer as an enterprise which sell to other local vegetable producers. The gross income from one vermicomposting unit averages KES 88000 per month which translates into KES 5500 per month/member.  Source of data ( Kebuse women group,	

## 17. Maize

**Counties implemented:** Bomet, Laikipia, Nandi, Narok, Kakamega,Trans Nzoia, Samburu

Name of innovation	Short term results	County

<b>Hermetic bags</b>	Reduction in PPL Kakamega) Reduction of post-production losses to 22% to 9% (Kakamega ); Reduction of post-production losses from 30% to 10% ( Bomet).	<b>Bomet</b> <b>Bomet</b>
<b>Two tine Ripper</b>	The innovation has enabled VCAs to increase the yields in one acre from 8-10 bags to 20-30 bags per acre per season. This translates to increase in income from KES 40,000 /acre to KES 120,000 /acre per season. The technology reduced the cost of land preparation from KES 10,000 to KES 6,000/ acre.  (Source of data: Eor-enkitok FFS, Olorropil ward)	<b>Narok</b>
<b>Solar portable maize dryer</b>	Currently able to dry 18bags(90kgs) in a day. Solar dryer has reduced drying costs from KES 69,600 (manual) to KES.26,100. 2 male youths employed to operate the machine on casual basis earning KES 250 each per day. Post-production losses reduction from 30 to 19% (2023 Trans nzoia County Survey) Source of data; Destiny Grain Handlers and Marketing Cooperative, Kapomboi ward)	<b>Trans Nzoia</b>

## 18. Mango

**Counties implemented:** Machakos, Makueni, Siaya, Tana river

<b>Name of innovation</b>	<b>Short term results</b>	<b>County</b>
<b>Shade net, Dam liner and irrigation system</b>	The use of shade netting reduced evaporation increasing seedling survival rate by 10%. Mango seedling increased from 50,000 to 85,000 seedlings with resultant income increase of KES 85,000 to KES KES 400,000. The increase in income is cost saving of KES 240,000 from purchasing of water.	
<b>Motorized sprayer pump</b>	The innovation has created sprayer services as an enterprise for youth. The VCO sprayed a total of 5400 trees per month 2023, generating KES 71,364 (Sprayer Service provider data 2023) Production of mango has increased to 302.4 tons in 2023 season from 56 tons (2019, ASDSP II Baseline data,).The 15% of income is retained by the group for maintenance of equipment. The per capita income has increase from KES 320 (manual sprayer) to KES 594.7 (motorised sprayer) (Kula Jasho Self Help Sprayer Service Providers, South Gem ward)	<b>Siaya</b>

## 19. Meat Goat

**Counties implemented:** Baringo,Mandera, Marsabit, Turkana, West Pokot

Name of innovation	Short term results	County
<b>Galla goat (buck) multiplication scheme</b>	This initiative has enabled the farmers to access galla goats for breeding at a lower price i.e. KES 8000 as opposed to KES 25,000 at source. Buck scheme operators generate KES 500,000 per annum and have employed 2 farm hands to care for the breeding goats.	<b>West pokot</b>

## 20. Meat Goats

Name of innovation	Short term results	County
<b>Galla goat (buck) multiplication scheme</b>	This initiative has enabled the farmers to access galla goats for breeding at a lower price i.e. KES 8000 as opposed to KES 25,000 at source. Buck scheme operators generate KES 500,000 per annum and have employed 2 farm hands to care for the breeding goats.	<b>West pokot</b>
<b>Meat goat disease surveillance</b>	This innovation has contributed to reduction in livestock mortality rate by 10% based on the data from the veterinary office. The technology is gender friendly and mainly used by youth and women. This innovation has created employment for the youths who will be engaged by the County government following the passing of the animal health bill and the CDR will be entitled to monthly stipend from the county government.	<b>Turkana</b>

## 21. Passion

### Implementing Counties: Kwale, Uasin Gishu

Name of innovation	Short term results	County
<b>Solar powered irrigation set</b>	Irrigation of passion under 1.5 yielded 600kg/ week(0.6 kg/plant) as opposed to 0.6Kg /plant. Over 2 seasons i.e. 20 weeks 600Kgs are harvested and sold at KES 100/- with an gross income 1,200,000/=. Total production cost=399,240/ resulting in a net income of KES 800,760/-. The group has invested in 3 motor cycles for passion fruit transport which earns the group an net income of KES 300/day. (Source of data: Kapuchulei Passion Youth Group)	<b>Uasin gishu</b>



## 22. Potato

**Implementing Counties:** Bomet, Elgeyo Marakwet ,Nyeri, Nyandarua

Name of innovation	Short term results	County
<b>Walking tracktor</b>	Reduced the cost of labour by 50% vis-à-vis manual labour and solution to labour scarcity; Reduced the cost of production from KES 17 to 14 per Kg. Mechanized harvesting reduced post-production loss from 20 to 5% saving KES 36,000/ acre/ season.	Nyeri

## 23. Pyrethrum

**Implementing County:** Nakuru

Name of innovation	Short term results	County
<b>TC pyrethrum splits</b>	A ¼ acre plot yields 30 kgs per month against a bassline of 10/kgs/¼ acre using non TC material. This translate to 240 kgs of dried flowers per year against 80Kg/¼ acre / year.  Total acreage under pyrethrum has increased from 501 in 2018 to 2300 in 2022.	

## 24. Sorghum

**Implementing Counties;** Homabay,Kitui, Meru, Turkana

Name of innovation	Short term results	County
<b>Sorghum thresher</b>	Efficiency in Sorghum threshing from 1 bag 90Kg /day using sticks to 15 90Kg bags/day. Post production losses reduction from 15% to 10% due to less spillage Job creation for six (6) machine operators, earning an average of Ksh 500/= per day. The quality of machine threshed sorghum fetches a higher price, of KES 200/= to Ksh 250/= per 2 kg tin (gorogoro) compared to KES 100/= from manual threshing. Reduction of drudgery especially for women who have been involved in manual threshing thus providing more time for women and youth to attend to other on-farm and off-farm activities. An improvement in the work environment because the machine has reduced the itchy effect from the sorghum head dust ( litho in dho luo) and respiratory infections leading to overall well being. Gross profit is KES 27,150/=, per month from one thresher, translating to KES 905/= per day. Source of data:( Kobodo Farmers Groundnut Cooperative ,Kanyamwa Kologu ward)	Homabay

<b>Walking tractor</b>	Reduction in cost of ploughing per acre i.e. tractor ploughing KES 3000 / acre, manual ploughing KES 5000 / acre, walking tractor is KES 1600/acre	<b>Meru</b>
<b>Shallow weeder</b>	Cost of casual labour for weeding @ 5000/acre while cost of weeding using shallow weeder@3000/ acre	

## 25. Sweet potato

Implementing County: Migori

Name of innovation	Short term results	County
<b>Solar powered irrigation and net tunnels for multiplication of sweet potato vines</b>	The use of irrigation system and net tunnels, has led to production of disease-free vines increased acreage under sweet potato from 0.5 to 2.0 acres/ household i.e. from 25 beds to 100 beds. Disease free sweet potato vines at sell at KES 1200 per bag as compared to KES 500 ( Source of data: Moheto Muungano Women group, Kuria )	

## 26. Tomato

Counties implemented: Bungoma, Kajiado, Kericho, Garissa, Isiolo

Name of innovation	Short term results	County
<b>Shade net, irrigation and pumice technology</b>	Reduced disease infestation of tomato from 30% to 10% which increase production from 7kg to 15kg per plant per season. Increased production of tomatoes during off season by 30%. Increased group income from KES 50,000 to KES300,000. Use of Insect traps has reduced use of insecticides which used to cost sh3000 now costing sh1000 Reduced bacterial wilt and other soil borne infection from 30% to 10%. Improved water utilization efficiency from 1 litre to 0.5 litre per plant. (Source of data: Rehoboth women group)	<b>Bungoma</b>

## 27. Water melon

Name of innovation	Short term results	County
Solar powered kits, pheromone traps, Sukari F1 seeds	The combined use of irrigation and certified seeds increased production from 12 tons to 16 tons per acres. Incomes increased from 360,000 to 480,000 per acre. Pheromone traps has reduce post havest losses from 10% to 4%. ( Source of data: Lenbib Farm Group, Wajir east)	Wajir

### Lessons learnt from innovation implementation

1. For most of the innovations, implementation and benefits are restricted to the individual beneficiary group and have not reached business scale level. A case in point are feed mills and mixers, and chicken incubators – not featured in this report mostly because they are operating below their installed capacity. This mostly because the VCAs do not have sufficient financial resources to operate the innovation at full scale. In future, there is need for due diligence of recipient VCOs to ensure that they can operationalize and sustain the innovation without programme support
2. Certain innovations such as breed upgrading take long before change can be reflected. Close monitoring is therefore needed to monitor herd improvement but such interventions should also be accompanied by the appropriate nutrition management solutions to ensure real benefits are accrued.
3. Innovations such as apical cuttings in the potato value shown (not featured in the list) performed poorly due to adverse weather conditions. They should not therefore be written off but supported with other climate smart interventions i.e. irrigation to ensure their success.
4. Follow up by most Counties on performance of programme supported innovations has been weak. There is need for the programme to support Counties with data capture tools on desired programme results especially in the short term to medium term.

### Recommendation

1. Due diligence of beneficiary VCO should be conducted before issuance of innovation with preference being given to VCOs that are at the growing stage so as to trigger business growth
2. Develop simple data capture tools on innovation performance and sensitize implementing units on data capture.
3. Some innovations such as TMR among others, motorized sprayers have shown early promise and should be properly documented with accurate data before scaling out to other Counties.