



Ministry of Foreign Affairs of the Netherlands



The Drylands Development Programme

Kenya

SOLAR IRRIGATION PUMP

FUTUREPUMP
SFI

An overview of approach and achievements

Programme overview

The Drylands Development Programme (DryDev) is a farmer-led initiative that aims to contribute towards a vision where smallholder farmers in dryland areas of Mali, Niger, Burkina Faso, Ethiopia and Kenya transition from subsistence farming and emergency aid to sustainable rural development.

In Kenya, DryDev is implemented in the lower eastern counties of Machakos, Makueni and Kitui.

To achieve its goal, the programme has employed an integrated approach designed to:

- increase food and water security;
- enhance market and financial access; and
- create an enabling policy environment.

Context-specific interventions are tailored for each sub-location¹, and delivered in an integrated manner through eight Work Packages (WPs) which collectively contribute towards the achievement of programme outcomes.

DryDev is funded by the Ministry of Foreign Affairs of the Netherlands (DGIS) through the World Agroforestry Centre (ICRAF) as the overall implementing agency, with substantial contribution from World Vision Australia.

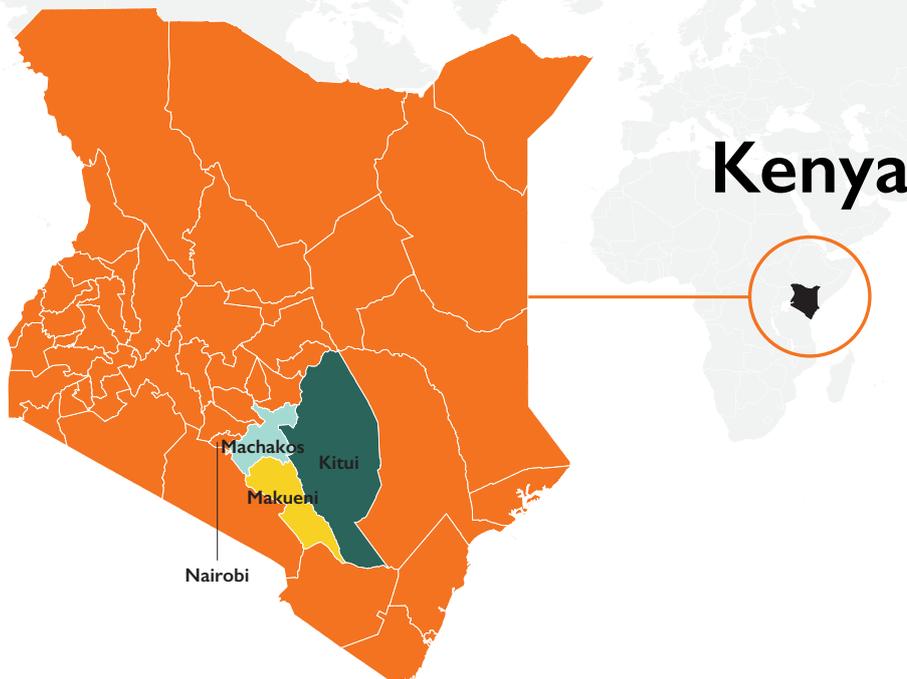
The programme implementation context

Drylands make up 43 percent of land area in Africa and are home to nearly 325 million people. Relatively neglected by governments and starved of private sector investment, poverty rates tend to be particularly high in these areas. This reflects the challenges associated with reliance on rainfed agriculture in soils degraded by continuous use and without replenishment. Lack of commercialisation and poor connectivity to markets further hinder rural development in these areas.

Dryland areas in Kenya make up over 80 percent of the country's land surface and are home for 60 percent of the national livestock population^{2,3}. Rural poverty in these areas is relatively high and is partly driven by unsustainable use of natural resources resulting in low productivity. As such, DryDev aims to address this by working with rural communities living in partly degraded sub-catchments or those at risk of degradation to improve the resilience of the land and its people.

DryDev is being implemented in 28 sub-locations within six sub-counties in Machakos (Yatta and Mwala), Makueni (Mbooni and Kibwezi East) and Kitui (Mwingi and Kitui Rural) counties (Figure 1). The 28 sub-locations are all found within six sub-catchments: Miindu, Mathautta, Upper Enziu, Mid Tiva, Upper Kambu, and Kalawa/Thwake. These areas are all categorised as semi-arid (i.e. having an average annual rainfall of 400-800mm) and with a high incidence of poverty and population density.

Figure 1: DryDev target counties in Kenya



1. Sub-locations are the lowest administrative units under the National Government headed by an assistant chief.
2. Ministry of Devolution and ASAL, Government of Kenya (2018) ASAL Counties. Available online at: <http://www.devolutionasals.go.ke/dasall/>, accessed on 19 December 2018.
3. IUCN (2011). Appreciating Kenya's Drylands. Available online at <https://www.iucn.org/content/appreciating-kenya's-drylands>, accessed on 19 December 2018.

Implementation structure

World Vision Kenya is the National Lead Organisation of DryDev Kenya and provides country-level coordination, working with ICRAF to guide and oversee implementation.

The programme’s country consortium includes three other implementing partners: Caritas Kenya (working in Makueni County), Adventist Development and Relief Agency (ADRA) Kenya (working in Kitui County) and the Netherlands Development Organisation (SNV) Kenya (working in all three counties). World Vision Kenya is implementing the programme in Machakos County and also supports all implementing

partners in executing certain interventions, such as institutional strengthening and policy influencing across all counties.

Programme approach

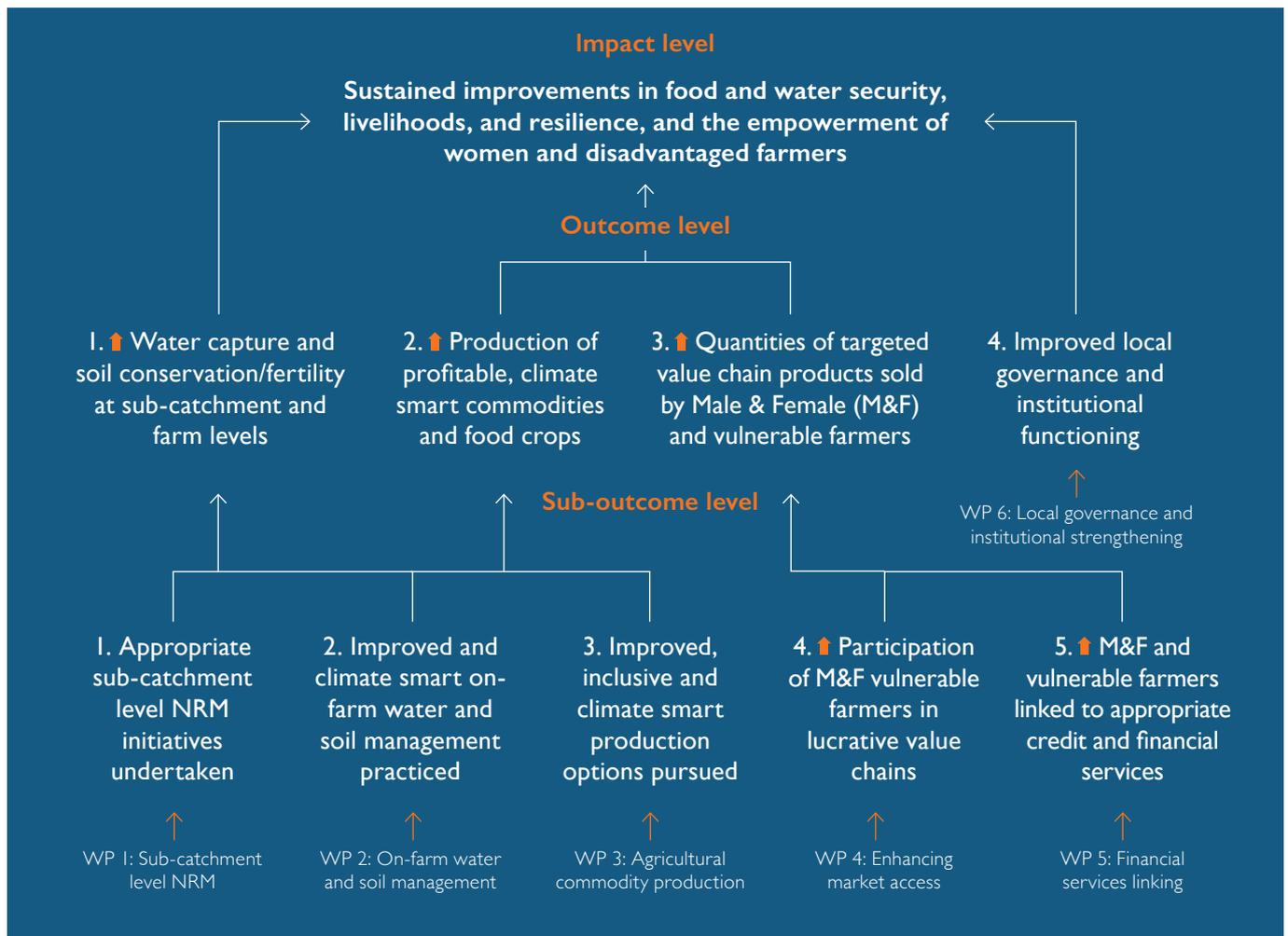
The DryDev programme employs multi-layered and interconnected WPs designed to catalyse transformational development as guided by two complementary and overarching “theories of change”.

The first theory of change is focused on DryDev’s direct development work with farmers and how these interventions will contribute towards sustained improvements in rural development (Figure 2). The second theory of change, led

by ICRAF, is focused on promoting the uptake of evidence and learning generated by the programme, and on influencing wider policy, practice and investment decisions.

DryDev’s approach recognises that the circumstances and environments of smallholder farmers vary considerably and intervention options may not be self-evident to farmers or experts. Options, or activities, must be tailored to suit each context. Consequently, implementing partners work alongside rural communities in a participatory, bottom-up manner to customise the options. These options are grouped into interlocking WPs that form the basis for DryDev’s theories of change:

Figure 2: Overarching theory of change guiding DryDev’s direct work with farmers



1. Sub-catchment level natural resource management.
2. On-farm water and soil management.
3. Agricultural commodity production.
4. Enhancing market access.
5. Financial services linking.
6. Local governance and institutional strengthening.
7. Planning, monitoring and evaluation, and scaling of learning.⁴
8. Policy analysis and influencing.

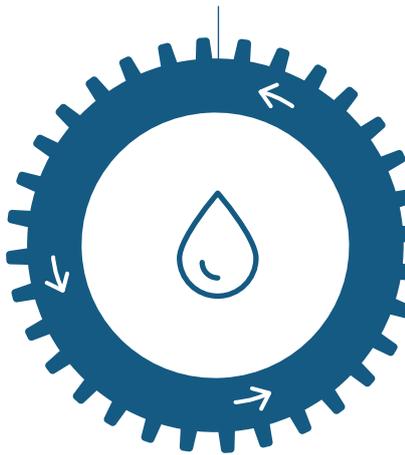
When the DryDev programme commenced in Kenya, communities in sub-catchments nominated men, women and youth to participate in Community Action Planning, a participatory, bottom-up visioning and planning process. Interventions in the various DryDev Work Packages were then contextualised to align and fit local realities.

Later, these plans were harmonised with Water Resources User Associations' (WRUAs)⁵ sub-catchment management plans (SCMPs) to align implementation, maximise

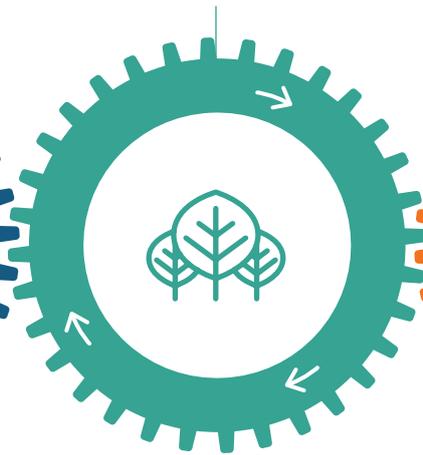
the benefits of DryDev interventions and enhance sustainability of outcomes.

4. Work Packages 7 and 8 relate to the second theory of change, which focuses on promoting the uptake of programme-generated evidence and learning by policy makers for upscaling. For more information, visit <https://drydev.org>.
5. WRUAs are community-based associations established for collaborative management of water resources and resolution of conflicts concerning the use of water resources under Kenya's Water Act. WRUAs existed before DryDev though most were dormant. DryDev revived them, seeing their potential as a sustainable platform for management of natural resources.

Landcare methods restore hydrological balance and improve access to water



Farmers are assisted in converting water into increased production, and improving soil fertility on farm lands



Food security and market-derived income increased



Drone photo of DryDev programme area

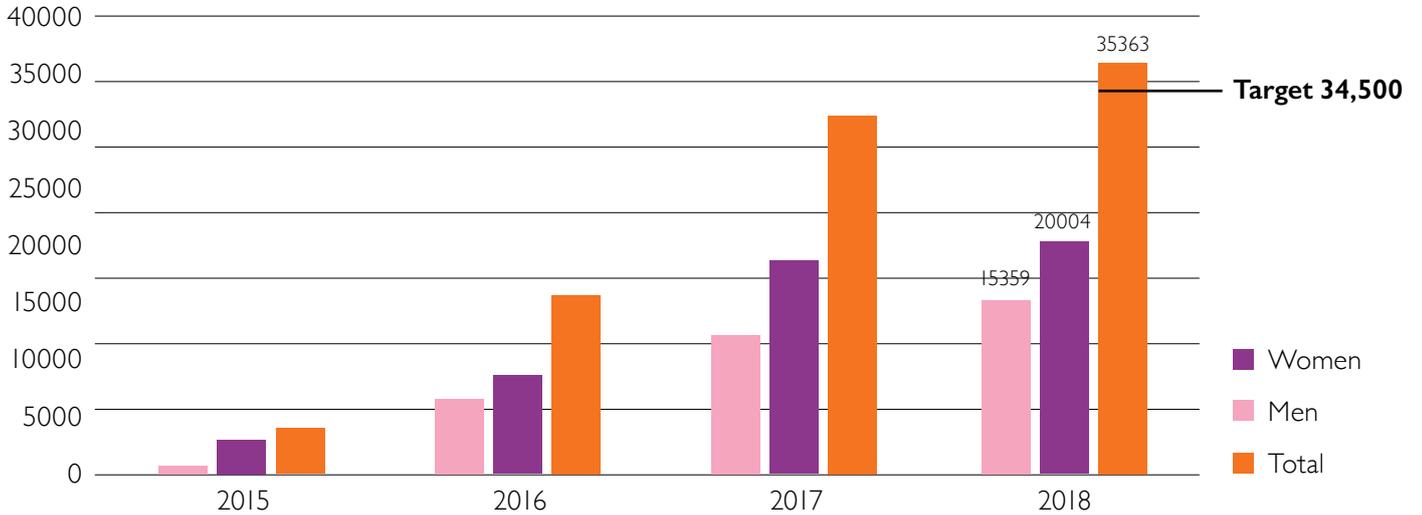


Community member participating in tree planting, Kitui

Programme achievements in Kenya as of December 2018

By the end of December 2018, DryDev Kenya had reached **35,363 farmers, including 20,004 women, rehabilitating a total area of 8,201 hectares.**

Figure 3: Farmers reached by DryDev in Kenya



Progress against sub-outcomes

WPI: Landscapes improved

In total, 8,201 hectares of land have been put under restoration interventions and 20,509 people including 9,199 women have participated in these activities. Landscape restoration is a challenge in Kenya: all land is privately owned, so an approach different to what would be applied on communal

or publicly owned land is required to convince people to rehabilitate degraded areas. DryDev Kenya has employed a two-pronged approach:

1. working with WRUAs to rehabilitate highly degraded riparian lands and prevent future degradation; and
2. creating demonstration sites on individual farmers' plots to enable communities to see it is possible to restore degraded areas through various biological and

physical interventions such as tree planting, Farmer Managed Natural Regeneration and terracing.

DryDev worked in partnership with six WRUAs to protect 119km of riparian land bordering river banks and constructed 39 sand dams. DryDev also established 23 demonstration sites in consultation with WRUAs and government partners.



Reborn rivers – the story of the Miindu WRUA

WRUAs were identified as a viable vehicle for sustainable community-based natural resource management. However, when DryDev began, most WRUAs in the programme area had few members and all were dormant.

A participatory diagnosis took place to understand the barriers to success for WRUAs and the gaps were identified. These gaps were limited understanding among WRUA members of their mandate and sub-catchment management approaches, weak resource mobilisation mechanisms, absent/outdated Sub-Catchment Management Plans (SCMPs) and general institutional gaps.

DryDev, in partnership with the Water Resources Authority⁷, invested in strengthening WRUA capacity.

Miindu WRUA in Machakos County covers the Miindu River catchment, an area of approximately 94km². The perennial Miu River and the seasonal languni and Ndumbuli rivers drain into this sub-catchment. Illegal large-scale sand harvesting and riparian land encroachment have led to the depletion and pollution of water sources and catchment degradation. Logging of trees for charcoal burning has contributed to the formation of gullies and increased damage to river banks.

Miindu WRUA has created wider awareness on riparian land policy. The Community Action Plan was harmonised with SCMPs and the community was mobilised for implementation. Ten sand dams were constructed. Community members contributed labour, sand and stones while DryDev provided technical support and construction materials.

In addition, local bylaws were developed on the protection and use of natural resources and trees were planted.

This has resulted in a remarkable reduction in illegal sand harvesting in the Miu, languni and Ndumbuli rivers. With more sand in the storage dams, there has been an increase in water levels in shallow wells and increased water recharge along the riparian area.

Over 900 households are now able to access water for domestic use throughout the year while 13,550 livestock (goats and cattle) have also benefited. This has reduced walking distances and time taken by households to collect water, which means there is more time for farming and other productive activities. Farmers have reported increased farm productivity as a result of increased water availability; they can now practise micro-irrigation for the production of tomatoes and kale, and sufficient water is now available for beekeeping.

7. The Water Resources Authority is a government entity established under the Kenya Water Act 2002 (revised in 2012) and mandated to manage the country's water resources.



WRUA members guide and contribute towards sand dam construction and tree planting on river banks, Machakos



WRUA members pegging riparian areas, Machakos

WP2: On-farm soil and water-management improved

At the farm level, interventions have increased access to water for farmers through the introduction of rainwater harvesting. Run-off diversion schemes capture rainwater and direct it into farm ponds. Water-lifting devices, including solar motor pumps, treadle pumps and furrows, direct this water onto crops. Simultaneously, moisture retention and water-efficient technologies such as zai pits⁶, drip irrigation, fertility trenches and sunken beds were also promoted. Farmers were trained on applying rainwater harvesting techniques, combining these with fertility management practices such as composting, use of farmyard manure, micro-dosing of inorganic fertiliser and use of fertiliser trees.

These soil and water management options reached 17,707 farmers (9,234 women), with 8,081 farmers (5,244 women) participating in training on soil and water conservation and soil fertility management. According to the DryDev Uptake and Sub-outcome Survey, by the end of 2017, **80 percent of farmers from participating sub-catchments were practising soil and water conservation and 88 percent were practising soil fertility management practices** promoted by the programme.



Crops growing in zai pits, Kitui

WP3: Inclusive and climate-smart production improved

Farmers have adopted climate-smart production practices that seek to increase yields and productivity of crops and livestock in increasingly drier climates.

For example, farmers are encouraged to specialise in crops or varieties that are less susceptible to climatic variability and/or sharp fluctuations in market price, such as shorter-season crops like green gram.

The programme has also facilitated the establishment of a local seed system where farmers have been trained as seed producers. Community-based seed multiplication is now taking place with certification from the Kenya Agricultural and Livestock Research Organization. Seed producers have contracts to sell to Simlaw Seed Company. They also sell to farmers groups who procure seed in bulk and sell it to members on cash or credit.

In total, 20,711 farmers (14,754 women) have been trained on climate-smart production, and 22,926 farmers (11,089 women) have been linked to improved inputs for crops and livestock. Some 343 producer groups have been established and they all developed business plans to guide their production.

DryDev Kenya's 2017 Uptake and Sub-outcome Survey showed 42 percent of farmers were practising climate-smart production techniques in DryDev programme sites. A rapid assessment of households participating in DryDev indicated the proportion of households consuming their own produce had significantly increased for most food items such as cereals, roots, pulses, milk, eggs, fruits and vegetables, indicating greater dietary diversity.

6. Zai pits are small rainwater-harvesting pits for growing crops



Farmers producing maize for markets

Co-learning

Farmers were empowered to find the best solutions to some of the long-term challenges they were facing, such as pest control in storage facilities and tree survival. With guidance from technical experts, they set up planned comparisons and experimented with various options, compared the results and decided on the best solution to suit their context. In total, 1,337 farmers participated in tree planting and pest control planned comparisons respectively.

Maize production under the zai pit system has increased yields from three 90kg bags per acre to between seven and eight 90kg bags per acre.

(DryDev External Review, 2018: drydev.org)



Pigeon pea grower, Kitui

Farm ponds changing lives

In dryland areas, water scarcity is a constant challenge for farmers, leaving them struggling to meet basic survival needs. Such was the experience of Magdalene Mwende from Machakos County until 2016.

Things started to change after she joined the DryDev Programme and attended a training session on rainwater harvesting. Magdalene recalled that most of the people attending the training didn't believe water could be retained and had concerns about evaporation.

After the training she and her husband wanted to build a farm pond. But they couldn't afford to buy a dam liner. Being an early adopter, Magdalene was selected by the programme to receive support in building the pond, with the understanding that her farm would be used as a demonstration site.

Magdalene's family dug the pond and the programme assisted with a pond liner. Initially, she used buckets to lift water from the pond, but now she uses a solar water pump, provided by DryDev, which has greatly reduced her workload.

The farm pond enables her family to produce vegetables (kale, spinach, onion, tomato and capsicum) to consume at home and sell, and to provide ample water for livestock. Vegetable growing is profitable because the demand in the area is high. From the sale of kale alone, she is earning an average of 800 shillings (US\$8) per day. Magdalene was excited to share her experience:

“We sometimes wonder why we didn't think all along about having a pond and solving the water problem,” she said. “Income from vegetables are fully saved and we use them to pay school fees.”

Members from her own Mwangaza Farmers Group and other farmers visit her farm and she is excited that those who attended training with her, and were sceptical, are now convinced. So far, three farmers have completed excavation for their own ponds; two more are in progress and 10 others have pegged areas for excavation. Her husband trained as an artisan through the programme and is helping others with the siting of ponds, for which he is paid.

By borrowing from her savings and loan group strengthened by DryDev, Magdalene bought a water tank to harvest water for drinking. After completing training in poultry raising, also through DryDev, her family started raising an improved breed. She calls them an “emergency stop gap”, in that when the family needs a small amount of cash, she sells a bird or two.

They have also changed their post-harvest management practices after attending training on the use of hermetic bags instead of pesticides.

Magdalene is a farmer transformed. Her farm is a wonderful example of integrated farming. *“Nothing is wasted here. Weeds are food for cows, kale is food for poultry and both cows and poultry provide manure for the farm. We don't need to use fertiliser.”*

She believes her family is one step ahead of other farmers in the area because of DryDev and hopes others will also take initiative and work hard to improve their lives.



Farm pond being used for irrigation in a greenhouse, Machakos

Innovative practices

DryDev Kenya has promoted various innovative practices to help farmers understand the use of technology and its benefits. These include:

Drip irrigation

Drip irrigation is a micro-irrigation system suitable for fruit tree orchards, and short-season horticulture crops that saves water and nutrients by allowing water to drip slowly to the plants' roots. Drip irrigation can be more efficient than other types of irrigation systems, such as surface irrigation or sprinkler irrigation. DryDev Kenya established demonstration sites combined with farm pond technologies to help farmers understand the water use efficiencies associated with the drip system. 4,444 farmers (1,742 women) have been reached.

Measured irrigation

Measured irrigation is a scheduling method for drip irrigation that distributes water according to net evaporation, thus using up to 50 percent less water than

programmed irrigation scheduling. The system is automated and therefore frees up farmers' time for other activities. Measured irrigation is well suited to the needs of smallholder farmers in poorer countries. At almost no cost, a farmer can upgrade a gravity-fed drip irrigation system to measured irrigation. DryDev Kenya supported four farmers to establish a measured irrigation system and facilitated other farmers to visit these sites for learning.

Two-wheel tractor

As the majority of smallholder farmers in DryDev sites in Kenya have been women, devices like a two-wheel tractor, that can reduce labour and save time, are a worthwhile investment. DryDev supported four farmers groups to obtain two-wheel tractors on a cost sharing basis and this has benefited 1,376 farmers including 889 women.

Capillary wick irrigation system

The Capillary Wick Irrigation System (CWIS) is a sub-irrigation system that uses a device to deliver water by capillary movement from a reservoir to the plant growing

medium. Sub-irrigation systems save on labour, time and watering costs compared to conventional watering systems. Four CWIS units have been set up in the fields of four women farmers and other farmers are visiting these sites for learning.

Seeding of denuded land using seed balls

In partnership with SeedBalls Kenya, DryDev has experimented with growing seedlings in-field using seed balls, in which seeds are embedded into a charcoal dust ball mixed with nutritious binders. The biochar coating of the ball protects the seed from birds, rodents, insects, and extremes of temperature until the rains arrive. Once soaked, the seed ball helps retain and prolong a moist environment around the seed to encourage germination. Participating farmers broadcast seeds in denuded areas using this technique. As a result, high tree growth has been observed compared with transplanting potted seedlings, and costs are much lower than for conventional tree planting.



Extension staff demonstrating the use of a two-wheel tractor, Machakos



Measured irrigation disperses water according to ambient conditions through drip irrigation on watermelons, Machakos

WP4: Participation of farmers in lucrative value chains increased

DryDev Kenya promoted seven value chains and 11,004 farmers (6,746 women) have participated in these. Farmers were organised into

producer groups and then producer groups formed community-based organisations (CBOs). CBOs were then confederated into cooperatives and registered with the Attorney General's Office under the Cooperatives

Societies Act 1997. This institutional arrangement builds sustainability into the work initiated by DryDev.

Indigenous chickens hatch success

Kienyeji (indigenous) chickens are in high demand in Kitui County and beyond. However, limited access to chicks for breeding has been a problem for farmers in the area.

Priscilla Musili is a progressive farmer participating in DryDev Kenya. Seeing the potential for income generation, she wanted to start producing *Kienyeji* chicks to help diversify her income.

So, in early 2018 she took out a loan from a microfinance institution (MFI) linked through

the programme to purchase an egg incubator. By the end of 2018, she had sold 1,200 chicks at 100 shillings (US\$1) each, earning her 120,000 shillings (US\$1,200). She also kept some chicks to raise herself and there was huge potential for expansion.

Development organisations and other groups have started placing orders with her for batches of chicks and the county government is using her farm as an extension field school to support farmer exchange visits.

Some farmers who bought chicks from Priscilla's hatchery in 2018 came together to form the Waita Poultry Farmers Group with the aim of learning, producing and marketing poultry together.

Successful poultry businesses require close attention to monitor the chicks' environment and to follow prices in markets. By working together as a group, and through DryDev facilitation, the farmers now exchange information regarding prevention and control of poultry disease and have formed links with other players in the value chain and like-minded partners for expansion and marketing.



The poultry value chain has a huge expansion and income potential

Figure 4: DryDev Kenya value chain commodities and achievements

Commodity	Number of participants	Key achievements
Green grams (Machakos, Kitui, Makueni)	6,398 (4,361 women)	<ul style="list-style-type: none"> • All marketing groups are linked to green gram buyers. • In 2018, marketing groups supported by DryDev sold 80 metric tonnes of green grams in collective marketing initiatives generating revenue of 5,975,840 shillings (US\$59,758). • Intensive capacity building on post-harvest handling and collaborative learning on pest control and warehouse management systems have seen increased adoption by farmers of hermetic bags, storage bins and pesticides to reduce post-harvest losses. • Farmer organisations are trained and practising value addition by sorting, grading, packaging and storage of pulses.
Honey (Kitui, Makueni)	1,172 (361 women)	<ul style="list-style-type: none"> • Mwingi Beekeepers successfully formed the Mwingi Beekeepers and Crops Cooperative to market their produce and the Mwingi Beekeepers Savings and Credit Cooperative (SACCO) to enhance members' access to finance. • Honey collected in raw form is being processed and packaged into 0.5 and 1kg tins for sale. The cooperative also sells honey by-products at an outlet in Mwingi. • 4,359kgs of honey were sold in 2018 at an average price of 704 shillings per kg (US\$7), generating total revenue of 3,068,384 shillings (US\$30,684).
Indigenous chickens (Kitui, Machakos, Makueni)	6,398 (4,361 women)	<ul style="list-style-type: none"> • Most DryDev farmers have embraced income diversification by investing in the indigenous chicken value chain alongside crop production. • As a result of exposure visits, most chicken farmers have gained knowledge on how to formulate home feeds using local raw materials. The "Sweat is Sweet" poultry group in Mwala is engaged in poultry feed formulation and several other groups are in the process of starting feed formulation businesses. • The Ngengi Self Help Group has been linked to a buyer and is already selling poultry to EastMeat, a company that supplies fresh meat to most Kenyan supermarkets. • The Nzamu CBO in Makueni County has constructed a demonstration poultry house for training purposes in Nzambani. It has also set up a 300-capacity hatcher and a brooder and is now selling day-old chicks to its members.



Commodity	Number of participants	Key achievements
Mango (Machakos)	402 (157 women)	<ul style="list-style-type: none"> • Farmers are now selling collectively after establishing links with various buyers such as Vert Limited and the Makueni Fruit Processing Plant. • In 2018, the Mwala Fruit co-op sold 8,000 pieces of fruit collectively at eight shillings each (US\$0.08), much better than the farm gate price of five shillings (US\$0.05). • To enhance the co-op's post-harvest management ability, Mwala Fruit Growers Cooperative Society is installing a charcoal cooler on a cost sharing basis with DryDev.
Goat (Makueni)	183 (121 women)	<ul style="list-style-type: none"> • DryDev farmers identified an opportunity to improve their goat-raising activities by breeding larger-sized Galla goats that fetch better prices (up to 15,000 shillings (US\$150) each compared to 4,000 shillings (US\$40) each for smaller sized goats). • 106 women producer group members raised 315 Galla goats in 18 months through a cross-breeding programme involving 127 Small East African does and 35 Galla bucks. It is estimated that they would have only produced 127 offspring over the same time period without this innovation. • The Taa Wa Aka Ma Nzvii group sold over 100 Galla goats in 2018. • Demand for the Galla goat breed by local farmers is now quite high. Some farmers have identified an opportunity to raise Galla breeding stock which they can sell at enhanced prices.
Cowpeas and Pigeon peas (Machakos, Makueni, Kitui)	6,398 (4,361 women)	<ul style="list-style-type: none"> • The appeal of cowpeas at household level makes them a perfect value chain for food security and for commercial purposes. Most farmers in DryDev sites cultivate cowpeas for home consumption. • Most buyers for green grams also buy cowpeas.



WP5: Access to financial services for farmers increased

Farmers' access to financial services is an essential element of rural commercialisation. However, limited financial literacy, as well as lack of access to credit among smallholder farmers, were identified as barriers in the programme's baseline survey (2014).

Therefore, DryDev Kenya, through the Training of Trainers and Farmer Trainer approaches, provided financial literacy training to **12,570 farmers (4,337 women) from 211 producer groups**. To increase access to savings and credit services, 393 savings groups have been established or strengthened by the programme and farmers have been linked to 14 financial institutions. These linkages enabled farmers to access credit worth 15,769,910 shillings (US\$157,699) from various financial institutions (MFIs, banks and SACCOs).

In addition, according to the DryDev Uptake and Sub-outcome Survey (2017), the average savings per savings group member have increased from **US\$34 in 2016 to US\$97 in 2017⁸; the number of those who have now obtained a loan had increased by 79.6 percent in 2018**.

8. The DryDev Uptake Survey (2017) has been the source of this information as no survey was conducted at the end of 2018.

Use of Information and Communication Technology (ICT)

Access to reliable, accurate and timely information helps farmers make informed decisions to minimise losses and improve productivity. The use of ICT systems enhances timely delivery of quality information directly to farmers. DryDev Kenya employed the following ICT methods to disseminate information and impart knowledge to farmers on various aspects of farming and marketing:

Digital Classroom System (using smart projectors)

This targets leaders of farmer organisations, all farmers, government extension officers, staff from other development organisations and other stakeholders in the agriculture sector. The smart projectors are loaded with presentations and 52 videos from reliable websites and other sources. The videos include farming, marketing and service information on seven value chains (Figure 4) and have been viewed by 7,051 farmers (4,352 women) over the past two years.

iShamba (SMS-based platform)

This targets leaders of farmer organisations, all farmers, government extension officers, staff from other development organisations, farm input providers and other stakeholders in the agriculture sector. Information on finances, farming, market prices and weather is sent to subscribers in the local language. So far, 8,851 DryDev farmers (5,724 women) are iShamba subscribers receiving information regularly.

Radio broadcasts

In partnership with Royal Media Services, DryDev ran a five-week campaign via Musyi FM Radio Station where farmer testimonies on the use and benefits of various technologies were broadcast both in local and English languages. These broadcasts reached over 400,000 farmers multiple times. This is generating interest among many farmers in learning and testing these technologies.



The Smart Projector is an investment that greatly assists knowledge dissemination

WP6: Local duty-bearers and farmer organisations capacity developed

To reach the 34,500 farmers targeted by the programme, DryDev has worked through farmer organisations and has made significant contributions to capacity building for these local institutions.

These contributions have involved:

- assessing the capacity of farmer organisations;
- action oriented institutional capacity strengthening;
- facilitating access to better quality inputs, extension services and profitable markets; and
- promoting linkages with relevant local government structures and institutions at the village, ward, sub-county and county levels.

To date, 1,950 farmers (877 women) from 241 farmer organisations and 240 farmers (121 women) from six WRUAs have been trained on governance and transformational leadership in partnership with the Ministry of Gender & Social Development and the Water Resources Authority. The groups are now more cohesive and working together to realise their objectives.

The programme has also focused on strengthening local government institutions so they can better support farmers. Some 599 (197 women) county and national government staff have been trained in good governance and have started playing a proactive role in project planning, community mobilisation and support, implementation and monitoring of DryDev programme initiatives.

To improve extension service delivery, a key government mandate, the programme has successfully

piloted a farmer-to-farmer extension system. In total, 1,761 farmers were trained to become Farmer Extension Service Providers. They in turn have led technology transfer among, and enhanced the skills and knowledge of 35,363 farmers over a period of three years.

Forums between local government institutions and farmer organisations have been facilitated to address existing and emerging issues, as well as to enhance government accountability and service provision.



Training of local duty-bearers



Kamuu Nzuvie Ngusuvie self help group meeting, Machakos

Impact of the DryDev Programme in Kenya

A quasi-experimental design has been set in place by ICRAF to evaluate and assess the programme's impact by the end of the implementation phase in July 2019. Two additional pieces of evidence document the impact of the DryDev programme:

- the DryDev 2018 External Review (refer to drydev.org) undertaken by an external evaluation team; and
- the preliminary impact assessment study undertaken in 2019 by DryDev Kenya.

DryDev External Review

The external review, commissioned by DGIS, was undertaken by an independent evaluation firm in May 2018. The report concluded that:

- The DryDev programme in Kenya has shown clear progress and results so far.
- The interventions chosen were relevant and in line with both the national and county government agenda.
- Capital-intensive interventions at sub-catchment level, such as the establishment of sand dams, gabions and terraces, are being taken up and taken over by county governments in other sub-catchments because such interventions are already historically applied in these counties. In this uptake and replication, specific DryDev approaches and innovations are taken into account.
- Attitude change was noted by county representatives as the most impressive change resulting from farmers' interaction with DryDev.

The community attitude has changed from that of desperation to hope. The community no longer expects free food aid from the government but asks for investment in interventions that will help them become self-reliant for food and water at the community and household level.

- The programme has helped to improve living standards in targeted communities by enabling farmers to increase their incomes by participating in DryDev-selected value chains. Their level of dependency on food aid has been reduced and in some places the reviewers observed that farmers no longer need food aid but do need support to produce their own food. This has given the farmers a sense of confidence and strong belief that they can work towards achieving food security without relying on aid.



Farmer Managed Natural Regeneration of a formerly denuded site, Machakos

Preliminary impact assessment

A sample of 362 randomly selected households participating in the programme were surveyed in January 2019 and the results were compared with the baseline survey conducted in December 2014. It was found that:

The percentage of households reporting any hungry months decreased from
72 percent to 46 percent
 and the average number of hungry months reduced from 3.87 to 1.55.

Household Dietary Diversity⁹ increased from

4.4 to 9

indicating people are consuming food from more food groups resulting in more balanced diets¹⁰.

The proportion of households consuming food they have produced themselves
has significantly increased for most food items

such as cereals, roots, pulses, milk, eggs, fruits and vegetables, indicating increased dietary diversity.

There has been a decrease in reliance on various food shortage coping strategies such as eating less, borrowing and skipping meals. There has also been a

95 percent decrease

in households where children eat less during hungry months.

There has been a

35 percent increase

in the household assets index score, indicating improved household economic capacity.

9. Household dietary diversity can be described as the number of food groups consumed by a household over a given reference period, and is an important indicator of food security for many reasons. In general, any increase in household dietary diversity reflects an improvement in the household's diet (Swindale et al., 2006). The household score will range from 0-12 and is equal to the total number of food groups consumed by the household.

10. Difference in measurement time/season might have some effect on this change. The baseline measure was taken in November/December which is a food shortage time, whereas this measure was taken in late January, i.e. harvest time.

Key learnings and recommendations

Use an integrated approach:

DryDev facilitated the integration of natural resources management, livelihoods and value chain development, as well as the creation of an enabling environment within a specific landscape domain. Farmers' participation through WRUAs and producer groups, policy alignment and close working relationships with relevant county departments have been instrumental in implementation of an integrated approach.

Align programmes with government policy and implement them through government structures:

Landscape management becomes complex in the Kenyan context where land is owned by individuals

and not the state. Aligning the programme with government policy on riparian land management and working through WRUAs have been helpful in implementing DryDev interventions and have enhanced the sustainability of the results achieved.

Use bottom-up planning and contextualise appropriately:

DryDev adopted a series of scaling principles in order to ensure the programme interventions remained farmer-driven and site-specific. Options or interventions that may be appropriate in one dryland context may not be relevant in others, therefore local knowledge and community input were integral in selecting options. Such an approach is likely to drive sustainability as a consequence of community ownership.

Learn and communicate together:

During programme implementation, DryDev worked diligently to clearly define roles and responsibilities between partners, stakeholders and farmer organisations. A complex programme like DryDev requires clear communication and coordinated actions to succeed and this has been successfully managed in Kenya.

Establish systems to complement existing ones:

If the programme had relied only on the currently overstretched government extension system, it could not have achieved its targets. DryDev established a complementary, farmer-to-farmer extension system that helped it achieve its intended results.



Farmers have better yields due to improved soil and water management and innovative practices



**Transforming the lives of
smallholder farmers
in dryland areas and helping
them transition to sustainable
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