

CONSERVATION AGRICULTURE NEWSLETTER



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CA Plus Enhances Irrigation Efficiency

**Neil Rowe Miller, Agriculture and
Livelihoods Technical Advisor for
eastern Africa**

Farmers who use Conservation Agriculture Plus (CA-Plus) are increasingly interested in combining these practices with irrigation. CA-Plus alone is a powerful tool to reduce the effects of climate uncertainty. However, severe droughts, such as that being experienced by parts of eastern Africa in recent years, illustrate the fact that in many environments, supplemental water is sometimes necessary to reap the full benefits of CA-Plus.



Soil cover dramatically reduces evaporation losses as illustrated by these maize plants growing side-by-side in bare soil (left) and mulched soil (right).

The good news is that CA-Plus principles and practices often increase the effectiveness and efficiency of irrigation technologies. Keeping soils undisturbed, and covered with live plants and/or dead mulch is extremely effective in reducing evaporation of water from the soil surface. Such practices can readily cut evaporation losses in half, meaning that if a farmer has a fixed amount of irrigation water, they can dramatically increase the land area on which they can grow irrigated crops.

Intercropping, another common CA-Plus practice, can also increase irrigation water efficiency. Intercrops may be deep-rooted perennials, such as *Gliricidia sepium*, which provide dispersed shade and reduced air movement, both of which can reduce water losses and plant stress in hot-dry, tropical environments. Tall, annual crops, such as maize, can be used in a similar fashion, to shade a sun-sensitive main crop, while providing secondary

income through their own production. Tomato farmers, for example, sometimes plant maize at a wide spacing between their tomatoes in order to reduce sun scald and heat stress on their main crop.

The limiting factor in undertaking irrigated CA-Plus is often the lack of available irrigation water. Only roughly [4% of cultivated land in sub-Saharan Africa is irrigated](#), while 3-4 times this amount could potentially be irrigated. Gravity-fed irrigation through damming of rivers and streams is only possible in a limited number of locations. This potential can and should certainly be captured by expanding development of irrigation schemes. However, such schemes often require very large financial investments in dams, and some create negative environmental impacts (e.g. destruction of habitat, restriction of down-stream water for other users).



This two-acre tomato field in Rwanda benefits from the dispersed shade of maize plants which were interplanted at a wide spacing.

Where dams are not feasible, surface water can also be pumped from rivers or lakes. If resources allow, such pumps can be powered by petrol or diesel engines, or even two-wheeled tractors. If the height and distance from source to field is relatively small, hand or foot-powered pumps may be appropriate. [Treadle pumps](#), which can be manufactured locally, are currently being used by an [estimated 2 million small scale farmers](#) worldwide.

An oft-cited alternative to gravity-fed irrigation schemes is small-scale water catchment and storage. Some proponents of such schemes don't seem to appreciate the quantity of water needed for agricultural production. A $\frac{1}{4}$ acre (0.0625 ha) field using 25 cm of water throughout a growing season, needs a total of over 300 sq m of water. If one factors in a modest seepage rate and evaporation losses, in order to irrigate this field, a farmer would need to collect roughly 30% more than this, or enough water to fill a pond 5 m deep, 8 m wide and 10 m long. Excavating the roughly 400 tons of soil for a pond of this size by hand is not small undertaking. And in soils with higher permeability, a rubber liner may be needed at a cost of around \$1,500-2,000 USD.

These calculations are not meant to discourage farmers and NGOs from undertaking water catchment schemes. In fact, a recent study identified East and West Africa along with Southeast Asia as the areas of the world with the highest potential for agricultural water harvesting. However, we need to be realistic about what we can achieve with water catchment, and to target such efforts to production of high value crops, on soils where water seepage and storage losses will be minimal.

And most of all, **irrigation systems MUST be combined with CA-Plus practices** which will, as noted above, drastically reduce the volume of water which needs to be pumped, or captured and stored, to produce a crop.

CARD expands CA-Plus to winter production with irrigation

Frequent drought and cyclones over the past two years have challenged farmers in southern Malawi. CARD project participants have responded by expanding their cropping season with irrigation. This, combined with CA-Plus practices has improved their food security through staple grain production and cash income through production of green maize and vegetable crops. Water availability is not a challenge since the Shire River runs the year-round. However, they face the challenge of getting the water to the crop via pumps or by hand.



Nature-Based Solutions

Mike Salomons, Agriculture and Livelihoods Technical Advisor

The worsening impacts of climate change and biodiversity loss around the world have led many to conclude that applying technologies like Conservation Agriculture (CA) at the field or farm scale alone is only part of the solution. Governments, NGOs and farmers also need to work towards restoration and conservation of the larger, surrounding environment. There are many different terms used to describe this type of programming, including Integrated Landscape Management and Ecosystem-Based Adaptation. Other proponents, including the leaders of the G7 countries in their [2030 Nature Compact](#), refer to these as Nature Based Solutions (NBS). Such approaches combine food systems work with broader ecosystem-level actions to enhance human well-being as well as restore ecological functionality, leading to more resilient and sustainable landscapes.



Nature-Based Solutions include many widely promoted practices, including CA-Plus.

WHAT ARE NATURE-BASED SOLUTIONS?

Nature Based Solutions can include many of the approaches and technologies that development agencies currently promote; including CA, farmer managed natural regeneration, soil and water conservation, etc.) Whether or not these approaches are 'Nature Based' depends very much on HOW they are used. CA, for example, can be used to grow large monocultures of maize and soybean while ignoring or damaging ecosystem

resources such as forests or riparian areas. Carbon credit schemes can take land from local communities for the benefit large multi-national companies and foreign interests.

Some critics have dismissed NBS as just another distraction from the transformative change that is needed to make food systems more sustainable, resilient to climate change and other shocks and stresses, and productive and profitable for all. To address these concerns, and to establish a framework from which NBS approaches can be evaluated, the International Union for the Conservation of Nature (IUCN) has led a global, participatory process to clearly define Nature Based Solutions. [According to IUCN](#), eight principles characterize Nature Based Solutions:

- 1. They effectively address societal challenges** – NBS address priority societal challenges such as food insecurity or job creation.
- 2. They are designed at a landscape scale** – They move beyond individual farm level planning and implementation to a social ecological system level.
- 3. They result in a net increase in biodiversity and ecosystem integrity** - NBS must work towards transforming degraded environments into thriving ecosystems.
- 4. They are economically viable** – NBS must result in both economic and social benefits to farmers and other stakeholders who are involved in its implementation.
- 5. They are based on inclusive, transparent, and empowering governance processes** – Without addressing power and people’s rights, NBS cannot lead to transformative change.
- 6. They balance trade-offs between their primary goals and broader interests** – While trade-offs cannot be avoided, they can be effectively managed through transparent and inclusive processes.
- 7. They are managed adaptively, based on evidence** – Involving local communities and stakeholders in design, management, and monitoring and evaluation.
- 8. They align with and impact appropriate national and global policy contexts.**

Canadian Foodgrains Bank is increasingly interested in [programming which falls within the NBS framework](#). Developing locally-led solutions to food insecurity, which also address global concerns like climate change, is key to finding long-lasting solutions in the communities where we work.

Partner Profile: Anglican Development Services Central Rift, Kenya

John Kimathi Mbae Agriculture and Livelihoods Technical Advisor for Eastern Africa

Anglican Development Services (ADS) is a specialised Development arm of the Anglican Church of Kenya. ADS-Central Rift (ADSCR) is an ADS regional organization that serves Nakuru, Baringo, Samburu, Laikipia and Nyandarua Counties. ADSCR has undertaken community development programs since 1961. It is affiliated with the Dioceses of Nakuru, Baringo, Maralal and Nyahururu, and serves as their development arm. ADSCR is a partner of World Renew who is a member of Canadian Foodgrains Bank.

ADSCR's mission is to improve the livelihoods of marginalized communities in Central Rift through integrated relief and development programs in dynamic environments characterized by cultural, political and economic diversity. Since its establishment, it has been promoting sustainable agriculture and livelihoods development to address food insecurity and poverty. ADSCR has been promoting Conservation Agriculture (CA) techniques among small-holder farmers from poor and vulnerable communities. These farmers have been affected by drought due to extreme environmental challenges exacerbated by climate change.

SCALING-UP CONSERVATION AGRICULTURE PROGRAM

ADSCR was one of eleven organizations which implemented the Scaling-Up Conservation Agriculture (SUCA) program from 2015 to 2021. The organization worked with 842 male and 1145 female smallholder farmers, promoting CA-Plus practices including minimizing tillage, keeping soils covered with green cover crops and dry mulch, crop rotation/association to reduce pests and diseases and increase production, precision planting, soil fertility improvement through manuring and fertilizer use, weed management, and timely planting.



Samuel Kinuthia stands next to his CA Plus maize

Through this project, participating farmers achieved:

- **Improved farm production** – By adopting CA-Plus, farmers increased maize production to an average of over 800 kg/acre, with the highest production achieved at over 4,000 kg/ha. beans.
- **Increased food security** – Months of adequate household food provisioning increased to 11 months.
- **Formation of marketing groups** – Through the SUCA project, ADSCR trained farmers group in marketing activities, which led to the formation of 20 market aggregation groups. Four of these groups sold 36.7 metric tonnes of maize and seven metric tonnes of beans at a price above that available to individual farmers.
- **Establishment of a community of practice (CoP)** – ADSCR played a key role in forming a CoP made up of NGOs, County government, universities, etc. which shared ideas, information and experience in CA-Plus implementation within Nakuru County. The structure has served as an advocacy platform for such practices at the county level. The CoP supported program learning which helped adapt project activities to support the project's overall goal. The presence of university and agricultural researchers in the CoP helped to build an evidence base and to spread learnings to other divisions of Nakuru County.

Due to the impressive results from SUCA, ADSCR through World Renew was awarded funding for a three-year CA project from USAID to scale-up the practices gained during SUCA. This new program will further increase food security, improve household nutrition, and reduce poverty through improved livelihoods for 3,000 smallholder farmers in Solai Division, Nakuru County.



The Community of Practice from various organizations visit CA-Plus farmers at an ADSCR project site.

ALTA TRAVEL SCHEDULES

Lilian Zheke

14-21 October, 2022

Rwanda

ALTA team building
CWA Regional Networking Conference

22-25 November, 2022

Harare, Zimbabwe

SA Regional Networking Conference

27-30 November, 2022

Zambia

Partner project visit

Jean Twilingiyumukiza:

3-7 October, 2022

Kayonza, Rwanda

CA Training for WFP/MCC Partners

14-21 October, 2022

Rwanda

ALTA team building
CWA Regional Networking Conference

22-25 November, 2022

Harare, Zimbabwe

SA Regional Networking Conference

27-30 November, 2022

Zambia

Partner project visit

John Kimathi Mbae

3-6 October, 2022

Makueni, Kenya

Fadhili Trust- KALRO Visit

14-21 October, 2022

Rwanda

ALTA team building
CWA Regional Networking Conference

1-4 November, 2022

Embu, Kenya

EA Regional Networking Conference

14--21 November, 2022

Turkana, Kenya

NCM & ADRA-Kenya support

Neil Rowe Miller

25 September - 6 October, 2022

Southern Ethiopia

EGWACDC, EKHC and TDA Partner visits
Partner Impact Conference

14-21 October, 2022

Rwanda

ALTA team building
CWA Regional Networking Conference

1-4 November, 2022

Embu, Kenya

EA Regional Networking Conference

December, 2022

Kondoa & Dodoma, Tanzania

DCT and Diocese of Kondoa Partner visits