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

Feed the Future Kenya Accelerated Value Chain Development Program (AVCD)

Stories of Impact

FROM THE DROUGHT TOLERANT CROPS VALUE CHAIN

Implemented by

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

USAID FROM THE AMERICAN PEOPLE

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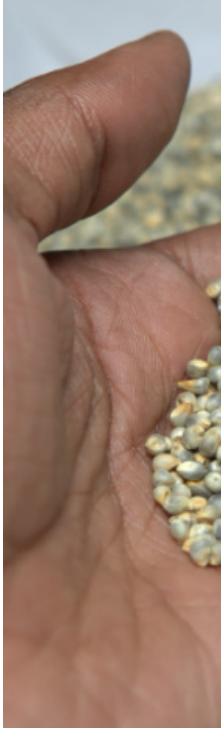
Acronyms and synonyms

AVCD	Accelerated Value Chain Development Program
CBO	Community Based Organization
DTC	Drought Tolerant Crops
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
KALRO	Kenya Agricultural & Livestock Research Organization
KEPHIS	Kenya Plant Health Inspectorate Services
USAID	United States Agency for International Development
2-4D	2,4-Dichlorophenoxyacetic acid



About the program

The Drought Tolerant Crops component of Feed the Future Kenya Accelerated Value Chain Development (AVCD) is a 3-year program (2015-18) working in Kenya to promote cereals and legumes that are not only climate smart but are also nutritious and offer an alternative to farmers in the drylands that have very few other options.

As part of the whole value chain development-the program has been working to improve household nutrition by diversifying diets, increasing household incomes from marketable surplus and mitigating the effects of climate change by ensuring that farm families have access to nutritious foods even in bad seasons.

The program team has been working to ensure production of breeder and foundation seed of the new varieties. They worked with multiple stakeholders to establish diverse seed delivery channels to ensure rapid and wide access to high quality and affordable seed by smallholder farmers, especially women and the youth. The mandate crops - pigeonpea, cowpea, green grams, groundnut, sorghum, and millets- in this program component, provides unique advantages for food and nutrition security, and livelihoods for farmers.

Message from the Chief of Party - AVCD Program

Dr. Romano Kiome (center) with project beneficiaries during a field visit.

In the Arid and the Semi-arid areas of Kenya, food and nutrition security is generally compounded by the lack of diversity of crops that can be grown in the harsh climatic and natural resources environments as well as poor infrastructure. In this region, one of the sure pathways to food security and nutrition are crops such as sorghum, pearl millets, and finger millets; pigeonpeas, green grams, and cowpeas that are drought tolerant and nutritious. However, the development of these crops has been constrained by lack of seed systems, low public-sector investment, lack of formal farmer-based organizations to provide extension, input supply, storage and marketing and value addition services to the smallholder farmers. Consequently, production of these crops is low and unable to transition from subsistence to farming as a business.

In the last three years, ICRISAT, with funding from the USAID Feed the Future program, has been implementing a program to address these constraints with improved technologies and innovation in this region of Kenya. The program which is referred to as Accelerated Value Chains Development (AVCD) Program seeks to accelerate the whole value chain development to inclusively increase food and nutrition security and reduce poverty among the smallholder farmers.

In this period the drought tolerant crops component of the AVCD program has reached over 144,000 smallholder households with improved high-quality seeds of various drought tolerant crops which have been planted in over 60,000 ha. of land area. To ensure that increased agricultural productivity translates into the consumption of more diverse and quality foods for women and children, AVCD program integrates agricultural and nutrition interventions. In this regard drought tolerant crops component has reached approximately 21,000 children under 2 years reached with nutrition messages and; over 7,000 women and youth trained in participatory cooking. It is anticipated that these children will no longer be exposed to high risks of malnourishment and stunting.

The stories contained in this document are an elaboration of the impact of the three years' work of this project. This work has been made possible by the financial support of USAID-KEA and collaboration of many partners who have worked closely with ICRISAT and the staff of County Governments to interact with the famers, traders and all stakeholders in the whole value chain development process to achieve these impacts.

Romano M. Kiome (PhD, CBS)

AVCD-Chief of Party/Program Manager

Message from the Project Team Leader – AVCD DTC

Dryland crops offer an opportunity for farmers in marginal areas to increase food production, increase livelihood opportunities and income, and improve their nutrition. This component of the AVCD project promoted the following crops: Sorghum, Finger millet, Pearl millet, Groundnut, Pigeonpea, Green grams and Cowpea.

To achieve its main objectives, the project carried out several activities towards increasing productivity through improved seed production, promotion of good agronomic practices (GAPs) and reduction of post-harvest losses by use of improved storage bags. Moreover, ICRISAT established partnerships with the County Agricultural Extension system and Egerton University to implement these activities in the various counties.

With surplus production, market linkages were created to take up the surplus production. This was achieved by partnering with Farm Africa. By using innovative approaches for aggregation and marketing, the farmers in all the six counties (Busia, Siaya, Kitui, Tharaka Nithi, Makueni and Elgeyo Marakwet) cumulatively realized a total of USD1Million for the sales of assorted grains in 2017-2018. For example, in 2016 farmers in Elgeyo Marakwet tripled the acreage grown to groundnut when they were linked to a reliable market.

The community education on the nutritional benefits of these crops, was done using various approaches in partnership with the County Departments of Health, Agriculture and Education. Using a variety of social networks, including the community health volunteers' network, approximately 100,000 families were reached in the past three years. It was apparent that nutrition education was important for dietary change, for lactating mothers and children under 2 years (0-23 months). Dietary diversity is important for combating malnutrition and stunting that hamper the mental growth of children.

These crops have shown greater returns on investment than maize, especially in the face of the threat of the Fall Army Worm. However, structural support for these crops remains rudimentary with little access to credit facilities and structured markets.

This project has demonstrated that smallholder farmers, when properly incentivized and provided with improved seed and training, can achieve household food security, especially in areas with unreliable rainfall, the dryland cereals and legumes performed better than maize and provided a harvest in situations where total crop failure would have occurred.

A major reason for the success of this component of the AVCD project is the partnerships that were developed with Egerton University, Farm Africa, County Governments and farmers. They provided invaluable support for the project and this is greatly acknowledged. Staff of partner institutions took up the project activities as part of their yearly workplans and implemented them with a lot of dedication. The SME's

that staked their own resources and facilities to take up our research products, have showed us that the private sector, if involved early in research and product development, can enhance the quality of research and products as well as uptake of the products. Other institutions, namely; Makerere University and Nairobi Technical Training Institute were instrumental in exploring new food products that have the potential to increase availability and accessibility to diverse food products.

To all our ICRISAT staff – we have shown that we can achieve a lot when we bring together our different strengths to enhance the livelihoods of smallholder farmers. I want to acknowledge the hard work of our technical staff and drivers that spent many days in the field to ensure activities were implemented in time.

Lastly, this project would not have been possible without funding support from USAID Feed the Future. This is greatly acknowledged. The AVCD project management team was always there to provide the necessary guidance – it was a great pleasure working with you. We acknowledge Dr. Romano Kiome for his leadership and willingness to make many trips to the field during the implementation of the project. We thank ILRI for coordinating the consortium and look forward to another opportunity for collaboration.

Moses Siambi, PhD

Regional and Research Program Director, ICRISAT-Eastern and Southern Africa

Note from the Editor

Dear Readers,

It gives us immense joy and satisfaction to bring you this booklet which is a collection of stories of how the AVCD - Drought Tolerant Crops Value Chain, has worked with individuals, businesses and communities to transform their livelihoods.

Whether by making available seed varieties of climate resilient crops, offering climate information services, building markets and linking farmers to buyers or helping communities diversify their diets.

I hope that you enjoy reading these stories as much as we enjoyed putting them together. They encouraged and assured us that our work on this project has been meaningful and impactful.

I wish to acknowledge the contributions of my colleagues - Njeri Maina and Eleanor Manyasa, who helped with the collection of these stories. We appreciate the efforts of all the Field Officers who made all the arrangements for the meetings with the project beneficiaries.

Special thanks to the entire project implementation team from ICRISAT, Farm Africa, Egerton University, county officials and farmers for all your insights into this work. Congratulations to you all for what you have achieved in this project!

For any queries or suggestions on this booklet please do not hesitate to contact me on the email address below.

Best wishes,

Christine Wangari
Communications Specialist, ICRISAT
c.wangari@cgiar.org

Making seed available for improved adoption of climate smart crops

The central problem facing climate smart crops such as sorghum, millets and pigeonpea, is how to accelerate the adoption of improved varieties– getting more farmers to grow the improved varieties.

Recent evidence suggests that the area planted to improved varieties of these crops averages at 40 percent in Eastern Africa. Moreover, only 26 percent of this area is planted to varieties released in the last 10-15 years. Thus, the adoption of improved varieties of these crops has not met expectations. One reason for low adoption is the challenge of scaling-up quality seed. To meet this challenge, ICRISAT Kenya team, in 2015, through the Feed the Future Kenya Accelerated Value Chain Development (AVCD) Program designed and started implementing a strategy to address three drivers of adoption.

These drivers are: **Awareness** – to create demand for seed; **Affordability** - making sure that it is affordable for farmers; and **Access** -making sure the seed is available when farmers need it.

Awareness

To create demand for improved seed, ICRISAT partnered with county departments of agriculture and health to create awareness about the importance of dryland cereals and legumes. This was in a bid to convince farmers to grow more not only for markets but also for their own consumption. As soon as farmers realized the value of these crops, they became eager to grow them. The project team also took them through various seed varieties available. The farmers then selected the best varieties suited to their needs, e.g. most productive, most nutritious and best tasting varieties

Affordability and Accessibility

For farmers to grow these crops in large quantities, the selected variety of seed has to be affordable and accessible. One of the strategies used to make sure that the seed was affordable and accessible was the use of the informal seed

A Nutrition Officer facilitating a nutrition education class in Makueni. **© ICRISAT**

system channels. This is whereby lead farmers are identified and trained to be producers of high-quality seeds that can then be shared with other farmers.

"We have partnered with County Departments of agriculture to mobilize suitable farmers with whom we can work with to multiply quality seed," explains Dr. Moses Siambi, ICRISAT Regional Director – Eastern and Southern Africa. "The farmers are given foundation seeds and trained on proper agronomic practices so that they can produce quality seeds, which can then be made available to other farmers in the communities"

Ms. Phyllis Nduva is a 65-year-old farmer from Mwaani Village, in Makueni County, Kenya. She is one of the beneficiaries of the AVCD program. She first learned about the program through a field day organized by ICRISAT in 2016. The program has been conducting participatory training sessions either at research stations or on selected farmers' fields, to promote new varieties and encourage farmers to grow drought tolerant crops.

> "They selected me as a seed producer and supplied me with improved seed of pearl millet, sorghum and green grams. We were trained on how to multiply the seeds while following the recommended agricultural practices," says Ms. Nduva.

Ms. Phyllis Nduva in her green grams farm. **© ICRISAT**

"Through the support and close monitoring of our progress by the ICRISAT staff, I have been very successful at producing seed. I sell the seed to other farmers in my community," she notes.

The AVCD project provided farmers with clean foundation seed and trained the farmers on how to produce subsequent foundation or certified seed while ensuring purity and quality.

"We provide the farmers with clean foundation seed and encouraged them to plant in isolation away from other varieties of the same crop. We also provide constant training services through site visits on how to maintain purity of the seed variety, from planting time up to the harvesting time. We monitor to make sure that varieties are threshed separately," Mr. Geoffrey Mutai explains. Mr. Mutai is a Research Technician at ICRISAT and is responsible for overseeing the AVCD project activities in Eastern Kenya region.

Impact

More than 450 farmers in the target counties received improved seed of the various drought tolerant crops and took up seed production as business ventures. As a result, more farmers like Phyllis, have managed to improve their quality of life, become more food secure and made some extra income to provide for other household needs. For instance, since Phyllis started her seed production venture, she has been able to qualify for loans to help her expand her business. "I am now my own boss," says Phyllis adding that she is now able to sustain her family mainly through farm income.

Phyllis' seed multiplication business has created employment for three permanent workers and several casual workers. She has made significant profits since she started. "I have made profits of at least KES 300,000 from this business. This has made me to afford college fees for my last-born child who is in the university." She grows sorghum and millet not only as a business, but she is also passionate about using and promoting them as nutritious foods.

> "I prepare dishes like Pilau and Chapati using sorghum," she tells us. "When people tell me that I do not age, I tell them it is as result of eating the traditional foods like millet, pigeonpea and green grams."

A farmer buying seed from the community seed bank. **© ICRISAT**

Providing seeds through community seed banks

To make seed more available and accessible to the communities, the AVCD project has established 24 Seed Banks in the target Counties. Community Seed Banks are forms of storage which farmers use to conserve and maintain access to quality seed. They are governed and managed by the farming community members. Seed Banks offer farmers high quality and more choices at affordable prices. They also offer a platform for farmers to sell seeds hence facilitating farmer's access to markets.

"We started by training farmers on seed production and management to ensure seeds stocked in the community seed bank are of superior quality," says Mr. Geoffrey Mutai, ICRISAT technician, Eastern Kenya region. "These community banks help to ensure availability of high-quality seed of improved varieties in communities. The seeds available at the seed banks are sold at affordable prices," he adds insisting that having better access to quality seed helps farmers produce more for household consumption and surplus for sale.

According to 45-year-old Ms. Elizabeth Muthiani from Makueni, community Seed Banks play a significant role in

communities. Elizabeth runs Kimundi Stores, a community seed bank in Wote, Makueni. She notes that farmers in her community are now more organized since the community Seed Bank was set up.

“The farmers are now able to multiply, save and exchange seed to ensure they always have quality seeds” says Elizabeth. “It also gives us a platform to sell our grains collectively thus helping us to get better prices. Selling individually is not easy.”

Private sector collaboration

Since 2015, ICRISAT in partnership with Egerton University, has enlisted the support of five seed companies to multiply and distribute high quality seeds of drought tolerant crops. One such company is Faida seed Ltd which is based in Nakuru town. “We mainly supply farmers in Nakuru, Bomet, Kericho and Uasin Gishu Counties,” says George Njihia, Operations Manager – Faida seed.

ICRISAT through Egerton University, supplies the company with groundnut foundation seed for multiplication. “We prefer seeds from Egerton and ICRISAT as they have higher germination rates. Faida seed strictly abides by the KEPHIS standards for seed purity which is 97.5 percent. Our seeds are always above 98 percent.”

Ensuring availability of quality seed is a strategy of the AVCD program. This strategy has played a critical role in enhancing adoption of new varieties thereby increasing productivity; enhancing food and nutrition security; and incomes.

“We plan strategically to ensure that quality seed gets to every farmer through agrovets as well as aggregation centers before the planting season begins,” adds Njihia.

Since 2016, Faida seed company has distributed over 35 tonnes of groundnut seed to over 2,000 farmers. In 2017 alone, the company made approximately KES 1,000,000 in profits from production and distribution of drought tolerant crops. This has helped the company expand its business, offering employment to over ten employees on a permanent contract and 30 more on casual basis. Access to better seeds has helped farmers increase their yield, and as a result, improve their livelihoods.

Faida seed company’s warehouse. **© ICRISAT**

Key highlights of achievement:

2016-2018

The project has:

Trained over **450 farmers** on community seed production.

Reached over **144,000 farmers** with approximately **1,000 tonnes** of certified and community produced seed of drought tolerant crops.
These crops were planted on a land area of approximately **60,000 ha.**

Trained over **144,000 farmers** on good agricultural practices in order to improve productivity.

>50%

Set up **24 community seed banks** to improve farmer access to improved seed at an affordable cost. Community seed banks have lowered the cost of seed by up to **50 percent** compared to commercial outlets.

Trained over **50,000 farmers** on improved postharvest handling and storage technologies including use of hermetic storage bags and use of mechanized threshing.

Providing climate information to farmers

Smallholder farmers tend to rely on collective experiences and traditional knowledge to help plan for their farming activities.

With climate change, however, the traditional knowledge of weather prediction is becoming unreliable due to changes in climate patterns.

Climate science and weather predictions have evolved over the years and can produce better predictions. The AVCD program devised and incorporated a strategy to empower farmers with this knowledge.

In 2017, the ICRISAT team worked with partners to develop a training curriculum/manual on climate information.

"The Farmers used to complain that information from the meteorological department comes late, usually after they have already planted," says Agnes Mwanzia, a student working in the project.

"If the farmers are aware that the season onset will be delayed, which means shortened cropping season, they can choose varieties that mature earlier," she adds.

Formative research and meetings with a variety of stakeholders were conducted to develop content and for validation. The manual was rolled out in 2017 and is used by Agricultural Extension officers to provide training to farmers on the use of climate information to help them manage and adapt to climate variability.

Since the roll out of the manual, extension officers have trained at least 500 farmers, majority of whom are members of youth and women groups. The training is combined with distribution of improved seed varieties of drought tolerant crops grown in the area. In Makueni, for example, the project team have distributed improved varieties of sorghum, pearl millet and pigeonpea, green grams and cowpea. The farmers then plant based on the climate information provided to them.

The climate information services team are working to ensure majority of farmers receive this training. "We have extracted key messages from the manual and produced fliers and leaflets which have been translated into Kiswahili. We are using them to conduct climate trainings in different wards," says Agnes.

Climate information training manual developed with support from AVCD. **© ICRISAT**

Key messages promoted by the climate information services team

- Farmers should focus more on high quality seed of drought tolerant crops.
- Farmers need to pay more attention from the start and end of a season so that they can be more prepared depending on the length of growing period.
- Farmers should keep in touch with agricultural extension officers to get more advice on recommended agricultural practices. They can be more prepared depending on the length of growing period.
- Farmers should practice crop rotation which reduces the level of inorganic fertilizer use.

Helping farmers fight the striga menace for better yields

Forty-nine-year-old, Jacob Okello is a smallholder farmer, who has been working with ICRISAT under the AVCD project. He was introduced to ICRISAT through a Ward Agricultural Officer in Busia County.

ICRISAT has trained more than 10,000 farmers on striga management in Western Kenya. Jacob is one of the farmers that has benefited from the training. Striga has been a challenge for him for a long time.

"I would lose more than three quarters of my crop because of striga attacks" Jacob says. This problem is now under control. "ICRISAT officers taught us how to control the striga weed. They gave us a herbicide called 2-4D and showed us how to spray. We were also encouraged to dig out the weeds and dispose them properly so that they do not grow back."

The productivity of his farm has since improved immensely. "Last season for example, I harvested 325 kg of sorghum from a ¾ of an acre piece of land and sold it locally at 60 shillings per kilo" he said. "The market was readily available. I sold some of the produce and left some for food for my family."

Mr. Jacob Okello at his farm in Aget village, Busia County. **© ICRISAT**

A striga infested sorghum plot in Busia. **© ICRISAT**

According to Mr. Daniel Ajaku, a Research Technician based at the ICRISAT Alupe station, Striga is a parasitic weed that constrains the growth of cereals in the sub humid areas of Africa. "The weed can easily be confused for flowers as they are very attractive," says Mr. Ajaku. "It is very prolific, and it can be easily disseminated by wind, animals and water it is very difficult to eradicate because it produces thousands of seeds. Since it cannot photosynthesize on its own, it drains nutrients off the plant to survive. The weed can cause up to 100 percent crop failure," he adds.

ICRISAT has been promoting ISM practices to manage Striga which include: hand pulling, weeding on time, intercropping with legumes like groundnuts, use of herbicide 2-4 D which kills all broad-leafed weeds, field sanitation, deep ploughing and increasing soil fertility.

According to Dr. Eric Manyasa – Sorghum Breeder at ICRISAT, a Striga plant produces thousands of seeds which can stay in the soil for over 20 years. Striga seed germination occurs when the right host is planted. Spraying Striga plant with 2-4D before flowering gradually reduces the Striga seeds in the soil and eventually depletes the seed over 3-5 seasons.

Farmers like Jacob have benefited in a variety of ways. He has been introduced to new sorghum, green gram, groundnut and finger millet varieties and received training on post- harvest management.

A total of **32 extension officers** have been trained and in turn trained over **10,000 farmers** on striga management in Busia and Siaya counties.

"Before this training, I did not know much about how to control striga, I did not know about the herbicide" says Jacob. "I used to leave Striga on the farm to dry after digging the weed out. It would then grow again," he laments.

He has, however, since switched from growing maize to farming hardy crops such as sorghum, finger millet and green grams in addition to the other crops. He has also switched from broadcast farming following training on crop husbandry.

Jacob enrolled as a trainer of other farmers. He educates others on how to control Striga in their farms.

"Getting rid of striga from my farm will not guarantee that it will not come back especially if my neighbors' farms are infected. I therefore decided to take up the responsibility of sensitizing my neighboring farmers on how to control striga."

"Since my involvement with this AVCD program, my economic status has improved, and my household is more food secure."

Aggregators help small scale farmers access markets

AVCD drought tolerant crops program, has been working with aggregators in project target counties to help link small holder farmers to interested buyers of dryland cereals and legumes.

> The project established a total of **38 aggregation centers** in the **six mandate counties** in Kenya and has successfully linked over **6000 farmers** through these centers.

Mr. Peter Mutegi from Tharaka Nithi county is one of the Aggregators under the AVCD project. “I have known the Project for three years now. The first time was at a meeting where I was linked with farmers who had been provided with seeds for planting and training in agronomy,” says Peter.

“My work involves registering farmers into CBOs and preparing Contracts with them. I provide them with fertilizers and pesticides on credit. We visit farmers and advise them on soil conservation and preparation before planting. We sell seeds at low prices on cash or credit to the farmers registered in the community- based organizations,” he explains.

Once the produce is ready the Aggregator buys the grain from the smallholder farmers and sells to the larger traders.

It is crucial that the grain submitted to the buyer is of high quality. “I ensure that the farmers use good quality seed and that they use canvas tarpaulins when harvesting and drying,” he emphasizes. “I also monitor my farmers to make sure that they practice crop rotation so that the soil fertility is not depleted”.

Aggregators play a critical role of ensuring that both producers and buyers get a win-win deal. “Farmers have bargaining power and are assured of ready market for their produce. On the other hand, I make it easy for buyers to access the amounts of grain they need and ensure that farmers are well trained to maintain the quality that the buyer wants,” Mutegi explains.

The project supported the Aggregators with agribusiness training and linked them to the Agricultural Finance Corporation for loans. This was an effort to resolve the challenge of lack of enough money to buy produce from farmers and pay them on time.

Mutegi’s business has grown tremendously since the partnership with the AVCD project. His social enterprise generates for him approximately KES 2 million every season. “Through support of this program, my company has been successful and has helped over 4,800 farmers to sell their produce,” says Mutegi.

Farmers deliver their pearl millet grain at an aggregation center in Tharaka Nithi. **© ICRISAT**

The case of groundnut aggregation in Elgeyo Marakwet

In Elgeyo Marakwet county, groundnut farmers formed a cooperative through which they sell their produce. AVCD supported the farmers to build the aggregation store which they use as a warehouse for collecting their produce in readiness for purchase by buyers. The store is based in Kapkayo market center, Soy-South sub-County.

"The project supported us to purchase a sheller which has helped ensure that our produce is of superior quality. It [the project] also provided a weighing scale which we use to measure grains" says Kipsang.

David Kipsang is the chairperson of the groundnut famers cooperative. According to Kipsang, before the project, farmers had a tough time marketing their produce.

"We used to sell shelled groundnuts to brokers at KES 80 in the morning. However, by midday, the price would drop to KES 60 and further down to KES 50 in the afternoon. We would desperately sell because we needed money to buy other commodities," he recalls.

In 2015, the project linked the farmers to Greenforest Ltd, a groundnut processing company based in Nairobi. The company has since been buying groundnuts from the cooperative in large quantities. In 2015, the company bought groundnuts from farmers worth KES 3 million. This gave the farmers motivation to expand the area planted to groundnuts.

"The next season, farmers sold groundnuts worth KES 6 million," says Kipsang.

Members of the Kapkayo Farmers' Cooperative. **© ICRISAT**

A groundnut aggregation center in Kapkayo. **© ICRISAT**

The introduction of a sheller in this community has helped increase efficiency in preparing for markets, which has increased the profitability of groundnuts.

"The sheller produces 30 bags per day, compared to the 1 bag a day they would get when shelling by hand. Before we got the sheller, we used to shell the groundnuts everywhere we went. For instance, in the market and at the Chief's Baraza," says Kipsang.

Since introducing the sheller, the academic performance of the students in the area has since improved. Kipsang argues that this is because the students who used to spend their time shelling groundnuts are now using their time to study.

"We have seen a change. The children have since improved their grades. Both primary and secondary schools in Kapkayo are now among the top performers in the zone" he says.

Uptake of improved groundnut varieties is on the rise in Elgeyo Marakwet County. "Production of groundnuts has more than tripled in the last three years after ICRISAT started the program from the initial 600 acres to at least 2,000 acres under cultivation," explains Mr. James Cheruiyot, Agricultural Officer, Soy South Ward.

"The area, which is characterized by low rainfall, is now known for green grams, groundnuts, cowpeas and sorghum," James continues. "Farmers have benefited a lot from this program. They have increased their incomes enabling them to give quality education to their children and improve their livelihoods."

"Groundnut farming has become very profitable for me," says Kipsang. "I have been able to educate my children, bought more land and a car,"

In 2017, members of the Kapkayo Cooperative harvested and deposited over 1,400 bags of groundnuts in the aggregation center which they sold for KES 25 million.

In 2015, farmers sold groundnuts worth
KES 3 million
doubling to
KES 6 million
the following season

Land under groundnuts production rose from
600 acres-2000 acres

In 2017,
1400 bags
of groundnuts in the aggregation center sold for
KES 25 million

Private processing companies find value in working with AVCD farmers

Eascom Foods, is one of the private food companies that have collaborated with the AVCD program in a bid to open up markets for groundnuts farmers in North Ugenya, Siaya County-Kenya.

"I run the company with my wife Lydia" says fifty-three-year- old, Charles Oloo, CEO- Eascom Foods company. "We started with Peanut butter and roasted peanuts, but we have since expanded to other products including peanut and sesame mix, pure peanut flour and composite flours of finger millet, cassava and sorghum."

Oloo whose background is in agriculture, used to be a seed producer and has now turned to value addition. "We prefer CG2 and ICGV90704 groundnut varieties for producing peanut butter and CG7 for roasted nuts," he says. CG7 variety is sweet, and its brown color is appealing. "It can be milled without removing the skin", he says.

Ms. Lydia Oloo at the Eascom shop. **© ICRISAT**

To ensure constant supply of groundnuts, Eastcom recruits two sets of farmers for seed and grain production respectively. The company then buys the seed from seed producers trained and provides them with foundation seed from the project. The high-quality seed is then sold to grain producers from which Eastcom buys the grain for value addition. "We used to buy groundnuts from Uganda, but now prefer to buy here in Kenya because farmers have now been trained properly to produce quality grain," he said. "Aflatoxin contamination is a major problem in groundnuts and thus quality is important".

With the support from AVCD project, Mr. Oloo is currently working with a number farmers this season.

He trains the farmers on the recommended crop husbandry practices and ensures that they follow the guidelines on post-harvest management.

Oloo's business, which he started with his personal savings, has taken off. His monthly sales volumes have increased progressively.

> "We sell about **4,000 kg of roasted nuts in a month, 21,000 kg of peanut butter** and **over 40,000 kg of composite flours**," he says.

"I am happy that my business is growing and has created permanent employment for five young people. I also employ casuals depending on the workload," he adds.

The biggest joy for Oloo is that his business has created a ready market for groundnut producers in North Ugenya.

"I have recruited three farmer groups who produce and supply us with raw materials. Siala women group in Sigomere has five members, Wamama Tuamue women group, has 28 members and Usonga groundnut producer farmer group in Alego has 30 members."

> The case of Eascom Foods shows that local processing companies, with enhanced capacity and proper engagement, have the potential to provide a ready market for small scale farmers.

Farmers linked to the East African Malting Limited Company

Farmers in the DTC Project of the AVCD program secured a contract from the East African Malting Limited through Agrisoko enterprises to supply white sorghum. Agrisoko is a private company that offers agribusiness solutions for rural farmers.

"We have been providing market linkages to sorghum farmers for the last 5 years. Our company targets farmers in the North and South rift, where there is high potential for sorghum production," says Anthony Ndirangu Wambugu, Director of Agrisoko Enterprises. "Our company makes sure that farmers are sensitized on the importance of planting quality seed sourced from certified companies, to uphold quality standards. Farmers have to be trained on post-harvest management," he adds.

Following the award of contract, Agrisoko enlisted the help of the program, to supply farmers improved seed to in the Kapkamak Irrigation Scheme in Arror. In addition, the program trained the farmers in crop husbandry and post-harvest management. Thirty-two-year-old Chebii Koech, a team leader at Kapkamak irrigation scheme, is one of the farmers benefiting from this new arrangement and had this to say.

"We signed the KES 1 Million contract with EABL in March 2018 after which we received a down payment of KES 600,000, says Chebii.

"ICRISAT and Egerton University officers gave us quality sorghum seed, which has resulted in high yields despite low rainfall this season. Our group produced 50,000 tonnes of white and red sorghum. 26 tonnes of this was white sorghum which was all delivered to EABL," says Chebii.

According to Chebii, the farmers were able to negotiate for better prices due to their numbers.

"Through the contract, we sold the sorghum at KES 30 per kilo, up from KES 23 per kilo when we used to sell through brokers," he said. "The payment received from the sorghum was used to pay school fees and buy other products for home consumption like fruits, vegetables and other food items."

50,000 tonnes
of red and white sorghum produced

In March 2018, farmers signed
KES 1million
contract with EABL

Farmers sold sorghum at **KES 30** per kilo up from **KES 23**

From left Dorah Achieng, Gabriel Odhiambo and Beatrice Auma members of Ayora Young Farmers Group in their farm in Kabarak village Siaya County. **© ICRISAT**

Creating income opportunities for the Youth

AVCD program pays special attention to the youth and recognizes the fact that young people are the future of farming.

Drought tolerant crops component of AVCD program, endeavored to create opportunities for integrating the youth in the value chains.

From building capacities of youth group members with agronomy skills to helping them set up businesses along the agricultural value chains. "Young people are easy to train because most of them have gone to school. They are also open to taking up new ideas easily," says Dr. Paul Kimurto, from Egerton University that implemented the project in Elgeyo Marakwet.

In 2017, ten young farmers from Ulamba sub-location, Siaya county came together to form a youth group called Ayora Young Farmers Group.

After graduating with a diploma in agriculture and unable to secure formal employment, Gabriel Odhiambo, the secretary of the youth group decided to pursue farming. Most of the group members are also graduates of different agricultural courses while others are still studying agriculture. The group was set up with a focus on crop and livestock production.

"Our involvement with the project started after a field day organized in Ulamba village, and we interacted with officers from ICRISAT who introduced us to finger millet and sorghum. Most of us were already farmers therefore when the idea of seed production was presented to us, we did not hesitate", said Odhiambo. "We were introduced to two new varieties of sorghum during a Participatory Varietal Selection (PVS) at the field day. We opted for IESV24029 SH which has a large head and is high yielding and is not easily damaged by birds. It also cannot be blown down by wind. The variety also stood out to us as we can plant it twice a year, says Odhiambo", he said.

The group members were lucky to be given 4 acres of land by their parents. They have planted the selected variety of sorghum on the entire piece of land.

> "Our crop has done so well, and from the **4 acres**, we are expecting about forty **90 kilo bags** of sorghum grain. We are not worried about market as we already have buyers," says Odhiambo.

"We had initially been approached by Kenya Breweries, but the variety we planted was not what they needed. This has motivated us, even more, to include that variety in our next season" he adds.

Top Link Youth Group is yet another group that has benefited from the AVCD Program. The group provides threshing, spraying and Extension services to farmers in West Gem in Siaya county. The group was conceptualized in 2017 after realizing that the ratio of Extension officers to farmers in the sub-county was very low.

"We saw an opportunity when the Fall Army Worm infestation struck our County, Farmers needed officers to assist them to combat the pest but there were very few officers, they couldn't serve the whole community,' said Immaculate Atieno the Chairperson of the group.

"Farmers needed spraying services and guidance on how to control the pest"

Top Link Youth Group also provides farmers with threshing and shelling services during harvest time.

"The use of manual methods of threshing not only lead to loss of yield, but is also time-consuming, labor intensive and costly" Immaculate tells us. "After our interaction with the AVCD project staff from ICRISAT and Ministry of Agriculture, we realized that there was opportunity in offering shelling and threshing services to farmers in our community. The project offered us a sheller and thresher for trial where farmers would only pay a small fee to cater for the cost of the operator and fuel for the machine" she adds.

The group now hires the threshers at KES 500 a day from the Agricultural Training and Development Centre (ATDC) after which they charge between KES 150-200 to thresh a bag of sorghum. The money made by the group from shelling caters for transport, operators fee, and fuel. The rest of the money is set aside for the group members to share.

"We encourage the farmers to aggregate their produce together to reduce the cost of threshing.

> The machines are very efficient as they can **thresh 20 bags a day.** We managed to make about **KES 60,000** during the past harvest season.

The money was divided among the members and the rest was set aside as savings."

The group also makes extra income through offering extension services to farmers at a fee. For the spraying services, the group charges KES 1,500-2,000 per acre depending on the pesticide being used.

The two-youth groups are a clear indicator that there are several opportunities for young people in agriculture. Government and development partners should therefore seek to tap into the potential of the youth to contribute to agricultural transformation.

Immaculate Atieno and Godfrey Oduor members of Top Link youth group. **© ICRISAT**

The young farmers expect to harvest **forty 90 kg bags** of sorghum from **4 acres**

KES 150-200 to thresh a bag of sorghum

The group charges **KES 1,500 - 2,000 per acre** for spraying charges


FLORENCE
TENA!

Promoting better post-harvest techniques in farming communities

To improve on the quality of harvested produce, AVCD drought tolerant crops team, has been training farmers on post-harvest handling. Post-harvest is the stage between harvest to consumption.

"Between 10-30% of produce is lost due to post harvest loses," informs Daniel Ajaku, ICRISAT Technician – Western Kenya region. "It is particularly hectic when dealing with small grained crops such as sorghum and finger millet."

Factors that contribute to post-harvest losses include: improper storage, hand threshing, threshing on open ground, rotting or molding due to moisture among others. To reduce these losses, ICRISAT rolled out a training program on post-harvest practices. The program has been promoting the use of tarpaulins for drying the crops, hermetic bags, or containers that are pest proof, and threshers in farming communities.

> The hermetic bags help prevent pests' attack. The bags have two layers of polyethene which locks the air and suffocates the weevils.

The project team organizes field days which are used as training platforms on how to use drudgery reducing machines such as the lifters, threshers and shellers.

Through the AVCD program, ICRISAT has bought threshers which are strategically placed at the KALRO Alupe research station for farmers to use. "We hire the machines at no cost," Ms. Rose Imoding, a farmer from Busia County tells us. "The only cost we incur is that of transportation and fuel for the machine. ICRISAT provides a machine operator in case a farmer is not conversant with the functioning of the machine."

"Before the program, we used to dry grain on bare land. This made the grains dirty thus reducing the quality." Rose explains. "I also engaged manual workers who would thresh using sticks. This would take an entire week and would result in grain breakage."

We also used traditional Uteo (plaited basket) smeared with cow dung, and we would store the grain in gunny bags which were not 100% safe from weevils and pests.

The losses were very discouraging for the farmers. "We would only farm enough to eat", Rose said. "This program has helped us start farming as business. Using threshing machines has proved to be very economical as it uses less time and energy", she concludes.

Ms. Rose Imoding using a multi-purpose thresher in Busia County, Kenya. **© ICRISAT**

Fighting food and nutrition insecurity through climate smart crops

Kenya is one of several East African countries where food shortages continue to persist, because of the devastating drought conditions. Statistics from the Kenya Red Cross indicate that almost three million people in Kenya are affected by drought.

However, the situation is improving in Busia county, one of the counties in Kenya where ICRISAT has been working with farmers to implement the AVCD program. Indeed, there is hope growing among farmers and a real potential solution to the situation.

Ms. Rashel Amoit, is one of the beneficiaries of the AVCD program. Before the project, she was barely earning an income from farming. As a result, she had challenges providing for her family of nine. She explains that her situation has since changed, and her life is different.

"When I joined the project through ICRISAT, I was given a 5 kg bag of groundnuts to plant by the Matayos sub-county department of agriculture. I planted the groundnuts and harvested a 100 kg bag which I shelled and gave back to ICRISAT the 5 kg seed that they had loaned me. They asked me whether I wanted to continue with the seed production, I gladly said, yes. I was selected to be a groundnuts role model farmer," Rashel explains.

The program has helped over 150,000 farmers replace their water-thirsty crops with drought tolerant crops.

"I used to work as a community health nurse," she continues. "But I have since left my nursing job to become a farmer. My wish is to promote farming as a source of nutritious food particularly for community members with special nutritional needs, particularly expectant mothers and children. They don't always have to buy food from the shops."

The program has been working to develop the whole value chain from 'farm to fork'. It sought to improve household nutrition by diversifying diets, increasing household incomes

Ms. Rashel Amoit admires her sorghum crop in her farm in Mabunge village, Busia County. **© ICRISAT**

Children enjoying finger millet ugali and cowpeas for lunch. **© ICRISAT**

and mitigating the effects of climate change. The project aimed at ensuring that farm families have access to nutritious food even in bad seasons.

One of the activities of the project was to educate farmers on crop-specific agronomic practices including water harvesting, intercropping, and conservation farming practices.

"I did not know when to plant, what crops are suitable for my area, the ideal varieties or even how to plant them. This Feed the Future program has helped me a lot. Now I know how to plant, what seed varieties to use and when to plant. I now know the crops which are more suitable for dry areas like here. Sorghum and groundnut farming has improved my life greatly. For example, last season, I made a profit of over $500 within a short period of time. I used this money to dig a borehole. Now I don't have to struggle with fetching water from the river anymore."

Focus on nutrition

The 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 with an objective to achieve both inclusive agriculture growth and improve nutrition status of communities. The team has partnered with county departments of agriculture and health and has reached over 60,000 households with nutrition messages and sensitized them on the nutritional value and health benefits of drought tolerant crops.

"My family now eats nutritious foods like finger millet, sorghum, groundnuts and green grams," Rashel says. "With green grams, I prepare stew to eat with chapati. I also make finger millet mandazi and sorghum porridge for my children. These grains are very smart. My husband and I together with the casual workers take porridge in the morning before going to work. These foods are rich in calcium, zinc and other important nutrients. They are particularly important for expectant mothers, so that their unborn babies can grow to be strong and healthy with strong immunity," she adds.

"I am very grateful to ICRISAT and Feed the Future for the education and support. I will continue with farming despite people's concerns that I may be getting too old for it. My advice to people who want to be successful in farming is to stay focused and dedicated."

Promoting dietary diversity in Kenya through multisectoral partnerships

ICRISAT through the Feed the Future Kenya Accelerated Value Chain program has been implementing nutrition behavior change promotion activities in Kenya.

Since 2016, the program has been promoting utilization of a diversity of nutritious foods, including locally produced crops such as sorghum, millets and legumes. The program has been creating awareness about the value of producing and consuming nutritious traditional grains, and promoting dietary diversity, in partnership with government officials from different sectors, mainly the departments of health, education and agriculture.

The nutrition activities are mapped along 3 nutrition impact pathways:

The pathways include educating the local population on the importance of dietary diversity, encouraging them to reserve produce for the household consumption. Moreover, social marketing approaches are being used to build markets for cereals and legumes, as well as supporting women with knowledge and skills on nutrition, energy saving technologies/innovations, and income generating activities.

"We did a baseline survey and found that most households consume less than three foods a day. For instance, women, ideally, are supposed to consume above five out of ten food groups. We found that our farmers were consuming less than that, meaning that they have poor quality diet," says Dr. Maureen Cheserek, Nutrition Specialist, AVCD DTC program.

To implement this program, ICRISAT forged partnerships with a variety of stakeholders in six counties in Kenya – Busia, Siaya, Kitui, Tharaka Nithi, Elgeyo Marakwet and Makueni – specifically partners from the departments of education, health and agriculture.

"We have trained trainers from the ministry of health and agriculture, and they have in turn trained the community health volunteers. The volunteers have learned the importance of agri-nutrition. We have taught them the importance of all these crops for their nutritional value

and resilience," Says Dr. Rhoda Nungo, Home Economist – KALRO. "Finger millet, for example, is rich in calcium. Pregnant women need that calcium to enable the fetus to grow."

Low awareness about the nutritional value of these foods as well as lack of knowledge on how to prepare them has been getting in the way of adoption of these foods in the communities. The project team therefore incorporated participatory cooking sessions into the training workshops to equip communities with skills to prepare diverse delicious meals which has helped change perceptions towards these traditional grains.

"We have been teaching the farmers how to prepare different foods from these crops. We have introduced them to new recipes for making a variety of products like mandazi, cakes, doughnuts and samosa from finger millet and sorghum," says Dr. Cheserek. "In the past they would only prepare ugali and porridge using these grains."

The project team has so far trained over 10,000 people in Kenya through 2-day nutrition workshops; trained over 8,000 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 behavior change communications activities.

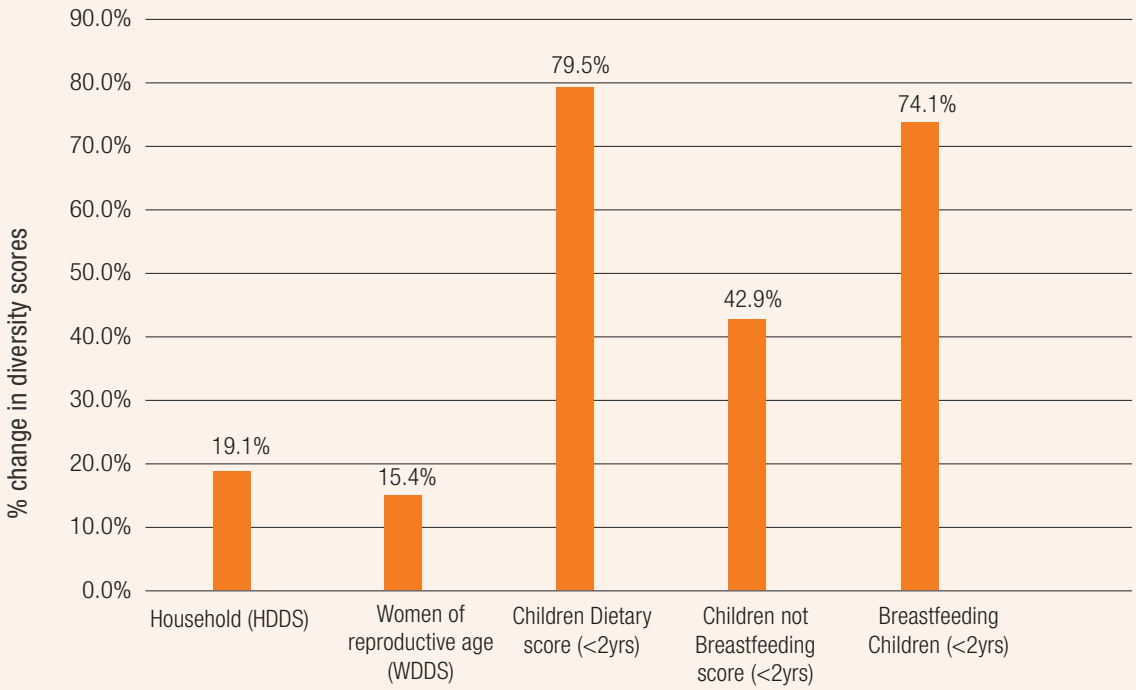
Farmers learn how to prepare samosas with pigeonpeas at a nutrition site in Elgeyo Marakwet. **© ICRISAT**

Through these activities, the initiative has impacted over 20,000 children below 2 years with nutrition messages through their parents.

All these activities are geared towards impacting on nutrition incomes of the rural communities and increasing utilization of nutritious traditional grain.

The project has registered considerable success. In only one year for example, women's and children's behavior changed significantly towards a more micronutrient diet. This is indicated by an increase by 15.4% of the dietary diversity score for women and of 79.5% of the children's dietary diversity score.

Fig. 1 Average changes in DDS from 2016 - 2017 in 6 counties



Key highlights of achievement:

2016-2018

The project has:

Trained over **10,000 men and women** in Kenya through 2-day nutrition training workshops.

Introduced at least **7 new nutritious recipes** to each of the 7,000 women and youth that took part in DTC cooking classes.

Reached over **80,000 households** with nutrition messages.

Reached over **21,000 children** below 2 years with nutrition messages through their parents.


GOLDEN
GOLDEN

Processors showcase pearl millet muffins developed during a value addition training. © ICRISAT

Business unusual – using a demand-pull approach to link farmers with consumers

In 2016, AVCD drought tolerant crops project team embarked on an awareness drive to promote drought tolerant crops. The aim of the drive is to promote utilization and drive commercialization of sorghum, millets and legumes so that dryland farmers can benefit.

ICRISAT and partners maintain that these crops are not only drought tolerant but are also nutritious, climate smart and have multiple uses to benefit farmers. Sorghum and millets for example, are rich in micronutrients and have low glycemic index. Drought tolerant crops have low water footprint, low levels of pesticides and inorganic fertilizers hence lower carbon footprint.

Despite their value, drought tolerant crops particularly millets and sorghum have been steadily losing their share of contribution to calories in Kenya to maize, rice and wheat. According to experts, the primary reasons for the low demand of these cereals are low productivity, poor image and lack of product development.

DTCs are largely grown and consumed by poor farmers so these nutritious grains have a reputation of being a poor man's food. Furthermore, these grains are mostly available in traditional markets rather than in modern supermarket chains, further reflecting their depiction as poor man's food. To meet new food market demands it is particularly important that products are convenient and provide variety and novelty.

"We believe that these crops have tremendous value and are important for diversification and complementing other foods", says Dr. Moses Siambi, ICRISAT ESA Regional Director. "They are critical for both farmers and consumers because of their high nutritional value and resilience under extreme weather conditions".

> The overall goal of the awareness drive is to improve the nutritional status and incomes of smallholder drought tolerant crops farmers by increasing demand for the crops thereby increasing sustainable productivity and reducing poverty. To achieve this, the project aimed at increasing the levels of awareness and utilization of millets and pulses.

The project team took on a demand-pull approach targeting consumers in a bid to build new markets for farmers' produce. "With this approach our aim was to increase demand for drought tolerant crops and document the impact the interventions would have on smallholder farmers, and processors" says, Ms. Christine Wangari, Communications Specialist. "We have been using social marketing techniques to stimulate interest and participation", Christine adds.

The project team started by conducting a formative research on both the supply and the demand side for the drought tolerant crops. "On the supply side, we worked with small-scale farmers who grow these foods and on the demand side we worked with processors who could potentially sell or increase their sales of DTC products", Christine explains. "On the demand side, we worked with chefs and food scientists to develop different ways in which these grains can be used. We also used both mass and digital media to disseminate messages to the consumers".

> The team developed a television reality show which was used to promote drought tolerant crops (DTCs). The show demonstrated many ways in which DTCs can be prepared to meet demands of consumers for delicious, nutritious, and convenient food. Season 1 of the show aired on a national television channel and on social media channels. **Over 800,000 viewers were reached every week** through the show.

"The fact is that a cooking competitions and social media engagement activities can generate great interest and reach and is one of the more effective ways to promote food" says Christine.

For the awareness drive to be successful, it is important to ensure that consumers have access to a range of DTC food products. For this reason, the AVCD Project joined hands with Makerere University to develop new products targeting rural and urban consumers.

> The products were to be under two categories - for the urban market and rural market. The products developed include a finger millet pancake mix, a sprouted pearl millet and pigeonpea weaning product, an instant pearl millet and pigeonpea porridge, an all-purpose sorghum flour, and all-purpose pearl millet flour.

Pearl millet muffins made using the all-purpose pearl millet flour product. **© ICRISAT**

Dr. Julia Kigozi (left) with her team of students that worked on the product development project. **© ICRISAT**

The product development research process begun with characterization of grain and flour. "We evaluated **5 varieties of finger millet**, **5 varieties of white sorghum**, **3 varieties of pearl millet** and **3 varieties of pigeonpea**", said Dr. Julia Kigozi, Makerere University.

The product development team prepared products using different flour formulations for each grain variety. These products were then subjected to a sensory evaluation. "Panelists were instructed to evaluate appearance, color, flavor, aroma, taste, mouth feel and overall acceptability of the products" says Dr. Kigozi in her report.

The consumer feedback helped the team select the best varieties and best formulations for the different products. For example, ACC#32 and GULUE finger millet varieties were selected as the best for pancakes at 80% finger millet and 20% wheat formulation.

These products were then introduced and promoted among 53 processors in four counties in Kenya – Busia, Siaya, Elgeyo Marakwet and Makueni. Over 92% of the processors were willing to adopt at least one of the products in their businesses – with the millet muffins being the most preferred by the rural processors. "The products are very exceptional", says Kiprotich Kiplagat, a food processor from Kapkayo village in Elgeyo Marakwet. "The products can be sold in supermarkets and are even viable for export", he adds.

According to Ms. Kathleen Malesi, a food specialist consultant working with the project, the newly developed products are envisioned to encourage more people to consume the drought tolerant crops and create a demand for the raw materials from the farmers. "We have received positive feedback from processors and consumers" says Kathleen.

The project, during the extension phase plans to continue building capacities of DTC processors in Kenya through trainings and business linkages in a bid to encourage adoption of the new commercial products.

Processors from Elgeyo Marakwet County – Kenya. **© ICRISAT**

Using photovoice to assess impacts of behavior change nutrition activities in Tharaka Nithi County - Kenya

Photovoice is a qualitative method used for community-based participatory research to document and reflect reality. It is an empowering and flexible process that combines photography with grassroots social action and is commonly used in the fields of community development, international development, public health, and education.

The ICRISAT nutrition behavior change team used photovoice methodology to assess the impact of activities implemented in one of the AVCD mandate counties – Tharaka Nithi.

“We used the photographs as our tool for data collection”, says Ms. Catherine Mwema, Researcher – ICRISAT. “We generated samples from two areas – a treatment site where nutrition activities had taken place and a control site where no activities had taken place”.

The team worked in partnership with the Tharaka Nithi department of health. “With the help of Public Health Officers, we were able to select 30 respondents from each area of mixed gender and ages to get a more representative sample”.

“Since 2016, we have been implementing the nutrition activities in Tharaka Nithi county basically targeting Marimanti, Chiakariga and Igambangombe wards within Tharaka Nithi county” says Cornellius Muendo – Public

Mr. Wambugu during a photography training session with participants. **© ICRISAT**

Health Officer – Tharaka Nithi county. "For the assessment, we decided to do our comparison between Marimanti and Gatunga ward. The respondents were selected based on a simple random sampling."

> The respondents were taken through a full day photography training with a certified photography trainer and were given cameras to use for their homework which was to capture photos of all foods consumed for the next 24 hours.

Mr. Wambugu introduced the respondents to the IXUS 175 and IXUS 177 digital cameras and demonstrated how to operate them. "They learned to tell a story using a camera," he says.

On Day One, the 30 participants were introduced to photography and the power of photography in society to tell stories. They were then given an assignment after they had learnt how to caption pictures.

"On Day Two we went to see what they were doing and what they were capturing. It was very interesting to see them trying to implement what they had learnt," says Mr Wambugu.

After the pictures were printed, the respondents went to the data collection point and used the photos to enter information about the food and ingredients used.

It was found that the photographs of foods consumed in the last 24 hours were an effective evidence-based approach that eliminated the challenges of the recall method.

Mr Simon Nyaga, Nutritionist, Tharaka Nithi, says that he found the exercise very useful. ""It captured information about foods that mothers, and their children consumed in their homes. They did not have to strain to recall what they ate. The photos were a ready reference for us to assess the legume/cereal ratio and to understand if the meal was balanced," Mr Simon adds.

Results from the assessment showed that dietary diversity scores for children and women of reproductive age were four points higher and 1.8 points higher respectively in the treatment area as compared to the non-treatment area.

The Photovoice exercise found that most women were not using diverse food groups.

There was a significant difference between the utilization of sorghum, millets and legumes in Gatunga (control or 'no treatment' site) and that in Marimanti (treatment site). Mothers from Marimanti used a greater variety of food groups in addition to the cereals and legumes. Mr Simon says, "Apart from legumes like cowpea and pigeonpea, they were taking vegetables and fruit. Mothers from Marimanti were also adding protein from animal sources, which is highly recommended."

"We need evidence-based reporting wherein researchers are sure that what happened on the ground is exactly what is reported by the respondent," says Mr Muendo.

Photovoice fulfilled this precise requirement of the researchers in Tharaka Nithi with very satisfactory results.

Photos from the 'no-treatment' households demonstrate low legume: cereal ratio. **© Project participants**

Photos from the treatment site reveal more food groups. **© Project participants**

ICRISAT appreciates the support of the following partners in the implementation of the AVCD DTC project:

Egerton University, KARLO and Farm Africa

County departments of agriculture, health and education –
Kitui, Makueni, Tharaka Nithi, Busia, Siaya and Elgeyo Marakwet.

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We believe all people have a right to nutritious food and a better livelihood.

ICRISAT works in agricultural research for development across the drylands of Africa and Asia, making farming profitable for smallholder farmers while reducing malnutrition and environmental degradation.

We work across the entire value chain from developing new varieties to agri-business and linking farmers to markets.

ICRISAT-India (Headquarters)
Patancheru, Telangana, India
icrisat@cgiar.org

ICRISAT-Liaison Office
New Delhi, India

ICRISAT-Mali (Regional hub WCA)
Bamako, Mali
icrisat-w-mali@cgiar.org

ICRISAT-Niger
Niamey, Niger
icrisatsc@cgiar.org

ICRISAT-Nigeria
Kano, Nigeria
icrisat-kano@cgiar.org

ICRISAT-Kenya (Regional hub ESA)
Nairobi, Kenya
icrisat-nairobi@cgiar.org

ICRISAT-Ethiopia
Addis Ababa, Ethiopia
icrisat-addis@cgiar.org

ICRISAT-Malawi
Lilongwe, Malawi
icrisat-malawi@cgiar.org

ICRISAT-Mozambique
Maputo, Mozambique
icrisatmoz@panintra.com

ICRISAT-Zimbabwe
Bulawayo, Zimbabwe
icrisatzw@cgiar.org

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