



ADAPTIVE F FARMS



CANADA-UNDP
Climate Change Adaptation Facility



Empowered lives.
Resilient nations.

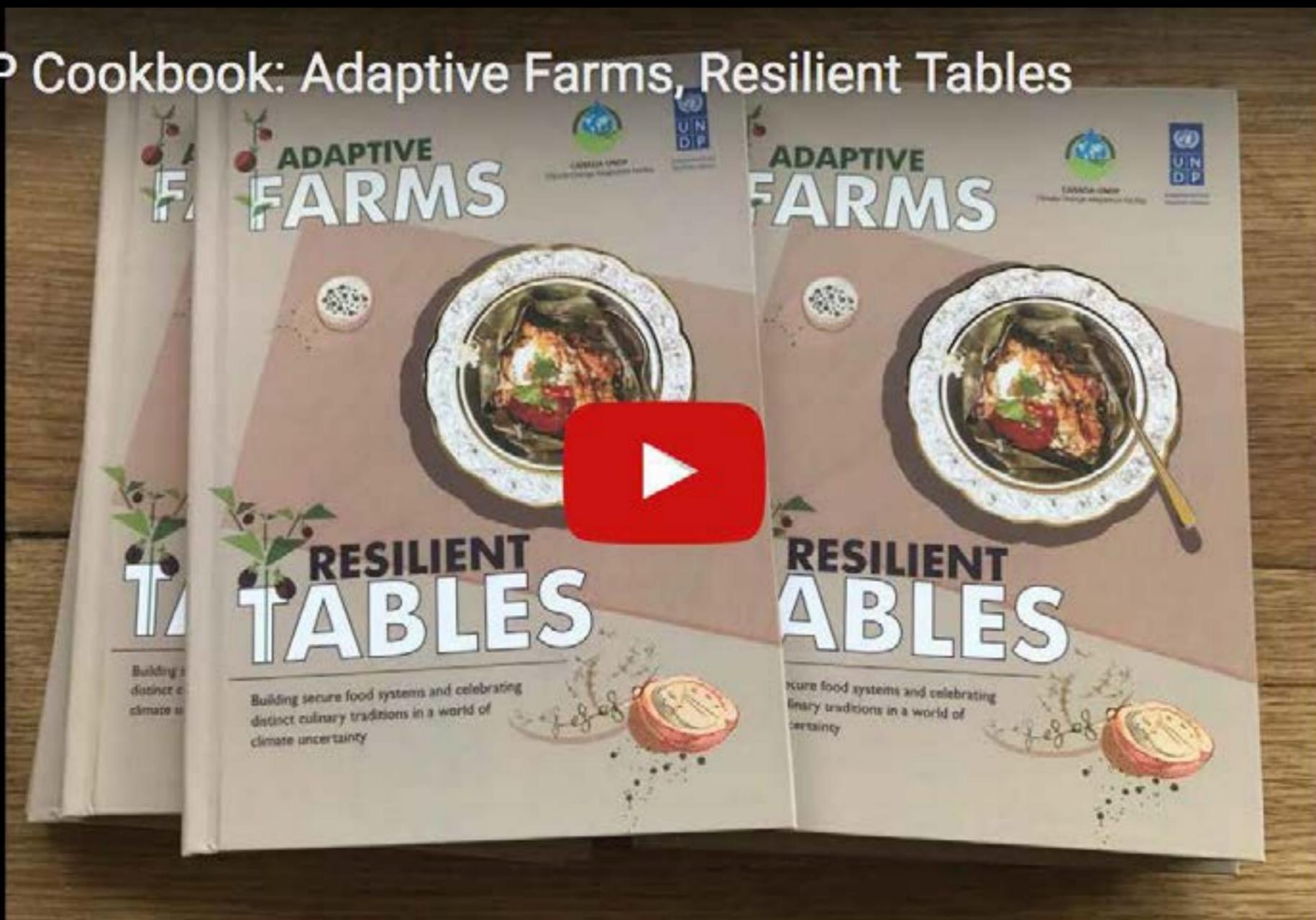


RESILIENT TABLES



Building secure food systems and celebrating distinct culinary traditions in a world of climate uncertainty

A good cookbook should change the way you view food. This cookbook celebrates the culinary traditions of six developing countries while shedding light on how they are adapting these traditions and enhancing food security in the face of climate change.



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As the world gets hotter and rainfall more erratic, the types and availability of ingredients for daily meals are changing.

For some countries these changes are more dramatic as climate change has already cut into the global food supply and many communities are struggling to get enough food on their plates. However, there is another story to tell: one of resilience and adaptation.

With support from the Government of Canada and the Global Environment Facility's Least Developed Countries Fund, the [Canada-UNDP Climate Change Adaptation Facility \(CCAF\)](#) has been supporting six least developed countries and small island developing states (Cabo Verde, Cambodia, Haiti, Mali, Niger and Sudan) to strengthen climate resilience and enhance food security. The CCAF is working with rural farmers to improve water access and management, introduce new varieties of crops, and strengthen alternative livelihoods that are not dependent on climate-sensitive natural resources.

Additionally, these efforts contribute directly to the United Nations' efforts to enhance food security and support communities in achieving Sustainable Development Goal (SDG) 2: Zero Hunger. CCAF projects are also working in all six countries to build gender-responsive

resilience to climate change by supporting women to increase food production, diversify their livelihoods and transform gender-based social norms in food production.

To better understand and share the experiences from these six countries, and to celebrate some of the successes of the CCAF projects, this cookbook examines and raises awareness on the links between food security and climate change. The CCAF Cookbook showcases traditional recipes and compares culinary and agricultural traditions across the six countries. It also explores how climate change is impacting specific ingredients and recipes, and how each country's adaptation efforts are changing the ingredients and cooking methods traditionally used.



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UNDP

Our hope is that the recipes and information provided in this publication will highlight the dynamic and delicious world we live in, and inform and inspire future adaptation.



FOOD SHOULD NOT BE A THREAT TO SUSTAINABILITY, BUT A SOURCE FOR ADVANCING SUSTAINABLE DEVELOPMENT.



The challenges of food security are complex, and intricately tied to the effects of our changing climate. Increasing temperatures and changing rainfall patterns are threatening the productivity of our agricultural land, while one in five people still lack access to electricity and more than 1.8 billion are without clean water. These conditions force us to rethink how we produce, prepare, store and transport food. Tackling climate change and achieving the Sustainable Development Goals should be a collective effort that involves governments, business, international organizations, as well as citizens who can make small but meaningful decisions in how they cook and what they eat every day.

The initiation of the Paris Agreement marks a new chapter for humanity and demonstrates that countries are serious about addressing climate change. More importantly, this global commitment can set in motion a greater awareness and understanding of how people's food choices can impact sustainability, health and the environment in our own communities and kitchens. This is critical for achieving the SDGs. Simple changes in cooking can contribute to the 2030 Agenda for Sustainable Development – food sourcing, waste reduction and preparation can all contribute to better food security and nutritional outcomes.

What we eat has a direct impact not only on our health, but also on the well-being and prosperity of our communities and our planet. This is a lesson we learnt at a young age at our parents' family restaurant, and one that we now try to spread from the kitchen at El Celler de Can Roca and in our new role as UNDP Goodwill Ambassadors for the Sustainable Development Goals with the SDG Fund.

One of these goals is fighting hunger and malnutrition, as well as improving the access of all people to a healthy diet. This is a significant challenge, considering, on the one hand, the terrible reality that nearly 800 million people are suffering from chronic malnutrition, and that there are nearly 100 million underweight children below 5 years of age in developing countries. On the other hand, we find a global food system that is unsustainable, that consumes too much land, too much water, generates too

many greenhouse gases and overexploits marine resources. At the same time climate change impacts threaten to undermine these food systems, particularly in the poorest communities dependent on the land to feed their families. As the final element of this equation, we cannot forget that the global population is growing, increasing the strain on our planet and its limited resources.

In this complex landscape, sustainable cooking can contribute to bringing about real and very positive changes. It is a type of cooking based on sustainable agriculture, small local producers and traditional production, and conservation techniques. It allows us to access more varied and nutritional food more resilient to changes, reclaim ingredients that have been all but forgotten and generate less waste. This support for local producers and family farms is particularly crucial in the rural areas of many developing countries, as they





are the biggest drivers of economic growth and employment opportunities.

On a larger scale, facing these challenges means, among other things, encouraging sustainable agricultural practices through the improvement of small agricultural producers' livelihoods and capabilities; ensuring equitable access to land, technology and markets; and encouraging international cooperation to ensure investment in the infrastructure and technology necessary for improved agricultural productivity in the face of climate change.

We are pleased that this cookbook highlights the experiences and traditions of six diverse countries. It sheds light on how they are productively and positively adapting to climate change by modifying their culinary and agricultural practices.

We must celebrate these efforts to strengthen resilience and enhance food security by following these examples and continuously striving to set a sustainable table.

Joan, Josep and Jordi Roca
UNDP Goodwill Ambassadors with the
SDG Fund
El Celler de Can Roca
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To learn more and participate in the campaign,
please visit: www.sdfund.org/sustainablecooking

FOOD SECURITY & CLIMATE CHANGE



Investing in climate change adaptation is imperative to ensure food security in vulnerable communities. 1.5 billion people worldwide live in smallholder¹ households, which account for 80 percent of food production in Asia and sub-Saharan Africa².

Most of these smallholder farmers are in developing countries, and 43 percent of the agricultural labour force in these countries is made up of women. Smallholder farmers are dependent on agricultural production for both subsistence and income generation. In many cases, they rely on rainfall to irrigate their crops, with limited access to reliable water sources such as wells, pumps or irrigation systems. They do not have insurance to cover failed crops, or money

to buy advanced fertilizers or nutrients to improve the health of their soil. Most importantly, they often do not have the knowledge and information to prepare for unpredictable climate changes, which increasingly threaten these households and their crop yields, as well as their food security and well-being.

¹ Smallholders are small-scale farmers, pastoralists, forest keepers and fishers who manage areas varying from less than one hectare to 10 hectares. They mainly use family labour for production and use part of the produce for family consumption. (FAO, 2012)

² http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Factsheet_SMALLHOLDERS.pdf

Food production is directly impacted by climate change. Changing temperatures, unpredictable rainfall patterns, shorter and more erratic growing seasons, and an increased frequency of extreme events like droughts and floods all directly affect productivity of traditional crops, livestock and fisheries.

Food security is not just about production. It is as much about the quality and diversity of food available, how it can be accessed by different sections of the society, its nutritional value, and the consistency with which nutritious food is available and accessible on a long-term basis.

A drop in productivity caused by erratic weather events means that there is less food available. This in turn impacts the accessibility of food, especially for the vulnerable sections of the population who are affected by the resulting increase in

prices of food and reduced income due to lower crop yields.

Similarly, climate change threatens other resources such as water, for irrigation and for domestic purposes, which directly affects the nutritional quality of food.

Finally, increasingly unpredictable weather events and the repercussions of extreme events take a toll on the regular and consistent availability of nutritious food, especially for vulnerable households. All of these factors contribute to undermining global food security, particularly in developing countries. The global community has committed to Sustainable Development Goal 2: Zero Hunger.

To reach this goal, we must consider climate-related impacts to each of the above-mentioned aspects of food security, and continue to design and implement resilient solutions, at scale.



HOW THE CANADA-UNDP CLIMATE CHANGE ADAPTATION FACILITY IS ADDRESSING FOOD SECURITY



NIGER

Several countries around the world are already addressing the challenges climate change poses to food security. [The Canada-UNDP Climate Change Adaptation Facility \(CCAF\)](#) supports projects in Cabo Verde, Cambodia, Haiti, Mali, Niger and Sudan which demonstrate some of these climate-resilient solutions.

While each country's experiences and adaptation approaches were unique to their local context, all the CCAF projects had a similar focus on enhancing food security, as well as generating additional income and diversifying livelihood options. Positive results have already been seen across all six countries. In **Niger**, increased yields from crop production reduced the number of food-insecure days, and alleviated the need to earn additional income to purchase food. In **Cambodia**, newly introduced solar water pumps and water user groups helped to establish small home-based vegetable gardens typically managed by women. These allowed them to produce a wider

variety of crops for families to eat, which helped improve nutrition. Similarly, in **Mali** the project assisted women's collectives to establish cooperative vegetable gardens, including securing access to water, tools and land, thereby diversifying participants' food and livelihoods. In **Cabo Verde**, the national research institution tested new varieties of crops that are more resilient to the expected drier conditions, and piloted them with local farmers. In **Sudan**, integrated pest management techniques have been introduced to address an increasing incidence of certain pests due to climatic changes. In **Haiti**, farmers are developing and implementing individualized farming plans, based on specific family needs, vulnerabilities and opportunities, to achieve sustainable subsistence food production and income generation.

Sustainable Development Goal 2 aims to end hunger, and achieve food security, nutrition and sustainable agriculture.





SUDAN



CABO VERDE

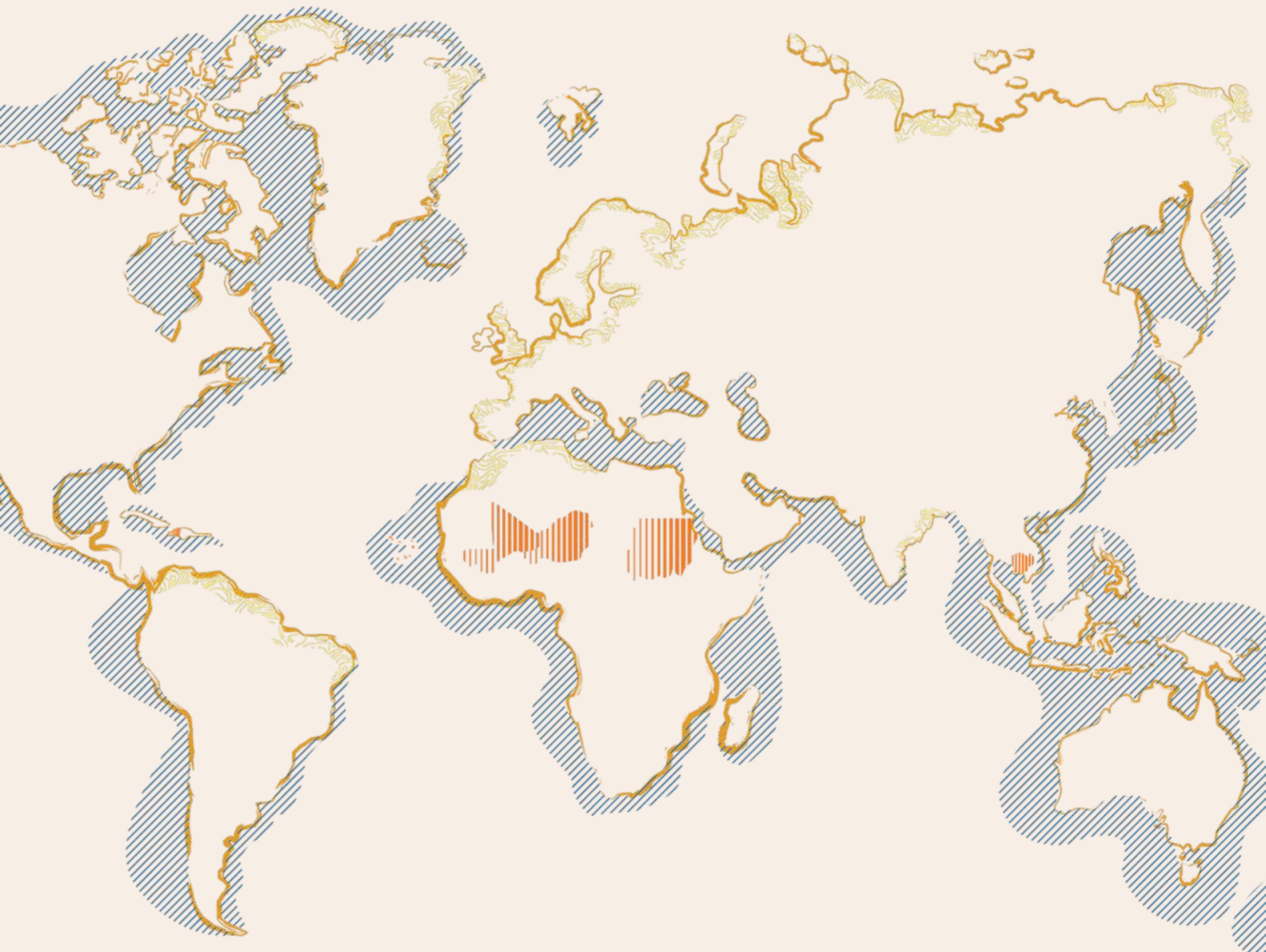
The cookbook acknowledges that there is much to learn from communities that are at the frontlines of climate change. These vulnerable households are being forced to adapt within their economic and environmental constraints, yet their innovative and successful strategies can serve as a model and inspiration for others around the world.

This cookbook represents the fruits of these efforts, restoring food to its position as a celebration of life, local culture and the environment.

BON
APPÉTIT!

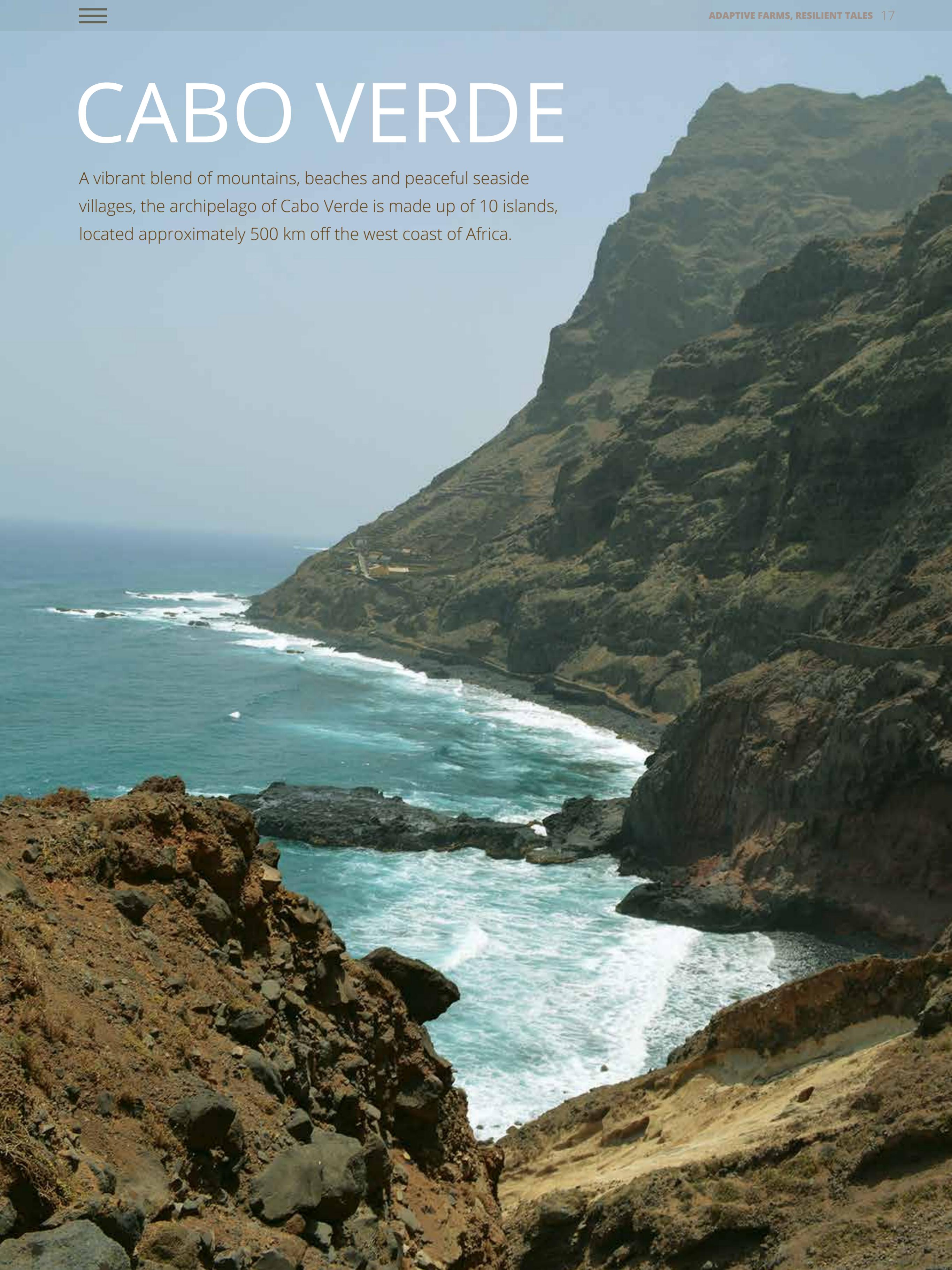


COUNTRY, CLIMATE, CUISINE



CABO VERDE

A vibrant blend of mountains, beaches and peaceful seaside villages, the archipelago of Cabo Verde is made up of 10 islands, located approximately 500 km off the west coast of Africa.



Cabo Verdean food is as fascinating and eclectic as the history that shaped it.



Originally uninhabited, the islands were discovered and colonized by the Portuguese in the 15th century, and went on to become an important stopover on shipping routes. Cabo Verde's population descends from its first permanent inhabitants – a mix of West African slaves, a small number of Portuguese colonists, and a smattering of Italians, Spaniards and Portuguese Jews. The fusion of European and African cultural traditions is reflected in Cabo Verde's culinary traditions.

CLIMATE CHANGE DRIVING THE ARID ISLANDS INTO FURTHER DROUGHT AND WATER SHORTAGES

Cabo Verde is characterized by a dry tropical climate. It has a highly fragile ecosystem that is vulnerable to extremes in climate and weather conditions. The dry season in Cabo Verde, which lasts about nine months, is almost completely devoid of rainfall. Climate projections suggest that the current level of vulnerability will be compounded by a hotter, drier future for Cabo Verde - up to a 4 °C rise in temperature and a decline in rainfall of up to 20 percent by 2100. These changes are expected to significantly reduce the availability of fresh water and threaten soil health, which will have a negative impact on domestic water needs - cooking, drinking and washing - and agricultural productivity.

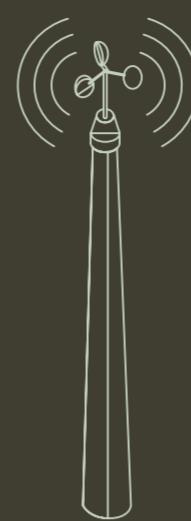


BUILDING ADAPTIVE CAPACITY AND RESILIENCE TO CLIMATE CHANGE IN THE WATER SECTOR IN CABO VERDE

Agriculture in Cabo Verde takes place under challenging conditions. The limited arable land is often found on mountain slopes or in valleys (*ribeiras*), where crops are regularly washed away by flash floods. Crop cultivation is further limited due to the harsh climate and inefficient irrigation practices. The project focused on training and building capacity on strategies for more efficient use of water using new technologies. Key species were planted to reinvigorate critical watersheds. Extensive research and testing was conducted on the adaptation and productivity of different types of crops under a variety of conditions, and recycled/treated wastewater facilities were strengthened and utilized for irrigating corn and animal forage. The CCAF project in Cabo Verde worked in arid, rural areas in five catchment basins located on the islands of Santiago and Santo Antão. In these five catchment basins, there were 18 community-led demonstration projects targeting the most vulnerable communities. The baseline survey in these communities showed that approximately 20 percent of the families were at risk of food insecurity. Inefficient use or lack of water limits food production. The consumption of fruits and vegetables was very low (maximum two days a week for the most vulnerable families), affecting nutrition. The CCAF project activities addressed priority needs and harnessed local knowledge to design approaches to strengthen resilience to climate change.

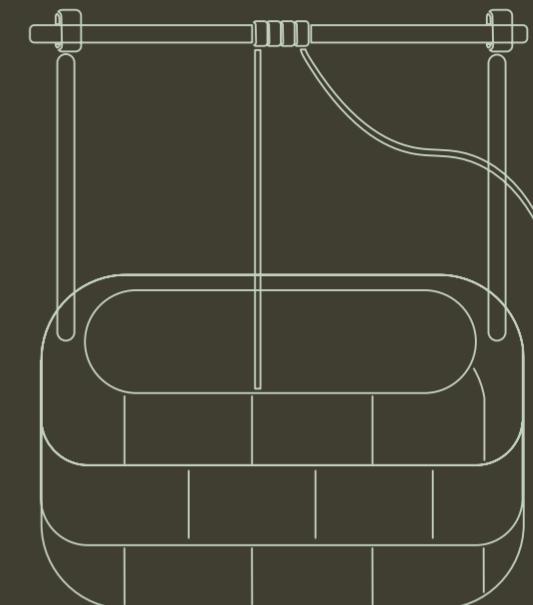


RESULT HIGHLIGHTS



4 AGRO-METEOROLOGICAL STATIONS

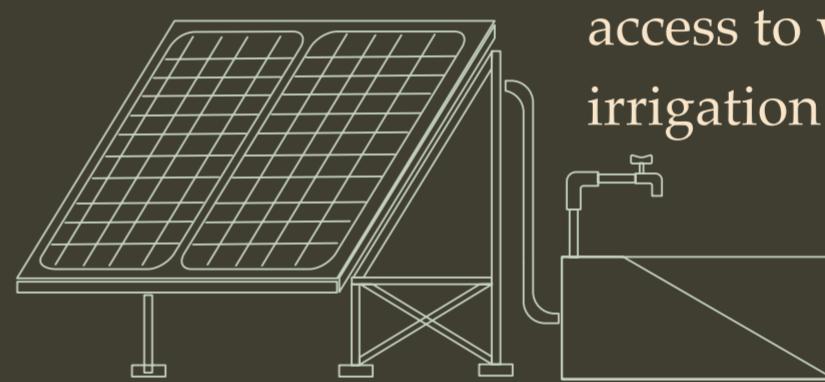
were rehabilitated to provide weather information for farmers



1,250 FARMERS (28% WOMEN)

have access to an improved and reliable source of groundwater

4 SOLAR-POWERED GROUNDWATER PUMPING STATIONS

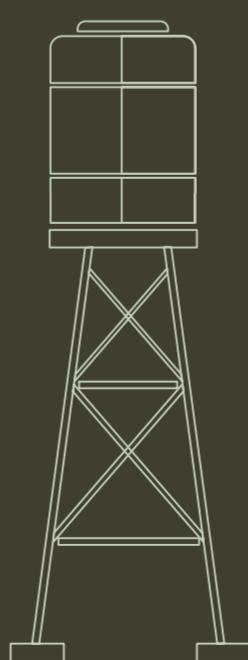


were established, providing 4 communities with access to water for irrigation



MORE THAN 200 FARMERS WERE TRAINED

in smart agriculture, and new seed varieties (tomato, carrot, sweet potato) were tested to improve yield potential in drier conditions



WATER STORAGE CAPACITY

of more than 2,500 tonnes / day and drip irrigation for approximately 100,000 ha of land was installed at project sites in Santiago and Santo Antão



Creole, Portuguese and African flavours, and a dry tropical island environment have shaped Cabo Verde's cooking traditions. Today the country's cuisine is a tantalizing blend of a variety of cooking methods, enhanced by the use of fresh seafood and a great diversity of vegetables and cereals.



CALDO DE PEIXE



D. ZEFERINA'S KATXUPA



PUDIM DE QUEIJO

CAMBODIA

Grand ancient architecture, a colourful culture, gentle people and the mighty Mekong flowing through the heart of it all make Cambodia an exotic destination.



Cambodia's traditional cuisine draws on rich natural and cultural resources, using a unique blend of flavours and colours that enhance the natural ingredients.



Cambodia has a population of 15.9 million people, and is classified among the least developed countries in the world. The country's economy has grown considerably in recent years, with manufacturing, tourism and agriculture representing major economic sectors. Around Tonle Sap, South-East Asia's largest freshwater lake and one of the world's richest inland fishing grounds, annual fish consumption is as high as 53 kg per person (including processed fish for *prahok* and fish sauce).

INCREASED FREQUENCY AND SEVERITY OF FLOODS, DRY SPELLS AND DROUGHT EVENTS POSE NEW CHALLENGES FOR FARMERS IN CAMBODIA

As one of the least developed countries in the region, Cambodia faces particularly acute challenges related to climate change, including a need to build domestic capacity to address challenges related to health, agriculture and water resources. To respond to climate change impacts, adaptation measures include: development of new high-yield crop varieties, improved crop management, warning systems for extreme weather events and improvement of irrigation.



PROMOTING CLIMATE-RESILIENT WATER MANAGEMENT AND AGRICULTURAL PRACTICES IN RURAL CAMBODIA

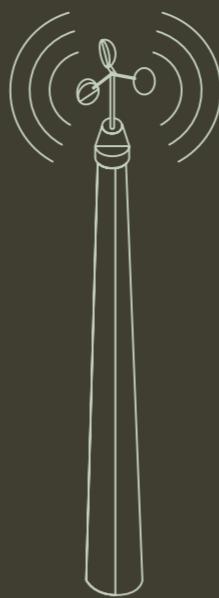
Cambodia oscillates between wet and dry seasons, while staying hot year-round. Its wet season, or monsoon, accounts for nearly 80-90 percent of the country's annual precipitation in roughly five months. With 70-80 percent of Cambodia's population dependent on the agriculture sector for their livelihoods, adapting to these new realities is imperative. Water plays a critical role in agricultural productivity, which is largely dependent on the monsoon rains. The majority of arable lands are rainfed and thus extremely vulnerable to variations in the timing and amounts of rainfall.

The CCAF project in Cambodia worked to reduce the potential impacts of climate change on rural farmers. The activities aimed to improve access to water through both wet and dry seasons, diversify people's sources of income, and make agriculture more resilient to extreme weather conditions.

The project's priority was to address the impacts of climate change on agriculture, especially on rice cultivation, and its consequences for food production and security in rural areas. Resilient rice varieties and integrated farming systems were introduced, coupled with crop diversification via home-based vegetable gardens. The project has also introduced climate-resilient rainwater harvesting techniques at both the household and village level, including introducing solar pumps and water user groups for effective water management.



RESULT HIGHLIGHTS

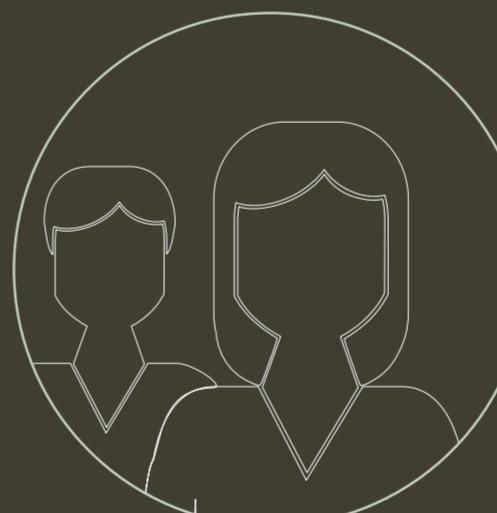
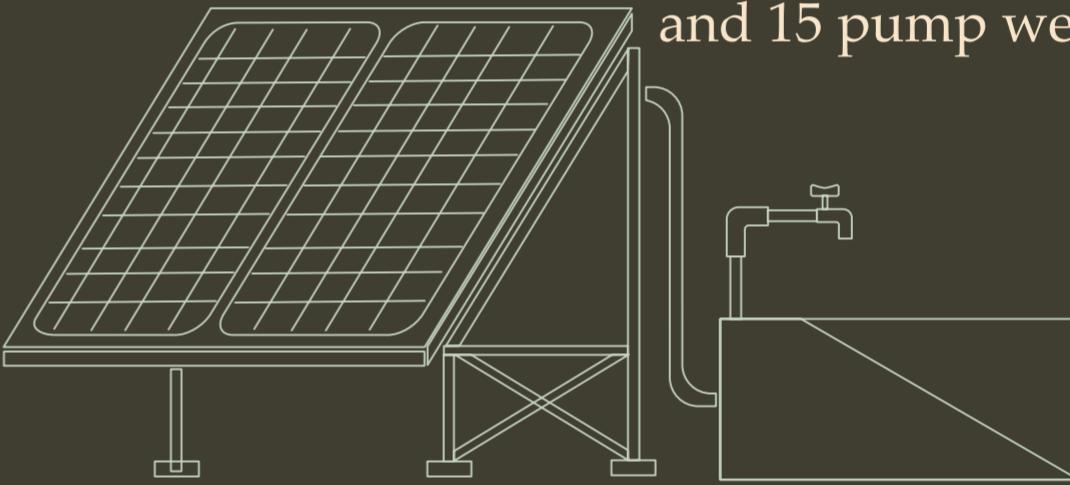


18,019 HOUSEHOLDS (54% WOMEN) IN 80 VILLAGES

were equipped with reliable, accurate and user-friendly weather information to inform decision-making

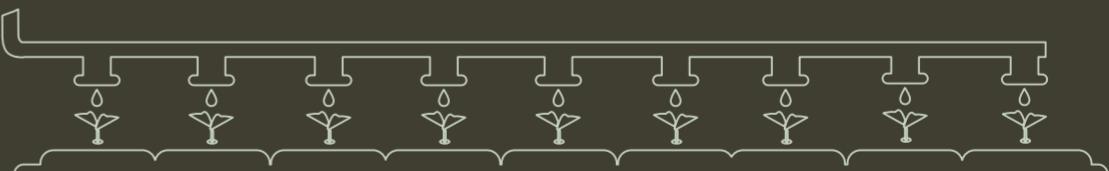
IMPROVED WATER ACCESS TO 1,481 HOUSEHOLDS (61% WOMEN) IN 37 VILLAGES

through the construction of new water supply infrastructure, including 2 community ponds, 35 solar pump systems and 15 pump wells



52 WATER USER GROUPS

were established to manage the new infrastructure



541 HECTARES OF PADDY FIELDS

now have access to irrigation through the construction of 3 new irrigation systems, benefiting at least 248 households



Fresh fruits and vegetables grow in abundance in its tropical climate, and Cambodian cuisine combines spice inspiration from India, noodles and soy sauce from China, French culinary techniques from its colonial past, chilli peppers and tomatoes introduced by Spanish and Portuguese traders, and indigenous ingredients and traditions. The staples of rural Cambodian food are rice and freshwater fish. On average, Cambodians consume 143 kg of rice per person each year, and 37 kg of fresh fish.



SAMLA KAKO



AMOK CURRY



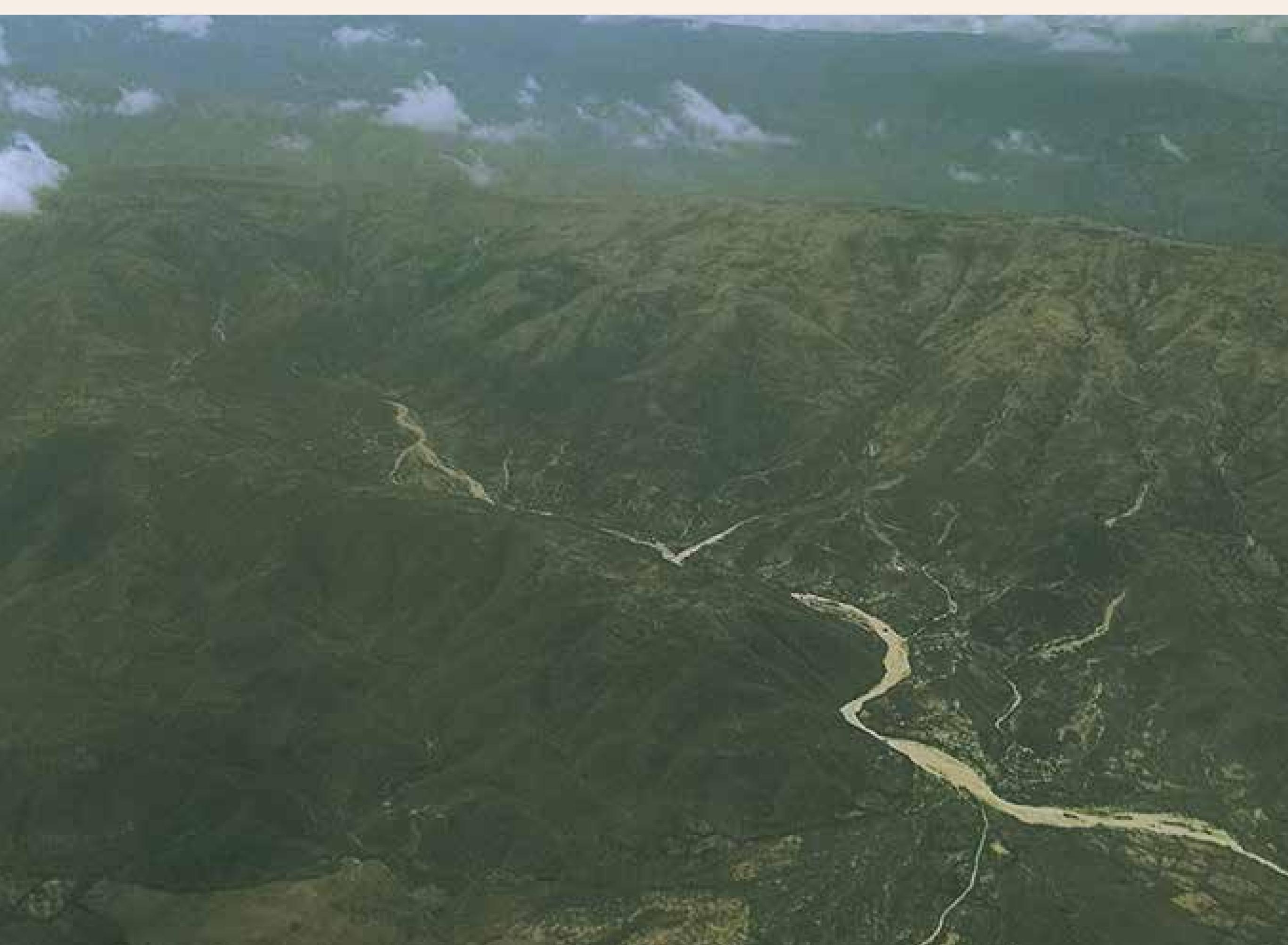
NUM ANSOM CHEK

HAITI

Haiti has two of the Caribbean's four tallest peaks and one of the longest coastlines in the area ringed by the azure waters of the Caribbean Sea.



This unique mix of cultures, landscape, flora and fauna has resulted in a vibrant and thriving culinary tradition.



Climate impacts and climate-related hazards will directly affect soil conditions and water availability. This will have major consequences for Haiti's agriculture sector, which employs around 66 percent of the population. With 30 percent of households already suffering from moderate food insecurity, climate change threatens to push these households further into poverty.

REDUCED RAINFALL, RISING SEA LEVELS, EROSION AND WATER SCARCITY PRESENT INCREASING CHALLENGES TO COASTAL COMMUNITIES

Haiti's widespread ecological degradation and poverty make it particularly susceptible to climate change impacts. Increased temperatures, decreased precipitation and more erratic rainfall directly threaten many natural resource-dependent livelihoods. There has also been an increased frequency of climate-related hazards including drought, intense rainfall, landslides, soil erosion, hurricanes, flash flooding and saltwater intrusion.

Coastal communities in Haiti are particularly vulnerable to these impacts, particularly the most intense rainfalls which result in significant run-off of water and pollution into densely populated coastal areas and marine ecosystems. In addition, climate change-induced sea level rise will greatly impact Haiti's coastal population and ecosystems, increasing coastal erosion and saltwater intrusion, which may compromise food and water security.

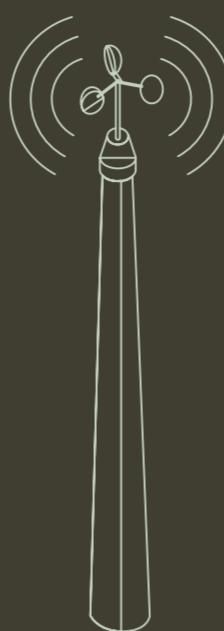
STRENGTHENING ADAPTIVE CAPACITIES OF COASTAL COMMUNITIES IN HAITI

The CCAF project in Haiti targeted vulnerable coastal communities with three main areas of work: i) strengthen secure sources of food for local farmers, ii) enhance watershed management in the face of climate change, and iii) improve reforestation of mangroves and forests to protect against climate-induced hazards like erosion and sea level rise. The project demonstrated that ecosystem management and biodiversity conservation can play a key role in reducing human and natural vulnerability to the multiple threats of climate change.



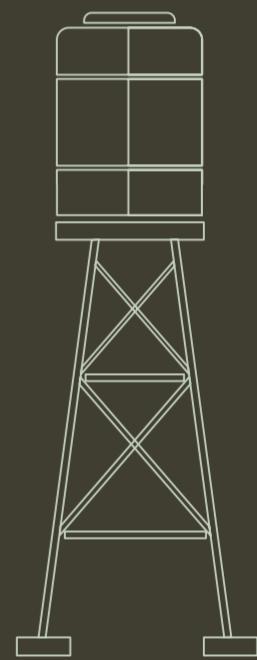


RESULT HIGHLIGHTS



8 HYDRO-METEOROLOGICAL STATIONS

were installed in the region of Aquin to strengthen climate information and weather forecasting



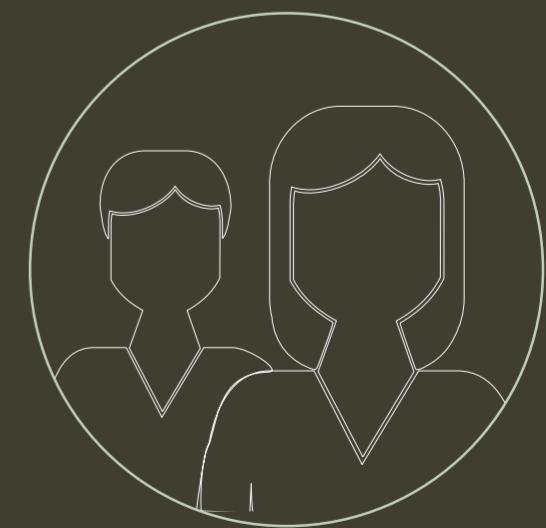
SUPPORT WAS PROVIDED TO WATERSHED MANAGEMENT COMMITTEES (WMC) IN 29 AREAS

which are now supporting the government to manage reforestation activities (2,500 hectares of watersheds) and disseminate information on climate change



2,400,000 SEEDLINGS

have been planted, including 267,479 mangrove plants



TECHNICAL SUPPORT WAS GIVEN TO 1,084 FARMERS

to improve their capacity to adapt to droughts and heavy rainfall



Traditional Haitian cuisine is a melange reflecting its historical ties to Spain, France, Africa, the wider Caribbean, and later, the United States. Many staple dishes are based on a simple foundation of beans, rice and sauce. These are frequently coupled with plantains or meat and topped with a flourish of *pikliz* (a pickled slaw with chilli). The country also boasts a great deal of fresh seafood, as well as a wide variety of tropical fruits which are mostly eaten for dessert.



MALI

Mali is ringed by desert and semi-desert, with a fertile inland delta created by the Niger River.



Malian cuisine is a mouth-watering melange of meats and sauces.



Agriculture will be significantly impacted by increased intensity and frequency of extreme weather events, changes in the rainfall regime, decreased water availability, decrease in the quality of the soil, and depletion of land covered by pastures. The losses in crops and animals will in turn negatively impact Mali's food security. In fact, the effects of climate change are already causing significant disruptions to a number of key production industries in Mali, including cotton, millet, sorghum and rice. In Mali agriculture employs about 80 percent of the working population and is an important economic pillar, underscoring the need to adapt to climate change to maintain well-being for the entire population.

LANDLOCKED AND LIMITED, TOO MUCH AND TOO LITTLE RAIN THREATENS RURAL FARMS

Mali is one of the largest landlocked countries in the world. Most of the country is situated in the southern part of the Sahara Desert, which has limited annual rainfall. In addition to disadvantageous socio-economic conditions, Mali's capacity to adapt to changing climate impacts is low. Mali has already witnessed several climate-induced impacts: severe drought, irregular rainfall, floods, storms and high temperatures, which have diminished agricultural production, reduced economic growth and threatened food security.

According to predicted climate change scenarios for Mali, the country's long-term development is expected to be significantly affected by both insufficient and unpredictable rainfall, increased frequency of flooding, and more violent winds in the Sahel and Sahara regions. Drought and irregular rainfall are also expected to become a greater threat in the future due to climate change.



ENHANCING ADAPTIVE CAPACITY AND RESILIENCE TO CLIMATE CHANGE IN THE AGRICULTURAL SECTOR IN MALI

The CCAF project in Mali worked to ensure that climate impacts are integrated into development strategies, with a particular focus on food security within the agricultural and rural sectors.

The project targeted four municipalities that are most vulnerable to the impacts of climate change. Women, as traditional leaders in natural resource management, are particularly important and the project explicitly targeted the diversification of women's livelihoods. Efforts aimed to ensure access to water for development of subsistence activities, and invest in climate-resilient farming practices and diversification for household production, crops and nutrition. Some of the key activities of the project were supporting climate-resilient multipurpose farming, dissemination of drought-adapted crops, promotion of dry-season gardening activities, and the establishment of collectives for women farmers to build capacity and improve livelihood management strategies.



RESULT HIGHLIGHTS



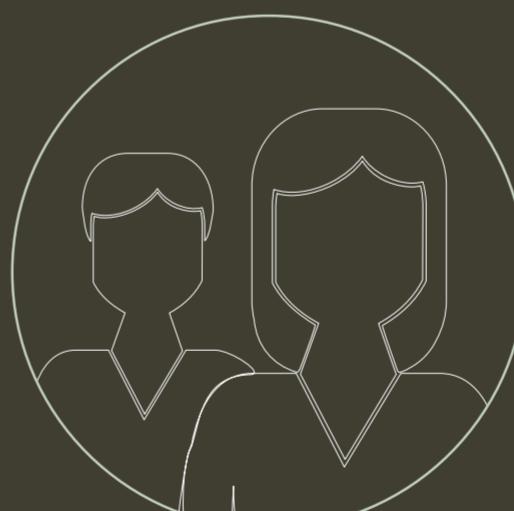
797 DEMONSTRATION PLOTS

were established using climate-resilient seed varieties, leading to higher yields for farmers



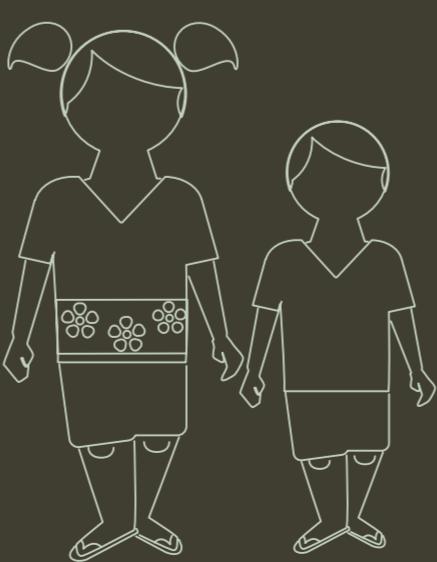
2,035 BENEFICIARIES, MOSTLY WOMEN

introduced new crops, such as sesame and market vegetables, as part of the diversification scheme, creating new opportunities for additional income and a more diverse and balanced diet



THE EFFECTIVE TRAINING OF 492 COMMUNAL ACTORS

to integrate climate change adaptation measures into municipal development programmes



The crops and climate-resilient seeds promoted have helped diversify diets, which have in turn improved public health, especially for children

**IN BENEFICIARY COMMUNES,
CHILDREN ARE NOW PROVIDED WITH
THREE MEALS A DAY THANKS TO AN
INCREASE IN FOOD PRODUCTION**

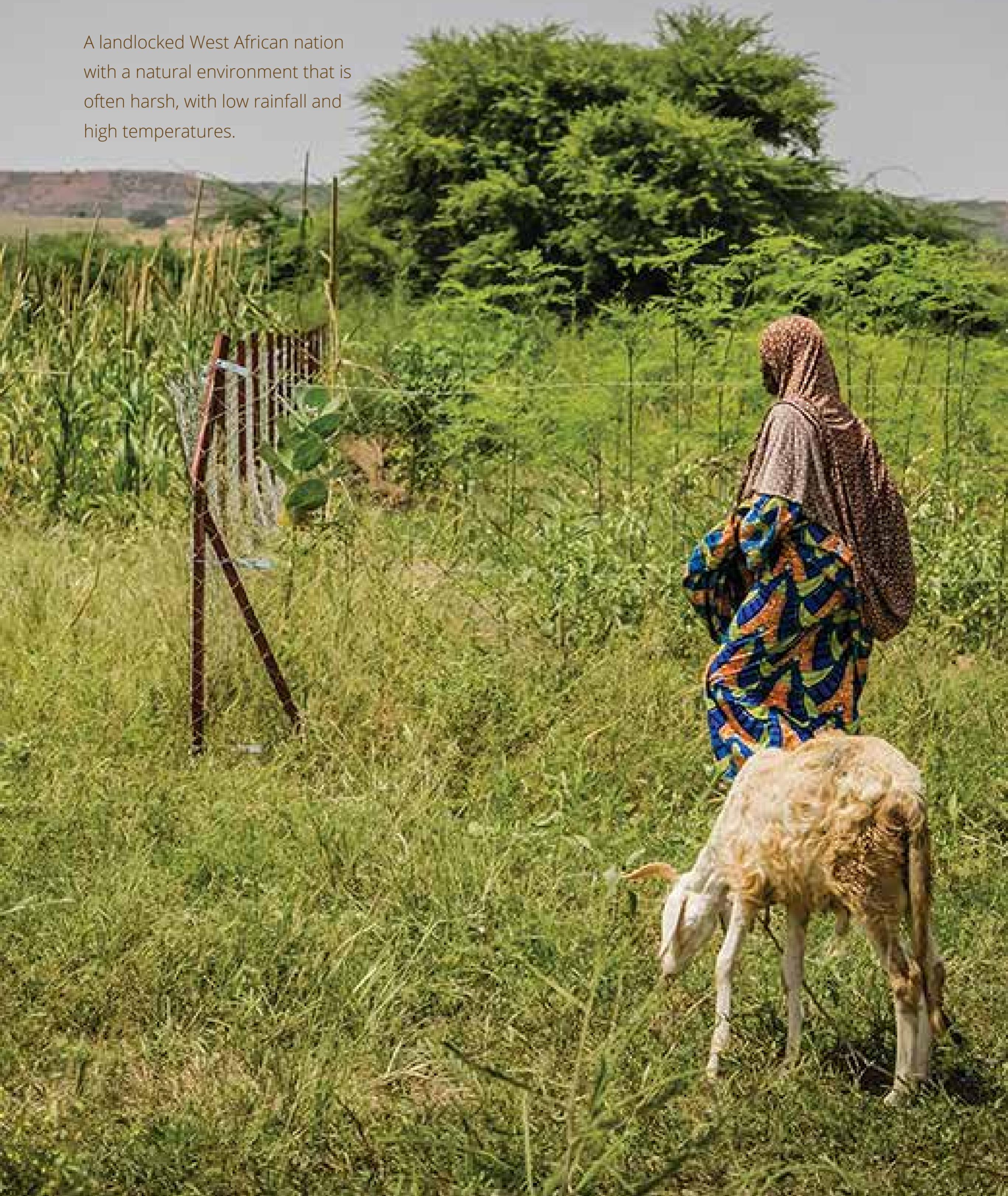


The cuisine of Mali mainly consists of millet, corn or rice porridge served with a variety of sauces or stews. These sauces can be made with peanuts, okra, baobab leaves or sweet potato leaves, and are supplemented with meats and vegetables. The sauces are then served over porridge, couscous or rice. In Mali, family and community bonds are extremely important, and meals serve as an important time to gather. Meals are also an opportunity to showcase the hospitality and generosity for which Malians are renowned.

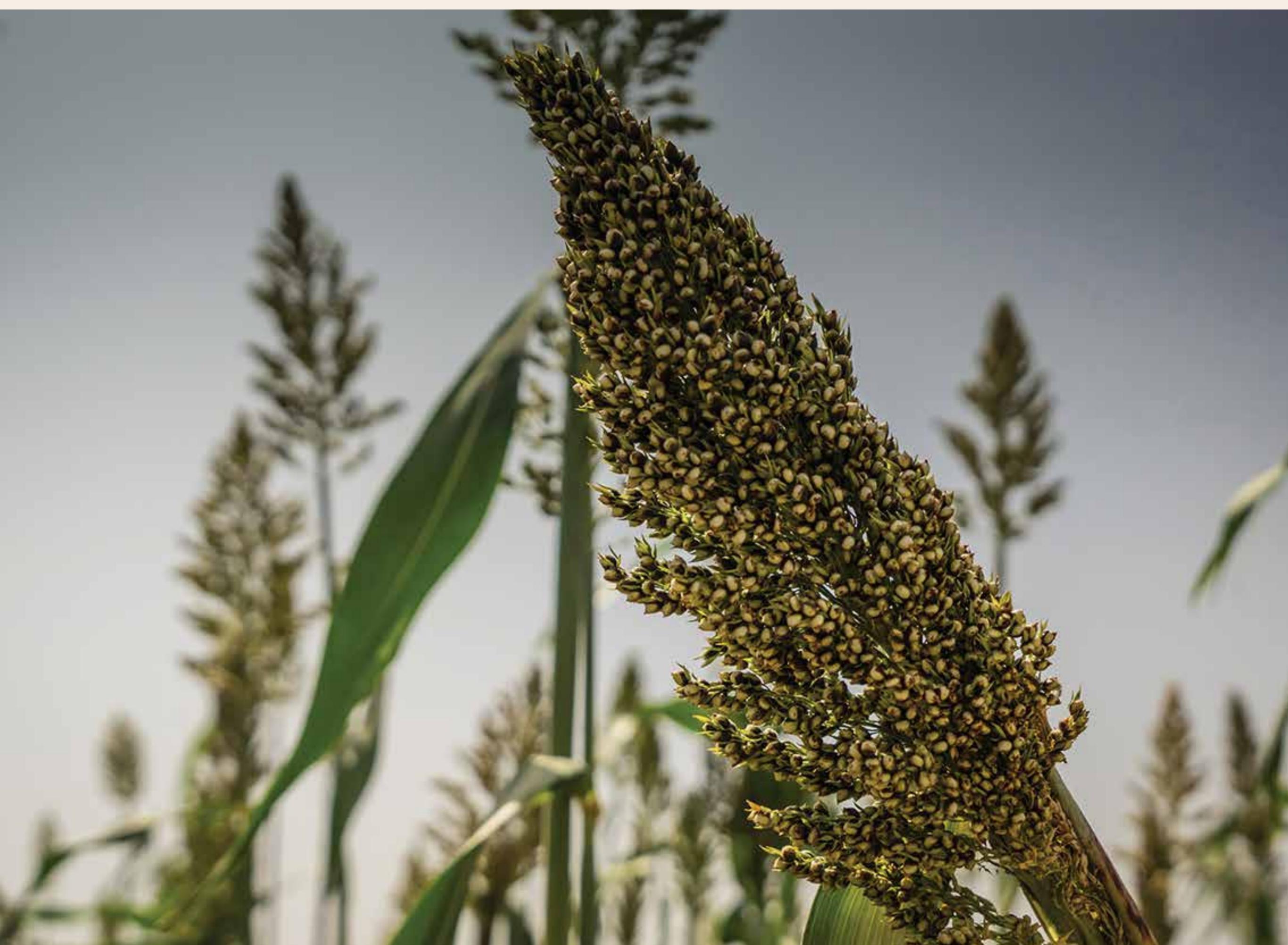


NIGER

A landlocked West African nation with a natural environment that is often harsh, with low rainfall and high temperatures.



The cuisine of Niger draws on other traditional African cuisines, blended with influences from Europe.



Niger is already experiencing declining rainfall and rising temperatures. Projections suggest that by 2020-2049, average annual temperatures will increase between 2.3 °C and 2.6 °C. The same projections also suggest that rainfall is likely to increase slightly between 2020 and 2049, but will start later in the rainy season and will be more torrential. This will have implications for agricultural production, which is predominantly rainfed in Niger, as well as general food security. 85 percent of Niger's population depend on agriculture for their livelihoods. Agriculture is primarily rainfed and therefore vulnerable to climate change.

INCREASING TEMPERATURES AND DECREASING RAINFALL LEAD TO DROUGHT

Niger has a Sahelian climate characterized by high annual variation in precipitation. Recent decades have brought reduced precipitation and rising temperatures, aggravated by climate change, making it difficult to feed the population.

Subsequently, the country relies on the purchase of cereals and food aid to meet its needs. Further projected effects of climate change, namely an increase of 1.9 °C in the average temperature, will intensify the situation, leading to increased frequency of drought. This will directly cause a decline in agricultural production, an increase in livestock pressure on pastoral ecosystems and large-scale soil degradation.

The main climate-related hazards in Niger include flash flooding, drought, low river flows, windstorms, sand / dust storms, extreme temperatures and forest fires. Combined with increased population pressure, severe droughts in recent decades have caused hydrologic disturbances, degradation of agricultural lands, depletion of the natural environment and loss of biodiversity.

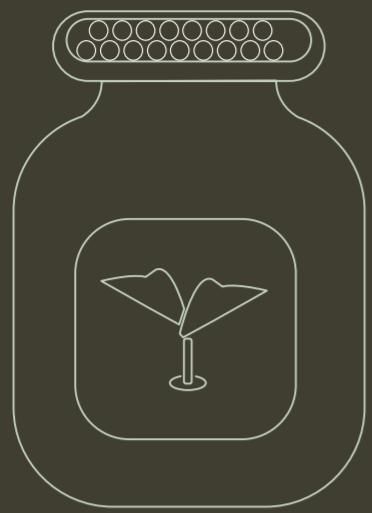
BUILDING CLIMATE RESILIENCE AND ADAPTIVE CAPACITY IN THE AGRICULTURAL SECTOR OF NIGER

The CCAF project in Niger worked to improve the reliability of water supplies for agricultural production, especially for smallholder farmers. When farmers have more reliable access to water supplies, their yields improve, which in turn leads to increased average incomes and better nutrition. By introducing drought mitigation techniques such as fodder banks and drought-resilient crops, the livelihoods of rural communities are enhanced.

Collaborating with the National Meteorological Department has been one of the main activities of the project. The team facilitated seasonal weather forecasts and access to climate information to enable rural farmers to make informed farm management decisions.



RESULT HIGHLIGHTS

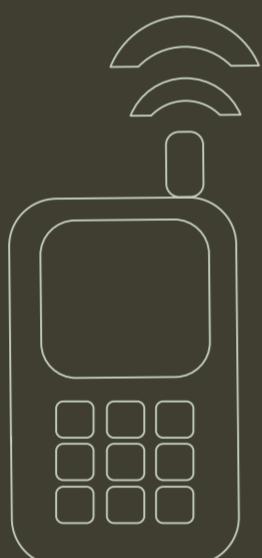


MORE THAN 20,000 HOUSEHOLDS IN ALL 8 COMMUNES

have witnessed agricultural yields increase to 800-1,200 kg/ha with the improved, drought-resistant seed-fertilizer-pesticide kit, compared with traditional seed yields of 300-400 kg/ha - leading to an increase in incomes

WITH IMPROVED CROP VARIETIES

the crop development cycle was reduced to 60-70 days instead of 90-120 days with traditional varieties, which provides opportunity for more crop cycles per season



THE USE OF MOBILE PHONES

in the dissemination of meteorological and agro-meteorological information helping farmers know when to plant the first crop – coupled with drought-resistant seeds - has led to a marked reduction of seedlings required per hectare - from 50 kg/ha to 10 kg/ha



31.75 HA OF SMALL GARDENING SITES WERE OPERATED BY 1,705 BENEFICIARIES (1,263 WOMEN AND 442 MEN)

with an increased revenue, on average, of approximately USD 240 per person, per year



1,336 PEOPLE (1,094 WOMEN)

were introduced to income-generating activities, particularly small processing units of agricultural products



Niger's cuisine draws on other traditional African cuisines, blended with influences from Europe - particularly Portugal and Britain. Spices like saffron, nutmeg, cinnamon, ginger and cloves were introduced by Arab neighbours and are often part of the dishes served in modern Niger. The use of hot spices is also a feature of this country's cuisine. Most of Niger's population live in the south-west of the country near the Niger River basin, making fish a staple in the diet. Meals in Niger usually start with colourful salads made from seasonal vegetables. Typical meals consist of a starch (rice and millet being the most popular) paired with a sauce or stew.



DAMBOU



KOURBA KOURBA & SAUCE NOIRE



HOORAY

SUDAN

As Africa's third largest country, Sudan has one of the continent's most diverse geographies ranging from desert conditions in the north to wetlands and high-rainfall savannah in the south.



Sudan's culinary traditions reflect its culture, which is particularly hospitable and welcoming.



Agriculture is the main livelihood activity in the country, contributing 30 percent of GDP and employing about 80 percent of the country's 41 million people. With 90 percent of agricultural production being rainfed (supporting 60 percent of the population), farmers and pastoralists are particularly vulnerable to climate change. Such vulnerability is intensified by factors such as high poverty levels, lack of income diversity, natural resource-based conflicts and environmental degradation. A significant decrease in average rainfall over the last 60 years, and an increase in variability, has already threatened 19 million hectares of rainfed land, which affected over 10 million people.

CLIMATE CHANGE RENDERS RAINFALL UNPREDICTABLE AND RARE

Climate change will exacerbate several of Sudan's existing vulnerabilities, including limited water resources in large parts of the country, low soil fertility, regular droughts, desertification, high reliance on rainfed agriculture, the legacy of a civil war and political instability.

With peace, Sudan has the potential to sustainably develop its considerable natural resource base and improve the lives of its population. However, due to the serious socio-economic implications of climate change - especially the vulnerability of the rural farming population to fluctuations in rainfall - this goal may only be realized if Sudan's government gives due attention to climate adaptation in its policies and development plans.



BUILDING RESILIENCE IN THE AGRICULTURE AND WATER SECTORS TO THE ADVERSE IMPACT OF CLIMATE CHANGE IN SUDAN

The key objective of the CCAF project in Sudan was to reduce the food insecurity of small-scale farmers and pastoralists. Through a focus on building resilience and adaptive capacity of rural communities in agriculture and water resource management practices, activities were designed to overcome current and future climate risks. The project targeted four agro-ecological zones in Sudan, and modified current coping strategies that were being undermined by increasing climate variability hazards (such as droughts and floods). Project activities introduced innovative adaptation measures to increase resilience of vulnerable rainfed farming and pastoralist systems - e.g. water management, introduction of renewable energy, bore-hole irrigation, introduction of stress-resistant breeds and crop varieties, sand stabilization, and other land management and agronomic techniques. The goal was to demonstrate viable and cost-effective adaptation options to inform the government's food security policies and address the critical social vulnerabilities which underpin most resource-based conflicts.

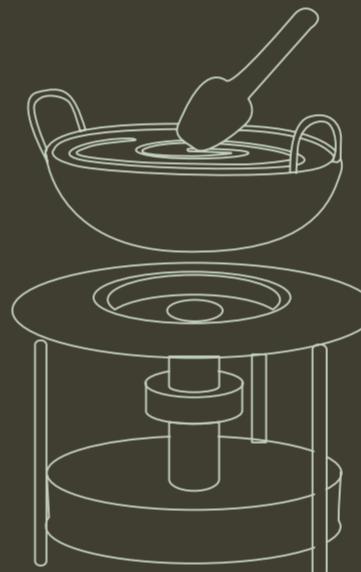
RESULT HIGHLIGHTS

The project's direct beneficiaries are 3,500 households in 37 villages in the 4 targeted states: River Nile, North Kordofan, South Darfur and Gedaref.



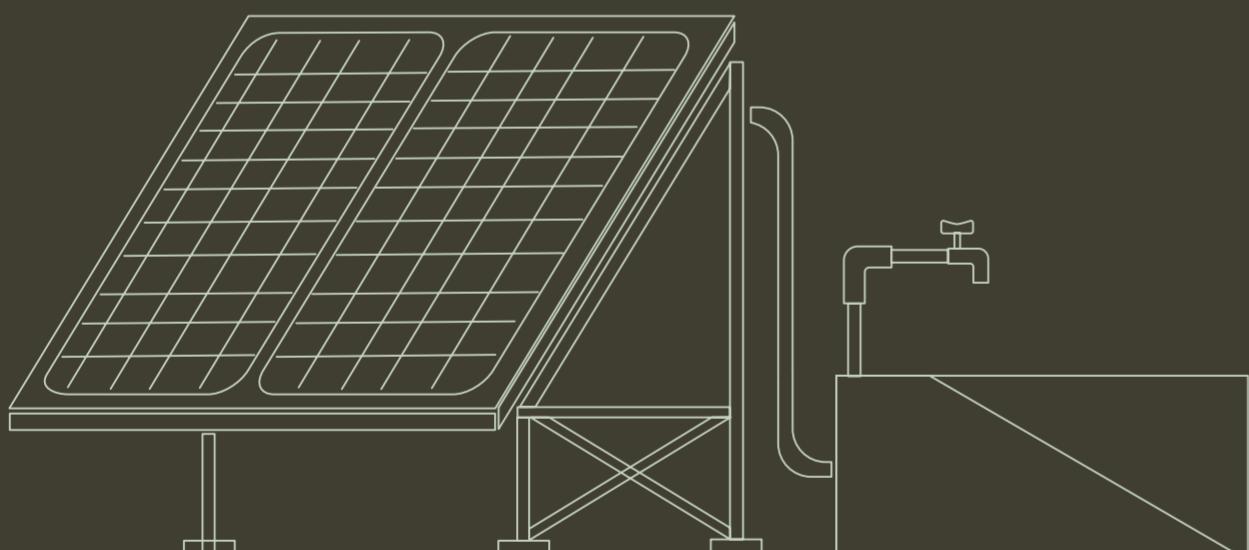
141.9 HECTARES OF PILOT FARMS

have been established, solar units were introduced to provide irrigation and drinking water in 10 villages, and 80.3 tonnes of improved crop seeds distributed to farmers; 2.2 additional tonnes of range seeds were also planted



BUTANE GAS STOVES

were adopted by communities. In South Darfur state 280 women from the 5 village clusters were trained in manufacturing improved stoves



378 HECTARES WERE PLANTED WITH CROPS IRRIGATED USING NEW WATER HARVESTING TECHNIQUES

benefiting at least 400 households who have also received 35.5 tonnes of different varieties of improved seeds



5,195 FARMERS

have benefited from attending awareness/training sessions on different adaptation measures, including forestry interventions which have begun rehabilitating a total of 730 hectares with 46,400 multipurpose trees planted, and 28 shelter belts established



Sudanese cuisine is as diverse as its geography and cultures. Meals are eaten around a large, communal tray on which various meat, vegetable, salad and sauce dishes are placed. The most popular subsistence crops grown in Sudan are sorghum, millet, wheat, sesame seeds and peanuts, with cotton and gum arabic produced for export. Livestock production is also a significant economic activity, with a majority (up to 90 percent) coming from smallholders and transhumant producers. However, the country remains a net food importer, in part because its agricultural economy is constrained by a lack of infrastructure, including both roads and irrigation.



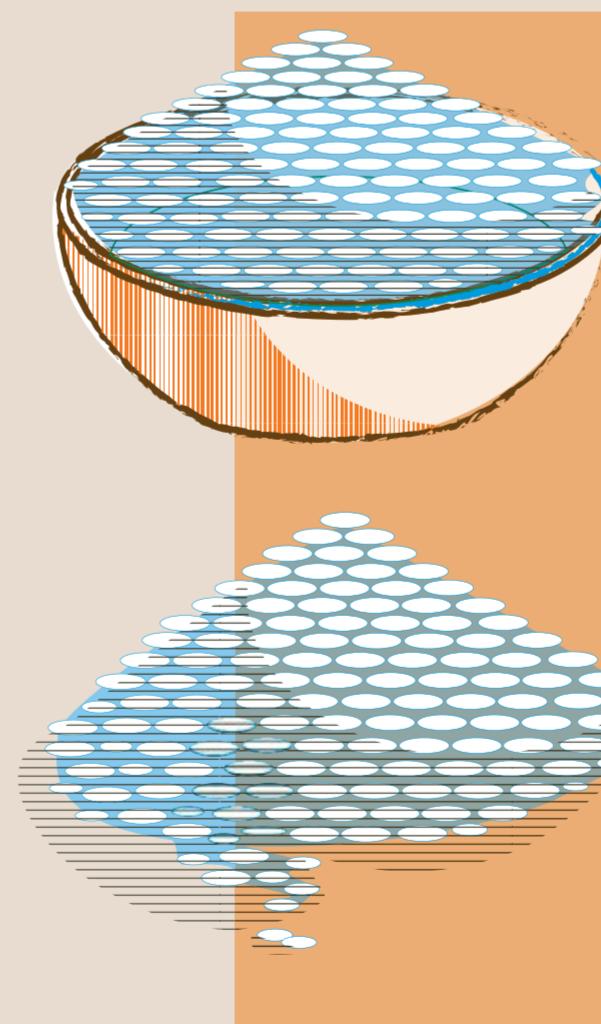
STRENGTHENING THE RESILIENCE of staple and cash crops

The livelihoods of many rural communities in CCAF countries are dependent on rainfed agriculture. As crops fail, farmers and their families are faced with dwindling income, limited food sources and no safety net to cope. Introducing new types of crops and agricultural practices can help increase crop production and food security of these vulnerable households. Under the CCAF, yields of principal staple crops have been boosted across all six countries. Access has been provided to more resilient crop varieties, alongside training and technical support to introduce more resilient agricultural and water management practices.



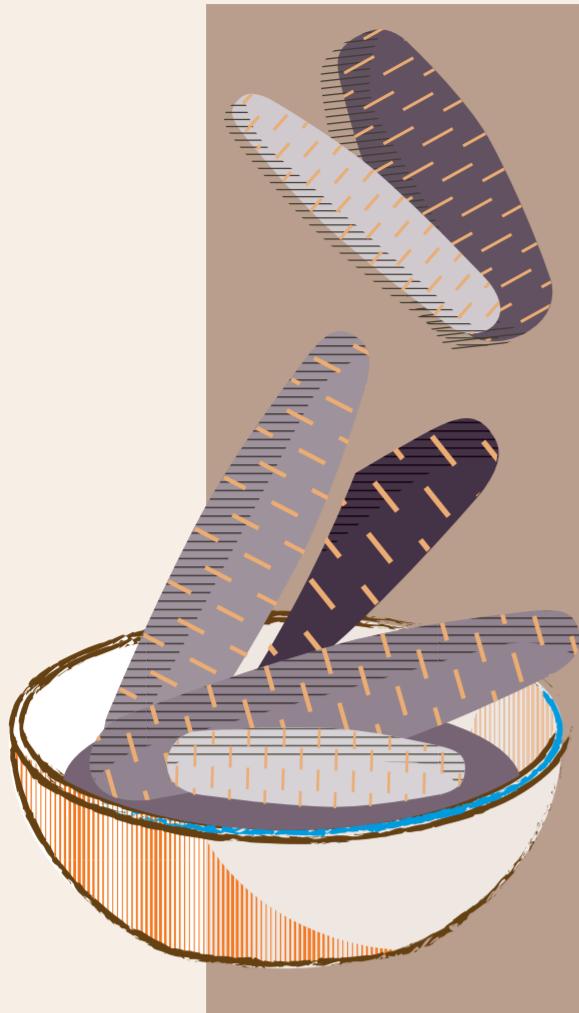
Cabo Verde **POTATO**

The project supported the National Institute for Agricultural Research and Development (INIDA) to undertake research on the adaptive potential of different potato varieties, which they then tested with local farmers.



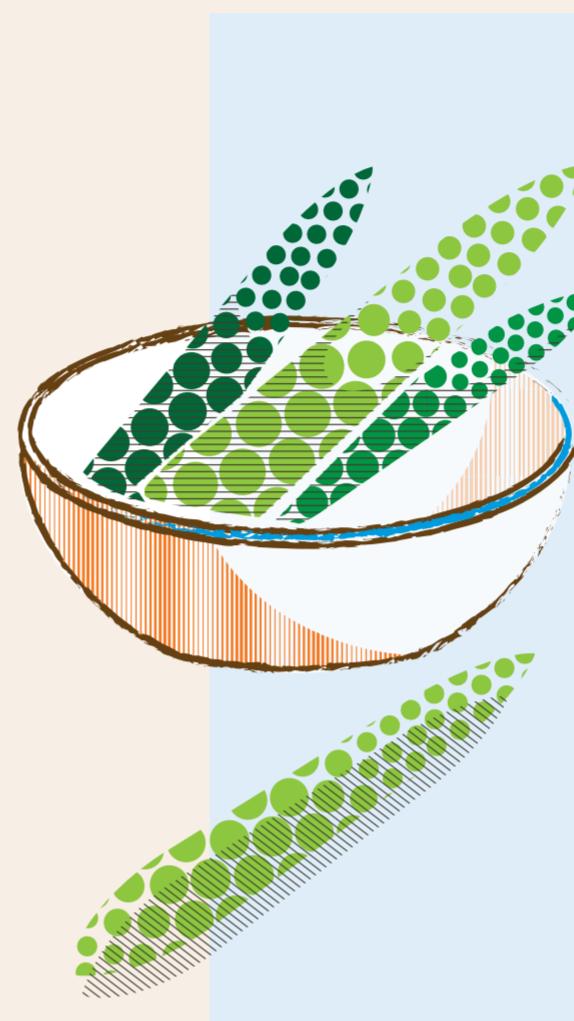
Cambodia **RICE**

Studies have been undertaken on the suitability of several types of rice varieties for specific and changing conditions, as well as introducing new irrigation systems to produce two crop cycles per year instead of one.



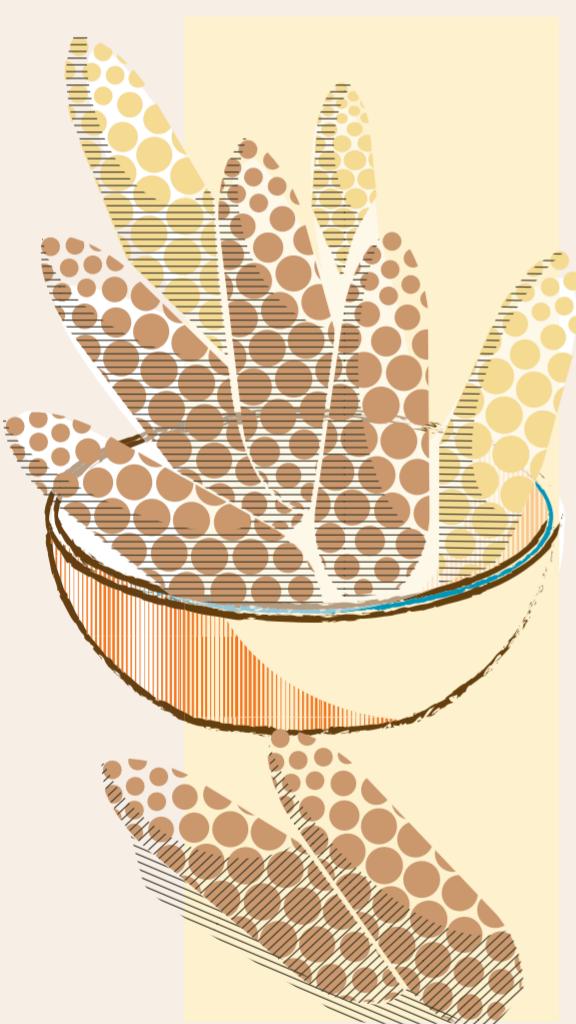
Haiti **MANIOC**

Due to increased drought and heavy rain, many of the farmers, as part of their 'farmer plans', introduced manioc which is more resilient to these changing conditions.



Mali **MILLET**

New, drought-resilient varieties of millet were tested by farmers, along with resilient growing techniques, which have proved to greatly increase productivity.



Niger **SORGHUM**

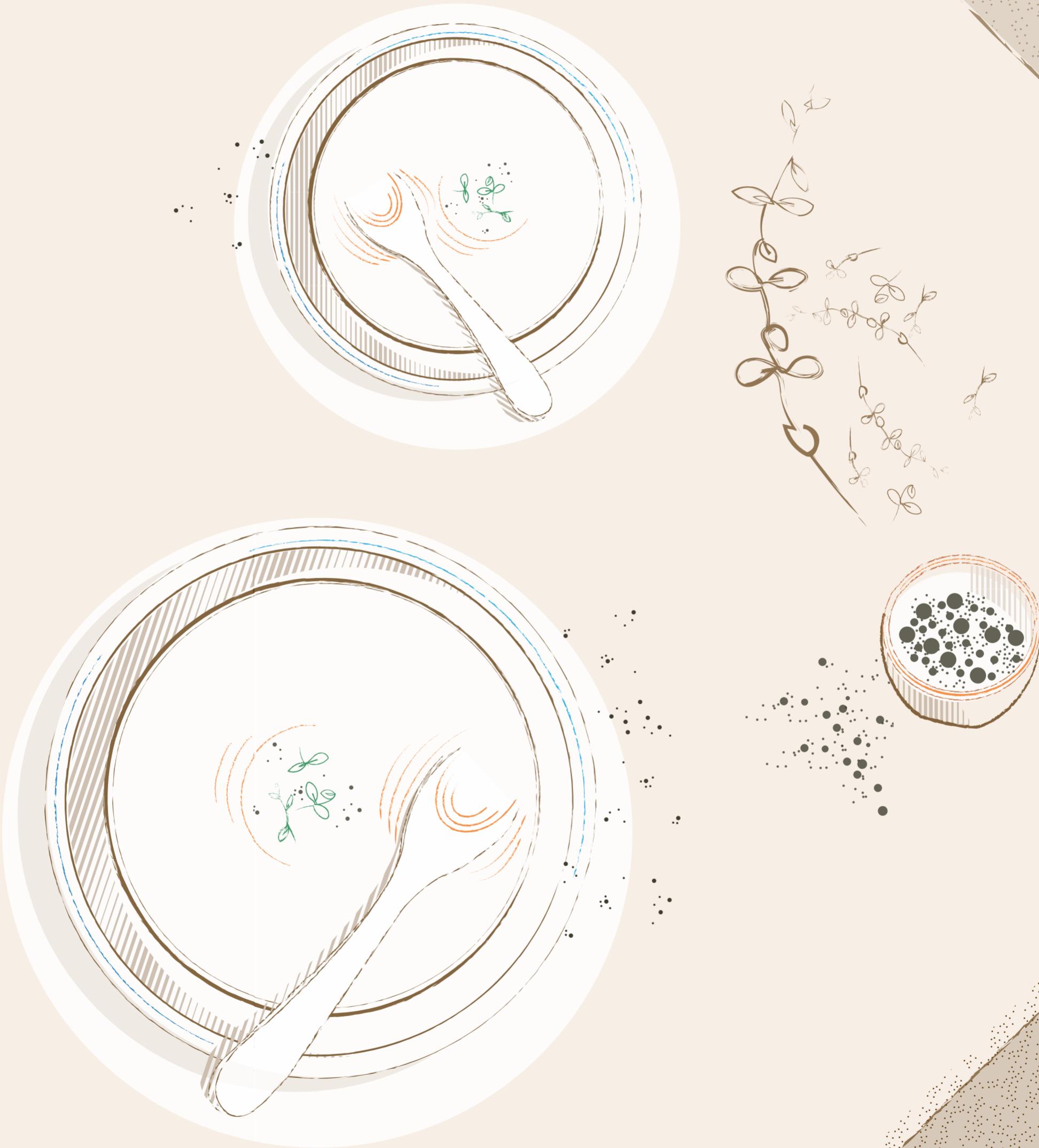
New varieties of sorghum have been introduced that helped strengthen the crop under climate change conditions, while village seed banks were established to ensure these resilient varieties are distributed and shared to reach more farmers.

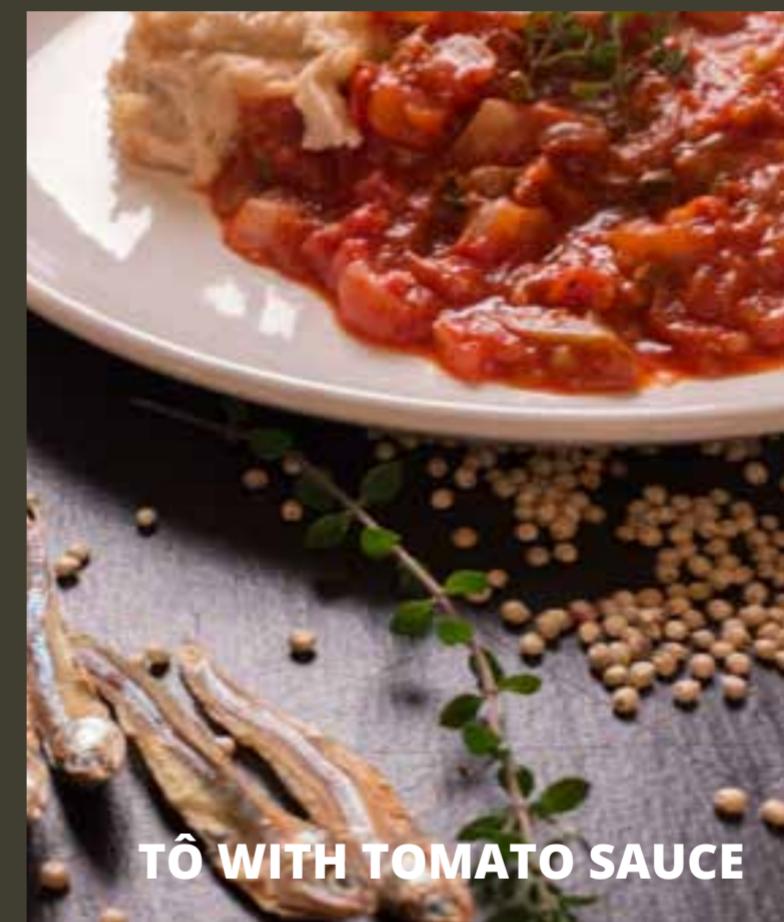
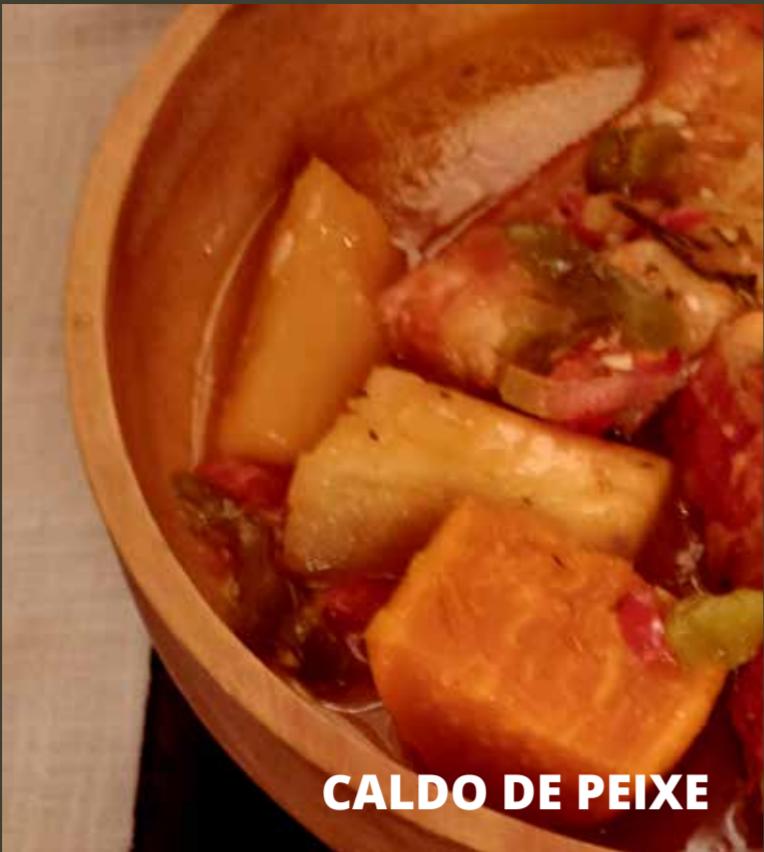


Sudan **LEGUMES**

Demonstration farms for legumes were established, using a technical package of more resilient and productive varieties.

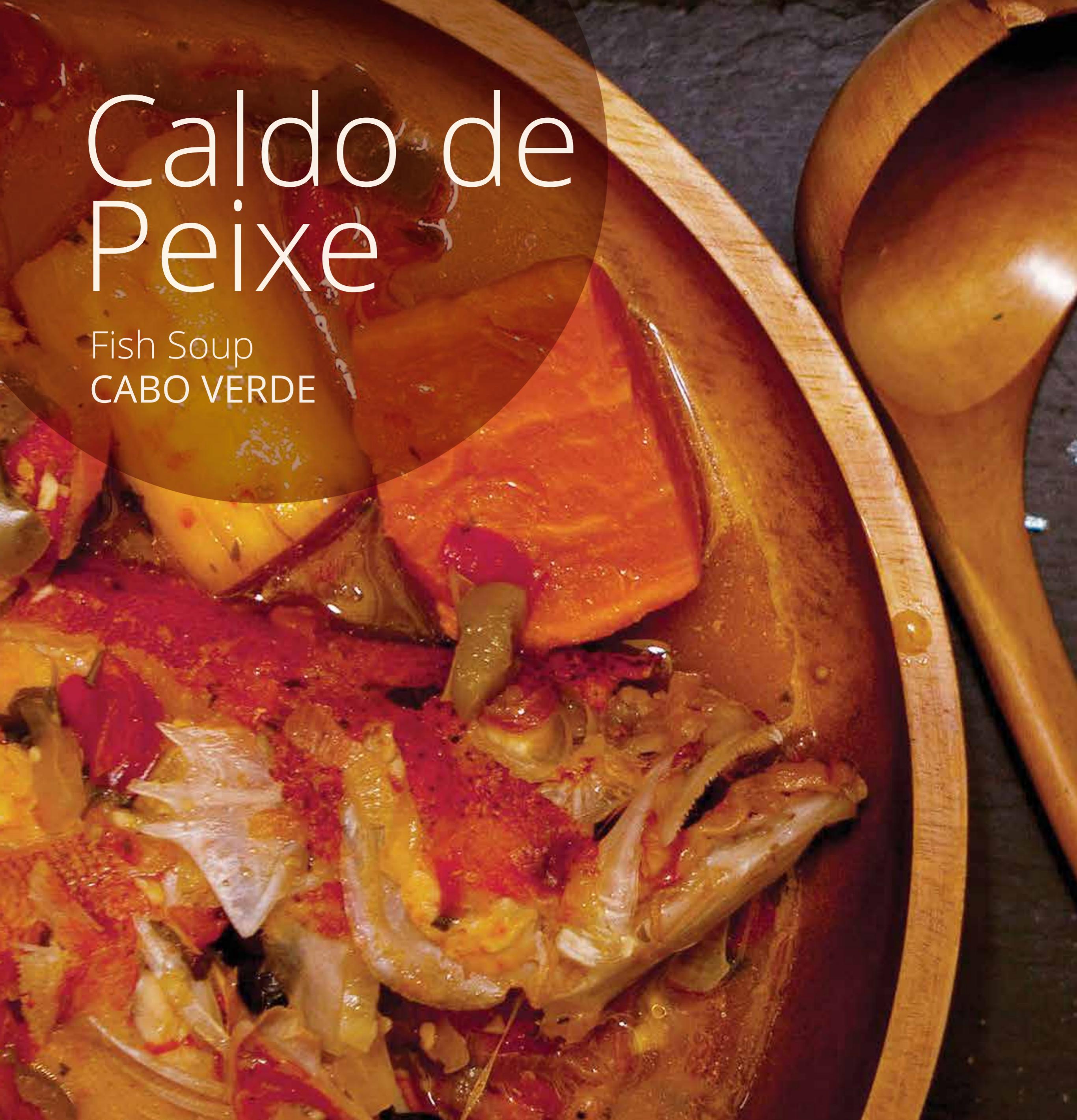
STARTERS, SOUPS, SIDES





Caldo de Peixe

Fish Soup
CABO VERDE



Caldo de peixe (fish soup) is a traditional Cabo Verdean recipe and a nutritionally rich dish. The soup can be made with tuna or other fish, such as grouper or Atlantic bonito depending on the season and personal preference. Caldo de peixe can be served with white rice or xerém (a traditional dish made with cornmeal). This recipe uses orange-fleshed sweet potatoes, which are a high-nutrition crop. They are part of a package of high-nutrition, resilient crops that the CCAF project has researched and distributed to the farmers in the project's targeted communities. Maria, one of the beneficiaries of CCAF project activities, provided this recipe. Maria lives in Achada Porto on Santiago Island, a community whose livelihood depends on fishing, small animal breeding and agriculture.

INGREDIENTS

- 1 kg (2.2 lbs) grouper fish
- 500 g (1.1 lbs) cassava
- 2 (400 g [14 oz]) orange-fleshed sweet potatoes
- 2 (250 g [9 oz]) taro roots
- 4 (350 g [12 oz]) green bananas
- 2 (200 g [7 oz]) onions
- 2 medium-sized tomatoes
- 1 green pepper
- 3 garlic cloves
- 1 bay leaf
- Salt – to taste
- Parsley – to taste
- Cilantro – to taste
- Chilli pepper – to taste
- 50 ml (3 tbsp.) olive oil

**Yuca:**

Yuca is the root of the cassava plant. It is also known as manioc and tapioca throughout the tropical regions of the world where it grows. Yuca roots have a starchy, grainy texture, similar to potatoes. They can taste sweet or bitter depending on the variety. Yuca roots should not be consumed raw as they contain cyanide. Yuca is a staple of Latin American cuisine, and is also popular in Asia and Africa. It can be boiled, mashed, fried or baked, and is often used in a similar way to potatoes. Malanga or sweet potato can be used as substitutes for yuca.

**DIRECTIONS**

Season the prepared, washed and sliced fish with thinly sliced garlic, salt, green pepper, tomato, onion, bay leaves and chilli peppers. Note that the green pepper, onion and tomato should be sliced in rings. Let it sit for 30 minutes to season.

Meanwhile, peel the green banana, taro, sweet potato and cassava. Slice the banana in half and cut the other ingredients into cubes. A useful tip for removing the peel of the green banana is to place it in a pot with water and boil for 3 minutes. After peeling the slightly boiled banana, let it sit in cold water (prior to starting the soup preparation). The taro should also be peeled and placed in cold water before going into the pot.

Place the fish with the seasoning ingredients in a saucepan with olive oil and sauté for 3 minutes. Afterwards, remove only the fish from the pan and set aside. Remove the fish with care in order not to break it. Add the peeled and cubed taro to the pan and simmer, stirring constantly with a wooden spoon. Next, add 1 litre of water (1 quart) and bring to a boil. When the water starts boiling, add the green banana, sweet potato and cassava. Add salt to taste. Make sure that the liquid in the pan covers all of the ingredients. If not, add water to the level of the ingredients.

When all the ingredients are cooked (you can check with a fork), add the fish that was previously removed and simmer for an additional 5 minutes or until the fish is cooked. Check for salt and turn off the heat. Add the cilantro and parsley, and cover the pot for 5 minutes. The fish soup is ready and should be served with rice or xerém.



Samla Kako

Kako Soup
CAMBODIA



Through the CCAF project, the introduction of vegetable gardens near the homes of beneficiary communities has led to better access and availability of the range of vegetables and spices used for herbal pastes and other recipes like this soup. Farmers are now less dependent on one cash crop (e.g. rice) which could be vulnerable to climate change. With increased diversity of crops, the gardens provide a safety net and have also led to increased income through the sale of vegetables on the market. They are also improving women's livelihoods, who are usually the primary managers of these gardens.

INGREDIENTS

- Green Kroeung
 - 30 g (1 oz) lemongrass (sliced finely);
 - 3 parts leaves to 1 part stalk
 - 1 tbsp. greater galangal (cut small)
 - 1 tsp. turmeric (cut small)
 - 4 garlic cloves
 - 2 shallots
 - 250-300 g (7-10 oz) chicken (could be replaced by other meats, e.g. catfish, pork, beef, fish or frog)
 - 1 tbsp. *prahok* (fermented fish paste)
- Kako Soup
 - 400-500 g (14-18 oz) vegetables and fruits - various vegetables/fruits can be used, e.g. coccinia, yard long bean, green papaya, green banana, green jackfruit, young palm fruit (sliced thinly), pumpkin (cut into cubes), purple eggplant (sliced into cubes), long beans or green beans (cut into 10-cm pieces), pea eggplant (small bunch)
 - 4-6 cups water
 - ½ cup rice (roasted and ground) to make rice powder
 - Salt - to taste
 - 2 tbsp. palm sugar
 - 1 cup Sesbania leaves and 1 cup Moringa leaves (alternatively you can use spinach or collard greens)
 - 3 stems curry leaves
 - 2 cups bitter gourd leaves

**Collard Greens:**

These big, leafy greens on rather tough stalks can be cooked, boiled, baked or eaten raw in salads.

They have a mild and smoky flavour. A member of the cabbage family, collard greens are one of the key ingredients in Gumbo Z'Herbes, or green gumbo. Kale makes a great substitute for collard greens as it is similar in taste and texture.

**DIRECTIONS**

Prepare the green kroeung by pounding all ingredients in a mortar or food processor until they have a smooth, paste-like consistency. Always add shallots last.

Cut chicken into bite-sized pieces.

Remove leaves from Sesbania and Moringa stems and place in a bowl - or use spinach.

Remove bitter gourd leaves and keep them separately.

Fry the kroeung with *prahok* in vegetable oil in a large pot over medium-low heat.

When the sauce turns green and the aroma intensifies, add chicken, salt, palm sugar and ¼ cup of water. Stir well.

Cook the chicken in the pot for about 15 minutes (10 minutes for frog and fish). Add the vegetable/fruit combo. Stir constantly.

Add the rice powder (which is dry, toasted rice, heated with no oil and ground finely). Stir and add the rest of the water.

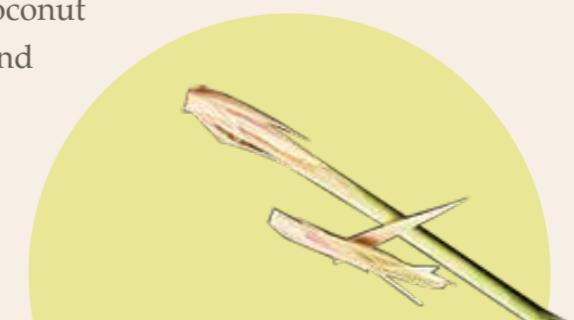
Increase the heat to medium-high and bring soup to the boil. Once it bubbles, add the *prahok*, Sesbania and Moringa leaves and remove from the heat immediately.

Brush the curry leaves over the flame about 4 times so the leaves burn slightly, and then remove them by rubbing thumb and index finger up the stem. Add to soup before serving.

The fresh bitter gourd leaves set aside in a bowl will be added individually.

Lemongrass:

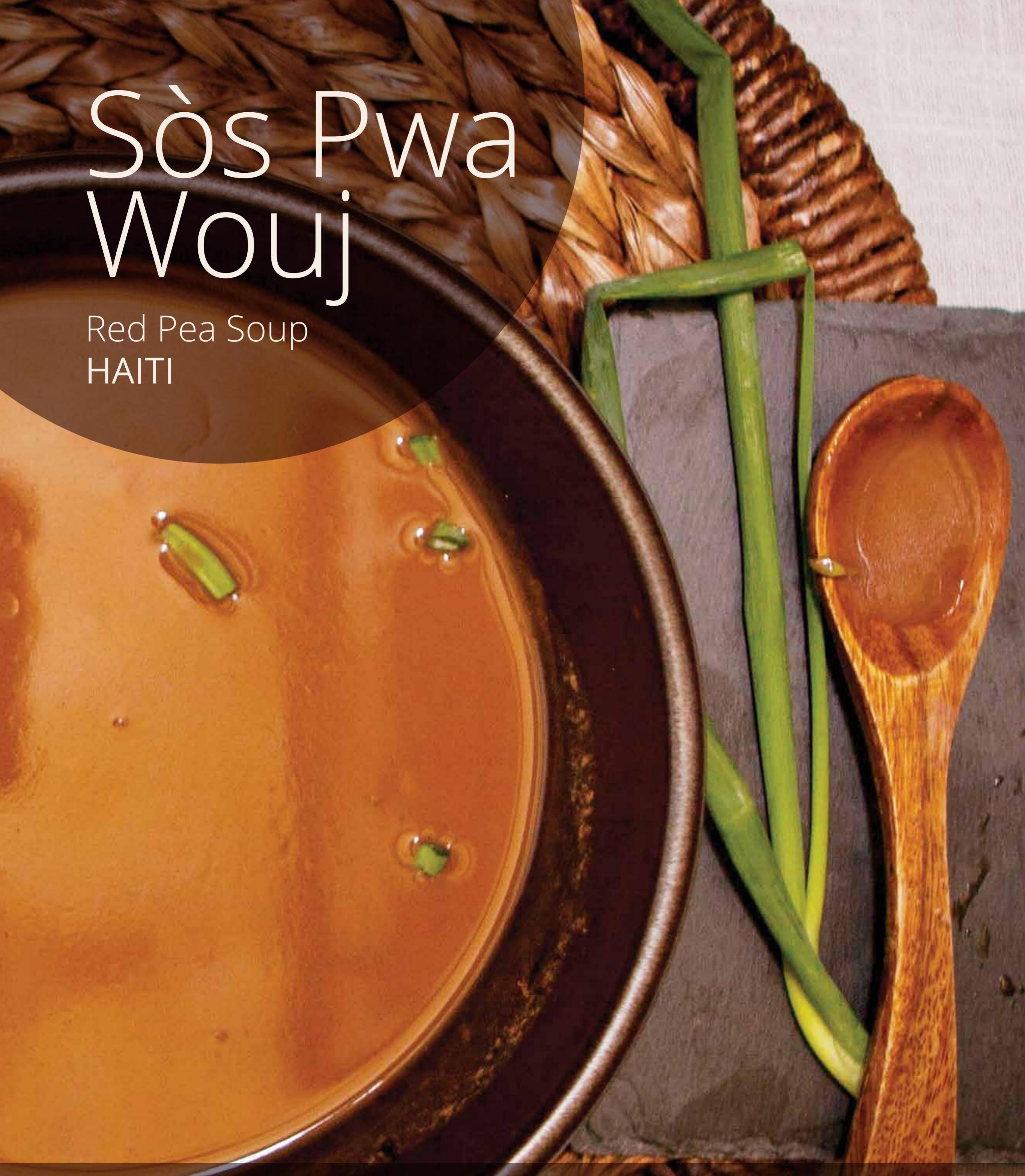
Lemongrass is a tropical grass with a delicate, lemony fragrance. It has a refreshing citrus flavour with a hint of mint and ginger. The thicker bulbous end can be added whole to dishes, or peeled, then crushed or sliced. Lemongrass features in South-East Asian, African and Indian cooking. It is widely used in meat, poultry, seafood and vegetable curries. It combines well with coconut milk, and the stems are also used in teas and marinades. Dried lemongrass can be used if it isn't available fresh, or lime zest and ginger could be an alternative.





Sòs Pwa Wouj

Red Pea Soup
HAITI



Red pea soup is usually served with rice or corn at dinner. It is a typical Haitian meal that is eaten by most Haitians, regardless of their origin. Through the CCAF project, a more resilient variety of red pea has been introduced and farmers have experienced a positive change in their harvesting. Farmers have also introduced a variety of spices and herbs into this recipe, such as green pepper, that they grow in their small project-supported gardens.

INGREDIENTS

- 4 cups dry red kidney beans
- 1 scallion, chopped
- 1 shallot, diced
- 4 garlic cloves, crushed
- 1 tsp. salt
- 1 tsp. black pepper
- 2 tsp. dried thyme
- 1 tsp. parsley
- 1 tsp. olive oil
- 1-2 tsp. seasoning powder

DIRECTIONS

In a large pot, bring water and peas to a boil. Let it cook for 1-2 hours, until peas are tender.

Drain the peas and set aside the reserved liquid. Using a food processor, add the peas, 500 ml (2 cups) of reserved liquid and 4 garlic cloves; puree until smooth.

Heat oil in a saucepan over medium-high heat; sauté shallots and scallions for 3-5 minutes.

Pour the pea soup into a large pot over medium heat. Season to taste with salt, pepper and seasoning powder.

Stir in the thyme, parsley, scallions and shallots. Remove from heat. Serve with white rice.



Women are contributing to maintaining seedlings and using them for reforestation in Haiti



TÔ

with Tomato Sauce
MALI



Tô is a dough made from water and flour derived from varieties of sorghum, millet or maize that are improved to withstand drought. The increased introduction of these resilient varieties has been supported under the CCAF project. To make the flour, the cereal is shelled, then ground. Once the cereal is ground, it is washed to extract the bran. The result is decanted to take off the sand and small stones. This is then sifted to remove the coarse parts. While this used to be very time-consuming, the CCAF project has introduced multifunctional platforms and a grain mill, which rely on solar energy to increase the efficiency of this processing and milling.

INGREDIENTS

- Tomato Sauce
 - 6 fresh tomatoes
 - 1 tbsp. tomato paste
 - 3 onions
- Tô
 - 450 g (1 lb) millet, sorghum or corn (maize) flour, (if using corn flour, white cornmeal is better, and it should be finely ground, like flour. Latin American-style corn flour, as is used in tortillas, tamales, pupusas, etc. is the right kind)
 - Water

**Sorghum:**

Originating from Africa, sorghum is a grain grown in warm, dry areas around the world. In arid regions it flourishes where other grains cannot survive. Renowned for its 'umami' taste – a blend of sweet and savoury with a nutty tang – this grain is used in porridges, tortillas, couscous and as a replacement for rice. Sorghum syrup or 'molasses' can be used as a sweetener, or the grain can be popped like popcorn. When ground into flour, it can add a superb flavour to gluten-free baking. You can substitute millet for sorghum, but not for popcorn.

**DIRECTIONS**

Bring 2 litres (2 quarts) of water to a boil in a large pot over high heat. Slowly add about a quarter of the flour to the water, stirring quickly and constantly so as not to allow any lumps to form.

Cook for about 5 minutes, stirring constantly.

Reduce heat. Remove about a quarter of the water and flour mixture and set it aside in a clean bowl.

Add the remaining flour bit by bit, about a cup at a time. Stir vigorously each time the flour is added. If the mixture becomes too thick to stir, add some of the flour and water mixture that was set aside. All of the remaining flour and as much of the set-aside mixture as necessary should be added to the pot in about 5 minutes. The result should be a thick, smooth paste that is too thick to stir.

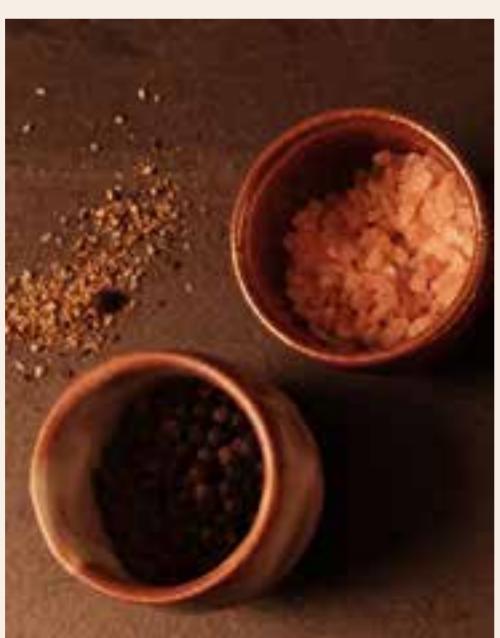
Cover the pot and cook for an additional 10 minutes at very low heat.

Remove from heat. Serve warm or cool with any sauce, soup or stew.

Make compote from fresh tomatoes harvested in the maraîchage (market garden) perimeters, adding tomato paste and onions.

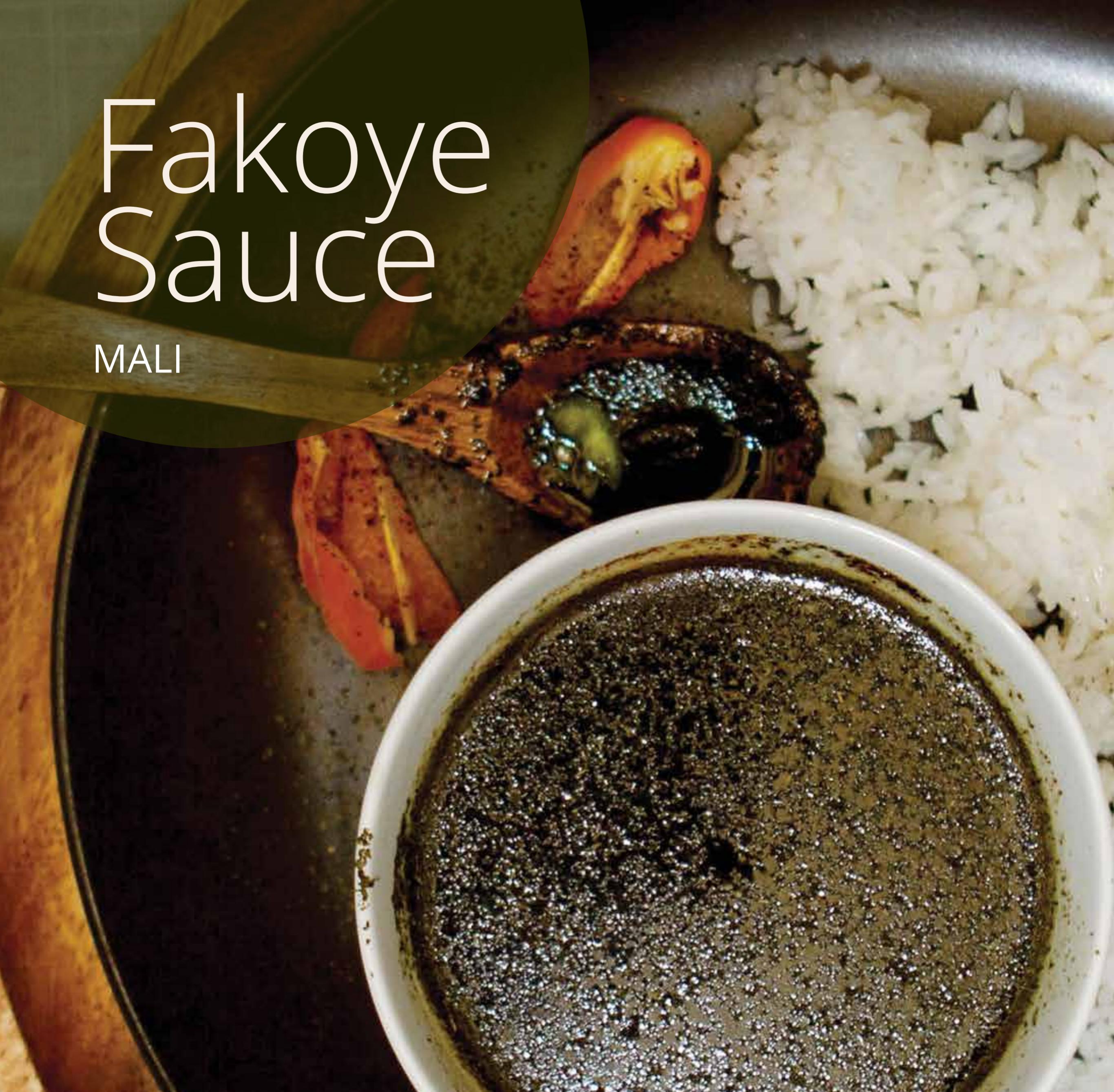
Mix with dry or fresh fish or meat.

Different sauces can accompany the tô.



Fakoye Sauce

MALI



Fakoye is a typical meal for the northern regions of Mali. The sauce is made with dry leaves and meat (goat, sheep), adding spices and shea butter. A powder is made from the leaves and is mixed with the shea butter to obtain a sauce, and then the meat and spices are added. While meat is often a luxury for many rural farmers, raising and selling small livestock is a common livelihood for these communities. Since goats and sheep can be resilient to drought and changing rainfall patterns, it is a good income-generating option in the context of climate change. Under the CCAF project, women in particular have been trained in the process of livestock fattening and breeding, and provided credit to purchase young livestock. They raise and feed these sheep or goats for six months to a year before selling them again for a higher price. This provides an alternative income for these households typically dependent on staple crops. It also provides women with an opportunity to generate their own income.

INGREDIENTS

- 1 kg lamb
- 2 cups powdered fakoye leaves
- 1 tsp. crushed dates
- 1 tbsp. kafonne¹
- 100 ml peanut oil
- 10 ml shea oil
- 2 tbsp. shea butter
- 1 chicken stock cube
- Salt, pepper, chilli
- 1 litre (4 cups) water

DIRECTIONS

Cook the meat for 15 minutes in a cooking pot with peanut oil, shea oil, salt, pepper, a Maggi cube and a glass of water.

Meanwhile, knead the fakoye with shea butter and kafonne.

When the meat has cooked, add dates, fakoye, chilli and 3 cups of water. Simmer for 25 minutes.

Serve with white rice.

¹ Kafonne is a spice mixture unique to the Songhai people of West Africa. If unavailable, replace with 1 tsp. herbes de provence, or 1tsp. mixture of rosemary, sage, marjoram, oregano, basil and thyme.

Fakoye Leaves:

Fakoye is a Malian herb with an earthy, musky aroma. It is used as a condiment in sweet potato leaf stew. A similar species, jute mallow, sometimes known as Egyptian spinach, has leaves which can be substituted for Fakoye.

**Shea Butter:**

Shea butter is made from the seeds of the African shea tree. Although it is primarily used in cosmetics, the butter is edible and is used as a cooking fat in Africa as a replacement for palm oil. It is sometimes used in chocolate production as an alternative to cocoa butter. It has a smoky, nutty fragrance and flavour. Shea butter can be substituted with butter or lard, depending on the dish.





Dambou

NIGER



The starches eaten most often in Niger are millet and rice. Sorghum and maize are also very popular in many parts of the country. Couscous is saved for special occasions. Most of these grains are grown by smallholder farmers, who are typically dependent on one crop for their livelihoods. With the impacts of climate change, these crops become more vulnerable to increasing droughts, changing rainfall patterns and seasonal uncertainty.

Under the CCAF project, new varieties of millet and sorghum that are more resilient to these changing climate conditions have been introduced to target communities. Further, 70 farmers, including 21 women, were trained in how to propagate or produce these improved varieties, which they can then sell to other farmers for a small profit. 3,755 kg of seeds of eight varieties of millet, sorghum and cowpea adapted to climate conditions were produced by the trained farmers and subsequently distributed to 3,000 rural farmers (around 600 of whom are women).

INGREDIENTS

- 1 kg (35 oz) semolina millet, sorghum, corn or couscous
- 500 g (17 oz) Moringa leaves (or cabbage or spinach)
- 2 onions
- $\frac{1}{2}$ litre (17 fl oz) groundnut or peanut oil
- 4 fresh tomatoes
- 1 garlic clove
- Fresh chilli
- Dry chilli
- Salt

**Moringa Leaves:**

Known as the drumstick tree or horseradish tree, *Moringa oleifera* is grown throughout the tropics. Moringa leaves are “tiny but pack a punch, containing more vitamin A than carrots, more protein than eggs, more calcium than milk, and more iron than spinach”. The raw leaves have a slight bite to them, and a bitter, nutty taste, reminiscent of horseradish. Moringa leaves can be eaten fresh, cooked or dried, and they are added to enhance the flavour of curries, dals and salads. Because of their slightly horseradish-like flavour, daikon or radishes are possible substitutes at a pinch.

**DIRECTIONS**

Boil the Moringa leaves (in case Moringa leaves are not available, cabbage or spinach can be substituted) for 3-4 minutes and drain well.

Mix with salt and pepper.

Dice the tomato, onion and garlic.

Fry the onion in groundnut oil until translucent and then add the fresh tomato and garlic. Incorporate this into the Moringa mixture.

Add the dry and fresh chillies.

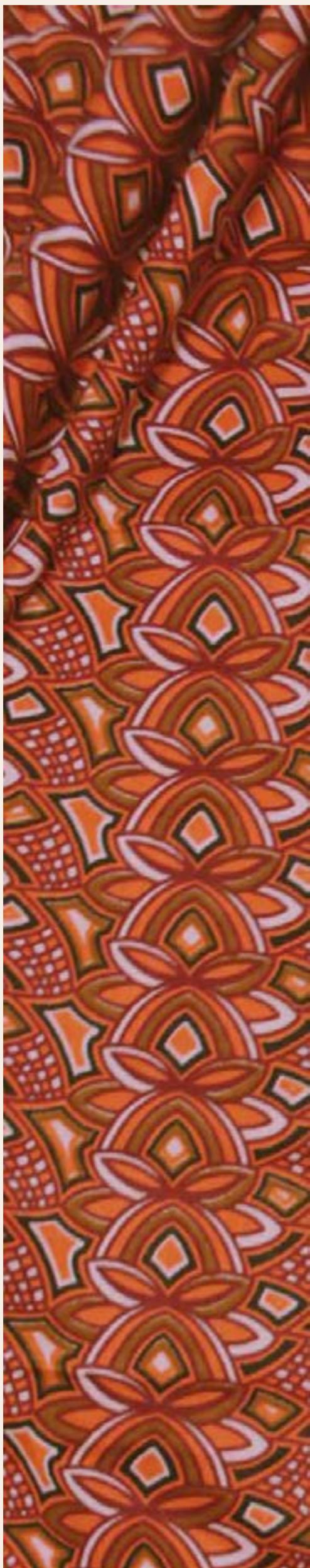
Cook the millet with twice as much water in a medium-sized saucepan at medium-high heat.

When the water starts boiling, turn the heat down to low and cover the pot.

After 10-15 minutes all the water should be absorbed. The millet is ready to serve.

Serve the Moringa mixture prepared earlier on a bed of millet. Some fresh chillies can be used as garnish.

Mix well and serve.



Cowpea Sauce

SUDAN



Cowpea is a multipurpose crop. It is mainly grown as a cash crop, but can also be used as livestock fodder. In rural Sudan, cowpea is used in home-cooking in soups and sauces. In South Darfur state, under the project, farmers were encouraged to reintroduce cowpea on their farms. Seeds were provided to the farmers and the agricultural extension officers trained the farmers to intercrop cowpea with sorghum and millet. Being a legume, cowpea adds to the fertility of the soil which was eroded by the impacts of climate change. About 200 farmers planted the cowpea in a total area of about 459 feddans (189 ha). Each farmer planted an average of 1.5 feddans and each feddan produced about 200 kg of cowpea. The net profit for the farmers who sold their whole crop was about USD 937, which had enormous positive impacts on their livelihoods.

INGREDIENTS

- 2 kg (4.4 lbs) cowpea beans
- 2 kg (4.4 lbs) meat
- 3 chopped onions
- 3 tbsp. oil
- Salt, garlic and black pepper - to taste
- 1 cup tomato sauce
- ½ cup tomato paste
- 2 cups water

DIRECTIONS

Boil the cowpea beans for 30 minutes or until they are soft.

Mash until they form a pasty texture.

Fry the onions in oil in a large pan at medium heat, stirring until the onions are crispy and golden.

Add the meat with the salt, garlic and black pepper. Add the tomato paste and sauce, cover, and leave for 40 minutes, adding small amounts of water when needed.

When the meat is tender, add the cowpea paste and cook at medium heat for another 20-30 minutes.

Serve hot with aseedha.



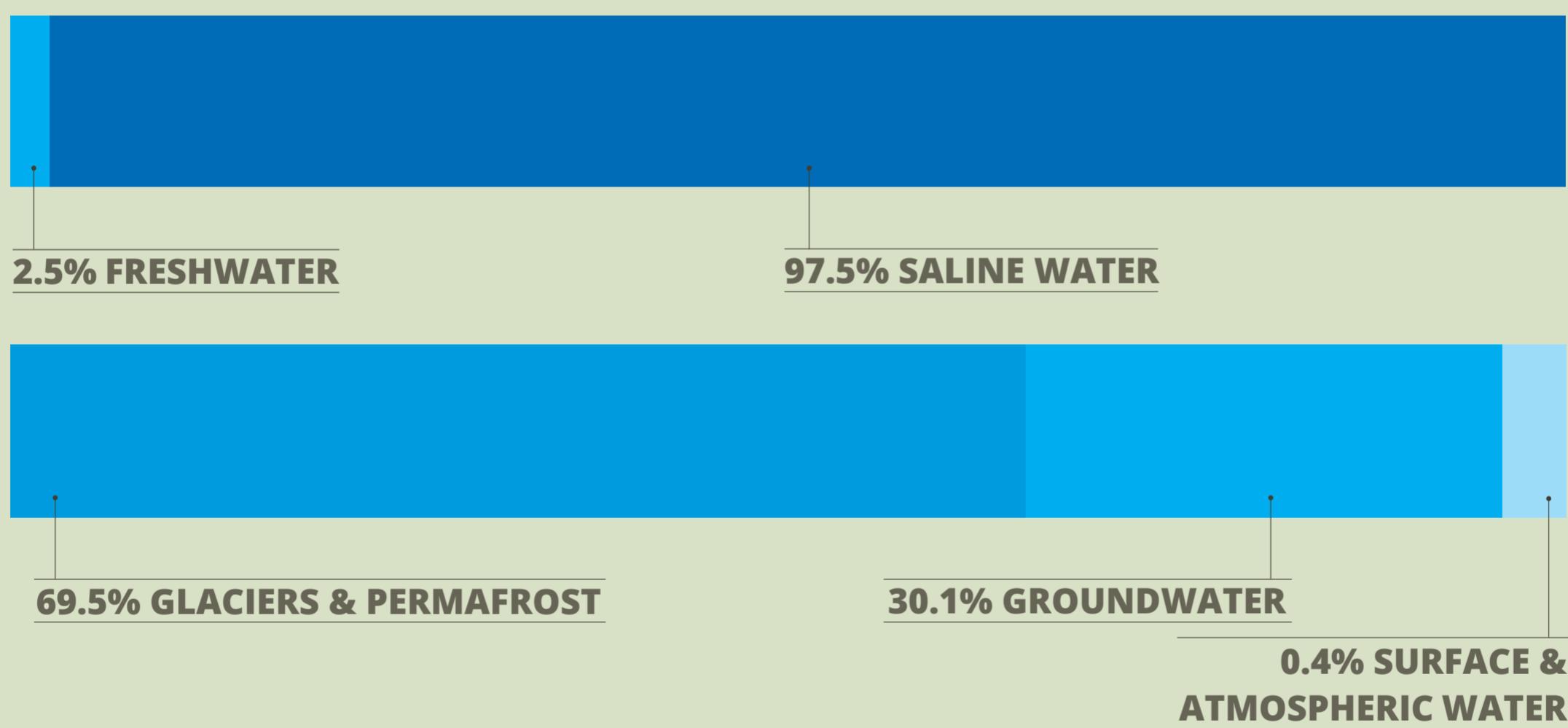


NO WATER, NO LIFE

Increased frequency of droughts caused by climate change is heightening the problem of water scarcity in all six CCAF countries. At the same time, in many countries flood patterns are changing, with flash floods occurring more often, even in arid zones. Altered rainfall patterns also contribute to uncertainty in agriculture, leading to declining yields, crop losses and increased animal mortality rates. Water access is therefore a priority issue when designing climate change adaptation strategies, particularly in CCAF countries. Further, given that women and men have different interests, priorities and concerns around water access, taking a gender-sensitive approach is critical for ensuring sustainability of these solutions.

GLOBAL FRESHWATER RESOURCES ARE LIMITED

Of all the world's vast water resources, only 2.5% are freshwater - the water that sustains human, plant and animal life¹.



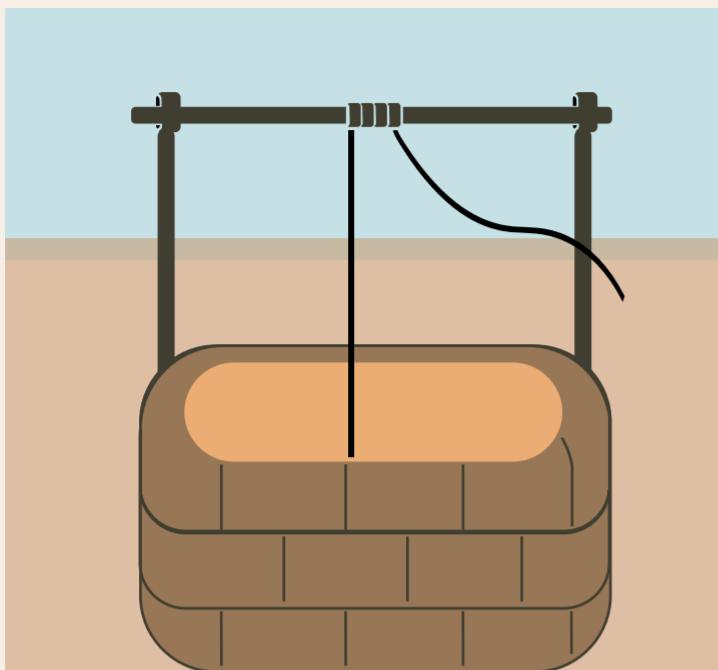
Of this 2.5%, less than one-third can be used by humans². Most of this is in the form of groundwater that is difficult to access. Globally, 70% of these freshwater resources are used for agriculture, even more (up to 90%) in Least Developed Countries³. Climate change further threatens the limited freshwater resources available, directly impacting food security. As the global demand for water increases with population growth, it becomes imperative to mitigate the effects of climate change and ensure a stable water supply. This requires small infrastructure paired with resilient water management practices.

¹ Data from Shiklomanov and Rodda, 2003

² UN World Water Development Report, 2012

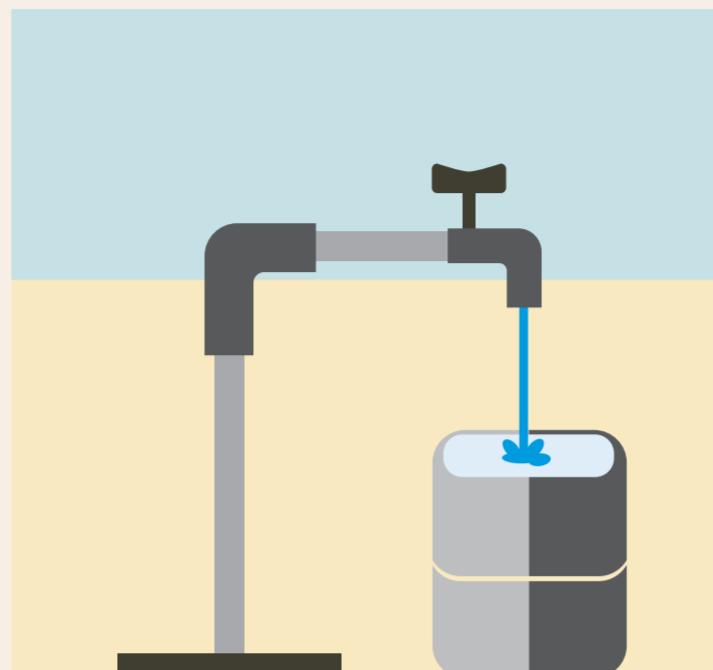
³ World Water Development Report, 2016

Each CCAF project introduced a range of small infrastructure to increase access to water for both irrigation and domestic use.



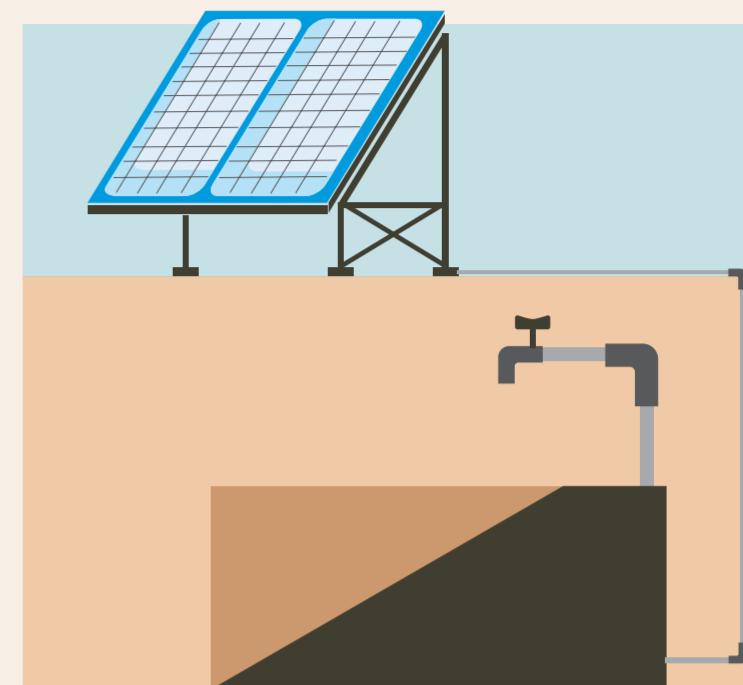
Mali **PUMPING WELLS**

Wells, many fitted with solar pumps, were provided to farmers and women's collectives to ensure sustained water access close to the farms and vegetable gardens. This had a direct impact on women's and girls' time and workload.



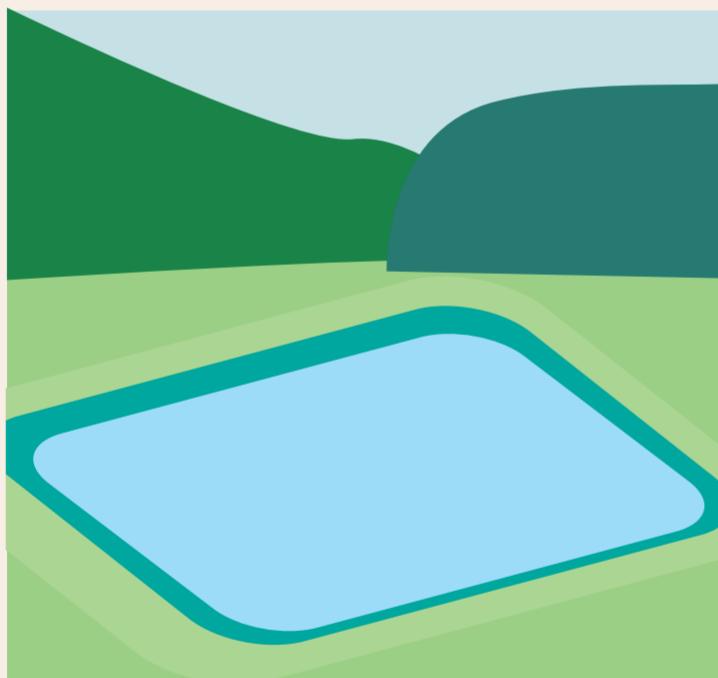
Niger **DRINKING WATER SUPPLY SYSTEMS**

In Niger, pumping wells were provided, along with the rehabilitation of 2 drinking water supply systems. This helped 1,605 beneficiaries grow food crops in their vegetable gardens.



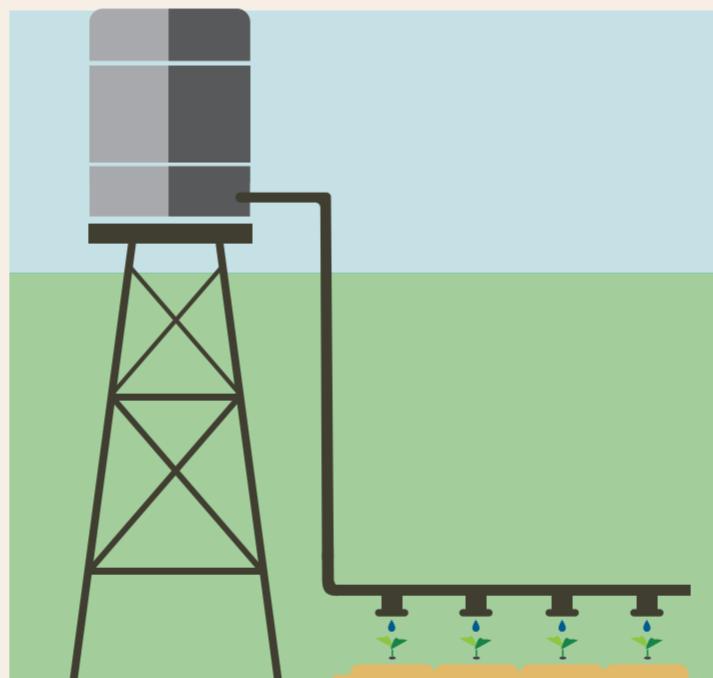
Sudan **SOLAR PUMPS**

9 wells were dug, rehabilitated and fitted with solar pumps in Sudan. This benefited 400 households (with an average family size of 7 persons). Farmers were also trained in new water harvesting techniques which enabled them to plant 378 additional hectares.



Cabo Verde **RESERVOIRS**

Other water infrastructures constructed were catch dams, cisterns and wells. Water distribution meters were provided and water distribution networks were also repaired. 748 farmers (10% women) gained access to improved and reliable sources of groundwater.



Cambodia **RAINFALL HARVESTING TANKS**

Pump wells, solar pump systems, wind-powered pumps and community ponds were provided through the project. 3,015 households benefited from small-scale water infrastructures.



Haiti **WATERSHED MANAGEMENT**

Watersheds are the natural network of rivers and streams that feed into large waterbodies, often supporting a large population base. To help ensure resilient management of watersheds threatened by climate change, 31 watershed management committees were established and trained in resilient practices.

ENCOURAGING SUSTAINABLE WATER MANAGEMENT PRACTICES

Appropriate management of water resources, and investment in training the local community to do the same, has the potential to create resilience to climate change and enhance water security. Clean water for domestic use and dependable water resources for agriculture are essential to food security and can also contribute to development in general.

The CCAF projects paid particular attention to establishing sustainable water management practices within the communities by initiating Water User Groups (WUGs).

Enhancing access to water through improved infrastructure does not, on its own, ensure resilient livelihoods. The management of water resources is a critical issue, which requires specific mechanisms to reduce potential conflicts and ensure sustainability.

Therefore, it is important to couple these infrastructures with management groups and strategies that consider social dynamics and equitable distribution. At the same time, the role of women in these management systems has implications on gender equality and dynamics within the community, which affect adaptation.



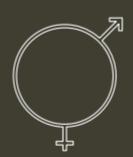
Under the CCAF projects, different countries have applied different approaches to address these management needs.

CAMBODIA



Strategy:

Two categories of groups were formed: Farmer Water User Committees (FWUCs) to manage water for irrigation purposes, and WUGs to manage domestic water supply.



Gender responsiveness:

The Ministry of Women's Affairs (MOWA) provided support to increase women's participation and leadership in WUGs. In 2014, 55 percent of villages had at least two (sometimes three) out of three group leaders who were women.



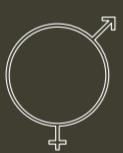
Results:

1,481 households were supported to be part of a WUG and trained to manage these water supply systems.



HAITI**Strategy:**

Two categories of committees were established - Watershed Management Committees which oversee the natural resource management of the entire watershed in an integrated way; and Drinking Water Supply and Sanitation Committees which manage the distribution and maintenance of the water supply systems. The committees were established through a consultation and awareness-raising mechanism with community organizations and authorities.

**Gender responsiveness:**

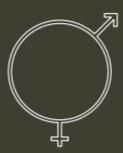
Women were involved in both committees, and particular consideration was given to women's decision-making roles within the watershed management committee, as they have localized knowledge of natural resources.

**Results:**

Three Drinking Water Supply and Sanitation Committees were supported under the project. Thirty-one Watershed Management Committees were established in the southern region, which were very successful in strengthening integrated natural resource management.

NIGER**Strategy:**

The project set up and trained management committees responsible for managing the wells and for hygiene around them.

**Gender responsiveness:**

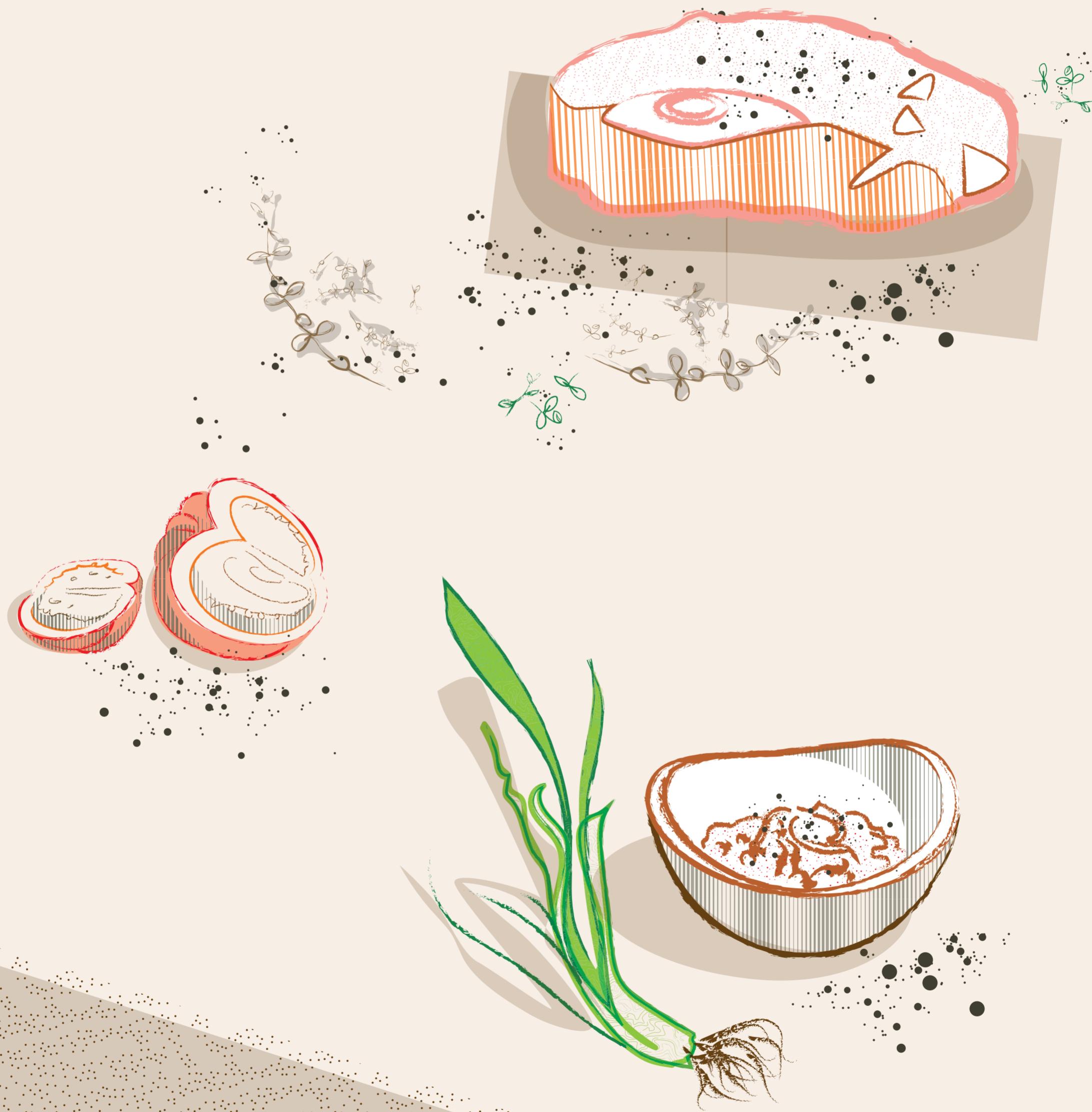
Each committee is composed of 12 members, including four women.

**Results:**

Two Watershed Management Committees were established, one in Kombaki (Roumbou) and one in Maïdachi (Tanout).



FISH, MEAT, VEGETABLES





D. Zeferina's Katxupa

CABO VERDE

This recipe is from Dona Zeferina who lives in Colonato - a community located in Tarrafal, where agriculture and animal husbandry are the predominant livelihoods. Colonato is one of the intervention areas of the CCAF project, where several farmers were supported to introduce a more diverse and resilient variety of crops.

Katxupa could be considered Cabo Verde's most versatile recipe. Each region has its own style and each family its own secret way of making it. It can be eaten at any meal (breakfast, lunch or dinner) on the day it is prepared or the following day. Corn and beans are the essential ingredients. Other ingredients can be added depending on local availability, the socio-economic conditions of the families and/or each person's preference. The making of the katxupa can be an authentic ritual which begins one day earlier with the preparation of corn in the *pilão* (traditional mortar and pestle), the removal of the salt from the salt-cured meat, and the soaking of the corn and beans. Katxupa can contain meat or fish, or a combination of both. It can be made with pork, goat, chicken or beef. Some people prefer using a mixture of various meats.

INGREDIENTS

- 1 kg (2.2 lbs) dried corn (hominy)
- 250 g (½ lb) dried beans (could be pinto, hyacinth or any other available type of dried beans)
- 250 g (½ lb) fresh fava beans
- 250 g (½ lb) carrots
- 250 g (½ lb) potatoes
- 250 g (½ lb) pumpkin
- 4 small kale leaves
- 300 g (10 oz) cabbage
- 250 g (½ lb) sweet potatoes
- 250 g (½ lb) tuna fish
- 500 g (1.1 lbs) salted pork
- 4 medium-sized tomatoes
- 1 medium-sized bell pepper
- 3 (≈200 g [7 oz]) onions
- 1 head (38 g [1½ oz]) garlic
- Salt – to taste
- 2 chicken stock cubes
- Parsley - to taste
- Cilantro - to taste
- 3 bay leaves
- Chilli pepper - to taste
- 2 tbsp. vegetable oil
- 100 ml (3 oz) olive oil



Baby Lima Beans:

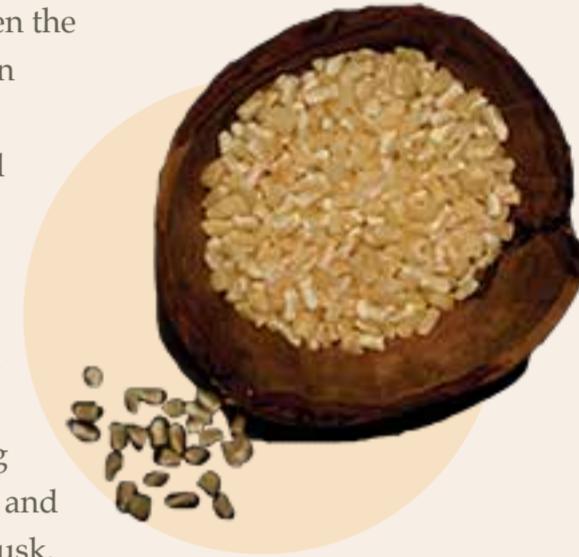
Baby lima beans are also known as butter beans on account of their creamy taste. They add flavour, protein and minerals to a wide variety of dishes. Baby lima beans are pale green, plump-bodied and have a slight kidney-shaped curve with a delicate taste. These New World beans are named after Lima, Peru. In Africa, the seeds are commonly used in soups and stews. Baby lima beans can be substituted with equal amounts of fava (horse/broad) beans or kidney beans. Lima beans should not be eaten raw because they release a cyanide compound when the seed is opened; however, cooking deactivates this compound.



with

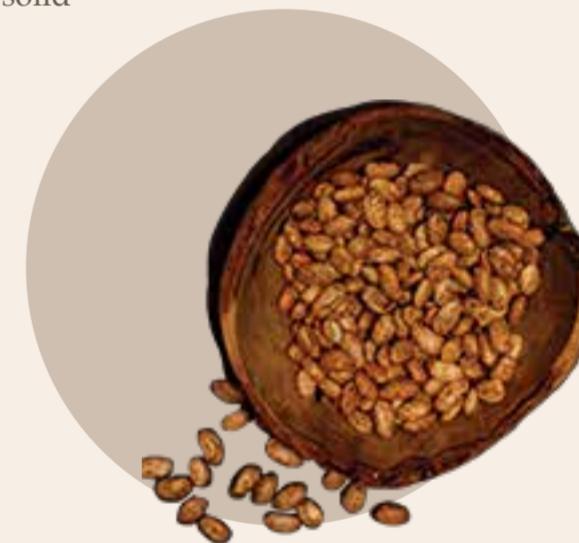
Hominy:

Hominy is made from whole corn kernels that have been soaked in an alkali solution to soften the tough outer hulls while causing the grain to swell. The kernels are then washed to remove the excess solution, the hull, and often the germ. This process is known as nixtamalization and originated in Mesoamerica in 1500 B.C. Hominy is the essential ingredient in grits and corn tortillas. Hominy is available in cans or dried, or it can be substituted by soaking some dried corn for a day, simmering it, and then letting it cool and rubbing off the husk.



Pinto Beans:

These orange-pink beans with rust-coloured specks grow across Latin America and the American Southwest. When they are cooked, the markings disappear, and they become a solid pink colour. Pinto beans have an earthy flavour and a creamy texture. They are often served with rice, soups and stews. They are the original ingredient of Mexican refried beans and are traditionally served in chilli recipes. Kidney beans and red beans can be substituted for pinto beans.





DIRECTIONS

The night before, soak the dried beans and corn and let them sit overnight. Wash the meat to remove the salt and place it in cold water overnight.

The following day, cook the corn and beans in about 2 litres (2 quarts) of water with chopped onion, garlic and oil. After an hour, check that the corn and the beans are cooked and that there is enough liquid. The liquid must be at the same level as the corn and beans. If necessary, slowly add more water (room temperature) and bring to a boil, ensuring that the corn is on top and the beans underneath. Boil the corn and beans until they're cooked and keep adding water if necessary.

Meanwhile, in a separate pot, prepare the meat. First, remove the meat from the water and rinse it again until all the salt is removed. Cook the meat in water for 15 minutes and throw away the cooking water afterwards. Repeat the procedure for an additional 15 minutes of cooking and again discard the water afterwards. Place the cooked meat in cold water for 1 hour. Next, cut the meat into small pieces. In a pan put 1 onion, 2 cloves of garlic, 50 ml (3 tbsp.) of olive oil, 2 tomatoes, a bell pepper, bay leaves and a chicken stock cube. Sauté for 10 minutes and then add the chopped meat. Cook for another 15 minutes or until the meat is well-cooked.

Check that the corn and beans are cooked. When they are, add the diced carrots, kale, potatoes, sweet potatoes, cabbage and pumpkin. Boil the vegetables, making sure there is enough liquid to cover all the ingredients.

In a separate pan prepare the tuna. Cut the tuna into medium-sized pieces (about 5 cm long) and sauté with onion, garlic, olive oil, the remaining tomatoes and a chicken stock cube for 5 minutes.

Make sure the vegetables are cooked. Place the cooked meat and tuna into the pot of cooked corn, beans and vegetables. Mix with a wooden spoon and bring to a boil. Add the parsley, coriander and chopped chilli. Add salt to taste; check the quantity of salt throughout the katxupa-making process.

When the broth of the katxupa is creamy, sauté a mix of onion and olive oil in a separate pan and place on top of the katxupa. Stir with a wooden spoon. Your katxupa is now ready to be savoured.



Amok

Steam Curry
CAMBODIA



Fish amok is a quintessential traditional Cambodian dish, with complex flavours from the fish, coconut milk and a blend of spices. It is a sweet curry, with a custard-like consistency resulting from the process of steaming as part of the preparation. It is usually served in a banana leaf and topped with coconut milk.

The ingredients used to make the red kroeung mixture are usually purchased at the local market. With the newly introduced solar water pumps introduced by the CCAF project, households are able to grow their own vegetables near their homes all year round, regardless of the drought or flood conditions. This includes the traditional ingredients used in kroeung, like galangal and turmeric.

INGREDIENTS

- Red Kroeung
 - 30 (1 oz) lemongrass stalks (sliced finely)
 - 1 tbsp. lesser galangal (cut small)
 - 1 tsp. turmeric (cut small)
 - 4 garlic cloves
 - 2 shallots
 - 2-3 dried red chillies, thinly sliced
 - Zest of kaffir lime, thinly sliced (if fresh kaffir limes are available)
- Amok
 - 300 g (10 oz) fish fillet¹
 - 180 ml (¾ cup) coconut cream
 - 2 cups coconut milk
 - 1 tsp. shrimp paste
 - 1 egg, beaten
 - 300 g (10 oz) young noni leaves² (removed from stem) or spinach or the leaves of Chinese broccoli
 - 1 tbsp. fish sauce
 - 3 tbsp. kaffir lime leaves (sliced thinly)
 - 2-3 chillies (optional)
 - Banana leaves³

**DIRECTIONS**

For amok steam curry, the red kroeung needs to be prepared beforehand.

Prepare the red kroeung by pounding all the ingredients into a smooth, paste-like mixture. Add shallots last.

Stir the red kroeung into 1 cup of coconut milk and add the shrimp paste.

When well mixed, add the beaten egg, fish sauce and sliced fish.

Add the remaining coconut milk and mix well.

Prepare the banana leaf cups.

Place the noni leaves at the bottom of each banana leaf cup.

Fill the banana leaf cups with the fish curry mixture.

Steam for about 20 minutes.

Before serving, top with coconut cream, thinly sliced kaffir lime and chilli.

¹ Any meaty fish. Could be replaced by chicken, snails, shrimp, crabmeat or scallops.

² Noni (*Morinda citrifolia*, cheese fruit, bois douleur in French). Some people use star gooseberry (*girombellier* in French) (*Phyllanthus acidus* or *distichus*) leaves instead of noni leaves.

³ If banana leaves are not available, use a bowl or an empty coconut instead.

Kaffir Lime Leaves:

Kaffir lime leaves have a spicy citrus flavour, which is zesty and light. These aromatic leaves are rich in natural oils. They are commonly used in South-East Asian recipes. Cooks 'bruise' or crush fresh leaves in their hands to infuse curries, soups, stir fries and stocks. Bay leaf with lime zest or lemongrass can be substituted for kaffir lime leaves.

**Galangal:**

Galangal is a root from the ginger family that is widely used in South-East Asian cooking. Galangal has a distinct peppery flavour and is used in curry pastes, soups and stir fries. There are two varieties: one known as 'greater galanga', which is more commonly used in Thai cooking, and the other, 'lesser galanga', which is native to China. Galangal powder is a good substitute for fresh galangal, or ginger can be used instead.





Kabrit Kreyòl & Bannann Peze

Haitian Stew and
Fried Plantains
HAITI



Through the CCAF project, support was provided to farmers to establish individualized farming plans for their plots of land. These plans use resilient agricultural practices like composting and better soil management, while introducing crops that can survive under more uncertain conditions, such as sweet potatoes and manioc, as well as citrus grafting and new fruit varieties, like plantains. This has become an alternative livelihood to cash crops, such as coffee, which are threatened by drought or heavy rain. These new farms use simple techniques and small spaces near farmers' homes. The new farms, with their diversified crops, help farmers to make traditional dishes like this stew for their family.

KABRIT KREYÒL

INGREDIENTS

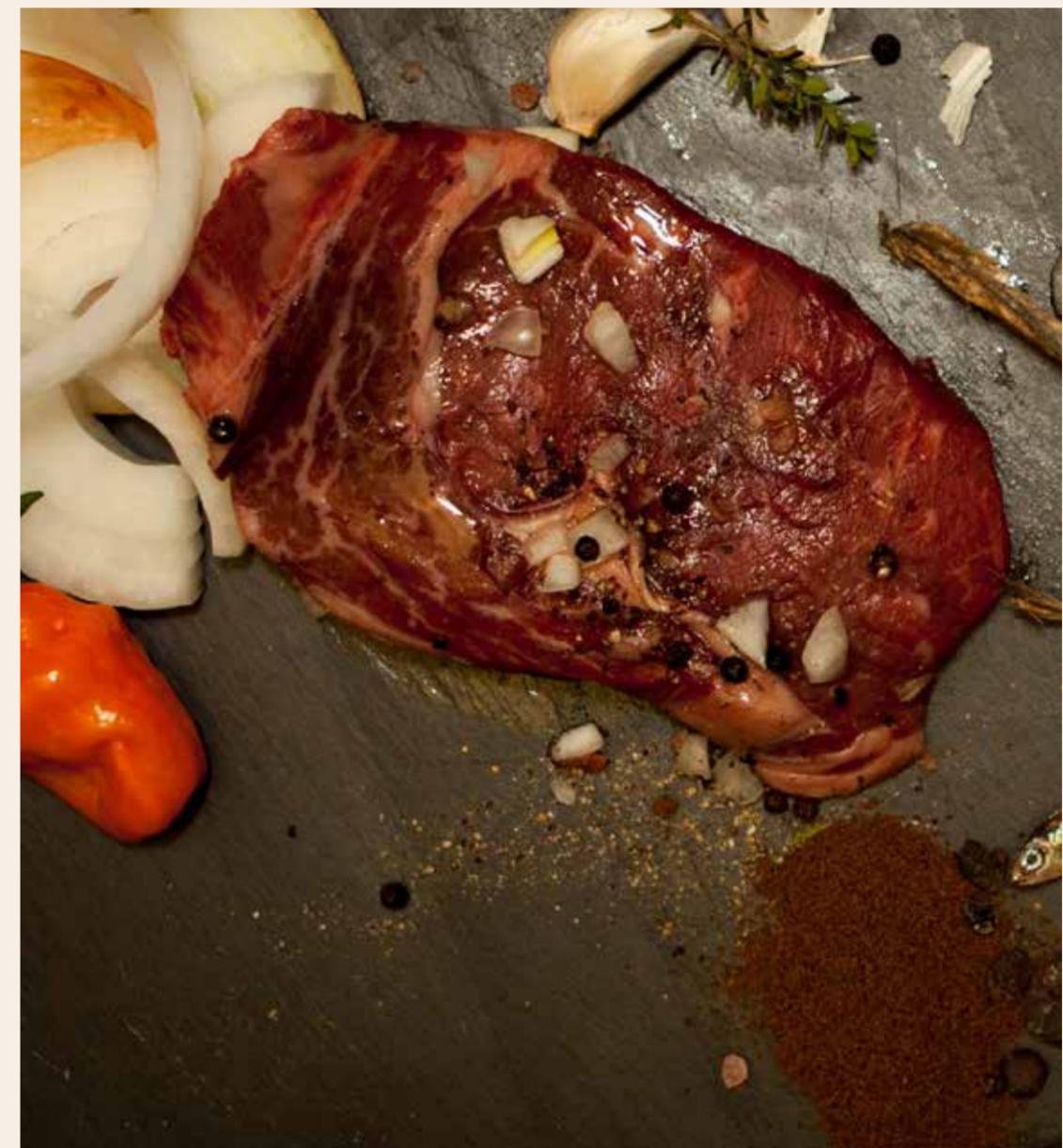
- 500 g (1.1 lbs) cubed goat meat
- 2 tsp. seasoned salt
- 2 limes cut in half
- 2 sweet potatoes
- 150 g spinach
- 2 potatoes
- 1 malanga
- 1 green pepper, sliced
- 3 carrots
- 2 onions, sliced
- 1 tsp. thyme
- 1 tsp. parsley
- ¼ cup scallions
- 3 tbsp. tomato paste
- Salt, black pepper and hot pepper to taste

DIRECTIONS

Clean the meat with hot water and lemon.

Add seasoning salt and set aside for 2 hours in a bowl. Combine meat and spinach in a stockpot with 2 litres (2 quarts) of water and cook at medium heat until meat is tender (appr. 60 minutes).

Add remaining ingredients and cook for an additional 20 minutes or until potatoes are cooked.



BANNANN PEZE

INGREDIENTS

- 3 green plantains
- 500 ml (2 cups) corn or vegetable oil
- 250 ml (1 cup) water
- 1 tbsp. salt
- 2 tbsp. vinegar or sour orange
- Equipment: 1 *tostonera* (plantain press)

DIRECTIONS

Peel the plantains and slice them diagonally into 1-inch pieces.

Place oil in a deep frying pan on medium heat.

Place cut plantains in hot oil. Cook plantains for 5-7 minutes on each side until golden brown. Then remove plantains and lower heat.

Use a wooden plantain press (*tostonera*) or 2 plantain skins to quickly flatten each slice to a thickness of about a third of an inch.

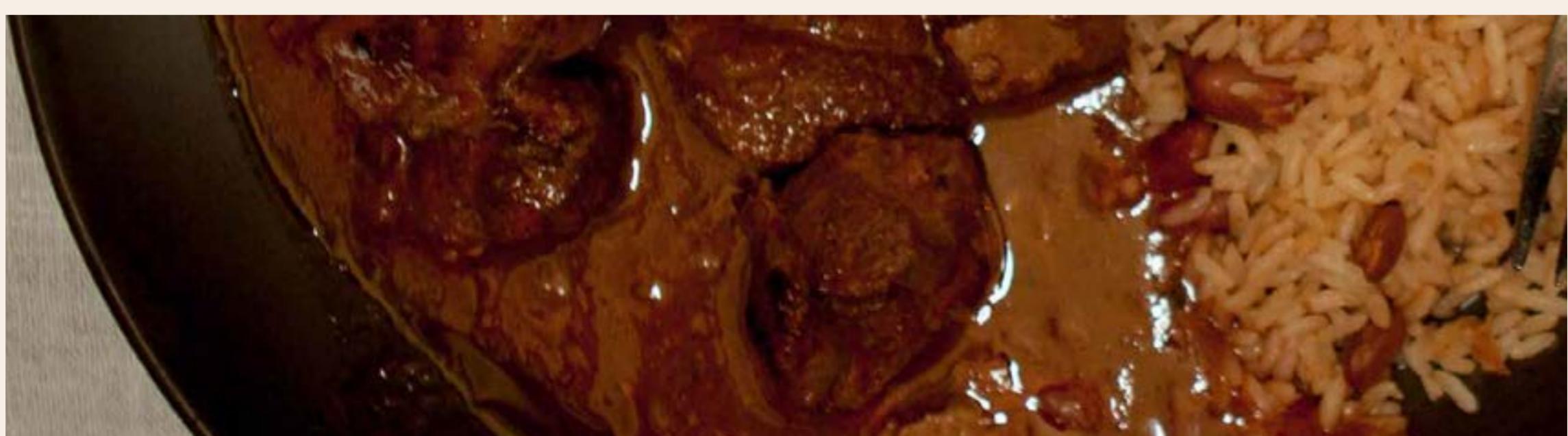
Soak flattened plantains in salted water flavoured with 2 tbsp. of sour orange juice or vinegar and place back in oil on medium heat.

Turn plantains on each side until crispy and golden.

Remove fried plantains; place them on paper towels to get rid of excess oil.

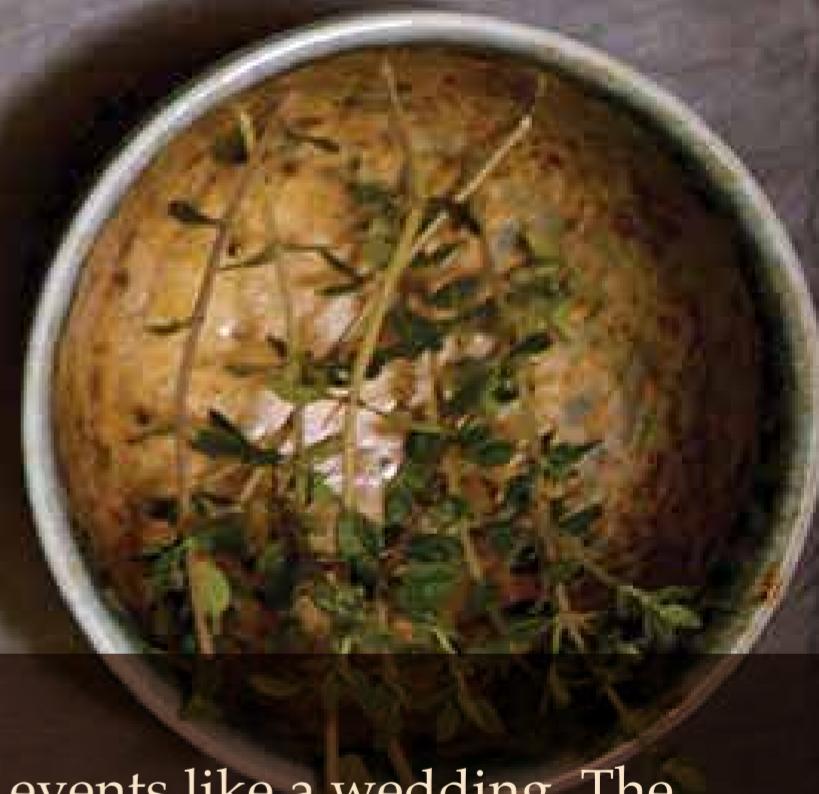
Serve hot.





Riz au Gras

Rice in Fat
MALI



This meal is served when you receive important people or for significant events like a wedding. The sheep, goat meat or beef is prepared in a sauce (made with meat, tomato and onion) and then the vegetables (i.e. eggplant, chilli pepper, cabbage, potatoes and sweet potatoes) are added in the order desired so that each vegetable is well-cooked. Then the meat and vegetables are taken off and the rice is cooked in the sauce. All the ingredients are then served together. These ingredients are often a luxury for rural smallholder farmers, who have limited income. However, with the support of the CCAF project, water access has been provided to farmers and women's collectives to grow vegetables even under very dry and uncertain conditions. Through their earnings from the sale of food crops, land has also been secured and agricultural equipment provided by the project is being leased. Not only do these activities provide access to the ingredients to make nutritious and traditional dishes like this, but they also increase resilience by providing alternative livelihoods, increasing income and strengthening food security.

INGREDIENTS

- 3 tbsp. vegetable oil
- 1 small onion, chopped (or $\frac{1}{2}$ a big one)
- 4 garlic cloves, crushed
- 450 g (1 lb) stew beef, cubed
- 1 eggplant
- 1 cup cabbage
- $\frac{1}{2}$ cup potatoes
- $\frac{1}{2}$ cup sweet potatoes
- 2 cups white rice
- 1 litre (4 cups) water
- 350 ml (1 $\frac{1}{2}$ cups) tomato puree
- 1 tsp. oregano
- $\frac{1}{2}$ tsp. chilli powder (for medium heat)
- Salt and pepper - to taste

DIRECTIONS

Heat the oil in a heavy-bottomed pot. When hot, add onion and garlic. Cook at medium heat until translucent and fragrant.

In the meantime, season the beef with a generous sprinkle of salt and pepper. This goes a long way to seasoning the entire dish.

Increase the heat to medium-high and add the seasoned beef.

Once the meat is browned, sprinkle the rice lightly over the meat.

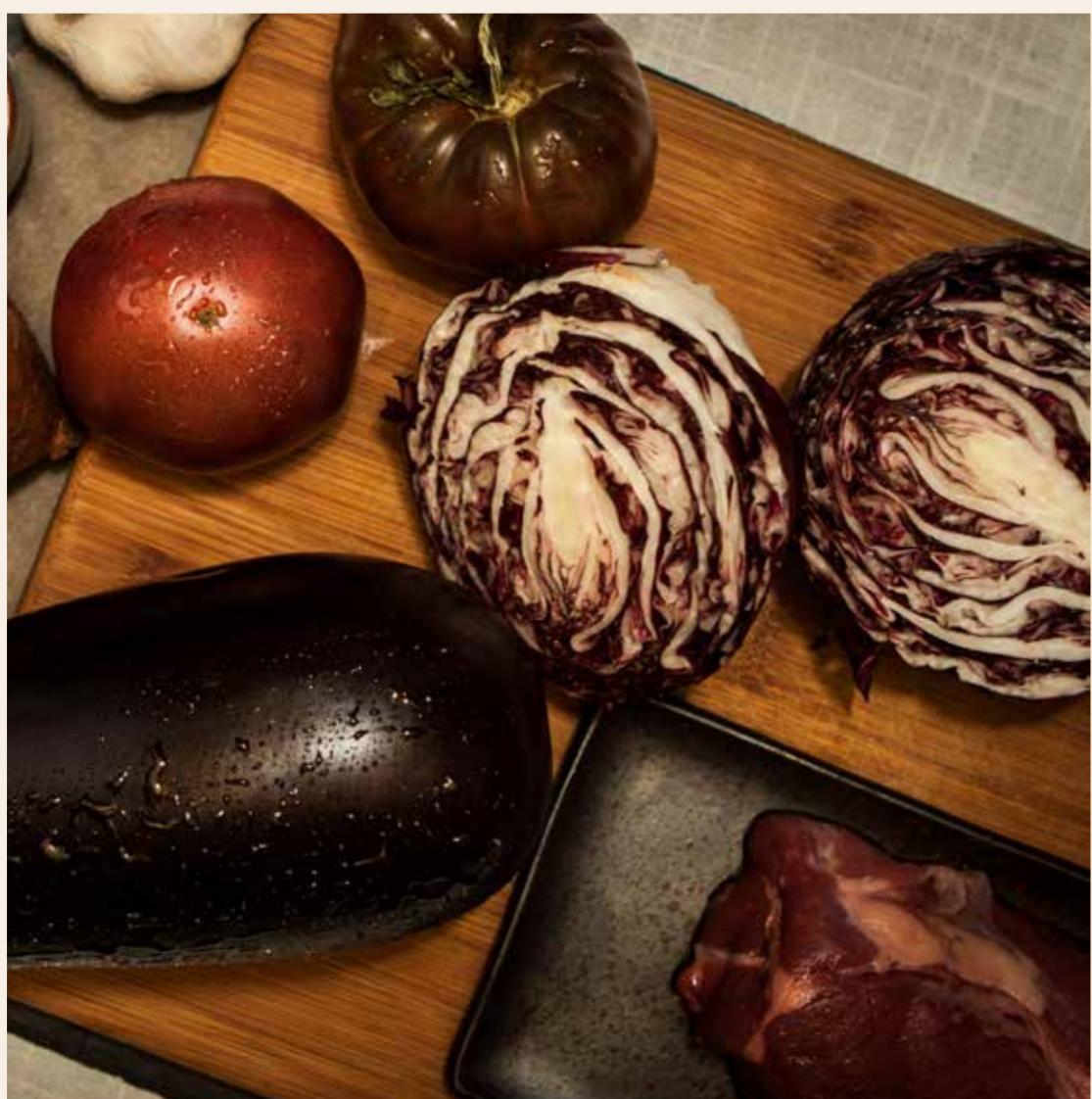
Pour on the water.

Stir in the tomato puree. This will give the dish its characteristic rosy hue, as well as a mild tomato-saucy flavour.

Sprinkle in a blast of chilli powder and a dash of oregano.

Finally, throw in the vegetables – starting with potatoes, sweet potatoes, cabbage and then eggplant.

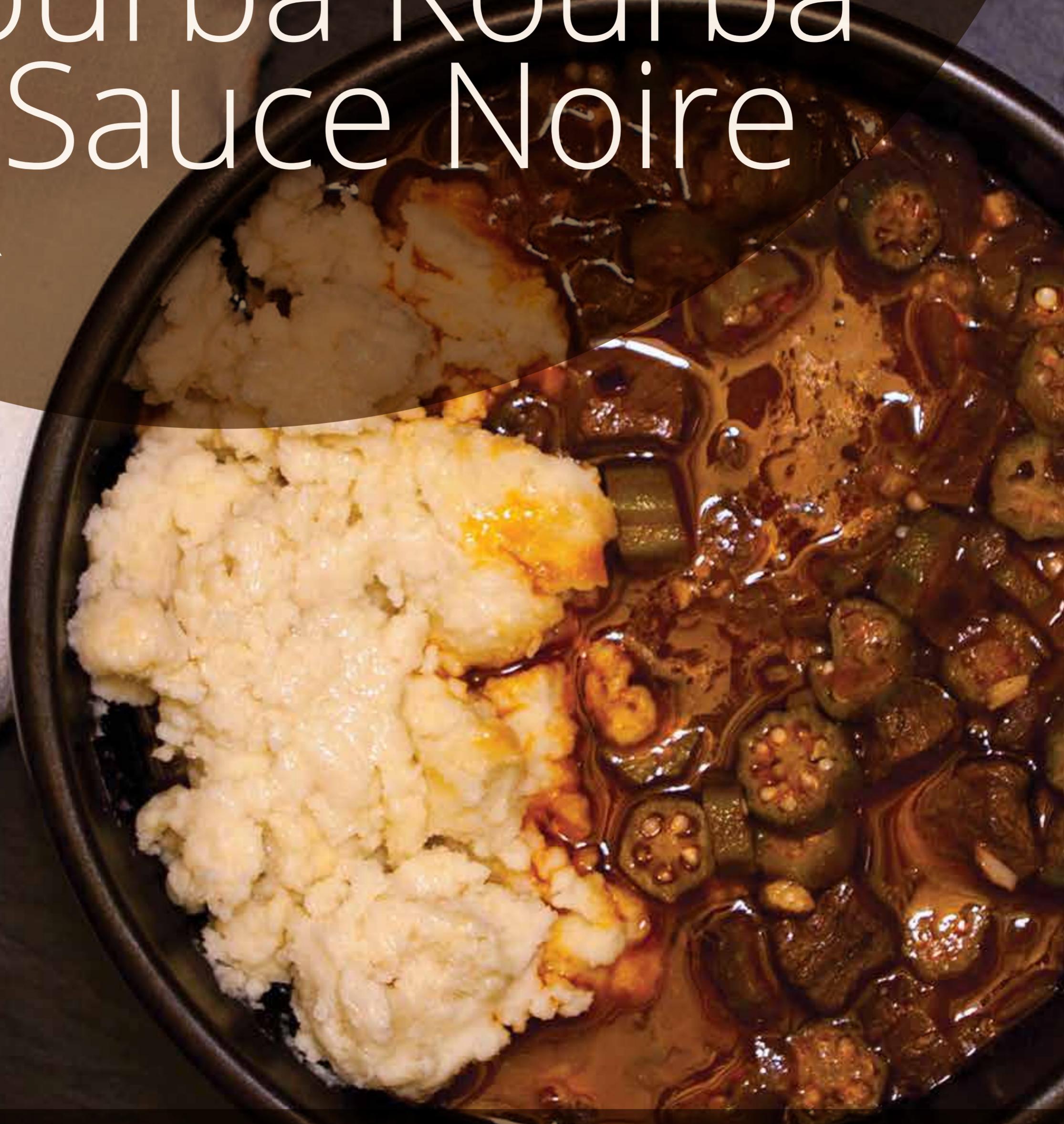
Simmer, covered, for about 20 minutes.





Kourba Kourba & Sauce Noire

NIGER



Meat is very expensive in Niger, and therefore not always accessible for the poorer, rural populations. However, raising livestock has the potential to be a very resilient and productive activity in drier conditions. Livestock replenishment and fattening has been supported under the CCAF project as a way for farmers, particularly women, to diversify their income by moving away from vulnerable staple crops. This approach builds on a traditional female practice of raising small livestock for emergency spending (goats and sheep are often considered 'women's banking systems'). Further, by targeting women, the project also helped them to earn their own income to contribute to the household, empowering them economically which led to more decision-making power. Through the sheep-fattening process, women were making a profit of up to USD 100 per sheep, which has a huge impact on their household.

INGREDIENTS

- Kourba Kourba
 - 1 kg (35 oz) flour - millet or sorghum or maize
 - 1 litre (1 quart) water
- Sauce Noire
 - 300 g (10 oz) chopped meat (goat, beef or mutton)
 - 700 g (25 oz) fresh okra cut into rounds
 - 1 onion, thinly sliced
 - 250 ml peanut oil
 - 1 piece of smoked fish
 - 1 tbsp. tomato sauce
 - 2 fresh chillies
 - 1 tsp. cumin
 - 1 tsp. soumbala
 - 2 garlic cloves, crushed
 - Pinch of pepper
 - 1 Maggi cube
 - Salt - to taste
 - 1½ litres (1½ quarts) of water

Millet:

Millet is a traditional grain used in Asian and African cuisine (especially in India, Mali, Niger and Nigeria). Typically sold whole, millet is also available in a cracked form (which is used in traditional couscous) and, increasingly, as a wholegrain flour. Millet has a mild, neutral flavour and delicate texture, which combines well with a wide variety of dishes. The term millet refers to a diverse range of grains. It is used to make breads and porridge. Quinoa, buckwheat flour or sorghum can all be substituted for millets.

**Okra:**

Okra is a vegetable in the mallow family that has a mild flavour similar to aubergine. Commonly referred to as ladies' fingers, okra is a key ingredient in the thick, piquant soup or stew called gumbo (derived from the word gombo, which in West African dialect means okra). Its 'gooey' consistency when cooked makes it a natural thickening agent. This seed pod combines well with other vegetables, particularly tomatoes, peppers and sweet corn. Okra can be cooked, pickled, eaten raw or included in salads. Green beans or eggplant (aubergine) can be used as substitutes.

**Soumbala:**

Soumbala is a fermented paste made from the seed of the African locust bean tree (*Parkia biglobosa*). It is used widely throughout West Africa as a condiment for soups, riz gras and other dishes. Soumbala has a strong, pungent taste and aroma, which decreases as it is cooked. This condiment is traditionally sold in balls or patties that can be kept for several months. Soumbala flavours meat, fish and vegetable dishes as well as soups. Industrial stock cubes (e.g. Maggi) have begun to replace this traditional seasoning. Alternatively, soybeans can be used as the locust bean tree is rarely planted and supply of soumbala is endangered.

**DIRECTIONS****Kourba Kourba**

Bring water to a boil, and add salt.

Dilute a quarter of the flour in a little water and pour in boiling water while stirring regularly to avoid lumps.

Cook for 15 minutes uncovered.

Stir in remaining flour in small amounts, while stirring regularly.

Cover and cook on low heat for 40 minutes.

Serve in deep dishes with a thick sauce topped with melted butter.

Sauce Noire

In a large pot, fry the peanut oil, meat and onion until brown. Then add pepper, tomato, cumin and soumbala and fry for 5 minutes.

Add water to the pot and boil for at least 30 minutes to cook the meat.

When the meat is almost cooked, add the smoked fish and simmer for 10 minutes.

Add okra, chilli and garlic.

Reduce the heat and let it simmer.

Stir occasionally to prevent the sauce from burning or sticking to the bottom of the pot.

Add salt and Maggi and cook for 20 minutes.

When the sauce is ready, serve with touwo labchi or kourba kourba (based on millet, rice, sorghum or maize). Enjoy your meal!



Tagalia & Aseeda

SUDAN



The main ingredients in this recipe: okra, tomatoes and meat (typically from sheep), are all affected by the drier conditions and more erratic rainfall patterns in Sudan. For pastoralist communities, learning how to nurture the animals, through training and access to veterinary services, has helped to increase the value of their livestock. Under the project, sheep that were raised using different types of food, such as Moringa, were sold for between USD 62 and USD 120 more than those raised on less nutritious fodder. The communities also breed more sheep which they can either sell for a profit, or keep for their family to eat. In North Kordofan, 20 sheep were provided to one community through the project, and after just six months, 150 kids were born. Okra and tomatoes are also being planted in the newly established community farms and home gardens (*Jubraka*). Tomatoes are commonly grown in rural Sudanese communities; however, they are affected by pests which are becoming increasingly prominent due to climate change. Through an integrated pest management system introduced by the project, a pest which had decreased tomato yield by 50 percent was controlled for minimal cost using resilient techniques such as appropriate land and water management, selecting pest resistant varieties, using plant-based pesticides, and the use of solar-powered light traps.

INGREDIENTS

- Tagalia
 - 4.4 kg (2 lbs) ground meat (fresh or dry)
 - 5 medium-sized pieces of chopped onion
 - ¼ cup vegetable oil
 - 3 tsp. wayka (dry powdered okra)
 - 1 cup tomato paste
 - 1 tsp. black pepper, garlic, salt
 - 2 cups tomato sauce
 - 2 cups water
- Aseeda
 - 2 cups (500 g) sorghum flour
 - 500-800 ml (17-27 fl oz) water
 - 2 tsp. salt
 - 3 tsp. yoghurt

**Aseeda:**

Similar to gruel or porridge, aseeda (asida) is a boiled flour pudding cooked directly in water. Aseeda could be described as a large, high-energy dumpling. It can be eaten sweet or savoury and can be made with a variety of flours. It is traditional fare throughout the Arab world including the Gulf countries and the Sahel region in Africa. Its closest substitute is fufu, a dough ball made from the boiled starch of potato and cassava, which is eaten in western and southern Africa and the Caribbean.

**Wayka:**

Okra powder (wayka) is a staple of West African dishes. Its gooey, slimy texture when cooked is a fantastic thickener for sauces and soups. Okra powder is made from the seed pod of the okra plant, which has been described as having a flavour somewhere between aubergine and asparagus. Filé powder — dried sassafras leaves that have been ground — can be used in place of okra powder to thicken gumbo, and has a distinct, earthy, somewhat musty flavour.

**DIRECTIONS****Tagalia**

Chop the onions and fry them in oil until they become crispy and dry.

Add the meat (along with the garlic, black pepper and salt) and cook at medium heat for 30 minutes.

Add the tomato sauce and cook for 10 more minutes.

Add the water and blend to a smooth mixture. Add the tomato paste, cook for 10 minutes and then add the wayka (dried okra) and stir for 2 minutes.

Serve hot with aseeda.

Aseeda

Mix sorghum flour with an equal amount of water and add salt to taste.

Add yoghurt, and then pour the aseeda mixture into boiling water and mix well. The flour should cook and thicken within 5-10 minutes to the correct consistency, which should be as thick as porridge when heated in the pan, so that when it cools its consistency is like jelly.

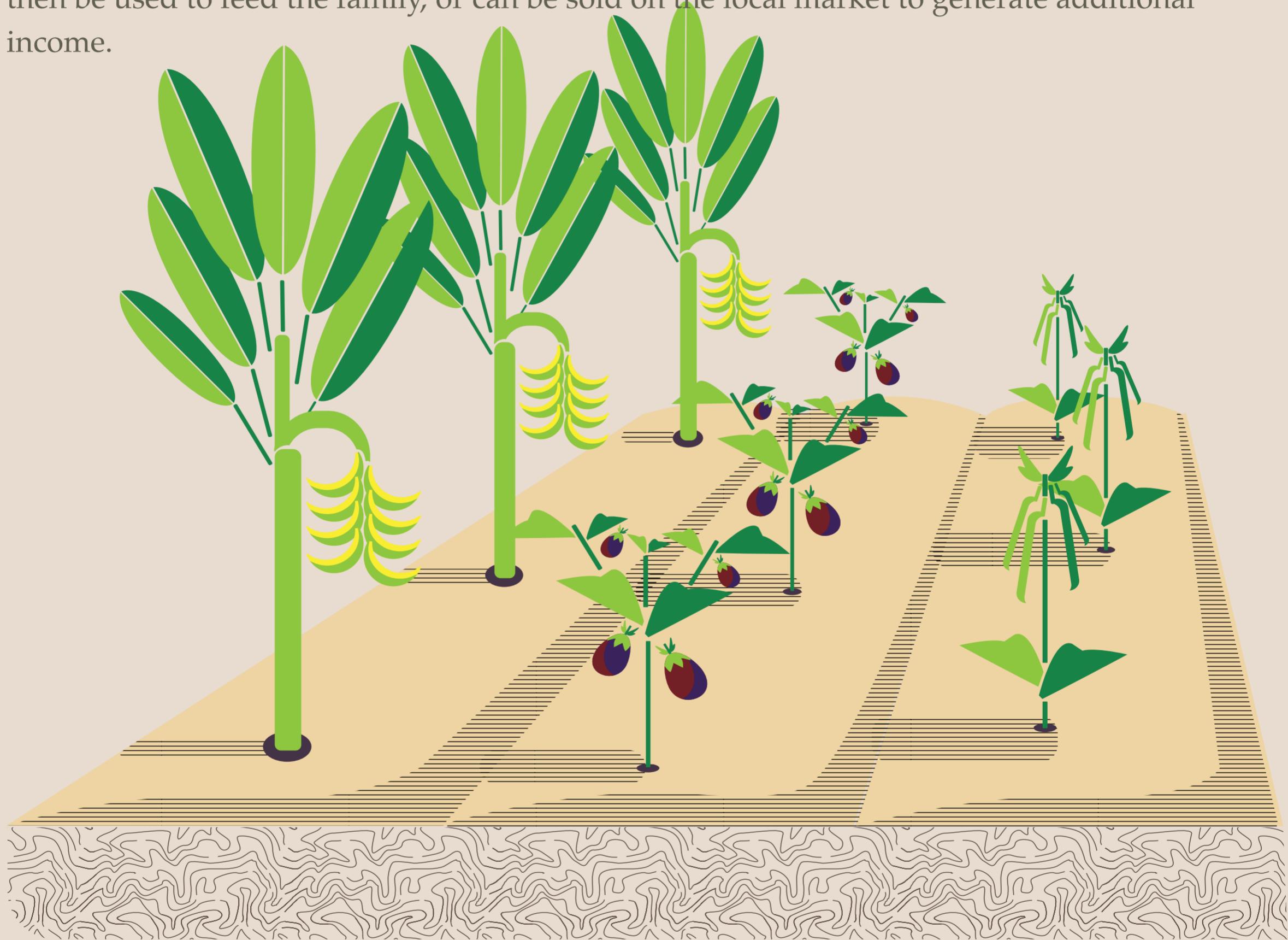
Pour into a bowl and allow it to cool for 20-30 minutes.

Serve with tagalia or any other sauce.



DIVERSIFYING CROP PRODUCTION through vegetable gardens

Across all six CCAF countries, an emphasis was placed on establishing vegetable gardens in order to diversify crops and ensure food security. Technical support, access to water and additional inputs were provided to make this happen. These gardens proved to successfully alter seasonal patterns of food insecurity while also reinforcing women's contribution to adaptation. Introducing vegetable gardens, which provide variety, means that if one crop doesn't do well during the season, the other vegetables will still be available. Vegetables can then be used to feed the family, or can be sold on the local market to generate additional income.



Cabo Verde

BANANA,
PAPAYA,
SWEET POTATO,
CASSAVA, SUGAR CANE

In sites targeted by the project, drip-irrigation was introduced to increase fruit and vegetable production in terraced fields.

Cambodia

EGGPLANT,
MORNING GLORY,
YARD LONG BEANS,
CHILLI, CABBAGE

The CCAF project supported home gardens, a traditional practice, by providing access to water in the off-season, to provide food and generate revenues throughout the year.

Haiti

BEANS,
PINEAPPLE,
PEPPER, MELON,
EGGPLANT

Le Plan de Ferme supported farmers to develop individualized farming plans, in order to adapt their farming plots to grow more diverse and resilient crops.

Diversifying crop production through vegetable gardens addresses underlying issues of gender inequality. Given that tending home gardens is often a female practice (particularly in Cambodia, Mali, Niger and Sudan), supporting it can expand women's role in food production. The vegetables can help improve family nutrition and / or generate profit that women themselves can control.



Mali

TOMATO,
GROUNDNUTS (PEANUTS),
BEANS, LETTUCE,
POTATO

Women's collective action groups established cooperative vegetable gardens with access to water, tools and land provided by the project, to diversify their food and livelihoods.

Niger

GREEN MAIZE,
CABBAGE,
LETTUCE,
TOMATO, CASSAVA

The CCAF project helped groups of women secure collective plots of land to grow vegetables by facilitating leasing of land from private landowners.

Sudan

SQUASH/PUMPKIN,
TOMATO, POTATO,
CUCUMBER,
OKRA

Individual home gardens, or *Jubraka*, are supported under the project to diversify food crops, particularly in the dry season.

ESTABLISHING VEGETABLE GARDENS: INDIVIDUAL OR COMMUNITY GARDENS?

Vegetable gardens help enhance resilience and food security by increasing diversification - for both nutrition and resilience, while providing additional income, particularly for women.

CCAF projects helped establish vegetable gardens through two different approaches, selected based on the local context.

INDIVIDUAL GARDEN



Vulnerable households were targeted to enhance resilience through individual gardens.



In Cabo Verde, vulnerable farmers, mostly women, demonstrated new, resilient crops in their vegetable gardens

Land: The project helped secure access to land around homesteads.

Water source and irrigation: Solar pumps, wells and other small infrastructures were established near the home to access water. Appropriate and sustainable irrigation systems were also introduced, such as drip irrigation.

Agricultural inputs: The agricultural inputs provided, such as drought-resilient varieties of crops, organic fertilizers or soil kits, helped ensure resiliency of the crops being farmed.

Planning: For individual vegetable gardens, crop selection and agricultural techniques were chosen keeping the seasonal forecasts in mind. Crop variety is important, since diversification improves the adaptive capacity of farmers. Selection is also dependent on what the household will consume (for subsistence production) or what the market will demand (for income-generating crops).

Results: Findings from the projects suggest that vulnerable households, often women-headed, could grow crops for self-consumption. This contributed to ensuring nutritious food was available year-round. Householders, particularly women, were also able to earn additional income through the sale of excess produce from these gardens.



In Cambodia, the project built on the local practice of individual home gardens, which are traditionally maintained by women, to strengthen their resilience

COMMUNITY GARDEN

Cooperatives and community groups were supported to establish or increase collective vegetable cultivation.

Land: Community gardens were established on land provided during the off-season through a long-term lease with private landowners.

Water source and irrigation: Community-managed water pumps or wells were built near the cooperatives' land to ensure access to water, even in the dry season. Systems were put in place to manage its distribution.



In Sudan, women undertook training on leadership and management to enhance their community farms

Agricultural inputs: Seeds, fertilizers and equipment were provided to the groups in bulk, making it easier to secure different varieties of seeds.



In Niger, women's collectives used newly established wells to irrigate vegetable gardens

Planning: Each member of the women's group tended her individual area, but decisions about agricultural inputs and management practices (e.g. water, fencing) were made collectively.

Results: Gardens managed by women's associations and collectives provide them with a productive source of income and improved food security. Revenues from vegetable production sites are entirely controlled by women, often contributing to further empowerment of women within their households and communities.

GENERAL CONSIDERATIONS WHEN SETTING UP A VEGETABLE GARDEN

Access to resources, including land, water and agricultural inputs, as well as training on how to plan for vegetable gardens was an important part of the CCAF project.

Land: Land for individual vegetable gardens can usually be found around the homestead. Creative strategies (such as leasing land during the off-season) were needed to secure access to land for communal gardens.

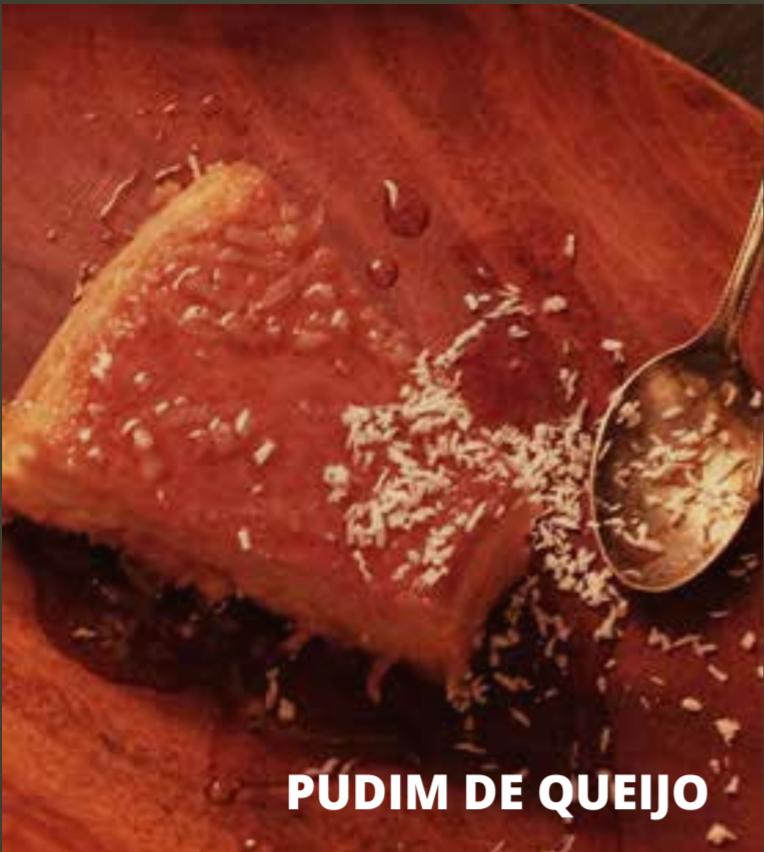
Water source and irrigation: A stable water source can provide an opportunity for more than one cycle of crops during the year.

Agricultural inputs: Gaining access to resilient seeds and sustainable fertilizers is sometimes a challenge. In some CCAF countries, seed banks were established, and local farmers trained in how to produce the seeds.

Planning: Preparing a seasonal plan takes into account the weather forecast, resilient agricultural techniques and water management.

SWEET DISHES





Pudim de Queijo

CABO VERDE



There are a lot of different variations of the pudim de queijo recipe. It is a very popular and widely enjoyed dessert across all of Cabo Verde's islands. This recipe is made with goat cheese as goats are more adaptive to the dry climate. Under the CCAF project, several corrals for goats and cattle were constructed in order to improve family livelihoods and diversify the sources of revenue for rural communities, in particular for women.

INGREDIENTS

- 500 g (1.1 lbs) soft goat cheese (as fresh as possible)
- 500 g (1.1 lbs) sugar
- 500 ml (2 cups) water
- 12 egg yolks
- 4 egg whites, beaten

**DIRECTIONS**

Preheat the oven to 200 °C.

Grate the cheese.

Boil sugar in water until it forms a thick syrup.

Add the cheese to the sugar syrup, cook at medium heat and mix well.

Remove the mixture from the heat and add the egg yolks and beaten egg whites.

Sprinkle the bottom of a pan with caramelized sugar.

Pour in the mixture and cook in a double boiler. (This can also be done by standing the pot with the mixture in another pan filled with hot water.)

Bake the mixture in a buttered and floured baking dish for ≈20 minutes.

After removing the cake from the oven, let it cool.

Cut into squares and sprinkle with coarse sugar.

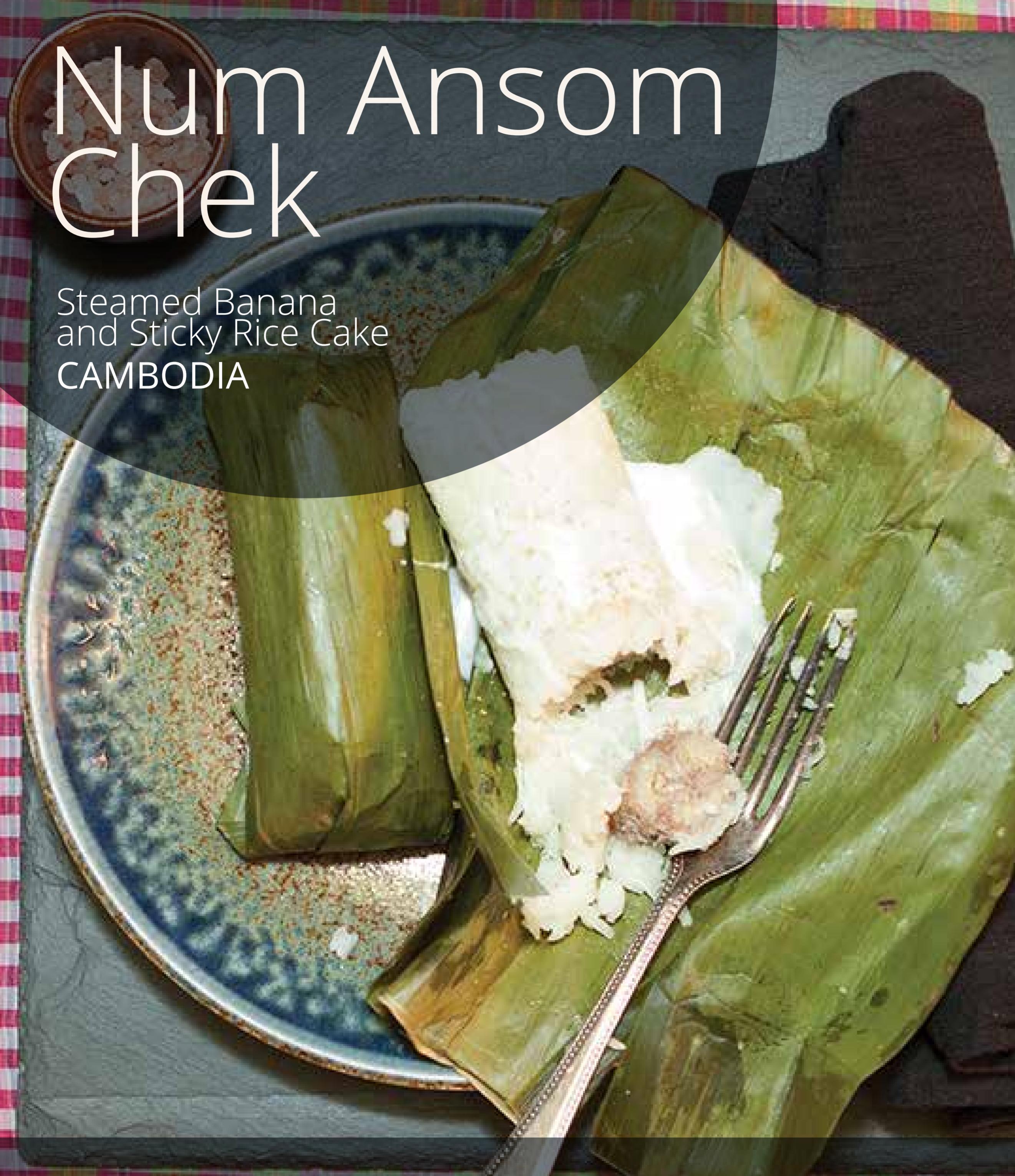


Under the CCAF project, 18 community-based interventions aimed at improving water sources and springs were implemented to rehabilitate and increase water availability.



Num Ansom Chek

Steamed Banana
and Sticky Rice Cake
CAMBODIA



Rice is a staple in Cambodia, but it's a thirsty crop. Paddy fields need to be flooded from planting till harvest. Traditionally, rainwater from the ample monsoon is used to irrigate the fields. However, climate change threatens to disrupt the monsoon system. The CCAF project therefore provided access to 541 hectares of paddy fields through the construction of three new irrigation systems, benefiting at least 248 households.

INGREDIENTS

- 250 g (½ lb) sticky rice
- 250 ml (1 cup) coconut milk
- ¼ cup caster sugar
- Salt
- 10 bananas (preferably baby bananas)
- Banana leaves
- 2 tbsp. coconut milk for garnish
- Banana trunk thread or twine

DIRECTIONS

Soak the sticky rice for at least 4 hours, then drain.

Bring coconut milk to the boil in a pot at medium heat, and then add rice.

Turn heat to low and simmer for ≈20 minutes or until the rice is cooked.

Stir constantly to prevent sticking and burning. When the rice becomes translucent, it is cooked.

Add sugar and salt and continue to stir until all the coconut milk has evaporated.

Ansom preparation

Cut the banana leaves into 25 cm x 20 cm (10" x 8") rectangles.

Blanch and pat dry.

Take two sheets of banana leaf and put one on top of the other.

Spread the rice 1½ cm (½") thick on one half of the sheet.

Line up 2 whole bananas in the middle.

Roll the rice over the bananas to enclose them.

Wrap the banana leaves tightly around the rice roll, and tuck in the ends firmly.

Tie with banana trunk thread / twine.

Steam for about 20-25 minutes.

**Banana Leaves:**

South Indian, Filipino and Khmer recipes use banana leaves as wrappers for frying. They are also used to line cooking pits. These huge, flexible, waterproof leaves are wrapped around both savoury and sweet ingredients.

A parcel made from banana leaves seals in moisture and flavour and infuses the contents with a subtle, sweet, anise fragrance. Besides adding flavour, the leaves keep juices in and protect food from burning.

Corn husks, hoja santa leaves or aluminium foil can be used as substitutes if banana leaves are not available.





Passion Fruit Juice

HAITI



Passion fruit juice is well known for its strong flavour and authentic taste. Some people don't even add lemon. Almost every Haitian prepares it at home and drinks it with their family. It is usually served during the day after a good meal. Women also often prepare the juice to sell at the market. Under the project, this fruit tree has been used for reforestation as part of the Watershed Management Committee's restoration efforts, and also grown by farmers as part of their individualized farming plans. Several communities have been supported by the project to improve freshwater access through installation of *chatodo*, or water tanks, which also facilitates the preparation of the juice.

INGREDIENTS

- 2 tsp. sugar
- 3 medium-sized passion fruits
- 4½ cups water
- 1 lemon

DIRECTIONS

Cut the passion fruits in half and scoop out the flesh on to a plate.

Put it in a blender, along with some water, and process until smooth.

Strain and add lemon juice and sugar.

Serve chilled over ice cubes in tall glasses on a hot, sunny afternoon.



Papayas were also introduced as one of the fruit tree species.



The CCAF project in Haiti worked with reforestation and through these efforts was able to reintroduce fruit trees such as the passion fruit.



Meni- meniyong

Sesame-honey Sweet
MALI



INGREDIENTS

- 1½ cups sesame seeds
- 250 ml (1 cup) honey
- 4 tbsp. unsalted butter

DIRECTIONS

Preheat oven to 230 °C.

Spread the sesame seeds on a baking sheet and toast in the oven for about 10-12 minutes.

Remove and cool.

Heat the honey and butter in a small saucepan over medium-low heat, stirring until it bubbles and darkens somewhat, about 5-10 minutes.

Stir the toasted sesame seeds into the honey mixture.

Spread the mix evenly on a buttered baking sheet to a thickness of about ¼ of an inch.

Cool until it is just warm and cut into finger-sized pieces.

Cool completely and serve.

For a tasty coating that will keep fingers less sticky, roll the candy in more toasted sesame seeds after cutting it into pieces.





Hooray

Millet Balls
NIGER



The dough is made from millet flour which is sometimes spiced with ginger, cloves and perhaps pepper. It is a very healthy and satisfying dish.

Hooray is a recipe for a typical lunch for farmers / rural beneficiaries of the project. Traditionally, wholegrain millet is locally processed using a mortar. The grains are pounded with a little bit of water to loosen the chaff. After blowing away the chaff, the hulled millet is then pounded and sifted to make millet flour. Drought-resistant millet was introduced through the CCAF project.

INGREDIENTS

- 400 g (14 oz) millet flour
- ½ to 1 tsp. ginger powder
- ¼ tsp. ground cloves
- Pinch of salt
- 300 ml (1¼ cups) water
- 1 litre (1 quart) milk
- Sugar (optional)

DIRECTIONS

In a large bowl, mix the millet flour with all the spices.

Add the water to the flour mixture a little at a time until a thick paste is formed. You might not need all the water or you may need a little more.

Shape the millet paste into small millet balls, the size of golf balls.

Place the millet balls in a pot, add some water and boil them for 60 minutes. Make sure the pot has enough water so that the balls are covered. You want the balls to be cooked all the way through. After 30 minutes, break a millet ball to see if it is properly cooked. If the inside still looks lighter in colour and raw, keep cooking until it is cooked through. The cooking duration will ultimately depend on the size of your millet balls.

After the millet balls are cooked, place them in a mortar and pound them into a paste. This makes them even in texture and easy to break later. A stand mixer or a food processor can also be used.

Shape the cooked millet paste into balls again. Roll them in some additional millet flour to coat them and keep them from sticking to each other.

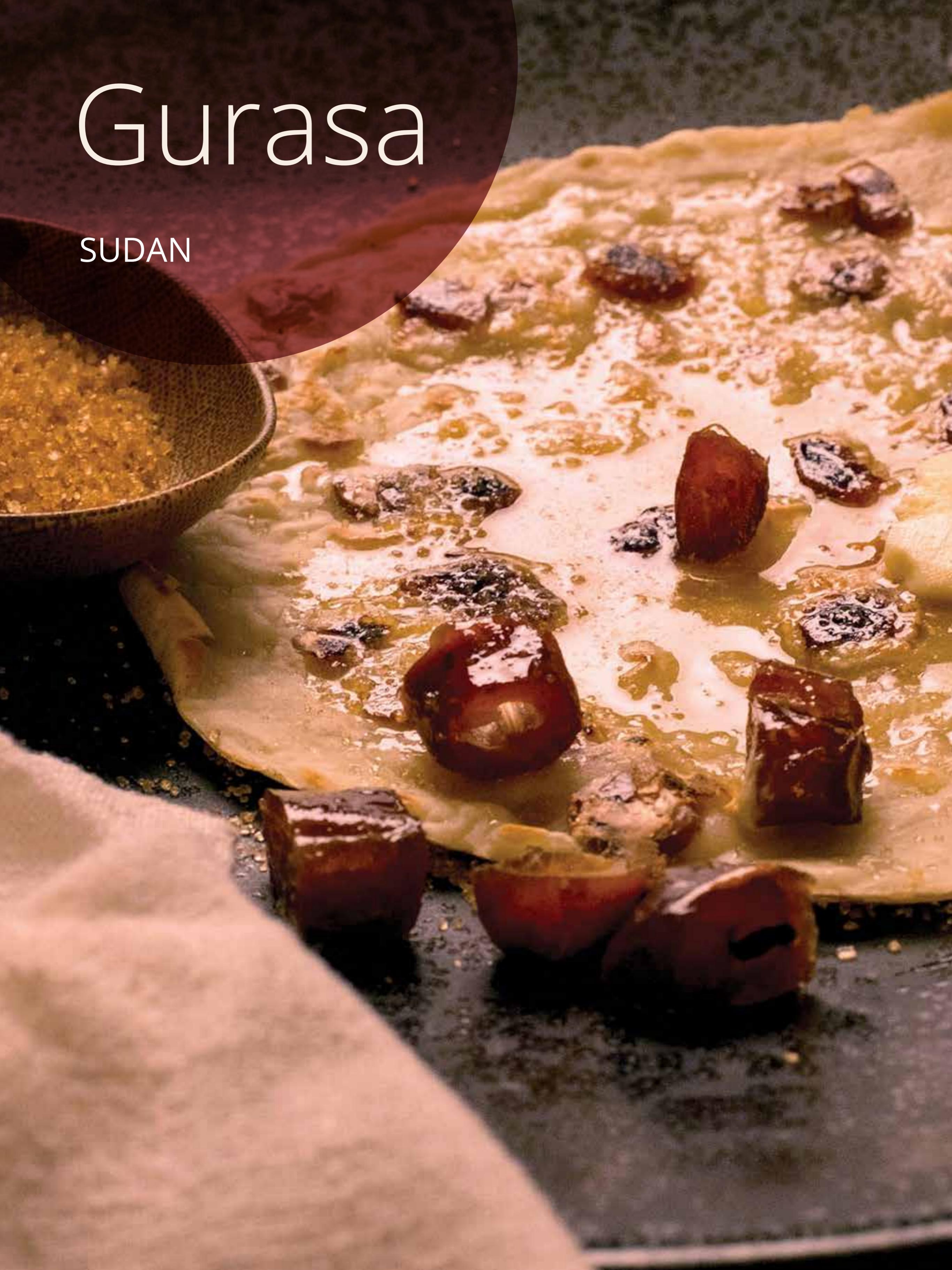
To eat, break some millet balls into a bowl and mix with milk. Add more milk to thin out the dish and sweeten it with sugar if you want to. If there is no milk, tamarind juice can be used.





Gurasa

SUDAN



INGREDIENTS

- 500 g (18 oz) wheat flour
- ½ tsp. baking powder
- 500 ml (½ quart) water
- 1 tsp. salt

Sweet version:

- 50 g (2 oz) dates (stoneless)
- 125 g (4½ oz) butter
- 4 tsp. sugar

DIRECTIONS

In a bowl, mix the flour, baking powder and salt (if you are making the sweet version, add dates at this stage).

Add and stir in water until it becomes a thick, smooth batter (similar to pancake texture).

Using a pancake fryer or a non-stick flat pan (at medium heat) spread ½ a cup of batter evenly and flip to the other side when golden on one side. Repeat until batter is finished.

Sweet version: Mix the dates in the batter and cook. Then coat with butter and sprinkle with sugar.

Savoury version: Serve with tagalia.





HOW THE CCAF IS SUPPORTING SUSTAINABLE DEVELOPMENT GOALS (SDGS)

SUSTAINABLE DEVELOPMENT GOAL 2 : ZERO HUNGER

Zero Hunger aims to end all forms of hunger and malnutrition by 2030, making sure all people – especially children – have access to adequate and nutritious food at all times of the year. Presently, extreme hunger and malnutrition remain major barriers to development in many countries.

Nevertheless, there has been significant progress over the past two decades. Rapid economic growth and increased agricultural productivity have halved the total number of undernourished people. Globally, the prevalence of hunger has declined, from 15 percent between 2000 and 2002, to 11 percent between 2014 and 2016.



ZERO HUNGER INVOLVES PROMOTING SUSTAINABLE AGRICULTURAL PRACTICES THROUGH SUPPORTING SMALL-SCALE FARMERS AND ALLOWING EQUAL ACCESS TO LAND, TECHNOLOGY AND MARKETS.

Agriculture already provides livelihoods for over 40 percent of the global population; while 80 percent of food consumed in the developing world comes from 500 million smallholder farms worldwide. Therefore, one of the specific targets under SDG 2 is to double the agricultural productivity and incomes of small-scale food producers by 2030, with a particular emphasis on women, indigenous peoples, family farmers, pastoralists and fishermen. This is only achievable if it takes into account climate change impacts, which threaten to further reduce productivity and hurt the poorest populations who cannot cope well with these shocks.



Estimates suggest that by raising the access to resources by women farmers to parity with men, the number of people hungry in the world could shrink by up to 150 million. Therefore, investing in strengthening the resilience of smallholder farmers, especially women, to climate impacts is an essential way to increase food security and nutrition for the poorest people, as well as to augment food production in global and local markets.

In all six CCAF countries, project activities are targeting smallholder farmers to ensure they have access to the best information related to climate change impacts and adaptation strategies, and the ability to use it. Context-specific approaches were designed focusing on women as food producers, including diversifying crops, and implementing new water and soil management strategies.

CCAF PROJECTS ARE ALSO CONTRIBUTING TOWARDS THE ACHIEVEMENT OF SEVERAL OTHER SDGS IN ALL SIX COUNTRIES



SDG 1: No Poverty

- aims to end poverty in all its forms everywhere. It specifically targets equal rights to access and manage economic and social resources and services, and building the resilience of the poor to climate-related events. The CCAF targets the poorest and most vulnerable populations in the six countries, providing access to information, resources and support to better plan for and address the impacts of climate change.



SDG 5: Gender Equality

- aims to achieve gender equality and empower all women and girls. Specific targets focus on recognizing and valuing unpaid care and domestic work, through better access to public services, infrastructure and social protection. Further, another target focuses on ensuring women's full and effective participation and equal opportunities for leadership.

CCAF projects target women as agents of change and leaders of adaptation. This includes specific strategies which focus on reducing unnecessary burdens of unpaid care and domestic work to make more time for other tasks, providing training and access to information, as well as ensuring women play leadership roles in water and natural resources management community groups.



SDG 6: Clean Water and Sanitation

- aims to ensure availability and sustainable management of water and sanitation for all, including targets on universal and equitable access to safe and affordable drinking water, with special attention on the needs of women, girls and those in vulnerable situations.

A strong focus of all CCAF projects is to ensure vulnerable communities, particularly smallholder farmers, have better access to water for both domestic use (drinking, cooking, washing, etc.) and irrigation. This includes installation of small infrastructure, like wells, solar pumps and drip irrigation systems, as well as strengthening water user groups to help manage these resources.



SDG 13: Climate Action

- aims to take urgent action to combat climate change and its impacts. This goal has several targets related to strengthening resilience and adaptive capacity; integrating climate change measures into national policies, strategies and planning; and improving education, awareness-raising and capacity on climate change. These objectives are at the heart of the CCAF projects.



SDG 17: Partnerships for the Goals

- this goal aims to strengthen the means of implementation and revitalize the global partnership for sustainable development. The global component of the CCAF plays an important role in sharing experience and approaches on climate change adaptation across the six countries, bringing them together to learn from each other.

FOOD IS PERSONAL, FOOD IS CULTURAL



Whether farming millet in the deserts of Mali, raising cattle in the semi-arid regions of Sudan or growing mangos on the coast of Haiti, the environments we inhabit and our cultural history shape the meals we eat. With climate change increasingly affecting each of these environments, our cultural practices and the food we prepare will need to adapt to keep pace with these shifting conditions.

The countries profiled in this cookbook have made extensive strides to adapt to these climate-related impacts. They have developed and implemented initiatives that simultaneously enhance food and nutritional security, while updating agricultural practices to be more suited to the current and expected conditions. Concrete results are being seen in terms of increased income generation, enhanced resilience of livelihoods to shocks, and improved development outcomes - like better health and more children in school. There is a lot we can learn from these communities on how to build a more resilient society.

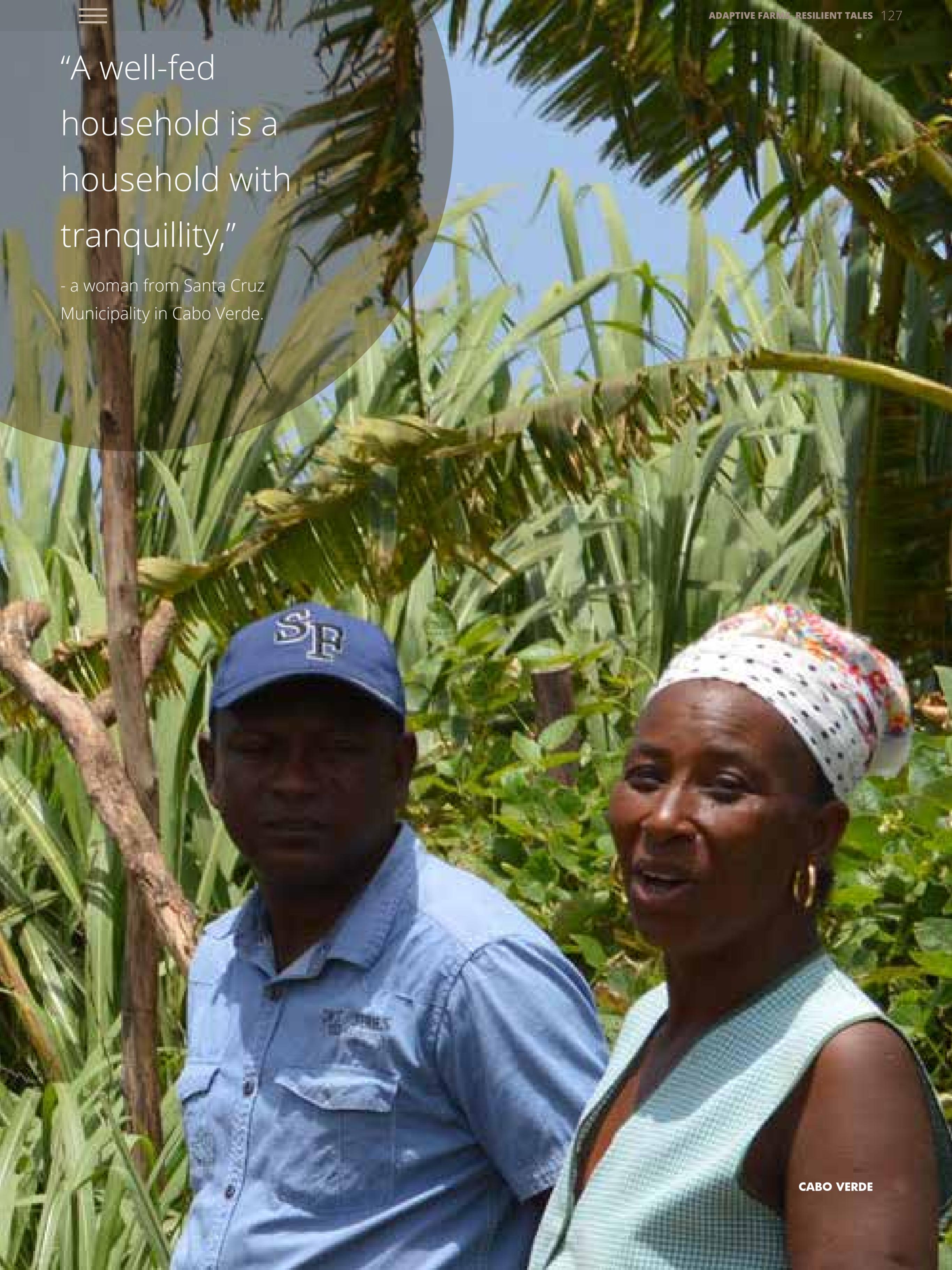
One of the best entry points to explore these lessons is through food - sitting down together at each other's tables.

This cookbook brings our focus from the projects and programmes governments are implementing to address climate change impacts, to how these actions are affecting the food on our plates. In doing so, it shows how global environmental changes are revealed directly in our kitchen, on our forks and in our bodies. We see that in many places people are being forced to change the food they eat; yet at the same time we must embrace this shift and adapt our ingredients and recipes to ensure a more nutritious, sustainable and resilient society. These links - from adaptive farms to resilient tables - demonstrate the close integration between climate change and food security.



≡
“A well-fed
household is a
household with
tranquillity,”

- a woman from Santa Cruz
Municipality in Cabo Verde.





CAMBODIA



MALI

ABOUT THE CANADA-UNDP CLIMATE CHANGE ADAPTATION FACILITY

The [Canada-UNDP Climate Change Adaptation Facility](#) supports a portfolio of national climate change adaptation projects implemented in Cabo Verde, Cambodia, Haiti, Mali, Niger and Sudan. These projects were initially supported by the Global Environment Facility's Least Developed Countries Fund (LDCF). In 2014, these ongoing LDCF-funded adaptation projects in each country received additional funding from the Government of Canada and UNDP

to further enhance the adaptive capacity of vulnerable communities, particularly in the context of food security and water management. The CCAF also includes a global component, which acts as an umbrella initiative aiming to document, analyse and share experiences and lessons learned across the six countries.



UNDP partners with people at all levels of society to help build nations that can withstand crisis, and drive and sustain the kind of growth that improves the quality of life for everyone. On the ground in more than 170 countries and territories, we offer global perspective and local insight to help empower lives and build resilient nations.

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UNDP Cambodia
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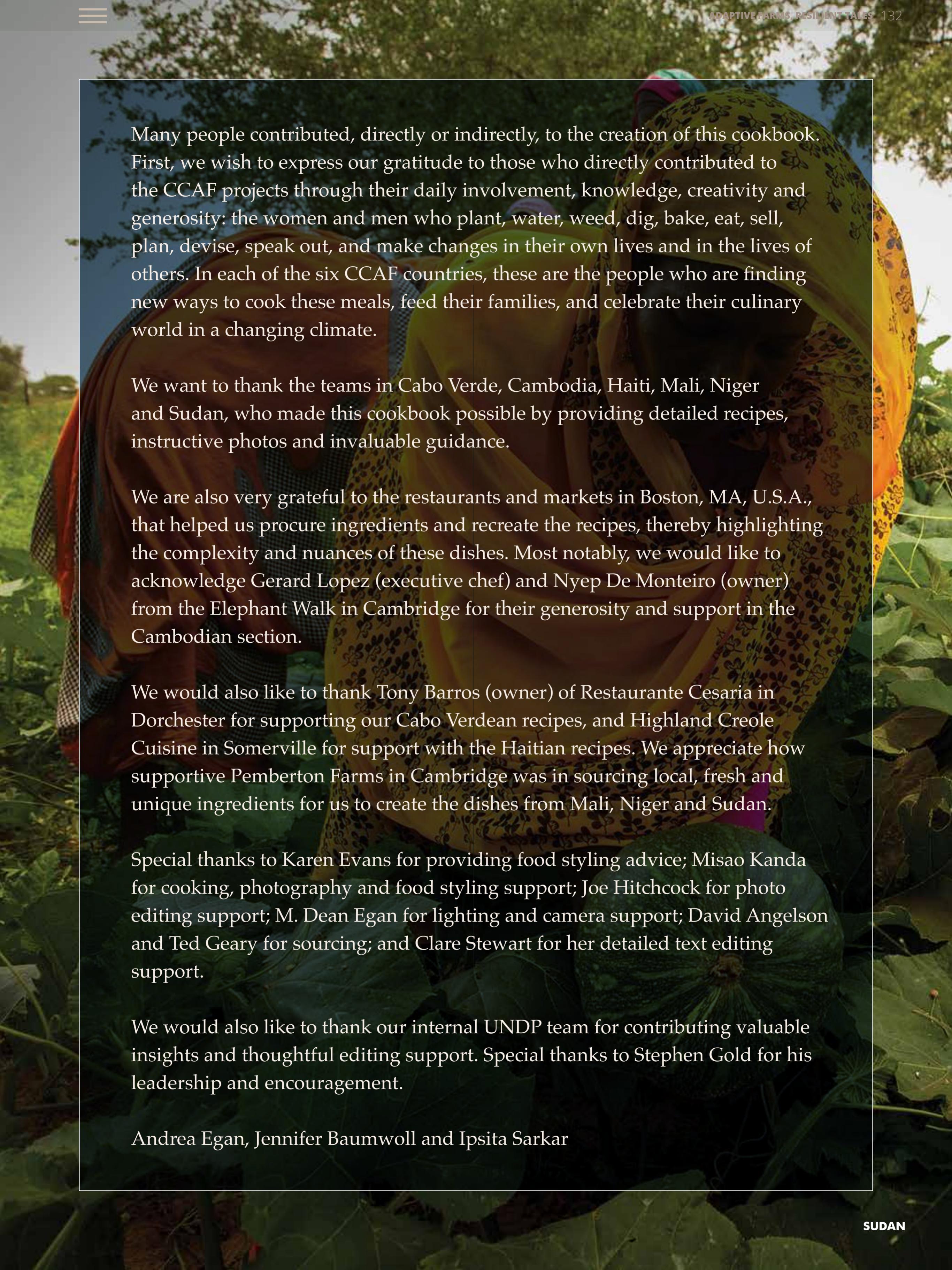
UNDP Haiti
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UNDP Mali
Page 35

UNDP Niger
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UNDP Sudan
Pages 4, 42, 43, 44, 45, 85, 99 and 100





Many people contributed, directly or indirectly, to the creation of this cookbook. First, we wish to express our gratitude to those who directly contributed to the CCAF projects through their daily involvement, knowledge, creativity and generosity: the women and men who plant, water, weed, dig, bake, eat, sell, plan, devise, speak out, and make changes in their own lives and in the lives of others. In each of the six CCAF countries, these are the people who are finding new ways to cook these meals, feed their families, and celebrate their culinary world in a changing climate.

We want to thank the teams in Cabo Verde, Cambodia, Haiti, Mali, Niger and Sudan, who made this cookbook possible by providing detailed recipes, instructive photos and invaluable guidance.

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