

Counteracting the crisis in Mali with decentralised irrigation

The country is able to expand its agricultural production and help to provide food security for the Sahel states in the long term.

The challenge

Mali is one of the poorest nations on earth and has been dealing with violent conflicts throughout the northern and central parts of the country since 2012. The situation has since improved slightly, not least due to an extensive international presence there. The German Armed Forces are – among others – with 1,000 soldiers on the ground to contain acute conflicts. But this cannot permanently stabilise the fragile areas. Therefore, it is all the more important to improve local people's living conditions for the long term, thus reducing poverty, opening up new perspectives and increasing resilience against external influences. This is why KfW is promoting an extensive small-scale irrigation programme in Mali on behalf of the German Federal Government and other international donors. Mali has the potential to help ensure food security in the Sahel states in the long run – if farming is expanded and becomes more productive. Water plays a key role in this approach, especially in light of increasing climate extremes.

Current situation

Mali is still far from exhausting its potential: it ranked 182nd out of 189 countries on the United Nations' Human Development Index in 2018. Over half of the population lives below the poverty line; a third is chronically undernourished. At the same time, Mali recently achieved economic growth of around five per cent.

Nevertheless, the country is only making slow progress in reducing poverty, not least because of institutional weaknesses at the local, regional and national levels. Another reason is that the rural population is growing at over three per cent per year. And the number of illiterate adults recently rose to over six million. Women are particularly affected, comprising almost 60 per cent of them.

Project title	Supporting the National Programme for Sustainable Small-scale Irrigation.
Commissioned by	The German Federal Ministry for Economic Cooperation and Development (BMZ), the European Union (EU), Global Affairs Canada (GAC), United States Agency for International Development (USAID).
Country/Region	The Republic of Mali.
Lead executing agency	Ministère de l'Agriculture.
Project partner	Direction Nationale du Génie Rural (DNGR).

Despite the fact that a peace treaty was signed in 2015, the situation in the country continues to be tense. It ended the conflict with the Tuareg people in the northern part who wanted to separate and had declared independence in 2012. However, the situation remains complicated; there have been repeated acts of violence, primarily in the northern and central parts of the country.



Photo 1: Harvests are rich when there is water.

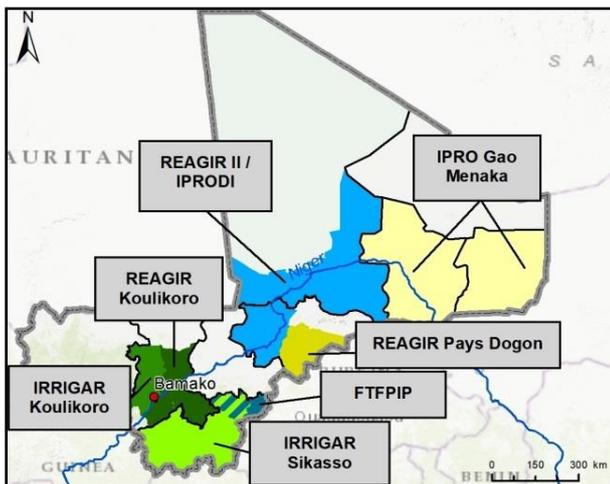
Photo 2: Walls hold back the water to make irrigation possible.



Photo 3: New warehouses improve shelf life and make it easier to market agricultural products.

Photo 4: A wide range of food can be grown in Mali when the conditions are right. Here, they are presented at a local market.

So improving the living conditions throughout all sections of the population is an important prerequisite for permanent peace. Mali's most important industry is agriculture, employing three quarters of the people. However, due to climate conditions and strong population growth rainfed agriculture is not able to ensure sufficient income and food for small farmers. But Mali has large water reserves that can be used to expand, stabilise and diversify agricultural production and improve nutrition.



The dry northern and central areas of the country in particular can significantly increase yields using irrigation along the powerful Niger River. Of the estimated 2.2 million hectares of agricultural land, only about 20 per cent is being farmed. Targeted irrigation has the potential to increase this area fivefold.

At the beginning of 2012 Mali's government adopted the "National Programme for Sustainable Small-scale Irrigation" (*Programme National d'Irrigation de Proximité - PNIP*), which was created with support from German development cooperation. Agricultural land will be expanded considerably within this framework. KfW is financing regional modules in several phases that build upon and complement each other. They make up the core of the PNIP. The overarching goal of these measures is: to increase food production in the long term, improve living conditions for rural populations and generate trust in local, regional and national structures, which is critical for stable conditions.

Project approach

The approach of using simple but robust systems for irrigation has proved its worth over the years. It is adjusted to fit the local hydrological and agricultural conditions in various phases and in cooperation with different donors. The different contributions are all part of the PNIP and aligned with one another.

A whole range of irrigation systems is implemented. The irrigation perimeters are often small areas of 40 to 60 hectares. Pumps and canals are used to increase targeted irrigation of the fields. New inundation areas serve as retention mechanisms to ensure the water remains and augments groundwater levels when the river recedes or the rains stop. Floodplains, dams and vegetable gardens up to 10 hectares in size that are irrigated with shallow wells are also included in the measures. Complementary infrastructure measures comprise erosion protection to prevent fertile soil from being washed away by rain, and for building roads, trails and warehouses to improve the ability to market agricultural goods.

In the barren Dogon region near the city of Mopti, the activities look like this: most of the area there was deforested a long time ago. In addition to the construction of small dams that collect surface water run-off, the area surrounding the dams is being reforested to improve soil stability. And new roads are being built to enable people in participating villages to bring their products to markets. The same basic principle – expanding irrigation – is applied in other areas but, depending on the conditions, other complementary measures are added.

In some places, the new irrigation infrastructure is also used for fish farming, for example; this helps farmers diversify their production. Other regions lend themselves to livestock breeding if animal feed can be cultivated on the new farmland. The implemented measures initially depend on local demand. The population is closely involved in the changes. The recipients take responsibility within the project through personal financial contributions and by assisting in building the new structures. This ensures that the promotional measures match the actual needs and at the same time fit the country's complex reality, thus facilitating acceptance over the long term. Due to the tense situation, support is also provided for local and regional councils that help to allocate usable areas and prevent or solve conflicts as much as possible.



Photo 3: New warehouses improve shelf life and make it easier to market agricultural products.

Photo 4: A wide range of food can be grown in Mali when the conditions are right. Here, they are presented at a local market.

Decisions about construction measures thus not only follow technical, socio-economic and hydrological criteria; instead they are also based on what the people want. An open application system helps to determine what those desires are in the affected municipalities. Cultural idiosyncrasies and customs as well as aspects of gender relations also play a role in this.

Because, even though women play a key role in Mali's agriculture, they are traditionally disadvantaged compared to men. They usually have less access to and control of land, markets and finances. This is why women in particular are taken into account in the parts of the programme that KfW is financing, and they receive support with defined target values. They are represented in all decision-making bodies and, in each case, receive a previously defined portion of the newly irrigated areas. This amount was initially set at 10 per cent, has now been increased to 15 per cent, and is going to increase again in future project phases. In addition, the promotion of vegetable gardens is directly targeted towards women as vegetable farming in Mali is traditionally their responsibility. Increasing women's participation not only strengthens their position in society but also usually increases the available household income, so it benefits the entire family.

To take all this into account, agreements are systematically made in the respective regions between the project participants, the population and those legally responsible for operation in the municipalities. These agreements define the parties, their responsibilities and how the investment is to be managed later. All this takes place before the actual construction begins.

To ensure that the people are also able to truly fulfil their part, supplementary training is offered in areas like irrigation management, cultivation techniques or maintenance of structures and motor-driven pumps. This has an additional effect of promoting literacy among adults.

Detailed overview of financing activities

Within the scope of the PNIP, EUR 170 million in grants have been implemented or committed. Germany is one of the key partners thereby. In addition to FC financing and a TC component implemented by GIZ on behalf of the German Federal Government, mandates from the European Union, Canada and the USA also contribute to the payments. KfW's financing in particular applies a longstanding, proven technical and organisational approach and its commitment includes several components from various donors:

- **IRRIGAR:** Is a German-European co-financing programme in the west of the Koulikoro region (north of the capital Bamako) and in the Sikasso region (south of Bamako). The German share during the period of 2014 to 2019 totals EUR 15 million; the EU is contributing EUR 19.6 million. An additional EUR 5.0 million increase by 2021 is in the pipeline.
- **FTFPIP:** This comprises mandated funds amounting to EUR 3.6 million from the United States (USAID). The project began in February 2017 and is planned to run for four years. It is being implemented in the Sikasso region on the border to Burkina Faso and in close coordination with IRRIGAR.
- **REAGIR inland delta:** Is a coordinated parallel financing project comprising German and Canadian funds amounting to a total of EUR 48 million, EUR 40 million of which is from funds mandated by Canada. While Germany is funding irrigation measures in the Timbuktu / inland delta region (formerly IPRODI), the Canadian funds are allocated to the eastern part of Koulikoro, the Dogon region and Mopti. In a second phase (REAGIR II), the German Federal Ministry for Economic Cooperation and Development (BMZ) will increase its funding by an additional EUR 24.5 million until 2022 for the inland delta area in the Timbuktu and Mopti regions. Canada is also considering an additional mandate.
- **GAO and MÉNAKA:** In 2018 a further project element was added in the northern part of the country in the Gao and Ménaka regions. KfW is financing this part on behalf of the German Federal Government with a total of EUR 17.0 million.

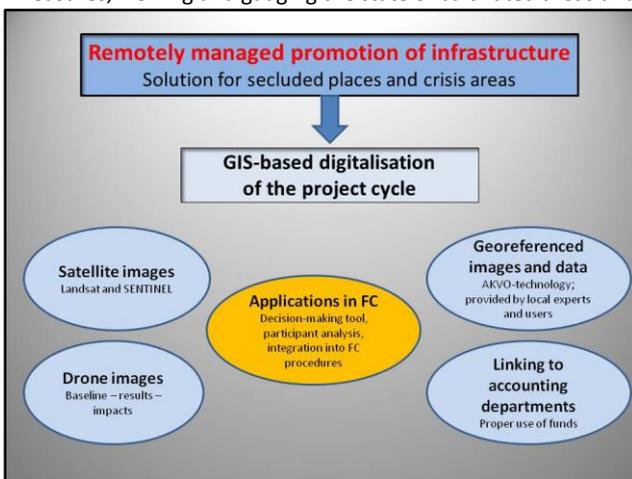


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Innovations

Digital technology is also being used by now. Satellite technology and drones have great potential uses for decentralised small-scale irrigation. Among them is monitoring progress of construction measures, viewing and gauging the state of cultivated areas and



evaluating harvesting operations. In particular, this applies to the country's unstable northern region. Using satellite images (SENTINEL and Landsat) is an important and inherent part of the project in the inland delta region. Drones are regularly used in the other PNIP regions, one per area (usually the ones most difficult to access) – to cover regions of up to 150 hectares. The drones supply valuable information and data from the project areas. The new projects also integrate the use of mobile-communication-based data and image processing in real time.

Impact

Between 2014 and 2019, the newly gained or rehabilitated agricultural area grew by close to 57,000 hectares with the financing from KfW. The largest areas are in the inland delta region with 33,900 hectares in Timbuktu and 15,900 hectares in Mopti. Close to 150,000 smallholder family operations and over 700,000 people have directly benefited from the new areas, which include village perimeters, inundation areas, vegetable gardens, fish farming, warehouses and new trails. This has enabled them to plant more rice, potatoes and vegetables and to increase their annual income by 30 per cent.

KfW-supported rice production in the inland delta region makes up around 50 to 60 per cent of the nation's production with small-scale irrigation. When compared to previous years, the yield per hectare generally increased around two- to threefold after the measures were implemented. In combination with the expansion of the agricultural area, overall production is rising three- to fourfold.

Through the small-scale irrigation programme, KfW, on behalf of the German Federal Government, is contributing to increasing Mali's food production and to diminishing still prevalent malnourishment. Due to the great potential of Mali's agriculture, the need for financing here will remain high in the foreseeable future.

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