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The U.S. Government's Global Hunger & Food Security Initiative



The Accelerated Value Chain Development program National conference report 26-27 April 2018

Developing value chains to farming as business with technology and innovations in Kenya

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National conference report

26–27 April 2018

Developing value chains to farming as business with technology and innovations in Kenya

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The Feed the Future Kenya - Accelerated Value Chain Development (AVCD) program seeks to widely apply technologies and innovations for selected value chains in order to competitively and sustainably increase productivity, contributing to inclusive agricultural growth, nutrition and food security in the country. The program's main goal is to sustainably reduce poverty and hunger in the Feed the Future zones of influence in Kenya.

Photo credits: ILRI/Paul Karaimu and CIP/S. Quinn.

About the AVCD program and national conference



Iain Wright, ILRI deputy director general, speaking at the AVCD national conference.

Photo credit: ILRI/Paul Karaimu.

The Feed the Future Kenya - Accelerated Value Chain Development (AVCD) program seeks to widely apply technologies and innovations for selected value chains in order to competitively and sustainably increase productivity, contributing to inclusive agricultural growth, nutrition and food security in the country. The program's main goal is to sustainably reduce poverty and hunger in the Feed the Future zones of influence in Kenya.

Focusing on the livestock, dairy, staple crops root crops and staple drought tolerant crops value chains in 21 counties in Kenya, the program aims to lift 326,000 households out of poverty, making them food secure and enabling their transition from subsistence to market-orientated farming. The program is implemented by three CGIAR centres – the International Livestock Research Institute (ILRI), the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the International Potato Center (CIP). ILRI is the leading centre, hosting the program implementation secretariat, in conjunction with several partners.

In addition to meeting its stated objectives, being purely developmental, the program serves the purpose of demonstrating that technologies and innovations can accelerate agricultural development and CGIAR can play a key catalytic role. In 2018, and after three years of implementation, it was time to exploit an opportunity to learn and share the project's experiences with the development community in Kenya.

The program organized a successful national conference on the 26 and 27 April 2018, in Nairobi, to showcase, share achievements and evaluate its approaches to program implementation. The event brought together national and county actors in crops and livestock development, to highlight the important role that the AVCD program played in supporting the development of these sectors at a national, county and farm levels. The event provided a distilled understanding of the *AVCD Theory of Change*, which was deployed to demonstrate the role of large-scale application of technologies and innovations in developing competitive, productive and market-oriented value chains for livestock, dairy and root and drought-tolerant crops.

Developing value chains to farming as business with technology and innovations in Kenya

Livestock value chain

Arid areas constitute about 60% of the land mass and are home to circa 30% of the population in Kenya. Land in arid areas is predominantly used for extensive grazing, and poverty levels in these regions, at more than 60%, are the highest in Kenya, and are exacerbated by poor accessibility and frequent droughts. The livestock sector in Kenya accounts for about 8% of GDP, hence is key not only to the economy but also to the livelihoods of a large proportion of the population. Livestock production offers pastoralist communities the most promising pathway out of poverty and towards sustainable economic development and improved household nutrition.

Extensive livestock production in Kenya's arid counties is constrained by several challenges. It is estimated that the drought period spanning 2008–2011, resulted in a loss of USD8 billion in the livestock sector. The impact of frequent drought is severe hunger, malnutrition and extensive loss of livelihood, with diminished resilience. Other challenges facing pastoralist communities include a lack of access to financial services and markets, limited availability of animal-health care outreach services, low levels of literacy and technical capacity, and a lack of integrated policies on management of natural resources, all of which have created policy challenges that limit market-access and livestock mobility.



The Feed the Future Kenya initiative is assisting at least 93,000 households in becoming resilient to climatic shocks and accelerating development in their zone of influence. In Marsabit and Isiolo counties, the United States Agency for International Development (USAID)-funded program, Resilience and Economic Growth in the Arid Lands–Accelerated Growth (REGAL-AG), has been implementing livestock value chain targeted activities, seeking to increase the value of livestock sales from USD23–35 million in the two counties by 2017.

In addition, the Resilience and Economic Growth in the Arid Lands–Improving Resilience (REGAL-IR) program is providing infrastructure support in 12 livestock markets in Garissa, Wajir and Turkana and promoting the co-management model in these livestock markets. This approach gives producers, through the livestock marketing associations, a greater role in the governance of their markets.

Focusing on semi-arid and arid counties of Isiolo, Garissa, Marsabit, Turkana and Wajir, the AVCD livestock value chain component seeks to accelerate the development of livestock marketing to improve the incomes and nutritional status of 60,000 households by increasing fodder production and access to improved grazing areas; creating additional local market associations and private sector enterprises; and applying improved livestock management practices, including livestock fattening.

The challenges in commercializing livestock production and improving links along the value chain in the Resilience Zone of Influence are compounded by the comparative lack of well-documented knowledge and experience. ILRI is bringing to bear its experience in supporting livestock value chains across Africa.

Livestock value chain component interventions include improvement of fodder production and grazing management, improvement of animal productivity, use of value chain analysis and innovation platforms to strengthen livestock markets and commercial activity, and creation of an enabling environment for livestock markets.

Dairy value chain

The dairy sector contributes close to 22% of livestock gross market value in Kenya. The sector provides livelihoods to about 1.8 million rural households, who produce about

80% of the total domestic milk. The sector has been growing at an estimated rate of between 3–4% annually. The contribution of cattle milk has been growing with increased total national milk production.

The consumption of dairy products has been growing faster than milk production and this growth is projected to continue at 6% per year. By 2022, the country will face a deficit of between 1.275 and 3.53 billion litres of milk per year. The rising demand presents several opportunities for sector-wide and project specific interventions.

Unfortunately, dairy production remains non-commercialized, heavily rain-dependent, and the market is still highly informal. The informality of the market sector is, therefore, holding back investment in processed dairy products.

Overall, the AVCD goal for the dairy value chain in Kenya is to improve diet diversity, food security and rural incomes among poor and vulnerable subsistence-oriented households. The project is implemented in nine counties with the objectives of increasing farm-level milk productivity, expanding market opportunities for milk producers and enhancing capacity among value chain actors to co-create solutions and enhance nutrition-based behavioural change, benefiting 40,000 households.

Staple crops value chain

The goal of the staple crops value chain project is to contribute to improving food security, nutrition and incomes of 100,000 smallholder households in Kenya over three years. The project aims to support seed system development through targeted private sector investment, increase crop productivity and market opportunities, and improve nutritional quality of diets across eight counties.

The potato sector is valued at USD500 million annually and provides employment opportunities for two million Kenyans along the value chain. Potato is grown by approximately 800,000 farmers, mostly smallholders, for whom potato is a key source of food security and income. Consumption of potato is growing rapidly and is currently ranked second after maize for staple crops in Kenya. Potato and sweetpotato are among the fastest expanding food crops in Kenya, used increasingly by smallholder farmers for food security and income.

Both crops are relatively fast-maturing (four months) and valued as reliable food security crops. Potato provides significant income opportunities for smallholder farmers and enriches diets with minerals and vitamins. Sweetpotato is known for its resilience and productivity across diverse agro-ecologies, ranging from high rainfall to semi-arid regions.

The International Potato Center (CIP), an AVCD implementing partner, and in collaboration with its partners, has developed and validated technologies and delivery systems that are easing bottlenecks to scaling out

potato and sweetpotato value chains, such as the seed system of these vegetatively propagated crops that has historically made it so difficult to manage devastating diseases.

In Kenya, technologies and approaches are now available for scaling up potato production with the potential to double smallholder potato yields from quality seed, and significantly increase the nutrition quality and economic value through improved orange-fleshed sweetpotato (OFSP) varieties.

Speakers at the conference



Andrew Mude, ILRI principal economist



George Wamwere-Njoroge, AVCD livestock value chain manager



Andrew Tuimur, chief administrative secretary, Ministry of Agriculture and Irrigation, Kenya



Tina Dooley-Jones, mission director, USAID Kenya



Iain Wright, ILRI deputy director general



Romano Kiome, AVCD chief of party



AVCD national conference

Since September 2015, a consortium of international agriculture research centers ILRI, ICRISAT and CIP have implemented a Feed the Future-funded program through USAID, covering 21 counties across Kenya.

After nearly three years of implementation, the AVCD program held a two-day national conference on 26–27 April 2018 to showcase and share its achievements, and evaluate its approaches on how it has achieved the stated objectives and targets. The conference considered the future of AVCD, a three-year USD25 million program in Kenya.

This high-profile AVCD conference, titled ‘Developing value chains to farming as a business with technology and innovations in Kenya’, showcased catalytic innovations spearheaded by the three CGIAR centres, reviewed lessons learned in the program and explored the potential of scaling out its innovations and technologies.

The conference delegates included program partners from national and county governments, development partners, crop and livestock industry experts, selected program beneficiaries, program staff, representatives from agricultural programs and industry stakeholders. An interactive space—the AVCD marketplace, a mix of exhibition stands and demonstrations—showcased AVCD contributions to the transformation of the agricultural landscape across Kenya.

A recurrent theme at the conference was the need for various sectors such as government, private industry and scientific research organizations to cooperate effectively

for Kenya to meet the ambitious targets set forth in the government’s ‘Big Four’ list of priorities—manufacturing, universal healthcare, affordable housing and food security.

Addressing over 400 participants at the opening of the conference, His Excellency President Uhuru Kenyatta applauded the project for contributing to his government’s three of four big goals: food security, healthcare and manufacturing. The president reiterated his vision that Kenya will eradicate poverty and hunger by 2022. He was accompanied by Hon. Mwangi Kiunjuri, cabinet secretary, Ministry of Agriculture and Irrigation. The US Ambassador to Kenya H.E. Robert Godec was present at the event together with other dignitaries.

In addition to president Kenyatta, ambassador Godec, cabinet secretary Kiunjuri and ILRI director general Jimmy Smith all spoke at the plenary opening.

Cabinet secretary Kiunjuri spoke of the ministry’s vision to transform the most vulnerable populations from small-scale farmers to agribusiness players.

Ambassador Godec spoke of the need to work with the national and county governments plus the private sector ‘to increase farmer and agribusiness access to markets, quality farm inputs and finance’.

ILRI’s Smith spoke of the broader challenges facing Africa’s agricultural sector. By the time the global population stabilizes in the 2050s there will be approximately 2.5 billion more people to feed than are fed now. That means



Photo credits: ILRI/Paul Karaimu.

that globally, we will have to produce 50% more food than we produce now—70% more here in Africa.

The session was notable also for the official launch by Godec of a second five-year phase of the Feed the Future Kenya Country Plan, worth USD115 million.

Overall, conference participants highlighted several achievements in AVCD focus areas.

For the dairy value chain, the program has upgraded the available cattle breeds through accelerated breeding technologies, has trained farmers in good animal husbandry practices and business skills, has enhanced access to a vaccine against East Coast fever in cattle, has set up dairy business hubs and has promoted use of improved fodder.

Another successful intervention is the introduction of high-quality livestock fodder grasses such as *Brachiaria* and disease-free varieties of Napier grass. *Brachiaria* is drought-tolerant, regenerates fast after harvest, tastes good and has high levels of crude protein.

AVCD's fodder component is so successful that program staff can hardly keep up with the demand for planting material. Together with good animal husbandry practices, the new fodder is enabling farmers to double their cows' daily milk production. Some farmers have begun to market their fodder crop successfully: One farmer in Makueni County made USD8000 by selling fodder planting material over one planting season.

East Coast fever, a commonly fatal disease of cattle in Africa, is endemic to much of the region covered by AVCD. A vaccine is available that offers lifetime immunity to the disease, but the cost of the vaccine and the logistics of getting it delivered to farmers have kept the vaccine out of reach of many poor farmers.

AVCD staff intervened by training vaccinators and offering an initial 20% subsidy for the vaccine for the initial first two months of implementation. Demand for the vaccine is now surging. Local business leaders say the reduced incidences of East Coast fever have not only lowered the cost of animal health services but also raised cattle productivity—and in addition have attracted the interest of vaccine distributors.

The AVCD program has also been supporting dairy cooperatives and other producer organizations to become more commercially oriented by adopting a 'dairy business hub' model. Through training in governance, financial management and strategic and business planning for these organizations, AVCD has encouraged dairy farmer groups to aggregate, which is enabling individual farmers to sell more of their milk.

In the livestock value chain, the main constraint was that pastoral livestock keepers in Kenya's remote northern drylands had little access to timely information about market opportunities.

To address this problem, AVCD organized a traders' business-to-business forum. Among its achievements was arranging for a women's trader group in Isiolo providing a local goat club with 35 goats a week, a contract worth nearly USD10,000 a month. The program has also developed a mobile telephone app generating real-time market information through a Livestock Market Information System (LMIS), dubbed 'KAZNET', currently in beta mode. Plans for KAZNET 2.0 are under way with a commercialization strategy being jointly developed with the Cornell University Center of Sustainable Global Enterprise.

To address poor rangeland conditions, inadequate pastures limiting livestock populations and unsustainable rangeland usage, AVCD has partnered with Kenya's county governments, USAID's Agile and Harmonized Assistance for Devolved Institutions (AHADI) project and other stakeholders to develop a draft livestock policy and several policy briefs on rangeland management, livestock disease control and livestock marketing. The Frontier Counties Development Council has been supported to develop a prototype Rangeland Management Bill, and grazing plans and maps have been generated and are in use across several counties to enhance pasture management.

In the arid areas of northern Kenya, a great constraint on livestock productivity is lack of animal health services, particularly for surveillance and control of endemic livestock diseases. The program has rolled out innovations such as community disease surveillance, an electronic disease surveillance system as well as private vet services. Thanks to the introduction of a new livestock disease reporting framework, a recent outbreak of foot-and-mouth disease in Garissa County was arrested.

For the staple crops value chain, the focus was on seed system development with a business-minded approach, supporting private sector investment in seed production, increasing potato productivity and enabling market opportunities. It has contributed to improved access to quality seed, food security, increased income and dissemination of better varieties and best potato practices in Elgeyo-Marakwet, Meru, Nandi and Uasin Gishu counties. In total, 30,500 farming households have been reached with quality seed, improved technologies and training, and 19 private sector firms are being supported to improve business performance.

Supporting 200 seed multipliers to develop into seed businesses and improve farmer availability to quality seed resulted in reducing the distance travelled by farmers to access seed potato from 110 km to 2 km.


The business approach to seed production earned seed multipliers an average gross margin of USD3000/ha/year. Encouraged by the high profitability of the seed potato business, seed multipliers have collectively invested USD71,300 in their seed businesses, which includes 123 tonnes of seed storage.

Another promising innovation is the integration of apical cuttings into the potato seed system. This will complement current systems to increase the availability of certified seed. So far the private sector is investing in the technology to produce cuttings in the screenhouse and produce tubers from cuttings in the field. Two private sector partners – Genetic Technologies International Limited and Stokman Rozen Kenya – have distributed 330,000 cuttings to farmers producing seed potato.

The Kenya Plant Health Inspectorate Service (KEPHIS), which regulates seed certification, has endorsed the cuttings and is integrating the technology into seed potato certification protocol currently being finalized. Once the modified protocol is approved by KEPHIS, cuttings will be eligible for seed merchants, use as starter material to produce certified seed.

Potato farmers have been trained on good agronomy, which has led to the near doubling of gross margins per hectare: from a baseline of USD720/ha/year to USD1326/ha/year. Becoming knowledgeable of good agronomy for potato and observing the benefits of using quality seed, farmers are investing in quality seed and purchasing it from their local seed multipliers. Business skills training and business plan development are in progress for five potato cooperatives and six youth groups. The training has enabled the groups to learn basic skills on visioning, marketing, cooperative/youth group as a business entity, and profit analysis.

The cooperatives and youth groups now appreciate the business approach to agriculture and are finalizing business plans drafted with program support.



For the OFSP, the story is vastly different since the AVCD program began. More than 10 hectares are under production of the OFSP vines, with potential to plant up to 150 hectares of sweetpotato. Farmers are growing OFSP in the main planting season. There is a diversity of delicious and nutritious OFSP-derived food products on the market, and the OFSP is viewed as a cash crop in four counties: Homa Bay, Migori, Busia and Bungoma. To increase availability of quality planting material, the program worked with the plant health regulator, KEPHIS, to supply 41 vine multipliers with certified tissue culture cuttings;

with these vine multipliers producing and selling vines worth USD49,952 to sweetpotato farmers.

Through the program's support, two puree (mashed OFSP) processors have emerged: Organi Limited and Safe Produce Solutions Limited. Puree is the intermediate raw material used in production of OFSP-derived baked foods. These processors in turn have been linked to two major retailers: Tusky's and Naivas supermarkets that have multiple stores in various towns in Kenya.

Billion shilling partnership with Kenya to reduce poverty and malnutrition through agriculture-led growth launched at AVCD national conference

US ambassador Robert Godec officially launched the planned KES11.5 billion (USD115 million) Feed the Future Kenya Country Plan under the US Global Food Security Strategy. The launch took place at the Accelerating Value Chain Development (AVCD) national conference that was also attended by the President of Kenya, His Excellency Uhuru Kenyatta.

Kenya is among the 12 countries selected to champion the US Global Food Security Strategy, which aims to reduce poverty and improve the ability of local farmers and pastoralists to cope with economic shocks such as drought.

'Together, we have reached nearly 900,000 Kenyan farmers. We helped them grow better crops and increase milk production, and then get those products to market. All told, working with partners we leveraged over KES22 billion in new assistance to the agriculture sector,' stated ambassador Godec.

The country plan is a framework for implementing the second five-year phase of Feed the Future program. Kenya's County Plan builds on the successes and lessons over the last five years.

AVCD is a USAID-funded activity implemented in partnership with the national government and 21 county governments through a consortium of international agriculture research centres led by the International Livestock Research Institute (ILRI) based in Nairobi. The AVCD project has provided farmers with innovations and technologies in dairy, livestock, root and drought-tolerant crops, significantly improving their income, nutrition status and food security.

The two-day conference involved panel discussions addressing the role of science and technology in agricultural development. Facilitated sessions for stakeholders and partners identified opportunities for forward movement towards the development of efforts in Kenya's agricultural sector and how lessons learned could be incorporated into future programs.



AVCD opening statements

H.E. Uhuru Kenyatta, president of Kenya



H.E. Uhuru Kenyatta, president of Kenya, addresses delegates at the Accelerated Value Chain Development (AVCD) program national conference. Looking on are H.E. Robert Godec (middle), United States ambassador to Kenya, and Jimmy Smith, director general of ILRI.

Photo credit: ILRI/Paul Karaimu.

I would like to recognize and note with gratitude that indeed in the last five years, USAID's Feed the Future program has invested approximately KES22 billion to assist approximately 1 million farmers and pastoralists with various interventions towards achieving food security and higher incomes across the country.

We are committed to providing for an environment that no Kenyan goes hungry – which is a major focus of any administration in this second term of government.

In order to achieve growth in the agricultural sector, we must resort to new thinking by relying on innovation and mechanization. The use of subsidies have previously majorly benefited the rich but not the small-scale farmers who are crucial in the country's resilience new approach will mean moving away from the old policy of using subsidies as the only method to boost production. My government is using science and technology to empower farmers as part of the efforts to achieve food security and nutrition.

We are committed to empowering Kenyan farmers through the availing of information to help increase their output per acre, reduce their unit cost of production and improve returns on their investment. In doing this we are seeking for ways to support the revival of crop and livestock extension services, which hold the key to improved productivity and help improve the knowledge base of farmers through a variety of means, such as demonstrations, model plots and training.

If programs like this succeed, they will not only help achieve two of my government's Big Four pillar – food security and nutrition, and health but will also help meet our third pillar – manufacturing, through developing the necessary value chains in agriculture. I believe that the success of programs like this will actually account for three of the four pillars. In closing, let me urge policymakers and regulatory authorities in the agricultural sector to open up to new ideas, and benchmark national standards with countries that are food sufficient.



H.E. Robert Godec, United States of America ambassador to Kenya



Photo credit: Getty Images.

More than five years ago, we announced Kenya as a focus country under our Feed the Future initiative. Since then, the United States has worked with the national and county governments, private sector, and civil society organizations to help make Kenya more food secure, to ensure every Kenyan has access to adequate food, and to give Kenyan farmers and pastoralists opportunities to increase their income.

Together, under the program, we have reached 900,000 Kenyan farmers. We helped them grow better crops and increase milk production, and then get those products to market. All told, working with partners we leveraged over KES22 billion in new investment to the agriculture sector.

Our program, USAID's Accelerated Value Chain Development program, was put together with the idea that cutting-edge technologies – developed by international research centres – can improve food and nutrition security as well as the incomes of farmers and pastoralists. And the program has worked.

Today, based on the successes and lessons learned over the last five years, I am very pleased to announce a second five-year Feed the Future program under the new U.S. Global Food Security Strategy. We will invest KES11.5 billion in the program, which will focus on reducing poverty, improving nutrition, and increasing the food security of Kenyans. Kenya is one of only 12 countries selected as a partner in this strategy. Today's launch, here at ILRI, is our very first across the globe.

The new US Global Food Security Strategy in Kenya will directly support president Kenyatta's Big Four pillar of food security and the priorities of the Ministry of Agriculture and Irrigation. As Kenya's agricultural economy continues to mature, agro-processing will also contribute increasingly to the manufacturing pillar.

Under the new strategy, we will work with the national and county governments plus the private sector to increase the access and availability for farmers and agribusiness to markets, quality farm inputs, and finance. We will bring technical expertise and resources from across the US government to help implement this strategy.



Photo credit: ILRI/Susan MacMillan.

We have come together to consider the attainment of a unique partnership among the Government of Kenya, the United States of America, the county governments, local development partners and the International Agriculture Research Centres of the CGIAR, led by ILRI. The objective of this partnership was to put agriculture research at the disposal of the rural poor – in transformative ways – in 21 counties of Kenya.

I am advised that all matrices applied revealed that the partnership met and exceeded its target of transforming the lives of about 250,000 beneficiaries in various ways. This is a significant achievement – not only in relation to what was done but how it was done. Yet, in the context of what needs to be done here in Kenya, and globally – it is only a start.

The replication of the successes of this program in other places in the world is not only important but urgent. By the time global population stabilizes in the 2050s, there will be an increase of approximately 2.5 billion people that will

need to be fed beyond our current population today – we will have to produce 50% more food than we produce now. In Africa, that number would be 70% more food produced for about 815 million people going hungry today.

Without new research and putting the findings into use, this enormous challenge cannot be met, and especially in the face of climate change and increasing threats from pests and diseases.

Our challenge is also about rural transformation, economic growth (with equity), and about productive and meaningful employment – especially of women and the increasing youth population on the continent.

In prevalent economic development modelling, excess labour in agriculture goes into manufacturing and then into services. Unfortunately, in most developing countries, manufacturing is not a big option as it once used to be and there are not enough jobs in the services sector – it is therefore imperative that agriculture becomes more attractive for job creation and growth.



Photo credit: ILRI/Paul Karaimu.

The AVCD program's overall objectives included, contributing to inclusive agriculture growth, food security and nutrition in Kenya by widely applying technologies and innovations in a whole value chain approach. We focused on livestock, dairy, and staple crops value chains in 21 counties in Kenya and targeted 317,000 beneficiaries to be food secure, come out of poverty and transition from subsistence to market-oriented farming (farming as a business).

In doing this, the program's guiding theory of change set to secure large-scale application of technologies and innovations in a whole value chain (from technology to consumption) approach to accelerate value chain development. This included a push (supply) and pull (demand) approach – on one hand–technologies, innovations, inputs, knowledge services, behaviour change; while on the other, market, business development, policies, financial services, nutrition value respectively.

The AVCD program's overall expected result is to catalyse a competitive, productive, market-oriented value chain that will spur farming investments into viable businesses.

We set targets for each value chain. In the livestock value chain we wanted to: improve the incomes and nutritional

status of 60,000; increase access to improved grazing areas; create 30 additional local market associations and 15 private sector enterprises; develop mobile-based marketing information application; and improve disease control and livestock management practices.

In the dairy value chain we set the program to: improve diet diversity, food security and rural incomes of 40,000 smallholder households by increasing milk productivity by 25%; establishing 6 dairy business hubs with 5000 farmers; and establishing 9 innovations platforms.

For the staple drought-tolerant crops value chain we wanted to: increase the incomes and improve the nutrition status of 100,000 households by over 25%; increase the yields of targeted crops by 30%; reduce post-harvest losses by 30%; and establish at least one market-producer group in each county.

Finally, in the staple root crops value chain we wanted to: increase productivity and incomes, and improve nutritional intake of 110,000 smallholder households by at least 20% and the value of sales by 30%; and reach at least 68,000 households with children under five with productive and nutritious orange-fleshed sweetpotato varieties and nutrition education.

AVCD Kenya program results

Impact – Outcomes	Impact/outcomes
	266,568 household have been taken out or are on track to be taken out of hunger and poverty
	229,594 farmers are doing or are in the process of learning how to do farming as a business, to earn income and have enough food
	Over 1.2 million hectares is the additional land that has been put under cultivation or is now better used for pastures in a sustainable manner
	898 profit private enterprises or producers organizations, are now better managed, doing business better, hence more profitable
	51,885 children under two years (0–23 months) have no more risk of stunting or/and being underweight

Achievements in top line FTF-indicators: March 2018	Indicator name	Target	Achieved	%
	Number of households benefitting directly from the project	256,937	266,568	104
	Number of farmers and others who have applied improved technologies or management practices	219,800	229,594	104
	Number of individuals who have received USG supported short-term agricultural sector productivity or food security training	118,553	148,044	125
	Number of hectares of land under improved technologies or management practices- conservancies	1,281,404	1,343,594	105
	Number of for profit private enterprises, producers organizations, that applied organizational level technologies or management practices	967	898	93
	HL9-2: Number of children under two years (0-23 months) reached with community level nutrition interventions	40,148	51,885	129

AVCD value of sales	Product	Year 1	Year 2	Total year 1 and 2	Y3 projected	Total Y 1–3
	Cattle	704,378	3,689,907	4,394,285	6,591,428	10,985,713
	Dairy	2,069,421	15,258,337	17,327,758	25,991,637	43,319,395
	Groundnut	676,111	917,133	1,593,244	2,389,865	3,983,109
	Pearl millet	100,579	139,717	240,296	360,443	600,739
	Finger millet	40,755	100,920	141,675	212,513	354,188
	Pigeon peas	174,153	113,256	287,409	431,114	718,523
	Green grams	1,472,959	1,999,086	3,472,045	5,208,068	8,680,113
	Potatoes	95,657	7,245,385	7,341,042	11,011,563	18,352,604
	Sorghum	103,535	369,281	472,816	709,224	1,182,041
	Sweetpotato		51,718	51,718	77,578	129,296
	Total	5,437,547	29,884,740	35,322,288	52,983,431	88,305,719

AVCD program voices



Photo credit: Raymond Jumah/FIPs.

Access to clean seed, knowledge of good agronomic practices and hard work has led youth to a tenfold potato harvest in Kibirichia, Meru County, Kenya.

Royal Group comprises youthful farmers Stanley Muriuki, Agnes Kinya, Faith Kanana, Everlyne Makena and Lucy Muthoni.

'We planted 800 kg of recycled seed potato from a local market during the March 2017 season of Shangii variety because planting time had arrived. We did not know that there were other sources of seed,' says Muriuki. 'We harvested a paltry 1800 kg.' (equivalent to 1.8 tonnes/acre).

In August 2017, the group attended a field day where they met James Ngugi who is one of five youth lead farmer-trainers and a hub seed multiplier (HSM) facilitated by Farm Input Promotions Africa (FIPS-Africa) in Meru County.

HSMs are supported through the US government's Feed the Future Kenya AVCD program in partnership with the International Potato Center to catalyse improved productivity and higher returns for potato farmers.

HSMs produce clean seed potato and sell locally to farmers who would otherwise struggle to access seed which is less prone to diseases. They also train farmers about the benefits of clean seed, new varieties that are available and good agronomic practices such as hilling that can double yields.

'We visited Ngugi's seed store a few days after the field day to check the quality of seed he had,' explains Muriuki. The youth group purchased 800 kg of clean seed of the Sherekea variety from Ngugi, the HSM.

'We learnt very simple things from Ngugi, things we could have read in books but become easy to adopt when he demonstrated them practically,' says Faith Kanana who is the interim secretary to the youth group. 'Joining this group is a life changer to us ladies, we can clearly tell that our efforts will amount to something.'

In February 2018, the youth group harvested 8200 kg ware potato (equivalent to 8.2 tonnes/acre). 'It was a miracle that neither I nor anyone else in the group had expected. We could not believe it,' says Muriuki.

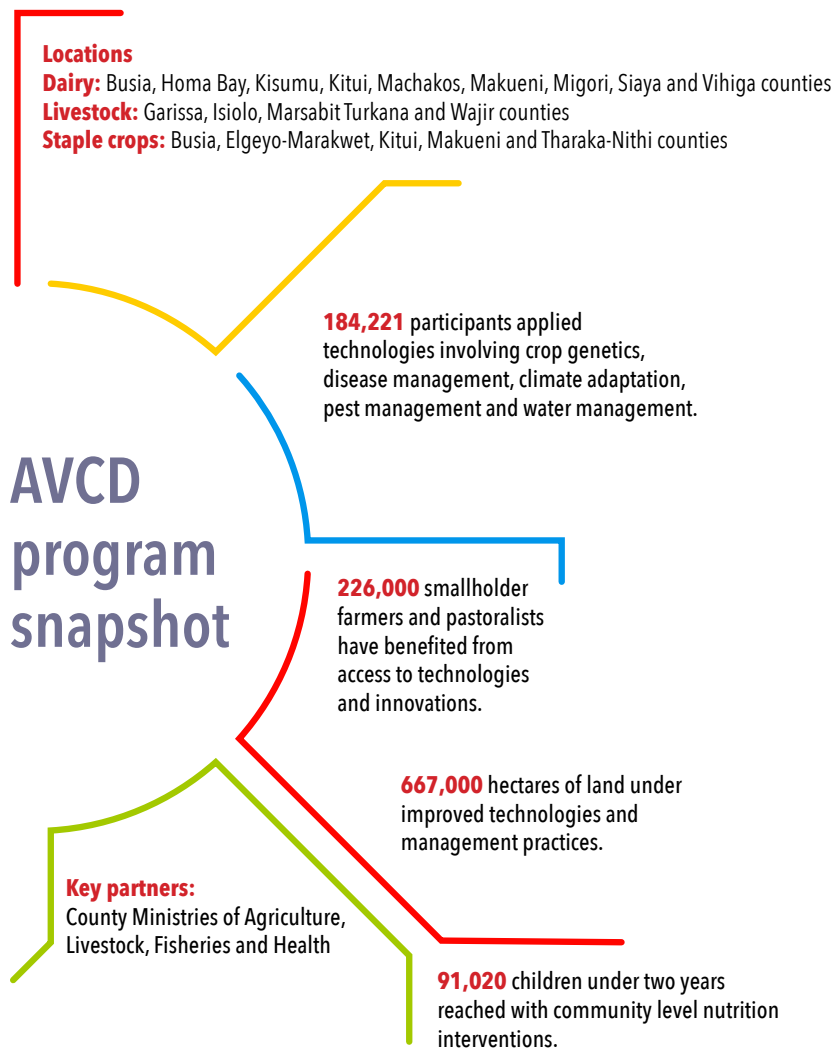
After such a successful harvest, the group began receiving multiple visitors every day. Other farmers wanted to learn their secret. 'There is no secret, we planted clean seed potato, did good hilling in a timely manner, and scouted our plot to check and manage pests and diseases,' says Muriuki.

In the season ending June 2018, the Royal Youth Group harvested 16,400 kg (equivalent to 16.4 tonnes/acre). 'If we sell the potato at KES20 per kilogram we will make KES328,000 (USD3280). The cost of production was less than KES60,000 (USD6000) so we will have a profit of KES268,000 (USD2680). We will then reinvest the money back into potato farming for next season' concluded Muriuki.

AVCD program achievements



Photo credits: ILRI/George Wamwere-Njoroge



Introduction to AVCD focus in Kenya

Agriculture is the engine of economic growth and a valuable source of income for most Kenyans. Most farmers work without modern seeds and technology or adequate financial or extension services.

About 75% of Kenyans derive all or part of their livelihoods from agriculture, and it accounts for 18% of the gross domestic product (GDP). Only 20% of the country's land is arable, and maximum yields have not been reached in these areas, leaving considerable potential for an increase in productivity.

AVCD has focused on strengthening livestock, dairy and staple crop value chains including root and drought-tolerant crops that are marketable and help expand the growth of Kenyan agriculture, as well as increasing the consumption of nutritious foods, especially for women and children. AVCD works with smallholder farmers, agricultural businesses and groups to increase the adoption of effective agricultural technologies and innovations that will increase resilience, agricultural productivity and profits, as well as contribute to food security.



Themes and sessions

Developing value chains to farming as business with technology and innovations in Kenya

The program introduces farmers, extension agents and county governments to new farming approaches such as agronomic practices; drought- and disease-resistant seeds; improved crop varieties; and livestock breed improvement systems, vaccines and veterinary services that can increase output and raise incomes.

AVCD also helps farmers capitalize on the weaknesses in target value chains. For example, in the dairy value chain, there are good opportunities for farmers to pursue commercial forage production as an economic venture. In breeding, there is an increasing demand for local suppliers of the East Coast fever livestock vaccine; the tick-borne infection is responsible for up to 80% of calf mortality.

AVCD has connected farmers to better quality inputs and services, including financing. Both male and female farmers are gaining access to credit through linkages to appropriate financial institutions and improving their business management skills by participating in training activities. The program is structured to be inclusive, therefore, contributing towards both food security and nutrition. The entry point of the program was based on technology and innovations which were intended to make advancements in the food production value chains.

Overview of conference discussions on AVCD program achievements

CGIAR is a global research partnership for a food-secure future dedicated to reducing poverty, enhancing food and nutrition security, and improving natural resources. ILRI, CIP and ICRISAT are working collaboratively to increase food production in the three value chain categories of livestock, dairy and staple crops value chains.

Throughout the 21 counties and 103 sub-counties in all the Feed the Future zones of influence in Kenya, tremendous impact had been realized. A large percentage of Kenya's GDP is generated in the agriculture sector making the AVCD program essential in alleviating poverty while contributing

towards the achievement of Kenya's Big Four pillars of manufacturing, food security and nutrition security, universal healthcare and affordable housing.

Because of this program, access to food should be enhanced in all of the four value chains by 2022. There is, however, the need to align the program with Kenya's Big Four agenda by working together with the county and national governments. The program's areas of weakness in catalysing value chains were addressed in a bid to secure efficiency and sustainability of the program.

Because the AVCD national conference intended to analyse various components of the value chain programs, the thematic sessions ran parallel to each other on the two days of the conference.

On the first day the conference participants acknowledged the achievements and shared lessons learned from the interactions with the value chains. On the second day there was a synthesis of the value chains that included, gap identification, sustainability strategies and forward planning for each of the value chains.

The synthesis identified opportunities such as fixing of the non-functional or untapped component(s) and also developed exit strategies for the value chains after the withdrawal of existing external support. Different moderators were assigned to different value chains to facilitate the discussions.

The forum addressed the dairy, livestock and staple crops value chains separately but in parallel. The staple crops value chain had the most prominent presence at the conference in terms of the food variety it offered. The showcase included drought-tolerant crops which comprised a variety of cereal crops i.e. sorghum, green grams, finger millet, pearl millet, pigeon peas and groundnuts and root crops value chains. The root crop value chain was further subdivided in potato and the orange-fleshed sweetpotato (OFSP) value chains.

Dairy value chain

The focus of the dairy value chain interventions are accelerated development of dairy farming in non-traditional dairy regions in Kenya – attracting the interest of many households that had not ventured into the dairy value chain.

Interventions such as upgrading the available cattle breeds through accelerated breeding technologies, training of farmers on good animal husbandry practices and business skills, enhancing access to the East Coast fever (ECF) vaccine, setting up of dairy business hubs and promoting the use of improved fodder were undertaken. The intervention areas were in nine counties: Busia, Vihiga, Migori, Homa Bay, Siaya, Kisumu, Kitui, Makueni, and Machakos. Over 6,000 ECF vaccinations have been administered, reducing animal diseases. In the program areas, the prevalence of the ECF is high due to favourable climatic conditions for the tick vector.

The program enhanced capacity by training 138 and 40 village-based advisors and farmer teams' respectively, to improve productivity in extension services. These trained providers are a crucial link to improving productivity of the dairy farmers in the program areas in the western region: Siaya, Busia, Homa Bay and Kisumu.

Further, the AVCD program formalized informal milk sectors in collaboration with cooperatives; build capacity to enhance nutrition education and fodder production. This was especially the case in growing *Brachiaria* grass, which is now grown by over 28,000 households.

Accelerated productivity of milk and fodder production has also been witnessed. This has also included improved access to farm inputs and dairy services through agrovets via coordinated development efforts done by working with various partners and organizations.

Because of the increased wealth generated through the commercialization of *Brachiaria*, the selling of fodder is generating substantial revenue from the sale of hay or splits to other farmers aspiring to venture into production. This potential has increased dairy production by at least two litres per animal and has spurred profits from the sale of milk.

Inclusion of women and youth has thrived with the program attaining an almost equal gender balance and youth empowerment in its initiatives.

A good example is Isaiah Ochieng from Homa Bay County, a young man with limited education who previously worked as a 'boda boda' (motorcycle taxi operator), and highlighted the benefits of farming *Brachiaria*, after being trained. In July 2017, he put his one-acre farm under *Brachiaria* and successfully harvested 200 bales for the first time and for a healthy return. He used the proceeds to pay for his brother's enrolment at Maasai Mara University and also purchased a dairy cow which he intended to artificially inseminate to acquire a pure breed. Pascalia Shikuku of Ugunja, Siaya County from the Sigongro Organic Program sited similar benefits from the sale of *Brachiaria* bales and splits.

The conference pointed out that corporate support through private partnerships including agent network models, have developed unique connections for farmers to dairy processors, elimination middlemen and reducing exploitation.

Livestock value chain in arid and semi-arid lands

The livestock component involved livestock production (cattle, camel, goat and sheep) aimed at enhancing market-access for pastoralists and increasing livestock productivity. This was supported by the objective of increasing livestock fodder through rangeland management; controlling, reducing and managing livestock diseases, and the creation of market-access and linkages for livestock sales (improving sales by 50% by end of 2018 and reaching 60,000 households).

There has been significant achievements including the creation of KAZNET, a livestock market information system (LMIS) which is a crowdsourcing mobile-based platform for collecting real time market information from value chain actors in remote locations in northern Kenya.

Developed by a team of researchers at ILRI, KAZNET's goal is to improve stakeholders' access to livestock market information. The mobile innovation has so far reached 25,000 traders and producers and increased commercial livestock production, sales and income.

According to Mohammed Hajji, the county executive for Agriculture and Fisheries in Isiolo County, the innovation facilitated hastened enactment of the Isiolo Livestock Sale-yard Act, boosting the promotion of effective and efficient operation of livestock markets. The Act spurred growth in the OI Nyoro market; assisted in market maintenance; increased market frequencies and enhanced law, order and

security within the market and increased business literacy skills and financial services through inclusion of women and youth in socio-economic activities. This allowed for the integration of livestock markets, with supportive business enterprises and services and ensured transparency in collection and management of revenues.

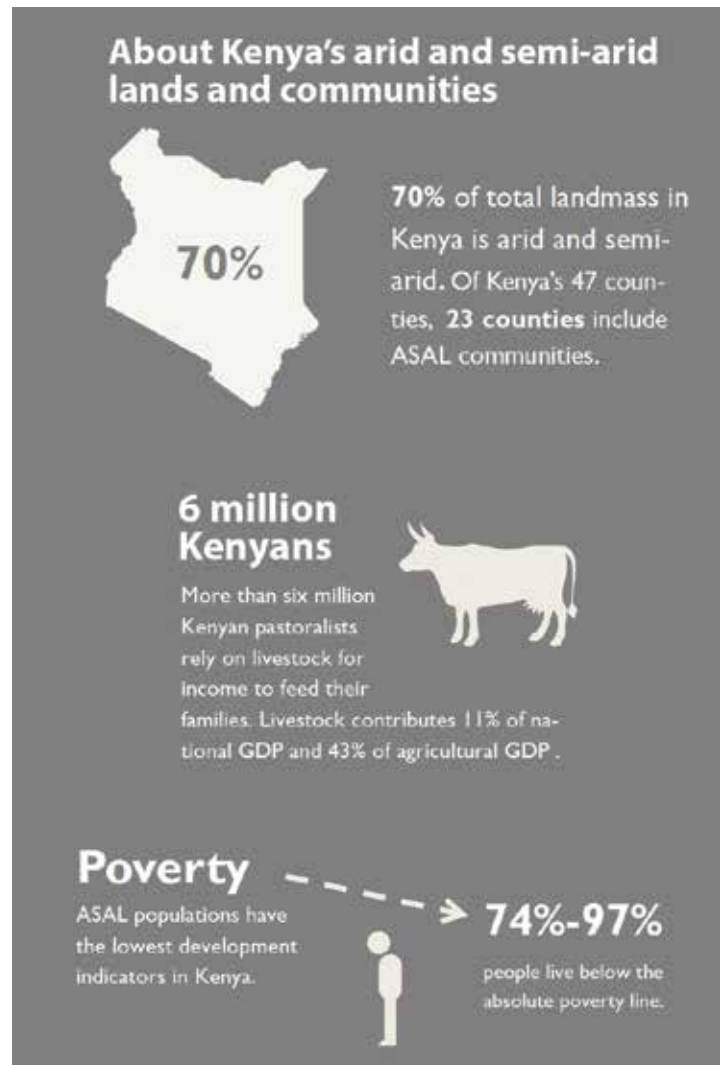
In addition, the creation of a Business to Business (B2B) forum brought together livestock producers, processors, market buyers and financial service providers including insurance companies and banks. A total of 131 groups, 82 in Isiolo County and 48 in Marsabit County, with overall membership of 2000 were trained. Some of these groups have benefited from the government sponsored enterprise fund-UWEZO.

Rangeland cover in arid and semi-arid lands (ASALs) has been degrading over the past few years. Conflicts broke out over water and pasture since there was little to be shared among a large number of community inhabitants. The rivalry perpetrated antagonistic relationships between the communities thus most grazing and water areas were risky places to move animals.

Through the AVCD program, the development of a prototype Rangeland Management Bill through the frontier Counties Development Council, provided grazing plans and maps to enhance pasture management (800,000 hectares of land in Marsabit, Isiolo and Turkana form the grazing plans). The impact of this intervention has reduced conflicts between communities as a result of their involvement in inclusive processes in fodder production and management. Further, the establishment of community conservancies by the county government and controlled grazing has supported neighbouring communities form a commercially viable wildlife and livestock ranch.

Security, livelihoods and conditions for livestock and wildlife have all improved as a more resilient social, economic and ecological landscape evolves. County governments are now responding to demands from communities, and have plans to support new community conservancies in AVCD focus areas.

Capacity building through training of over 900 pastoralists on fodder production and harvesting has yielded over 1,100 kilograms of quality rangeland grass seeds. In addition, four grass species have regenerated availing increased quality pasture lands for the communities and opportunities for commercialization of fodder.



Credit: USAID.

Adan Ismail, a community representative from Nasuulu Community Wildlife Conservancy in Isiolo noted that in 2017, the conservancy sold 100 heads of cattle through the Northern Rangeland Trust's trading livestock to the market program.

Other achievements have included: Improved animal health and innovation of the community disease surveillance through disease manuals; pictorial and electronic disease surveillance (e-surveillance). These have improved timely and effective disease reporting to curb the spread of foot-and-mouth disease in Garissa.

To support animal health service delivery, 800 surveillance reporters from the community have been trained in collaboration with the county governments' veterinary services. Sidai Africa's representative Diba Dida pointed out that partnerships through collaboration with ILRI, the county governments and the private sector-based organizations facilitated distribution of antibiotics, animal feeds, vaccines and biological veterinary and farm equipment together with clinical services to provide a complete range of quality products and services.

Further developments have been achieved in the creation of systems for data collection and analysis; training of 32,156 producers and 240 community reporters; development of an electronic syndromic surveillance system which is available in Marsabit, Isiolo and Wajir counties. The program has also been able to enhance the reporting time for issues related to animal diseases.

Staple crops value chain

Drought-tolerant crops

This value chain aims at increasing the productivity and profitability of key drought-tolerant staple crops: sorghum, green gram, finger millet, pearl millet, pigeon peas and groundnuts. This is done through improving access to affordable high-quality seed, promoting improved post-harvest handling and storage technologies through mechanization of threshing and use of hermetic bags for storage.

The program has so far seen an increase in productivity (about 800 tonnes) and profitability due to seed access prices at 50% lower than in commercial outlets. This has also included capacity building of 90,000 farmers in good agricultural practices. Through the program's effort, more than 90% of target beneficiaries harvested enough grain for food, while about 40% of the farmers had surplus grain for sale.

Because of the use of improved post-harvest management and storage technologies – including use of hermetic storage bags and mechanized threshing, there was over 90% conservation of threshing labour. This outcome has improved school performance as children are no longer involved in shelling of crops allowing them to focus on their schoolwork.

The program has also led to enhanced marketing channels which has increased sales for farmers. The value chain catalysed improved efficiency through the sale of unshelled groundnuts.

Overall, the AVCD program has established 38 aggregation centres operated by community-based organizations and private sector players. In doing this, the program trained 2,600 members in agribusiness and group dynamics and reached 5,000 producers who are now aggregating and marketing drought-tolerant crops with an estimated value of KES200 million (USD2 million).

Potato crop

There are a total of 30,500 farming households who are accessing quality seed in the pioneer counties of the AVCD project: Meru, Elgeyo-Markwet, Uasin Gishu and Nandi counties. These zones have forerunner farmers who have become successful with most increasing their acreage to boost revenue income from the sale of the seeds to other farmers joining the potato farming space, and thus contribute to business development and economic growth.







Primarily, the project has been focusing on seed system development from a business-minded approach that supports the private sector through seed production, increasing potato productivity and enabling market opportunities.

Increased potato productivity has now seen over 30,500 households reached with quality seeds from 233 seed multipliers who have eased availability of quality seeds and reducing the distance covered by farmers to access seed potato from 110 km to 2 km. The program has also enabled 200 seed multipliers to develop into seed businesses.

Pre- and post-harvest training has been offered on demonstration plots pitting certified seeds and local seed, planted parallel to each other to make case for using certified seeds. The post-harvest training included storage, marketing and sale to maximize revenue generation for farmers. Through the training and the use of enhanced technology, 19 firms have been able to improve their businesses.

The program enhanced youth engagement through training them in seed production. Goods Africa, one of the program's partners has youth as network coordinators, serving as the seed hub and are able to produce seed and sell to farmers after training them. The youth have been linked to seed markets, where they can buy and sell the seeds.

Adapting agriculture to climate changes and variabilities.

Potato				
	 Provision of seeds and other inputs	 On-farm production	 Harvesting, storage and processing	 Product marketing
 Floods	Scarcity and unavailability of potato seed and decomposed organic manures; limited access (availability and high costs) to inputs due to transport challenges	High labour and production costs (logged field conditions, labour scarcity, pests and diseases incidence); agrochemicals leaching; environmental pollution (intense spraying); damaged and unearthed tubers; germination before harvesting	High harvest and transport costs (unfavourable conditions in fields and road networks); Damaged and broken storage structures/ facilities; increased post-harvest loss (quantity and quality)	Low prices due to low quality of product
Magnitude of impact	Major	Severe	Severe	Severe
Farmers' current strategies to cope with the risks	Seed recycling; purchase from seed multipliers; reliance of informal seed systems (relatives, neighbours); subsidized seeds (from cereal boards); inputs purchase from agro-dealers	Scanty and inconsistent input (fertilizer, chemicals) application at planting and within crop cycle; planting in trenches/ trash-lines (to conserve moisture); strip cropping; manual land preparation; tree planting; water harvesting; staggered planting	Manual packaging based on volumes; product transportation from farm to stores using cheap transport means (donkeys and labourers)	Informal tuber pricing (prevailing market conditions); sale on local markets
Other potential options to increase farmers' adaptive capacity	Farmer training on on-farm seed bulking, engage more seed multipliers; introduction of specialized inputs (fertilizer blends for potatoes); capacity building on compositing; provision of credit facilities to access inputs; mechanisms for bulk sourcing (through groups)	Mechanization (land preparation, tilling, planting, spraying); access to protective gear for agronomic practices (spraying); advisory services for planting times and production requirements; conservation agriculture; county support to construct drainage channels	Mechanized harvesting; specialized packing (air-circulating gunny bags); packaging on weight basis; standardized units of weighing (per kg); pooled transportation by farmers from field to stores; improved storage infrastructure; availability of insurance products	Farmer groups to enhance bargaining; formalized marketing (contracts); new market opportunities
 Droughts	Scarcity and unavailability of seed and organic manures	Rainfall dependence due to lowered capacity to irrigate; increased production costs (in mechanized and irrigated farming)	Loss of employment opportunities and livelihoods; lack of storage facilities	Product scarcity leading to disruption and/or low market activity
Magnitude of impact	Major-Severe		Major-Severe	Severe
Farmers' current strategies to cope with the risks	Seed preservation, multiplication and bulking from previous crops (government centres); use of FYM (blending with fertilizers); use of traditional chemical control (ash); land consolidation to increase production acreage	Planting clean seed; planting in deep trenches on fields with higher moisture retention (high soil organic matter); irrigation and water sprinkling to prevent frost damage; mulching; intercropping; agroforestry; staggered planting	Manual grading; packaging in market-determined volumes; storage in dry sheds; pest and rodents control; efficient harvest transportation methods (bikes, lorries)	Tuber sale at farm gate prices (low prices)
Other potential options to increase farmers' adaptive capacity	Promote capacity building and involvement of private sector and smallholders in seed multiplication and bulking (increase acreage in centres); subsidized inputs costs; provision of pest- and disease-tolerant, early-maturing varieties	Mechanization of planting activities; tree planting; promotion of agroforestry and conservation agriculture technologies; promotion of IPM technologies; awareness on proper husbandry practices; irrigation	Mechanized harvesting; weight-based packaging; mechanical loading; value addition	Direct access to processors; contract farming to curb exploitation; farmer associations to facilitate marketing agents



Emmy Jepkosgei is a local decentralized seed multiplier in Eldoret, benefiting from the AVCD program in the North Rift Valley of Kenya. She sells seed to over 20 farmers and supplies a handful of restaurants with potatoes.

Photo credit: CIP/Hugh Rutherford.

The integration of apical cuttings into the potato seed system has increased availability of certified seeds from private sector entities. These have included Genetic Technologies International Limited and Stockman Rozen Kenya, who have invested in the technology to produce cuttings in screen houses and produce tubers for cuttings in the field, with a marked distribution of over 330,000 cuttings. In addition, the Kenya Plant Health Inspectorate Service (KEPHIS) is playing a role in regulating seed certification and is currently in the final processes of endorsing cuttings and their integration into seed potato technology to enable seed merchants to use it to produce certified seeds. This will complement current systems aimed at increasing the availability of certified seed.

In 2017, seed production and sales from seed multipliers rose to 392 tonnes of quality seed potato valued at KES15.7 million (USD157,000) generated from 2,300 potato farmers.

Market-access has been enabled through creation of market opportunities. This has been achieved through business skills training and business plan development currently running in five potato cooperatives and six youth groups that have learnt basic skills on visioning, marketing, cooperative/youth group as a business entity and profit analysis. The cooperatives and youth groups now acknowledge and appreciate the business approach to agriculture and are finalizing their business plans drafted using AVCD program support. This has opened up other opportunities for transport services, storage and

production of potato-related products like French fries and potato crisps production.

In collaboration with county governments and community health volunteers, mass awareness has been created through household-to-household education of community members on food and nutrition security for both farmers and buyers.

The program established functional cooperatives and savings and cooperative societies (saccos) through public and private partnerships to protect farmers from exploitation and to offer guidance on acquisition of financial support. This has enabled farmers' interaction with the potato value chain to strengthen market-access and entry into the processing markets.

Meru County has solicited for financial support from the national government and several financial institutions. This further provided opportunities for documentation of evidence for research and production of seed systems; disease, pest and drought-resistant crops, adaptable to various soil types and climate to maximize production.

Orange-fleshed sweetpotato (OFSP) crop

The OFSP value chain was launched in Homa Bay, Migori, Busia and Bungoma. The program's objectives were: increasing productivity, increasing nutritional knowledge and improving marketing; and it met or exceeded nearly all. The program worked with KEPHIS to supply 41 vine multipliers with certified tissue culture cuttings.



There has also been increased awareness of the nutritional value of the OFSP, registering a wide reach of 37,556 households. With its rich beta-carotene, an excellent source of vitamin A, OFSP is helping improve resistance to infectious diseases, reduce morbidity and reduces mortality in pregnant and lactating mothers and their children.

A beneficiary aged 30 years with nine children testified at the national conference that her last child born after she had received nutritional education, was much healthier compared to her other eight children. The nutrition education offered demystified the perception that OFSP is a woman's crop and the myth that it is for HIV infected persons; and positive behavioral change has enhanced food diversification in the community.

Increased yield as a result of technological advancement has allowed the production of vines that are not infested, enabling farmers to produce abundantly without the risk of stunted OFSP development. The AVCD program has advanced the adoption of good agronomical practices

and increased market opportunities for farmers through partnerships with the private sector and working in conjunction with the county governments. Increased acreage as a result of increased demand has led to improved significant socio-economic welfare of the farmers. This has been in tandem with the mushrooming of vine multipliers and puree processor businesses that are optimizing value chain opportunities.

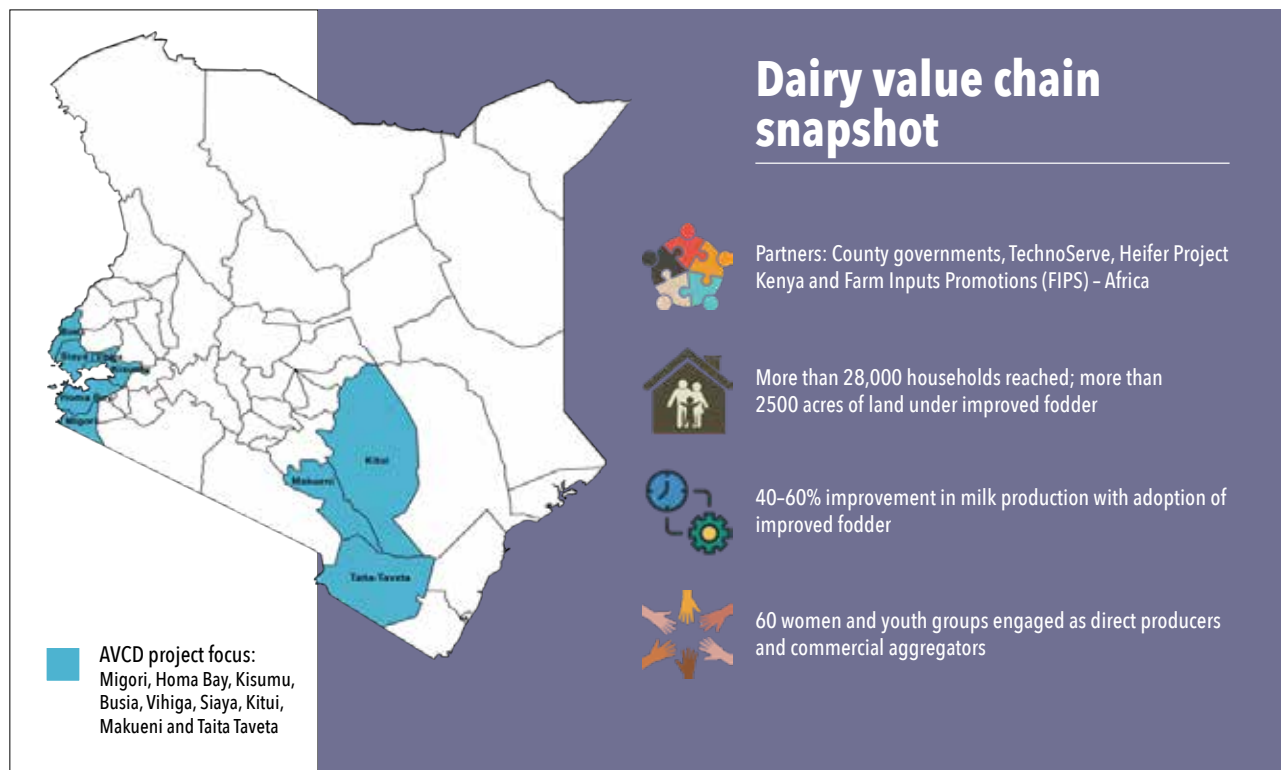
Vine multipliers produced and sold vines worth approximately KES4,995,200 (USD49,952) while firms like Organi Limited and Safe Produce Solutions Limited operating as puree processors are success stories that are attributable to the AVCD program. Today, pastries and other OFSP-derived baked foods are fast moving products found of the shelves of leading supermarket chain stores like Naivas and Tuskys. More farmers are now venturing into OSFP as they are paid within two weeks of supplying their roots via mobile money, encouraging them to invest in the production of quality sweetpotato.

Dairy value chain



In the dairy value chain, the program has upgraded the available cattle breeds through accelerated breeding technologies, has trained farmers in good animal husbandry practices and business skills, has enhanced access to a vaccine against East Coast fever in cattle, has set up dairy business hubs and has promoted use of improved fodder.

Photo credit: ILRI/Paul Karaimu.



Value chain defining characteristics

Farmers' access to productivity enhancing technologies and services in AVCD program sites have characteristics of low adoption and high cost of production. Breeding services include access to semen through bulls or artificial insemination (AI) use, remains inaccessible to smallholder farmers. Several bottlenecks continue to limit efforts to increase milk production in the country. At the farm-level, farmers' adoption of productivity improving technologies remains low, and producers poorly manage their dairy herds and continue to struggle with several biophysical and socio-economic constraints.

The key animal health service requirement for most dairy producer is access to vaccinations and vaccines. Similar to AI, supply of vaccines is provided by the Kenya Veterinary Vaccines Production Institute (KEVEVAPI) that does not adequately supply them to farmers and private distributors. Their services have further limited entry of private providers due to numerous market distortions. Farmers' use of vaccines is low due to unavailability of vaccines and farmers' low vaccines knowledge.

Vaccinations are perceived to be unaffordable by most farmers in Makueni, Vihiga and Homa Bay counties. The majority of farmers, especially in Homa Bay and Vihiga, were not vaccinating animals and numerous cases of East Coast fever (ECF) were reported.

Other bottlenecks at the farm level include over reliance on rain-fed dairy production, use of low-quality agricultural by-products for feeds, lack of adequate quality feeds and forages, climate variability and changes and ownership of small herds. Market associated factors include losses due to spillage and spoilage, lack of ready and profitable markets and milk rejection due to poor quality eventually resulting in reduction in total milk supplied.

In addition, there exists significant gaps in the use of better feeding, breeding, and animal healthcare practices. Most farmers also rely on inadequate and low-quality feeds and breeding materials. Generally, more than 90% of total costs of dairy production are variable costs meaning that yield management is an important focus area for improving dairy profitability. Unfortunately, taking advantage of economies of scale for improved profitability is untenable and ineffective since most costs are variable in nature, especially for the majority smallholder farmers. Under the relatively less intensive systems, profits can be increased

by practicing balanced feeding i.e. efficient management of feeding costs and reduced over-reliance on seasonal feeds. Relying on open grazing is also responsible for the frequent seasonal milk supply with surplus production occurring in the wet season (April–August) and shortages during the dry season (January–March).

Poor animal productivity has placed a significant burden of malnutrition in AVCD project counties. Overall, malnutrition is a public health concern in the counties of operation with diets of children and women lacking diversity and predominantly characterized by starch-based foods. This has led to prevalent cases of stunting and wastage of children aged below five years. Cases of stunting for example in project counties range from 17% in Kisumu County to more than 45% in Kitui County.

AVCD program interventions

As part of its strategy to improve the livelihoods of livestock keepers, the dairy value chain component of the AVCD project set out to enhance dairy productivity in nine non-traditional dairy counties in Kenya. To counter the vicious cycle of low adoption and high cost of production, the program is promoting accelerated breeding through fixed-time artificial insemination (FTAI). The FTAI intervention is overcoming barriers to farmers' entry into the dairy value chain by providing them with a cheap way to upgrade their dairy animals. By targeting a large number of animals for oestrus synchronization, particularly cows of indigenous breeds, the technology ensures that large sets of households adopt improved dairy cows and enter the lucrative dairy value chain.

The program has also provided refresher training to existing AI service providers on FTAI. Through the breeding component of the project, artificial insemination technicians have undergone refresher course training on AI in cattle including training in the use of oestrus synchronization and FTAI for cattle breeding.

The program has provided subsidized services to encourage adoption. This has included availing hormones; and supporting county government infrastructure for supplying semen to farmers. By providing training to new AI service providers in areas with low density and partnering with county governments to equip newly trained AI service providers, non-traditional dairy areas are benefiting from dairy development activities to support their substantial land area and biomass for a vibrant dairy

sector. This initiative in Homa Bay and Migori counties, for example, has deepened engagement with county governments through collaboration in the accelerated breeding program, which has attracted high interest from the county governments.

To reduce the disease burden and the vicious cycle of high prevalence of ECF and other diseases, the program has introduced the ECF vaccine via a 20% subsidy; trained ECF vaccinators; and provided incentives to vaccinators via a seed vaccine program. This has encouraged more vaccine suppliers to make their services available to cash in on growing demand from dairy farmers.

The program has enhanced capacity for improved productivity by introducing more nutritious and high-yielding fodder varieties; enhanced grassroots extension services via village volunteer livestock extension workers working closely with technical county and agro-dealer staff. This has in turn deepened agro-dealer innovations and linkages to enhance input access for dairy farmers. Higher productivity has helped improve performance of businesses that serve smallholders resulting in enhanced customer interaction.

The village-based dairy advisor (VBDA) model is a private-sector led extension approach based on trained and commercially-oriented village dairy business advisors providing extension advice, while also acting as agents of input suppliers. This model not only maximizes on the power of knowledge sharing among farmers but also empowers farmers to intentionally reach out to others and extend their knowledge.

This approach has increased access to improved fodder varieties such as *Brachiaria*, disease-free Napier varieties, *Desmodium* and *Caliandra*, for the VBDA's who also share the planting materials with other farmers.

Further the program has created market system facilitation to enhance informal milk market efficiency in the nine focus counties. This has included supporting milk aggregators to enhance their governance and financial management; supporting aggregators to develop and implement strategic and business plans and milk traders to achieve quality and standards compliance. The AVCD program has also created linkages with equipment

suppliers to aid acquisition of pasteurizers by local entrepreneurs, provided market rebranding support for their shops and helped them adopt hygienic milk handling practices. One reason that makes livestock-derived foods particularly beneficial to diets is their contribution to diet diversity. A widely recommended indicator of infant diet is dietary diversity. A healthy diet is a diverse diet.

Dietary diversity in turn serves as a proxy for micronutrient adequacy. The more varied an individual's diet, the more likely it is to meet that individual's nutrient requirements.


The minimum acceptable dietary diversity includes four food groups. The total number of food groups comprising individual dietary diversity is seven, three of which are livestock-derived foods. Including livestock-derived foods in diets thus efficiently increases diet diversity as well as micronutrient adequacy.

To improve nutrition outputs and outcomes, the program has trained 2,468 Ministry of Health and Ministry of Agriculture staff on applied agri-nutrition. Further, 6,530 mothers of children under two years have been reached with messages on agri-nutrition to stem stunting and wasting at an early age. This has also seen an increase in the percentage of women who consume five or more food groups per day from 46.8% to 53.1%. This has enabled an improvement of diet quality and nutrition in target communities in the nine counties.

Lessons learned

There are multiple business opportunities in fodder production which needs to be exploited. These include sale of planting materials, equipment service provision, production and sale of hay and commercial aggregation of hay. The dairy value chain needs a coordinated approach incorporating various stakeholders to collaborate on the issues affecting the dairy sector.

Breeding is the foundation of dairy in pre-commercial dairy areas. To chart a path to success, collaboration among county governments, private sector and research institution necessary for successful breeding programs. While breeding is privatized, county government should play a strong convening, coordinating and overseeing role. An all-inclusive platform should help coordinate such programs.



The dairy value chain provided an opportunity for social inclusion. Smallholder farmers inclusion provides opportunities for scaling up of adoption and deployment of innovation and technology. There are spaces for youth inclusion at various nodes of the fodder value chain while women, particularly in production, aggregation and sale, can further secure community development.

Coordinated inclusive innovation platforms (IP) convened and driven by non-state actors with county participation can help stakeholders get assigned roles to avoid duplication of responsibilities necessary in exploiting value chain opportunities. The support of county government is crucial in developing models for leveraging production and market systems.

To address nutrition and children development challenges, sensitization programs through a multi-sector approach have great potential. The program appreciates the need for the Ministry of Agriculture and the Ministry of Health collaborating in the implementation of the AVCD program to facilitate the nutritional aspect of the dairy component. There is, however, the need to include the Ministry of Education to address early child development and the incorporation of nutrition into the education curricula to support current efforts.

Program gaps and sustainability

With most farmers relying on inadequate and low quality feed and breeding materials, conference participants identified that there were significant gaps in the dairy sector specifically in the feeding, breeding and health of animals.

Because the growing of *Brachiaria* grass is rain dependent, milk production is low in the dry season resulting from diminished quality feeds. Improving access to appropriate animal husbandry practices and breeds can enable producers achieve yields that are closer to the global average.

Despite Kenya having access to some of Africa's best dairy research institutions, customization, promotion and adoption of better dairy technologies remains low. This is closely linked to farmers' lack of access to adequate and quality extension services. Since input access is determined by availability of financing for smallholder

producers, financial institutions have a mandate to engage in the value chain, by providing targeted products that expand access to financial services to farmers. While this is necessary, perceptions of high risk and low collateralization livestock are nevertheless huge knowledge gaps that need to be addressed in availing financial packages for the dairy value chain actors.

Participants further noted that farmers' access to productivity enhancing technologies and services such as breeding service(s) including access to AI are poor. Despite continuous growth and acceptance among dairy farmers, deployment of technology remains low for smallholder farmers. Bull service access to smallholder farmers is constrained by lack of high-quality bulls. Absence of proper infrastructure for managing breeding materials such as the bull semen, poor access to breeding materials, absence of technically competent practitioners, and low participation of the private sector in supplying semen are seen to be the key impediments.

These have been aggravated by conditions of unfair competition between private sector actors and state agencies, particularly between the Kenya Animal Genetic Resources Centre (KAGRC) and the Kenya Veterinary Vaccines Production Institute (KEVEVAPI). This hinders adequate supply of breeding and vaccination services to farmers and the participation of private distributors.

There is need for increased public-private partnership for inputs supply and service provision. Supplementing extension services provided by both private and public actors including provision of vaccinations by agrovets and animal health practitioner should be encouraged and supported. Increased dissemination of information through frequent farm visits, over the counter information, field demonstrations, facilitated exchange visits, training and through telephone.

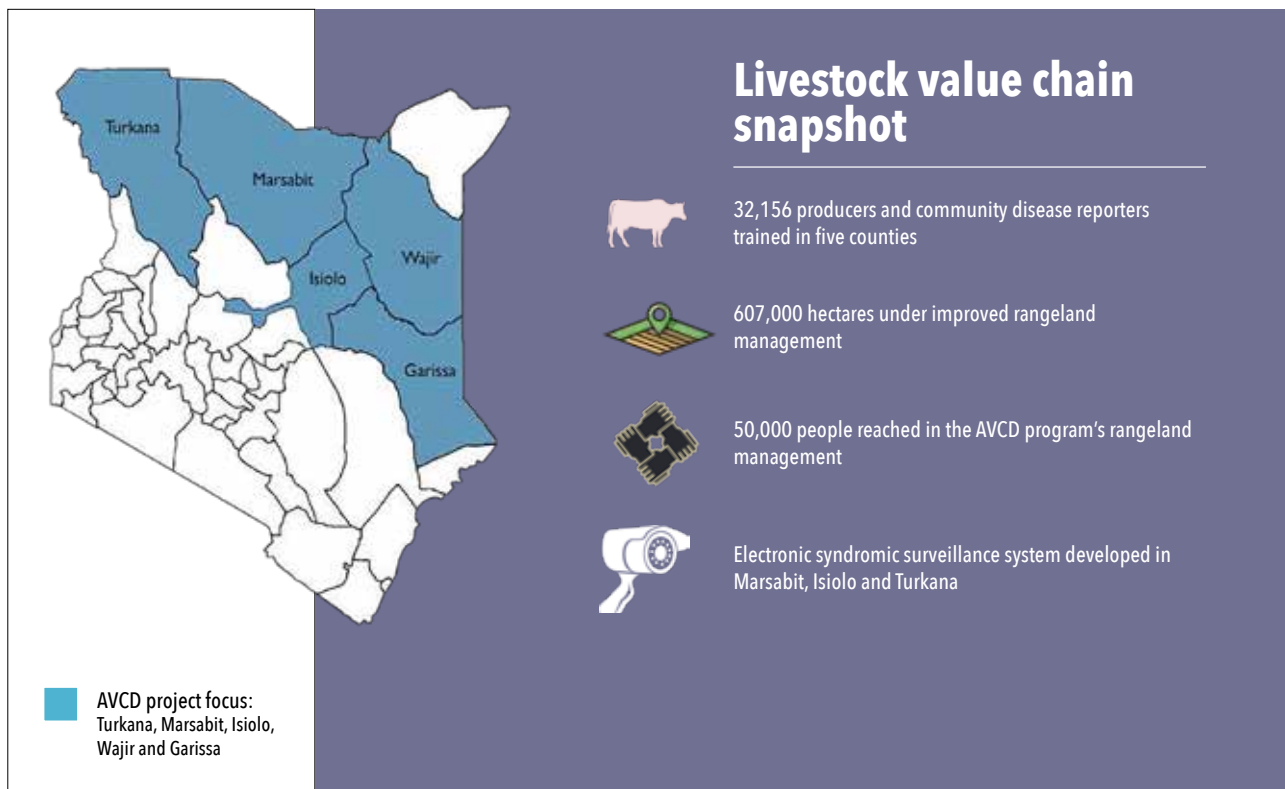
Other issues identified included the need to develop robust milk market structures to safeguard participation of processors, the availability of accurate and timely information sharing to build capabilities in the value chain and consideration of gender equitability. While the inclusion of women in the AVCD program is encouraging, the inclusion of youth in all aspects of production and market systems in the sector requires concerted effort.

Livestock value chain



To address poor rangeland conditions, inadequate pastures limiting livestock populations and unsustainable rangeland usage, AVCD has partnered with Kenya's county governments, USAID's 'Agile and Harmonized Assistance for Devolved Institutions' (AHADI) project and other stakeholders to develop a draft livestock policy and several policy briefs on rangeland management, livestock disease control and livestock marketing.

Photo credit: ICISAT/Swathi Sridharan.



AVCD program interventions

In Kenya over 70% of the national livestock herd, including camels and donkeys, is kept in arid and semi-arid lands (ASALs). The livestock sector employs about 90% of the 7 million people in ASALs and contributes to 95% of the family income. It contributes to 42% of Kenya's agricultural gross domestic product (GDP) and 10–15% of its total GDP. With such a great impact on the economy, the livestock sector has a high potential to contribute towards achieving economic growth through an expansion of the regional and export market of both semi-processed and finished leather goods.

The AVCD program promotes and seeks to increase the use of improved technologies and innovations for smallholder farmers and pastoralists in Kenya. The AVCD program's livestock component employs the philosophy of layering – building on what has been achieved/what others are doing, sequencing – picking up on/continuing what others have reached/attained and integration and using hybrid approaches with instruments/tools borrowed from different disciplines.

Some of the achievements acknowledged included 607,000 hectares made up of about 50,000 people that was put under improved management in the last 2 years. It is projected that this will grow to 975,000 hectares at the close of the AVCD program.

In providing achievements for program interventions in disease surveillance, an electronic syndromic surveillance system was developed in Marsabit, Isiolo and Turkana. Surveillance data should inform intervention measures but sometimes the long turn around time used for processing some of these data limit their timeliness and utility. Syndromic surveillance systems are therefore being used more for early detection of and response to, diseases since they can identify clusters of cases before definitive diagnoses can be made.

Further, the program provided syndromic surveillance training manuals and utilized them in a series of training sessions targeting 32,156 producers and community disease reporters in all the five program counties. Initial analyses show statistically significant improvement in knowledge of those trained. There are also improved linkages between technical personnel in the counties and community disease reporters.

Specifically, Turkana and Marsabit counties have taken over the management of their e-syndromic surveillance system indicating identification of staff to manage the system and commitment of funding

Some way forward issues that emerged included the need for developing partnership plans with the Department of Veterinary Services to support funding of electronic surveillance systems for sustainability – e.g. roadmap on e-surveillance system in Turkana County; training of epidemiologists in the counties on alternative ways of analyzing syndromic surveillance data; and conducting more intensive analyses to determine the impact of the training offered on disease identification and reporting and utilization of the data collected for risk mapping and analyses.

Lessons learned

The national conference had a summary of reflections from those implementing and managing the AVCD program and government stakeholders involved at county level. Key lessons were identified.

Nutrition-sensitive programming through a multi-sector approach has a great potential in addressing malnutrition. This would be the involvement of different sectors i.e. agriculture, education and health with coordinated effort in addressing nutrition. There are opportunities for front-line workers of the ministries of Agriculture, Health, and Education to converge approaches at the community level. Many of the current examples of nutrition-sensitive implementation in Kenya are led by partner agencies. Partners therefore are playing an important role in bringing on board the government agencies to which they are respectively affiliated to initiate or strengthen inter-sector discussions.

In rangeland management discussions, there was a general understanding of the dearth of traditional range management institutions and practices. The AVCD program therefore worked with existing institutions (community conservancies and community-based natural resource management committees to build governance capacity by having these committees establish and implement seasonal grazing plans. The success of one community can motivate neighbouring communities to replicate the process.

A key element discussed was the relations among communities at a landscape scale – supporting inter-community forums. Although progress has been made, legal recognition of community grazing organizations is still not fully established. Mapping of community rangelands allows collaboration with county governments in planning. This would guide investments and other projects in coordinating who, what and where to prioritize in integration to their development agenda(s).

Integrating indigenous knowledge in development processes is key. Complex rangeland rehabilitation methods, while appropriate in some places, are not always needed – the simple step of establishing and enforcing a seasonal grazing plan in itself can result in improved range condition. This was a key lesson learnt from the case of the Nasuulu Community Wildlife Conservancy in Isiolo County.

It is evident that among elders, community leaders, and stakeholders working on grazing issues, there is an intuitive understanding of the potential of county spatial planning to address the challenges and opportunities of rangelands.

Participants at the national conference concluded that it was important to engage with political leaders, particularly members of county assemblies, raising their awareness of how a well-informed county spatial plan can address real needs of constituents beyond just being 'just a plan' and potentially can be part of a county's rangeland management system.

On innovation, the program has initiated KAZNET, a universal micro-tasking platform that we have developed and are currently using to collect livestock market information from pastoral regions of the Kenya as a proof of concept. These markets present an informative case because they are notoriously difficult to monitor due to their remote locations and great degree of variability between markets.

Program gaps and sustainability

According to Andrew Mude, a principal scientist at ILRI, there was need for business and financial management training to enhance financial and market-access for

business and youth in particular. Capacity building through additional facilitated training and assessment of different market patterns would help facilitate development of viable business plans. It was affirmed that there is need to work closely with the financial institutions to understand the reasons for rejection of proposals.

Absence of a proper market structure was identified as a major constraint impeding the prices that producers fetched for animals. This was as a result of the lack of a transparent price discovery mechanism leading to exploitation of the pastoralists.


Consequently, high numbers of brokers led to high marketing costs resulting in livestock owners receiving less than 50% of their livestock sales. This was further aggravated by weak livestock markets with livestock keepers forced to travel for long distances to access the livestock markets

Some livestock markets in the counties had livestock market associations (LMAs) in place but only a few (<5%) of them implement the revenue sharing co-management model.

Frequent droughts and livestock disease outbreaks closely associated with climate change phenomena posed a threat to the livestock sector. Recent cases of drought and famine caused livestock deaths of up to 50% of the herds.

Insecurity as a result of communal feuds is a challenge that is reducing goodwill interventions by public-private organizations. In addition, interventions were also resisted by the communities based on traditionally acquired misconceptions and stereotypes.

The livestock component could support efforts towards establishing agreed livestock grading schemes in selected markets with strong collaboration with county governments, other Partnership for Resilience and Economic Growth (PREG) partners, LMAs and traders. Auditing of the LMAs to ensure that efficiency in implementation of the revenue sharing co-management model which would see the revenue go back to benefit the community.



In line with these, it was resolved that there is need for follow up(s) on proper execution of these policies to ensure they are executed to achieve the intended purpose. Inclusion of women and youth in employment and employment creation opportunities was a sustainability strategy proposed by one of the community leaders in attendance.

KAZNET as the main innovation for market-access to scale up access to terminal markets in Nairobi and Mombasa and meet the funding gap before commercialization. There was need to develop a demand-driven business and dissemination strategy to assure sustainability of the KAZNET system by encouraging paying customers for the information provided. Other considerations for the platform include automated payments, calculation and delivery.

Simultaneously, training processes, data validation and data cleaning would assure availability of quality market data near real time by different actors in the livestock value chain. In the same manner, inclusion of new types of data and tasks that quickly and easily meet the demand of the users will need the creation of a centralized database for data storage, dissemination and accessibility.

On land tenure issues, the lack of legal recognition of pastoralists and the community at large lacking legal documentations for land ownership; limits their activities across grazing lands. In lieu of these titles, fights over grazing lands between private developers, land grabbers and the community have emerged creating a rift between communities and landscape-level rangeland planning.

Engagement of county governments in land governance, enhance registration and recognition of conservancies together with community-based natural resource management also needs to be promoted. Through this, advocacy for legal recognition for pastoralists and the community acquisition of title deeds can support claims for land ownership thereby giving legal weight to grazing plans and counties and communities to work together for proper registration, legal recognition and land governance.

It was revealed that rangeland management is not included in county spatial planning, and is thus not prioritized during developmental activities. It was established that there is shortage of staff and animal health providers necessary in identifying diseases at community level. Equally, the source of data is limited to a few veterinary personnel and consequently, decision-making was based on laboratory analyses that take a lot longer to put to use because of the lengthy processes of approvals and transfer of such information to actors.

It was noted that there is inadequate regulation of the veterinary pharmaceutical sector (drugs were handled by unqualified persons) and quacks and substandard drugs were in circulation within the targeted communities. There is inadequate funds to facilitate incentives for disease reporting leading to low incidences of reporting.

There was also inadequate control of livestock movement, hindering the tracking of livestock to address vaccination and surveillance. Subsequently due to lack of coordination between actors in the in the health sector there is duplication of activities leading to unstructured vaccinations.

Fodder production, conservation and marketing enterprises are yet to gain strength in many parts of Isiolo County. There are, however, efforts by both government and donor organizations to promote fodder enterprises in areas with relatively high amounts of rainfall and near rivers where irrigation is possible.

A representative from Sidai Africa suggested that there is need for more collaboration between the public and private sectors. Localized training of disease reporters and animal health technicians would increase number of disease reporters. Procuring Android phones for voluntary community disease reporters would incentivize them to volunteer information more readily. It was further agreed that developing ways to make use of e-surveillance for syndrome system analysis rather than laboratory analysis would help address diseases in a timely and more effective way.

Staple crops value chain




A baker making commercial products that integrate orange-fleshed sweetpotato puree.


The goal of the root crops value chain project is to contribute to improving food security, nutrition and incomes of 100,000 smallholder households in Kenya over three years.


Photo credit: CIP/Christine Bukania.


AVCD project focus:
Busia, Siaya, Elgeyo-Marakwet, Makeni and Kitui

Drought-tolerant crops value chain snapshot

- 

Improved productivity including use of improved seed, implementation of good agronomic practices and post-harvest handling
- 

Nutrition: Positive Dietary Diversity Scores in households, women of reproductive age and children under two years
- 

Linking farmers to grain markets and processors
From August 2016 to March 2018 yielded 2622 tonnes of drought-tolerant crops valued at USD1,043,299
- 

99% positive change of quantities of sorghum retained for home consumption

AVCD program interventions in the drought-tolerant crops value chain

The goal of the drought-tolerant crops value chain of the AVCD project is to contribute to improving food security, nutrition and incomes of smallholder households in Kenya over three years. The project aims to support seed system development through targeted private sector investment, increase crop productivity and market opportunities, and improve nutritional quality of diets across five counties. As maize, the main staple crop, often fails in the drylands, farmers are being encouraged to grow more drought-tolerant crops (DTC). Replacing staples such as maize with drought-tolerant crops such as sorghum, millets, pigeon pea, cowpea and green gram is helping farmers overcome the failure of rains and its damaging impact on maize in particular.

To promote DTC like millets and sorghum, farmers have been trained on good agricultural practices, post-harvest handling and value addition, and have been provided with quality seed of improved varieties. Capacity building of farmers and agricultural extension workers to promote production and utilization of sorghum, finger millet and groundnuts has resulted in improved accessibility of quality seed by farmers.

Lessons learned

In AVCD program's three years of implementation there have been some valuable lessons learnt along the way notably: There is need to provide credit facilities all through the value chain to facilitate the affordability of production costs and processes. Value chains play an important role in providing financial services that help to reduce risk, improve crop yields, manage liquidity, and transact with markets. But for many of the smallholder farming households, value chain financing remains either inadequate or entirely out of reach.

Participants also felt that communication made to the county governments by scientists on the program should be understandable enough for the governors to be able to come up with requisite policies. Scientists also need to understand the policy environment beyond the lab. This will stimulate conversations between citizens, scientists, and policymakers.

Formation of partnerships was also identified as critical in facilitating development of linkages to market, essential for the growth of production activities. With regard to

enhancing access to inputs and services by smallholder the involvement of the private sector will enhance production of quality input as a result of competition from their peers.

Program gaps and sustainability

Conference participants felt there was need to establish a national DTC association to give farmers a voice. The association will help farmers to overcome constraints related to seizing new economic opportunities to improve their socio-economic status and food security. The association would also facilitate access to natural resources, productive assets and markets, information and knowledge, and encourage participation in the policymaking process.

Enactment of a policy framework by both national and county governments with the theme 'develop industry with agriculture and support agriculture with industry', was necessary to advance economic development with due emphasis on both agriculture and industry. Policy objectives needed to be flexible – changing with dynamic environments. There is need to also link farmers to innovative insurance programs to safeguard them against risks like crop failure. The Kenya National Agricultural Insurance Program was cited as one of the programs that could address the challenges that agricultural producers face when there are large production shocks, such as droughts and floods. These programs need to be extended to reach DTC farmers.

Creation of more awareness in other counties outside the AVCD program through a network of DTC ambassadors was identified as necessary in recruiting more farmers. In this regard, more information should be shared with county governments, on the importance of embracing DTC crops and incorporating them even into school feeding programs.

Lobbying for government funding in the promotion of DTC to alleviate poverty was discussed. Agricultural subsidies should reach DTC farmers to supplement smallholders' income, manage the supply of agricultural products, and influence the pricing and supply of commodities.

Utilizing strategies to scale up the successful DTC, value chain activities such as use of improved seed in combination with agronomic recommendations would enhance viability of farmers in increasing household incomes. Recognition of community-produced seed as a

vehicle for enhancing adoption and improving productivity is required. The county governments, in consultation with the national government, should provide an enabling environment to promote use of community-produced seed.

County governments should also develop and implement strategies to scale up DTC value chain preferences. To further increase productivity, there is need to push for mechanization so as to encourage more youth engagement in agriculture and to sustain their participation in agriculture, through the use of model farms and mentorship.

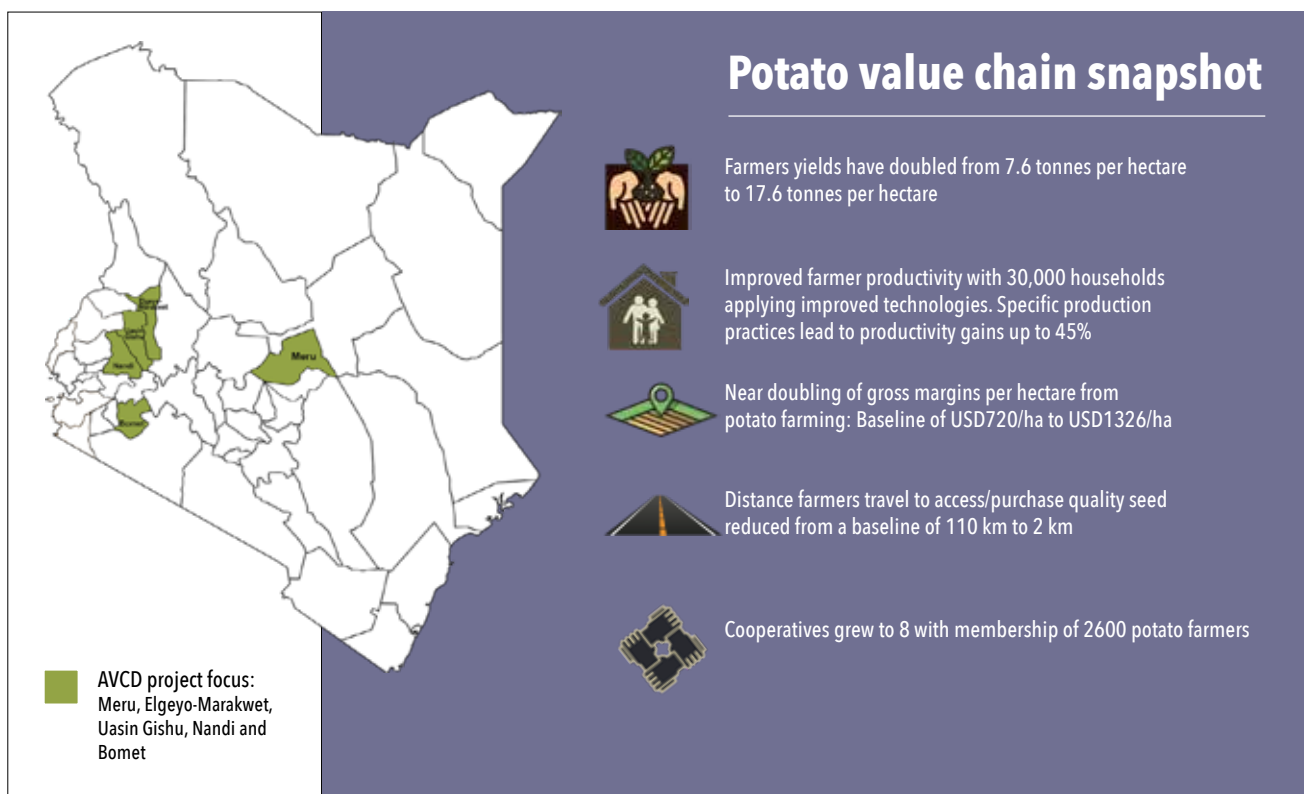
Increased participation of the private sector in seed production is needed in order to bring in the aspect of competition that enhances efficiency and effectiveness. Government's monopoly position as a key seed producer inhibits competition in the production of quality seed and hinders sustainability. A sustainable seed system will ensure that high-quality seeds of a wide range of varieties and crops are produced and fully available in time and affordable to farmers and other stakeholders.

An emerging framework for improving diet quality involves value chains. Low-income households typically subsist on monotonous staple-based diets and lack of diet diversity is associated with inadequate intake and risks of deficiencies

of essential micronutrients. Improving nutrition through more sensitization is one of the factors that could catalyse the development of this value chain. Scaling up successes in DTC food businesses and pushing for DTCs to be incorporated into school feeding programs is also a way of encouraging good nutrition for early childhood development.

Overcoming commercialization barriers requires an upgrading process that includes investment in local infrastructure, strengthening of business services, and improving farmer skills. Providing linkage for farmers to markets by ensuring quality adherence, integration of grain aggregators and community seed markets; providing grain producers with market-preferred varieties for aggregation and linking players to credit and finance, to facilitate cash payments to farmers, can enhance volumes of produce available in markets.

With effective management, contract farming can be a means to develop markets and to bring about the transfer of technical skills in a way that is profitable for both the sponsors and farmers. There is need to expand groundnut and other DTC grain markets to enhance production. Participants called for processors/buyers to initiate shelling services or encourage youth to acquire shellers to create employment and improve grain quality.



AVCD program interventions in potato crop value chain

The potato sector is valued at USD500 million annually and provides employment opportunities for 2 million Kenyans along the value chain. A principal obstacle to vibrant potato value chains in Kenya are low yields averaging 8–10 t/ha, far below realistic yields of 20–25 t/ha, largely as a consequence of limited access to quality seed. Opportunities within the seed potato value chain offer diverse entrepreneurial opportunities for smallholder farmers to large-scale professional farms and businesses, contributing to business development and economic growth.

The AVCD program and its partners have developed and validated technologies and delivery systems that are easing bottlenecks to scaling out potato and sweetpotato value chains, such as the seed system of these vegetatively propagated crops that has historically made it so difficult to manage devastating diseases. Engaging the private sector is key to sustainability of AVCD root crops interventions. Shifting seed production from national institutions to the private sector and enabling national institutions to provide technical backstopping are key focus areas.

Lessons learned

There has been increasing recognition of the strategic importance of agri-food systems for job creation and inclusive, broad-based growth. Participants at the value chain session identified some of the lessons learned including the need to improve access to credit for the youth and accommodate more youth and farmers in capacity training. This should incorporate youth employment as a motivation to boost their appreciation of agriculture as a business.

Decentralized seed multipliers were seen to be effective and efficient in supporting adoption of potato farming by farmers. For example, a farmer from Meru shared their experience in sharing a kilo of potato with neighbours motivating them to try out planting potatoes. Through this approach she has been able to reach 200 smallholder farmers.

Participants felt that sustained benefit from AVCD project requires a comprehensive package of support that ensures partnerships with the private sector, the government and other development actors. The county governments in particular were seen to be unwilling to offer their support in investment of potential outreach of the potato value chain.

Program gaps and sustainability


However, there were challenges, especially in the North Rift region. The forum noted that there was weak coordination in the seed multiplication process as local farmers opted for local seed, as it was cheaper. There was also a lack of awareness about the resultant issues that lead to isolated supply producers.

The production of too much potato created marketing and distribution challenges. There was no market structure in place thus farmers and producers faced exploitation in the pricing. A number of constraints across the value chain were identified including huge price differentials between farm gate and market sometimes influenced by middlemen, the use of extended bags sometimes weighing up to 200 kilograms, poor enforcement of regulations, inappropriate and inadequate storage facilities and poor physical conditions of the markets.





Further, small-scale local farmers had low incomes and yet needed the capital for venturing more into the seed multiplication and potato production. However, most of the lending and financial institutions found it to be too risky to invest, because most farmers did not have financial records and/or collaterals and guarantees to qualify for loans.

To curb these challenges, the forum pointed to increased private sector engagement along the seed potato value chain to improve access to quality seed potato. This in turn would trickle down creating support for private sector SMEs to invest in early generation seed potato, produce certified seed and transform and strengthen progressive farmers into seed multipliers. In addition, enabling farmers to maximize investment in quality seed potato and providing farmer training on good agronomic practices in demonstration farms will enable savings on seed on-farm as a result of not buying seed every season.

In Kenya, about 98% of ware potatoes are sold for 'fresh' consumption. For industrial processing, the most favourable opportunities are the production of crisps and fresh – not frozen – French fries. To change the low-input low-output strategy of many small-scale farmers linkages between producers and markets need to be improved. Supporting market development through information and communications technology (ICT)-based options was said to be one way that could guarantee better markets for farmers.

Orange-fleshed sweetpotato value chain snapshot

-  Puree value chain with returns exceeding USD120,000 per annum
-  Root sales projected at USD200,000 in 2018, and could triple based on requirements for roots by the two puree processors
-  Vine enterprise among 41 decentralized vine multipliers worth USD50,000
-  Over 40,000 households have been reached with high-quality OFSP start up planting material

AVCD project focus:
Bungoma, Busia, Homa Bay and Migori

AVCD program interventions in orange-fleshed sweetpotato value chain

Orange-fleshed sweetpotato (OFSP) varieties which are rich in beta-carotene, play a key role in combating vitamin A deficiency (VAD) in women and young children. In Kenya, where 84% of children below five years and roughly 20% of women are affected by VAD, OFSP has great potential to reduce VAD in these target groups. Sweetpotato is grown across diverse agro-ecologies, ranging from high rainfall to semi-arid regions, hence is a reliable food security crop.

The AVCD seeks to widely apply technologies and innovations for selected value chains in order to competitively and sustainably increase productivity, contributing to inclusive agricultural growth, nutrition and food security in the country.


Specifically, the AVCD root crops value chain aims to transform potato and sweetpotato food security, nutrition and incomes in Kenya. With at least 93,500 smallholder households reached over 3 years the project anticipates that approximately USD2 million will be made in profit annually through sales of planting material and increased yields of both crops by the end of the first three-year

period. A further, dietary quality of least 54,000 children under 5 years and 65,000 women will be improved by 20% as measured through diet diversity scores.

Lessons learned

Analysis of the value chain of sweetpotato and household food security revealed a number of lessons. Key to the discussions was the need to facilitate more linkages with value-adding enterprises and develop more products as there was huge latent demand for OFSP puree-based products. Farmers are growing OFSP in the main planting season. There is a diversity of delicious and nutritious OFSP-derived food products on the market, and the OFSP is viewed as a cash crop in four counties: Homa Bay, Migori, Busia and Bungoma.

The forum also lauded the strategic positioning of the value chain to enhance enough production to meet demand. The need for private partnership is pivotal in driving market development of the OFSP. With up to 60% substitution of wheat flour for the major confectionery products, these products will be produced at a fraction of their current price, increase the gross margin of the processors and make the products and the value chain quite attractive.



The potential is huge, and the youth could be attracted to this value chain. Substitution of wheat flour for OFSP puree will also save the country forex exchange since about 80% of the wheat used in Kenya is imported.

To improve storage and marketing of OFSP, further linkages between producers and wholesale traders need to be established. In addition there is need to explore storage using solar power. If this technology is scaled up it can preserve the large volumes expected from farmers, allowing for curing and storing for slow distribution to both formal and informal markets when sweetpotato are not in season.

The forum also noted the need for robust information transfer from researchers to farmers and further down to all stakeholders. It was realized that more OFSP varieties could be developed and availed. This calls for research and coordination in coming up with better varieties. Better integration of national agricultural research and extension systems into the value chain, as well as farmer training schemes in seed management and storage, can accelerate innovation.

Lastly, absence of proper market structure along the value chain hindered development of more business opportunities leaving the post-harvest gaps all the way from storage to consumption. There was therefore a need to plan, coordinate and manage the marketing aspect of the value chain.

Program gaps and sustainability

Because it emerged, at the national conference, that there is still an unmet demand for OFSP, participants felt that increased awareness about the nutritional aspects had led to the increasing demand. The production on OFSP products like OFSP bread and other derived baked foods had enhanced the value chain development but shortage in supply was limiting optimal development of the opportunity.

Engaging the private sector is key to sustainability of AVCD root crops interventions. Shifting seed production from national institutions to the private sector and enabling national institutions to provide technical backstopping are key focus areas. The private sector is willing to invest in this value chain by buying root

crops as long as there is consistency and farmers do not 'stagger plant'- where they plant in irregular patterns and switch their efforts elsewhere and discourage the private sector from investing.

Development of more OFSP varieties through research and technology was seen as key in developing nutrition-based opportunities. In Kenya, availing of nutritious OFSP varieties into new communities and farmer groups should be facilitated.

Another gap identified was the need for increased capacity building through awareness creation and information sharing on adoption and application of good farming practices for smallholder farmers. It was noted that some farmers still recycled old vines after harvesting which led to low yields.

For nutrition, participants noted that strengthening the existing health facilities through integration of strong messaging and activities on maternal, infant and child feeding practices with particular focus and emphasis on vitamin A and OFSP, would build community capacity for health. There was need to explore capacity building of healthcare providers to increase uptake of agro-nutrition linkages to improve nutrition by demonstrating various OFSP recipes integrating common household foods.

Further, it was noted that improving storage of OFSP to assure year-round availability for trading would grow formal and informal markets. Although it was noted that storage had been improved, more needs to be done to ensure sustainable quality over a longer period into the production off-season. This could be achieved through capacity building of farmers on good agronomic practices, collective action in production and marketing; mentoring vine multiplication as a business, use of ICT platforms to access market information and contractual linkages between farmers and buyers.

Lastly, the exit strategy was pegged on CGIAR centres continuing with their support, expanding provision of extension services by county governments, sourcing of vines by puree processors and selling them directly to farmers, forming of groups among farmers to acquire more root volumes, more research and resources for OFSP development and educating the masses to help the project realize its full potential.

Nutrition and dietary diversity



There is a diversity of delicious and nutritious orange-fleshed sweetpotato (OFSP) derived food products on the market, and the OFSP is viewed as a cash crop in four counties: Bungoma, Busia, Homa Bay and Migori.

Photo credit: CIP.

The AVCD program recognizes that an increase in agricultural productivity and incomes alone does not result in improved nutrition status. The drought-tolerant crops component has activities along the value chain whose aim is to achieve both inclusive agriculture growth and improve nutrition status. The team has partnered with county departments of agriculture and health and has so far reached over 48,000 households with nutrition messages and sensitized them on the nutritional value and health benefits of drought-tolerant crops.


The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is implementing a nutrition behaviour change initiative since 2016. The program has been promoting utilization of nutritious foods including locally produced crops. The approach used revolves around creating awareness about the value of producing and consuming nutritious foods and promoting dietary diversity with the support of officials from mainly the departments of health, education and agriculture in the national and county governments and other officials from different sectors.

The project team has so far trained over 7,000 men and women in Kenya through two-day nutrition workshops; trained over 6,000 women farmers through participatory cooking classes where they were introduced to new recipes

and energy efficient innovations; and reached over 80,000 households with nutrition messages through a variety of behaviour change communication activities. The initiative has also reached over 20,000 children below 2 years with nutrition messages through their parents.

In a keynote address, ILRI's senior nutrition specialist, Esther Omosa, reiterated that millions of children are malnourished globally, with half drawn from Africa and Asia with more than one-third of the cases in Africa alone. In Kenya, three in every ten children suffer from malnutrition, with Kitui and West Pokot counties most affected with 45% of their children under the age of five years stunted compared to the national average of 26%. The reality is that stunted children today lead to stunted economies tomorrow, and therefore nutrition is crucial to economic development. The first 1,000 days (about three years) are essential in the determination of the development of children. The most stunted growth cases among children were associated with inadequate nutrition within the first 1,000 days after birth.

The main determinants of proper nourishment are household food security; care and feeding practices especially for women at the reproductive age and access to clean water and proper sanitation practices.



On the other hand, the benefits of nutrition include more productive communities, leading to increased earnings, improved learning outcomes and poverty reduction by about 33% as a result of proper brain development.

Malnutrition reduces GDP between 4–11%. Better nutrition aids in the attainability of the three of the Kenya government's Big Four agendas of food security and nutrition, universal healthcare and manufacturing.

The AVCD nutrition activities were mapped along the three nutrition impact pathways: production – involved the agricultural aspect of the value chain; income – the marketing aspect of the value chain for self-employment and generation of revenue and women empowerment – capacity building through training on all socio-economic aspects.

A small group from Isiolo performed a skit at the national conference highlighting how the nutrition education they received had improved their health, especially those of mothers and children. Tradition barred the women from taking certain foods i.e. pregnant women were not allowed to take too much milk as this would make the infant 'bigger' leading to difficulties during birth an advantage since they did not deliver in hospitals.

Consequently, they were very receptive to the nutrition teachings as they incorporate food diversity in their meals. Men have been supportive of this initiative. This was one of the impacts created by the AVCD nutrition component.

The forum made several recommendations. In mainstreaming nutrition in agriculture, the goal was to incorporate nutrition into agricultural investment plans and feeding into the development of roadmaps for implementation. At the same time, scaling up included nutrition-sensitive agricultural interventions (indirect actions addressing underlying determinants of nutrition) as integral components for dealing with nutrition challenges.

Investment by county governments in integrating nutrition into their development plans put a premium on coordinated forums such as county steering groups and county nutrition

technical forums to help propel nutritional awareness and address cases of malnutrition.

In including women and youth, the general sentiment was that women and youth were being left out and including them into the agricultural activities would unlock income generation potentials to further propel proper care for households and children including proper feeding using diversified foods. Youth in particular should be the primary target of the nutrition campaign since they epitomize the chance for breaking the intergenerational cycle of malnutrition.

Multi-sector collaboration in scaling up the nutrition agenda encouraged more sectoral interaction that closely worked together as facilitated by the ministries. There was a call for the Ministry of Education to incorporate nutrition in the school curriculum and for the Ministry of Agriculture to facilitate cultivation of diversified foods according to the comparative advantage across the country to reduce the dependence on maize. The Ministry of Interior and Coordination of National Government was asked to ensure internal stability for agricultural and trade activities, while the Ministry of Industry, Trade and Cooperatives was to facilitate exportation of the produce for sale. It was envisioned that these ministries could work together and push the nutrition agenda from different angles for the common goal of making Kenya a well-nourished nation.

Private sector engagement especially in business development by capacity building through entrepreneurship training, facilitating credit access, aligning market structures to provide greater access among others was highlighted. The participants saw this as having the ability to enhance increased income generating abilities making households able to afford diversified foods.

Finally, to increase the scope for improved research in providing evidence-based agro-nutrition, participant asked for more investment in CGIAR centres. Innovation and technology infrastructure would require for research development for better nutrition in Kenya.

Conference outcomes



The AVCD national conference was an opportunity for all of us to come together and share best practices, learn from each other and recommit ourselves to our shared objectives.

Photo credit: ILRI/Paul Karaimu.

The AVCD national conference was held to reflect on the achievements and to consider the future of AVCD, a three-year USD25 million program in Kenya funded by the USAID Feed the Future initiative and implemented by a consortium of CGIAR institutes, led by ILRI together with CIP and ICRISAT.


More than 400 people participated in the conference. Guests included representatives from national and county governments, implementing partners, sub-grantees, selected beneficiaries, partnering projects and the Kenya development donor community as well as high-level representatives from the diplomatic corps.

The conference took place at a critical juncture for Kenyan agriculture. A large swathe of the country's breadbasket is under dual attack from a severe drought and an unusually virulent and invasive pest known as the fall armyworm. The participants noted that with continued research and the kind of innovative, productive and successful government and public-private agricultural research partnerships on display at the conference, the challenges could be met and overcome.

The forum reflected on AVCD's past two-and-a-half years of achievements by showcasing catalytic innovations spearheaded by the three CGIAR centres, by reviewing lessons learned in the program and by exploring the potential of scaling out its innovations and technologies.

The conference delegates included crop and livestock industry experts, selected program beneficiaries, program staff, representatives from agricultural programs and industry stakeholders. An interactive space—the AVCD marketplace, a mix of exhibition stands and demonstrations—showcased AVCD contributions to the transformation of the agricultural landscape across Kenya. The conference was a success. It clearly demonstrated the standing and achievements of the USAID Feed the Future AVCD program.

The focus of AVCD's dairy value chain work was on expanding dairying into non-traditional dairy regions of Kenya. The program upgraded the available cattle breeds through accelerated breeding technologies, trained farmers in good animal husbandry practices and business skills, and enhanced access to a vaccine against East Coast fever in cattle, set up dairy business hubs and promoted use of improved fodder.



Another successful intervention showcased was the introduction of high-quality livestock fodder grasses such as *Brachiaria* and disease-free varieties of Napier grass. *Brachiaria* is drought-tolerant, regenerates fast after harvest, tastes good and has high levels of crude protein. AVCD's fodder component has been so successful that program staff can hardly keep up with the demand for planting material.

East Coast fever, a commonly fatal disease of cattle in Africa, is endemic to much of the region covered by AVCD. A vaccine is available that offers lifetime immunity to the disease. However, the cost of the vaccine and the logistics of getting it delivered to farmers have kept the vaccine out of reach of many poor farmers. Due to the vaccine's high cost, AVCD staff intervened by training vaccinators and offering an initial 20% subsidy for the vaccine for the initial first two months of implementation. Now, the demand for the vaccine is surging.

The AVCD program has also been supporting dairy cooperatives and other producer organizations to become more commercially oriented by adopting a 'dairy business hub' model. Through training in governance, financial management and strategic and business planning for these organizations, AVCD has encouraged dairy farmer groups to aggregate, which is enabling individual farmers to sell more of their milk.

AVCD organized a traders' business-to-business forum to provide pastoral livestock keepers in the country's remote northern drylands access to timely information about market opportunities. Among its achievements was arranging for a women's trader group in Isiolo to provide a local goat club with 35 goats a week, a contract worth nearly USD10,000 a month. The program has also developed a mobile telephone app generating real-time market information through a livestock market information system (LMIS), dubbed 'KAZNET', currently in beta mode. Plans for KAZNET 2.0 are under way with a commercialization strategy being jointly developed with the Cornell University Centre of Sustainable Global Enterprise. AVCD has partnered with Kenya's county governments, USAID's 'Agile and Harmonized Assistance for Devolved Institutions' (AHADI) project and other stakeholders to develop a draft livestock policy and several policy briefs on rangeland management, livestock disease control and livestock marketing.

The program also rolled out innovations such as community disease surveillance, an electronic disease surveillance system and private vet services. Thanks to the introduction of a new livestock disease reporting framework, a recent outbreak of foot-and-mouth disease in Garissa County was arrested.

The potato value chain has focused on seed system development with a business-minded approach, supporting private sector investment in seed production, increasing potato productivity and enabling market opportunities. It has contributed to improved access to quality seed, food security, increased income and dissemination of better varieties and best potato practices in Elgeyo-Marakwet, Meru, Nandi and Uasin Gishu counties. In total, 30,500 farming households have been reached with quality seed, improved technologies and training, and 19 firms are being supported to improve business performance.

The business approach to seed production earned seed multipliers an average gross margin of USD3,000/ha. Encouraged by the high profitability of the seed potato business, seed multipliers have collectively invested USD71,300 in their seed businesses, which includes 123 tonnes of seed storage.

The forum noted there is a diversity of delicious and nutritious OFSP derived food products on the market, and the OFSP is viewed as a cash crop in four counties: Homa Bay, Migori, Busia and Bungoma. To increase availability of quality planting material, the program worked with the plant health regulator, KEPHIS, to supply 41 vine multipliers with certified tissue culture cuttings; with these vine multipliers producing and selling vines worth USD49,952 to sweetpotato farmers.

Through the program's support, two puree (mashed OFSP) processors have emerged: Organi Ltd and Safe Produce Solutions Ltd. Puree is the intermediate raw material used in production of OFSP-derived baked foods. These processors in turn have been linked to two major retailers: Tusky's and Naivas supermarkets that have multiple stores in various towns in Kenya.

Summary of gaps and proposed way forward

Livestock value chain

Gaps

1. Risks associated with frequent drought and insecurity limit the impact of AVCD.
2. Poor management and governance in the livestock chains manifested by absence of animal pricing: private developers disrupt normal animal prices.
3. Lack of coordination among major actors: leads to duplication of activities among county government and private sector.
4. High numbers of brokers leads to high marketing costs: livestock owners end up receiving less than 50% of their livestock sales.
5. Community resistance due to stereotypes hinders adoption of interventions.
6. Challenges in developing and drafting quality funding proposals limits financial access for business women and youth groups to invest in building their sustainability.
7. Shortage of staff and other animal health providers to help identify disease syndromes for delivery of preventative measures of animal health. Data limited to laboratory analysis which takes a long time to produce.
8. Lack of structured routine vaccination due to lack of coordination between actors.
9. Inadequate regulation of veterinary pharmaceutical sector: results in drugs being handled by unqualified people and substandard drugs in the target communities.
10. Inadequate control of livestock movement: hinders tracking of livestock to address vaccination and surveillance.

Sustainability considerations and way forward

1. Scale up KAZNET to other terminal markets in Nairobi and Mombasa to meet the funding gap before commercialization.
2. Automate the payment calculation and delivery, training processes, data validation and data cleaning to assure quality market data which can be accessed near real time by different actors in the livestock value chain.
3. Livestock market associations to be audited to ensure that revenue collected goes back to benefit the community.
4. Proper execution of policies to ensure they achieve intended purpose.

5. Collaboration with conservancies because they are organized through their grazing plans: will contribute to more efficient routine vaccination and controlled animal movements.
6. Enhance and increase training to a larger population of disease reporters and employ more staff through County Integrated Development Plan: needs collaboration between public and private sectors in the training.
7. More focus should be given on offering preventive rather than curative measures through vaccination of selected diseases.
8. There is need to develop inspectorates to weed out quacks to enable both public and private sectors to develop sustainably.
9. Need to procure Android phones for community disease reporters and provide incentives for them to motivate them.
10. Develop ways to make use of e-surveillance to focus and depend more on syndrome system analysis rather than laboratory analysis to help address diseases in a timely and effective manner.

Dairy value chain

Gaps

1. Getting mechanization right to be used in fodder production is a challenge.
2. Fixed-time artificial insemination is expensive for farmers.
3. Nutrition component should be mainstreamed in farmer training to create more awareness on nutrition.
4. Provision of extension services is a challenge in most communities since county government extension services are not efficient and effective.

Sustainability strategies

What can we do to ensure we do not step back?

1. Taking fodder innovations to scale via a business approach through an inclusive breeding program involving mechanized processes and structured business systems.
2. Scale up volunteer extension approach to help in the provision of extension services.

3. Sustaining VBDA/PFT (peer farmer training) extension model via cooperatives which entail structured systems with revenue.
4. Sustaining grassroots extension; field extension officers can also be used to reach farmers.
5. Develop artificial insemination business case for cooperatives.

Way forward

1. There is need to think proactively and repackage messaging and other extension services.
2. Engaging stakeholders is key since the dairy value chain requires a coordinated approach. Partnerships and collaborations among various stakeholders is therefore important.
3. Supporting business engagements and farmer-to-farmer cooperatives is vital to strengthening service delivery.
4. Technological interventions need to be scaled up to enable them cover a wider geographical location.
5. More farmer training sessions should be conducted in a coordinated approach with stakeholders.

Orange-fleshed sweetpotato value chain

Gaps

1. There is still an unmet demand for OFSP.
2. Staggered planting – where farmers plant just once and switch their efforts elsewhere discouraging the private sector from investing. Need for continuous planting for consistent supply.
3. More varieties of OFSP could still be produced through research so as to compete fairly with the traditional varieties of sweetpotato.
4. Some farmers still recycle old vines after harvesting which leads to poor yield.
5. Unexploited business opportunities along the value chain.
6. Marketing should be better planned and managed.

Drought-tolerant crops value chain

Gaps

1. A national drought-tolerant crops (DTC) association is needed to give farmers a voice.
2. A policy framework by both national and county government has not been enacted.
3. Lack of linkages for farmers to insurance as farming has risks.
4. The DTC national association committee should petition for scheduling DTC crops as important in achieving the Big Four agenda.
5. Lack of a sorghum ambassador/DTC ambassador to promote the same across the counties in Kenya to increase mass registration of farmers to produce these crops.
6. A National Treasury fund is needed to promote role of DTC in alleviating poverty
7. Limited access to mechanical threshers by producers and aggregators

Sustainability considerations and way forward

1. Identify strategies to scale up the successful DTC value chain activities such as use of improved seed in combination with agronomic recommendations.
2. Garner support from county governments to sustain commercialization of agriculture to scale up successes from AVCD.
3. Ensure better access to credit by farmers to purchase inputs.
4. Recognition of community seed as vehicle for enhancing adoption and improving productivity.
5. The county governments in consultation with the national government, should provide an enabling environment to promote use of community-produced seed and incorporate quality-declared seed.
6. Strengthen the use model farms for mentorship in scaling up AVCD successes.
7. Coordinate in efforts to control fall armyworm to maintain momentum on productivity.
8. Scale up successes in DTC food businesses and brand products.

9. County governments to link DTC to school feeding programs including early childhood development (ECD).
10. Provide grain producers with market-preferred varieties for aggregation.
11. Link aggregators to credit financing to facilitate cash payments to farmers to enhance marketed volumes.
12. Processors/buyers to initiate shelling services or encourage youth to acquire sellers to provide this service to create employment for the youth and improve grain quality.
13. Counties to include DTC in their list of priority crops and urgently integrate DTC nutrition and community seed supply components with county integrated development plans, establishing sustainable sources of quality foundation seed supply to counties.

Potato value chain

Gaps and sustainability considerations

1. There are still seed shortages due to insufficient producers: there is a need for public- private (business) partnerships to produce early generation and certified seed. This will spur investments in seed potato.
2. There is a need for stronger marketing institutions to ensure coordinated sales through cooperatives. The county governments should provide support in promoting sustainability to lead to increased supply to consumers.
3. Greater farmer inclusion is required. This will ensure increase in numbers and productivity of smallholder producers through targeted investment such as training on demonstration plots. This is more effective in reaching people and can involve parallel planting to identify the difference between certified seeds and traditional (local) seeds. Gender inclusion is vital: youth as well as women should be targeted through more participatory technical training.
4. There is a need to document evidence on resilience to climatic changes and adapt potato production to climate change through efficient irrigation.
5. Consider nutrition aspects: through promoting increased production and sale of potato (more potato businesses) to enhance affordability of other foods for nutritional purposes; and integrating nutrition into the value chain for instance through sensitization on nutritional values of potato e.g. effective storage to retain nutrition value of potato.



Photo credit: AVCD/Muthoni Njiru.

Cyrus Bundi seen here with his wife Lucy from Meru County, has undergone training as a village -based advisor by the Internatioanal Potato Centre (CIP). He received 200 kg of certified potato seed samples, 100 kg for his demonstration plot and 100 kg to distribute in 1 kg sample units to 100 neighbouring farmers.

He provides best-practice potato farming knowledge and training to farmers in his village with additional assistance from his potato production and training manual.

'In the past, I would only harvest 150 kg (3 bags) of seed potato from my 1/8th acre plot but with this certified seed and planting techniques I just harvested a tonne (20 bags). I am very excited, I just cleared more land to plant more potatoes!' says Bundi.

'We will sell 10 bags (50 kg each) of the seed to pay from our firstborn's third term fees, she is in Form 3, he adds.'

AVCD program voices



Photo credit: AVCD/Muthoni Njiru

Selvin Odhiambo (right), wife and mother of six, sought the assistance of her neighbour and relative, Bernardus Agumba (left). As part of a United States Agency for International Development (USAID)-funded subsidized livestock breeding program, he agreed to lend one of his four cows to Odhiambo in order for her to start up her dairy farming. With four healthy dairy animals, he felt the need to support his neighbour in whatever way possible. The cow has now benefitted from the breeding program, delivering a female calf that will allow Odhiambo to produce milk for her home.

She received a healthy crossbred calf from her neighbour's cow after a successful pregnancy from fixed-time artificial insemination (FTAI). The sheer excitement in her eyes displays how Agumba's generosity has opened a new opportunity for her and her family.

'Odhiambo, is more than a relative, she is my friend and her six children need milk every day; the calf will help her achieve this,' said Agumba. 'She and her husband, who is my friend, have to look for school fees and buying a cow would have been too difficult because of their limited resources and need to care for six children. But dairy farming can change things for them.'



Photo credit: CIP/Vivian Atakos.

Caleb Wanyonyi and his wife Margaret (pictured above inspecting vines) have been part of AVCD since inception in 2016. The couple, who have 12 children, have been growing Kabode and Vita varieties of orange-fleshed sweetpotato (OFSP) on a section of their three-acre farm in Ndivisi division, Bungoma County. They sell the vines to the local community and to local non-governmental organizations who distribute them to farmers. The couple are referred to as decentralized vine multipliers (DVMs) for the role they play in availing sweetpotato planting material to their community.

Prior to start of their enterprise, the Wanyonyi's participated in a training session organized by CIP and the Ministry of Agriculture on production of OFSP vines and roots as well as marketing. They learnt how to produce and conserve clean sweetpotato planting material using low-cost insect-proof nets referred to as net tunnels.

'From the sale of the OFSP vines, we have been able to pay school fees for the children, buy food for the family and also plant other crops. We also bought a cow and more recently acquired a goat', they say.



H.E. Uhuru Kenyatta, president of Kenya, arrives at the Accelerated Value Chain Development (AVCD) program national conference. He is accompanied by Hon Mwangi Kiunjuri, cabinet secretary, Ministry of Agriculture and Irrigation, Kenya.

Photo credit: ILRI/Paul Karaimu.



H.E. Uhuru Kenyatta, president of Kenya, confers with Romano Kiome, AVCD program's chief of party. Looking on is H.E. Robert Godec, the US ambassador to Kenya.

Photo credit: CIP.



Accelerated Value Chain Development (AVCD) program

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