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Adaptation Stories

About CCAA

The Climate Change Adaptation in Africa (CCAA) research and capacity development program was launched in 2006 and is jointly funded by Canada's International Development Research Centre (IDRC) and the United Kingdom's Department for International Development (DFID). It is hosted and managed by IDRC from headquarters in Ottawa and three regional offices in Africa. Our original mandate is for 5 years of programming activity, gradually devolving to African institutions, with initial funding of CAD 15 million from IDRC and GBP 24 million from DFID.

We aim to improve the capacity of African countries to adapt to climate change in ways that benefit the most vulnerable.

The program works to establish a self-sustaining African body of expertise on adaptation that responds to needs defined by African communities, decision-makers, and institutions.

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Introduction

Numerous regions in the Sahel bear the scars of several decades of successive droughts and desertification beginning in the late 1960s. These phenomena, which are due to serious climatic changes, have destroyed farmland and agrarian systems, caused major food shortages, decimated herds, and resulted in considerable material and human losses, prompting many to drift away from the land. The extreme variations in climate and low resilience of ecosystems and communities have made the Sahelian zone one of the most vulnerable to climate change, which is increasing in scope and visibility.

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Yet, even in this dire situation, glimmers of hope appear on a daily basis. Within these fragile communities, individuals are becoming aware of the growing insecurity of their living conditions. They are analyzing the causes and consequences and looking to find their own solutions. With a view to sharing and capitalizing on their experience, they now wish to harness the knowledge and experience they have accumulated during prolonged periods of drought and desertification.

A collection of first-hand accounts, a record of experiences, a rush of optimism – what we have gathered are stories of individual or collective adaptation to climate change from various regions of the Sahel. Their simple narrative style, sometimes bordering on the poetic, is intended to reach a non-scientific audience or one that is unfamiliar with the issues of climate change. Beyond that, we hope above all to convince the reader that adaptation is not just a matter of techniques or technology; instead, it is first and foremost a social approach that is voluntary, anchored in real-life experience, and founded on individual or community standards and values, which often influence the strategies adopted.

The cases described below show that adaptation to climate change can take different forms and involve a variety of activities. In Mékhé, Finkolo, and Namari Peuhl, adaptation involves communities that face multiple threats caused by increasingly precarious living conditions, while in Ramongo, Djélia, and Agnam, the initiative came from individuals who were aware of their problems and realized their own responsibility to seek solutions.

The activities they undertook – drip irrigation, fodder production, integration of herding and agriculture, restoration of ecosystems, conservation of water and soils, income diversification, etc. – were not new, but the determination and leadership they showed, guided by a concern for family and community survival, were remarkable and formed a real foundation for endogenous, and, therefore, sustainable, strategies for adaptation to climate change. The stories reinforce what we already knew: that successful adaptation must come from the people who are living on the front lines, facing the many problems caused by climate change and climate variation. Local leadership and individual efforts – even in the context of so-called spontaneous

adaptation – are essential elements of strategies to reduce climate-related risks.

The actions carried out in Mékhé, Ramongo, and other locations were not undertaken for environmental reasons alone. The environment served as a pretext to resolve day-to-day problems of survival. To better grasp these survival issues, it is important to recall the teachings of Chinese philosopher Lao Tzu (700 BC):

Go to the people. Live with them. Learn from them. Love them. Start with what they know. Build with what they have. But with the best leaders, when the work is done, the task accomplished, the people will say "*We have done this ourselves.*"

Surviving
one drop at a time
Story 1
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The village of Agnam is in the administrative region of Matam, in northeast Senegal on the border with Mauritania (15° north, 13° west). Located in the Sudano-Sahelian zone, Matam has a predominantly Sahelian climate, with an average annual rainfall of 500 mm, concentrated between July and September.

The mainly agro-pastoral economy is profoundly influenced by the Senegal River, which flows along the eastern border of the region. In years of abundant rainfall before 1970, the population was able to

practise floodwater farming on the floodplains outside the rainy season. However, since 1970, this off-season agriculture, which demanded little in terms of input, has suffered terribly from climate change.

After several years of drought, the states bordering the Senegal River built two dams – Diama and Manantali – to provide the area, including Agnam, with year-round access to water for irrigation. However, achieving this goal has not been without challenges. Because of the cost of the irrigation systems, the state can only provide water to a quarter of a hectare on each family farm. The cost of purchasing and maintaining pumping systems for the rest is beyond the means of local farmers. Thus, although the dams hold water when the river runs low, they also prevent the villagers from practising floodwater farming – a low-cost option during the off season.

Less well-equipped farmers feel left out and have developed their own strategies. They are turning to farming on the *dieri* – land that the river does not run through and on which no development has taken place – to increase their crop area and production.

Bouna Sow is one of those farmers. Deeply attached to his homeland, after many years abroad, he views his return to his native village as a form of retirement. However, he was frustrated to find that his village had not been able to derive any significant benefit from the dams while villages that had access to river water had been able to thrive and diversify production.

Bouna Sow took a long look at his farm and shook his head, remembering the hardships he had experienced on the site. His passion for farming and his determination have never faltered, despite his advanced age. Over 60 years of age, despite everything, he is still the first one up in the morning, the first to go to work, and the last to stop work in the evening. The source of his motivation and commitment is the challenge he set for himself on returning home from Gabon.

Like most men from his area, Bouna Sow left Agnam in his youth. After many long years of hard labour, he chose to return home to work the land. He plunged into the work, but soon encountered two obstacles linked to irrigation: lack of water in his area, which was relatively far from the river, and the need to manage water properly when he did gain access to it.

He entered into a partnership with rural technical support services in the area, who were conducting research-development activities on Bouna's site to test the feasibility of low-pressure drip irrigation systems in the *dieri*. Significant results were achieved the first year. By growing melons, Bouna was able to earn a good income, one quarter of which was needed to pay the amortized cost of the irrigation system.

However, the system's limitations were quickly revealed following a shortage of water from the village well, which was used by both local families and those on *dieri* farms. This situation forced Bouna to find an alternative source of water for his farm. A modest grant from the local technical support services allowed him to sink a well to feed his irrigation system and purchase pumping equipment.

This simple system, whose cost and maintenance were financially sustainable, brought about a radical change for Bouna. Now he could

farm all year round, no matter how long the dry season lasted and, after two harvests, he was able to purchase a second drip irrigation system.

Thus, poor yields caused by persistent negative climate change created in Bouna a capacity for adaptation. The partnership he struck with technical support services operating in his village helped him move to year-round production rather than farming only three months a year. The challenges he faced setting up the system revealed his capacity to adapt to changing situations. He was able to secure a water supply throughout the year and increase the capacity of his irrigation system by purchasing a second kit. However, he is also aware that the sustainability and extension of his system depend on collaboration with local partners.

When the future lies in fodder reserves

Story 2

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Since the mid 1970s, rural Burkino Faso has reflected the realities of an agrarian subsistence economy. Waves of drought have considerably hindered expansion of the agricultural sector and caused an average decrease in production of 16%. These major, far-reaching changes have led to constant evolution, which has become natural to small farmers who have always had to adapt to their environment.

The long period of hardship experienced by the rural populations of Burkina Faso has created a "school of hard knocks" for farmers who have responded with innovation and successful adaptation. And their innovations can be adapted to suit all arid zones in Africa.

Like most villages in agro-pastoral zones in the Sahel, Barkomba, in the province of Coubritenga, has long practised transhumance. In the early 1970s, when pastures were still abundant, herders and cattle could travel for three or four months seeking green pastures before returning to the village. On their return, major celebrations were organized to honour those who had led the cattle to distant horizons. But in 1973, drought set in, pastures dwindled cruelly, and waterholes dried up quickly. This was the beginning of a crisis that has now persisted for many years.

Bouréma is a herder from Barkomba. At the beginning of the crisis, he decided to stay on the land, but he understood the need to find suitable alternatives to meet food needs and produce wealth. Although he had always been a herder, climate change in recent decades has forced him to combine agriculture with herding.

After a few years of farming and herding, Bouréma has adopted a method that enables him to learn from experience and save time, which he spends caring for his herd. The method has been so successful that Bouréma can guarantee a sufficient supply of high-quality food for both his family and his cattle.

Despite dwindling pasturelands, Bouréma has been able to create fodder reserves, which allow him to feed his cattle during the six months from January to July when pastures are poor. "*The basic function of rural people is agriculture, but it needs to be practised in harmony with herding,*" said Bouréma. He is now developing his own fodder crops, along with harvesting and preservation techniques which he improves over time, based on his own personal experience.

> *The farming technique ("half-moons") which I introduced gives me enough time for herding. The grass is cut in September, when its nutritional value is at its peak. The operation is carried out manually using a machete. The mown grass is transported by cart.... Drying takes place in a hangar, sheltered from the rain, for approximately eight weeks before baling.... Baling takes place at the end of the rainy season using locally built balers[1]. Each bale is calibrated between 12 kg and 15 kg, i.e., the average bulk ration for four adult bovines or ten small ruminants.... The bales are then stored in buildings requisitioned for the purpose.*

1 Two types of straw balers were designed: a simple cubic baler and a pressure baler (with a worm screw).

Production ranges between 80 and 100 bales corresponding to 1200 kg of dry straw.... The human resources used are those of the family farm, especially the men... the financial resources required are used for capital investments: hangar, balers, ropes, transportation. The materials used include locally built straw balers, a storage building (hangar), a cart for transportation, and sundry equipment for mowing (harrow, pitchfork, machete).

Bouréma seems to have thoroughly mastered determination of the best time for grass-cutting and drying, baling, and storage techniques, but planning of the operation and community management of pasturelands need to be negotiated with the local authorities.

Bouréma's experience has been shared with the agro-pastoral community throughout the area, which includes seven villages. The technique enables them to store 1200 kg of fodder per producer, feed their animals during the six-month dry season, and reduce spending on cattle feed: the estimated value of the stored hay is CFA francs 350 000 (about 671 USD).

Today, Bouréma and the people of Barkomba are satisfied with the results achieved, but they remain aware that improvements and effort will be required to obtain significant economic results. "*The sum of these experiences, combined with the contribution of technical knowledge, will undoubtedly add value to our practices,*" he said.

Kourty
and its water bank
STORY 3
© Régis L'Hostis

The Diourbel region is located in central Senegal. Its population is predominantly rural – 83.8% compared with 16.2% in urban areas. The rural population struggles to compensate for shortfalls in agricultural production, and water shortages occur, despite the otherwise peaceful living conditions in the area. Permanent surface water is virtually non-existent; the Sine and Car-Car river valleys have been buried after drying up long ago.

The village of Kourty is located in the southwest part of the Diourbel region. The zone is fed by two groundwater bodies, which constitute the only abundant source of water for the people and herds. There is

an average of one well per village, but the water is unfit for human consumption; the cattle are obliged to drink it or go thirsty. The few existing boreholes yield brackish water with a fluoride content that sometimes exceeds the World Health Organization's safety standard of 1.5 mg/L. Villagers, whose ponds used to be always full of water, must sit by helplessly as their water disappears only months after the end of the rainy season.

The drying up of wells and ponds, combined with an increase in the size of families, the transformation of production systems, and new ties between the city and the country have led to considerable changes in practice. It is now necessary to travel great distances to seek out ever larger quantities of water for the numerous requirements.

The first boreholes, even when they were located far from the village, were a boon to the women, who, during the dry season, were spending a considerable time at the well, which barely provided enough water to satisfy the demand. However, boreholes must be sunk to a depth of at least 300 m to avoid the high salt content in earth above that level. The need to fetch drinking water from ever greater distances entails numerous risks, including the risks run by children

driving carts to fetch water. In addition, the cost of equipment and maintenance (carts, draught animals, barrels) leads to frequent disruptions in water supply.

During exchanges with a technician on the domestic use of rainwater, a decision was made to test a rainwater capturing system using cisterns at the level of family concessions. The chief concern was to satisfy family needs during the dry season for water for drinking and food preparation. Discussions culminated in a lengthy debate on issues of water safety, quality, sustainability, and the social aspects of the action. In the end, a criterion for household eligibility was the availability of an appropriate catchment roof.

The cisterns offered numerous advantages and the beneficiary families were central to their implementation. In Kourty, a village development association was organized to manage the project. It advocated applying to a nongovernmental organization (NGO), which facilitated the transfer of a technology suited to the real needs of the people.

Work began with the improvement of storage conditions and the recycling of metal or plastic barrels of various sizes to hold the water. Families who had sufficient means built cement tanks, which stood up better to the intense heat when there was no water.

Twenty families with tin-sheet roofs with a minimum surface area of 48 m^2 (12 m by 4 m) were chosen to receive a cistern. The NGO's financial contribution was intended to cover the purchase of construction materials, estimated at 600 000 CFA francs. The families' contribution was materials (sand, water, and stone rubble), labour, transportation, and the cost of providing meals for the technical team. On-the-job training was provided to local technicians who would maintain the systems and ensure continuity of the project.

Cisterns were constructed to capture enough rainwater to satisfy drinking and cooking water needs for an average family of eight to ten people for seven or eight months. The systems included connecting pipes for water collection and transportation and a storage basin with a capacity of 10 m^3 – an internal diameter of three metres and a height of two metres.

Constraints included the need for a catchment roof as a condition for acquiring a cistern, which meant that poor families would not be selected. Also, estimates of the supply of water needed did not take into account the solidarity among families who shared everything.

However, despite these limitations, the results were considerable. The people believe that the systems can be adapted to other types of homes, and the ultimate objective is to equip each family with a cistern to satisfy its household needs.

The Finkolo Forest
STORY 4
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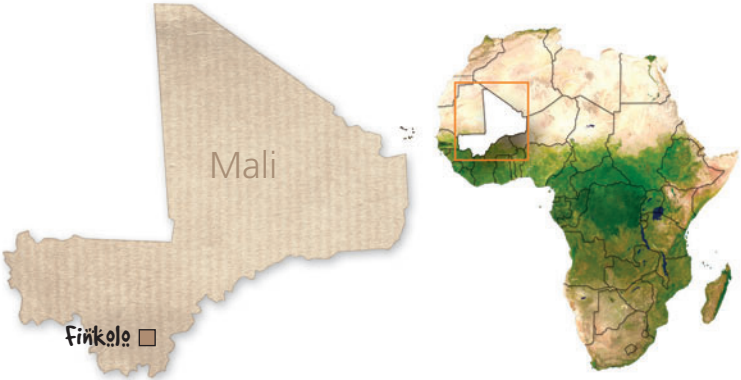

Agricultural is the the most important sector of the Malian economy, accounting for 45% of national wealth and most of the country's exports. Cotton and cattle are the first and third largest exports, respectively. This economic performance is achieved essentially by small and medium-sized family farms with diversified farming systems – i.e., combining plant production, animal husbandry, horticulture, fishing, forestry, food processing, and handcrafts. These family farms and other rural assets employ 80% of Mali's labour force, whose employment and income depend entirely on the agricultural and rural sector.

Most production in the agricultural sector depends on rainfall. Despite efforts of the state, irrigation remains limited to a few privileged areas. However, even in these zones, peasants face serious constraints linked to insecure land ownership, unavailability of inputs, and inadequate communications infrastructure. So far, steps taken to remove these obstacles have made only a minimal contribution.

To these problems must be added the cumulative impact of irregular rainfall, low productivity and yields, the depreciation of producer prices, and unfair competition from imported alternative products. The situation is heightened by insufficient protection of local production; farming families no longer receive enough income to cover their production costs, much less invest in better equipment or inputs.

Strong regional disparities in cereal production affect the food security of more than a million rural people in Mali. Disparities between arid and wooded regions that are attributable to climate change are readily apparent. Fortunately, Mali still includes some very humid areas, which require only a small conservation effort by the population to ensure that the country's basic food needs continue to be met.

In the current situation, poverty is mostly rural (73.04% of the population of rural areas are poor compared with 20.12% in urban areas). Thus, it is hardly surprising that this has led to the deterioration of natural resources, particularly a decrease in soil fertility and degradation of forests. According to rural people, their decision to stay on the land is based on socio-cultural

values, far removed from the economic considerations that, they say, threaten them with loss of identity.

The village of **Finkolo** used to be known for its herding and agriculture potential thanks to its lowlands. However, its remote location makes it particularly vulnerable. The village acts as a pole for some ten smaller villages, chiefly populated by hunters known as dosso. Hunting used to be characteristic of the zone, exceeding by far all other occupations. Persistent climate variations and the progressive disappearance of fauna have made the hunters aware of the insecurity of this activity, posing a serious threat to the dosso people, who want to preserve their socio-cultural values and remain self-sufficient.

A dramatic deterioration of natural resources has precipitated the disappearance of the forest, along with a large proportion of the game animals. As a result, people have been tempted to modify their production activities, but the elders viewed this as a loss of identity, and they urged the rest of the population to be aware of the dangers threatening their survival. Thus, a community response was needed to meet the challenge. Active solidarity, one of the foundations of local socio-cultural values, is strong enough to constitute a force for change and represents an asset the elders make use of.

Since the early 1980s, the people have become aware of the advanced state of deterioration of their environment. The effects that have been felt include the silting of ponds, the disappearance of the bamboo forest,

which was a chief resource, the scarcity of game, and frequent movements of herds to look for water.

To manage the conflicts inherent in this situation, the community maintained its traditional organization, in which each village is led by a traditional chief who is recognized and respected by everyone. The traditional chief co-governs with a village chief who handles administrative affairs. The latter is appointed with the consent of the former, thus establishing a tacit hierarchy that might escape the eye of an outside observer. The two chiefs consult each other and urge the chiefs of satellite villages to reflect on issues as well. This method of addressing problems has always been used, and it is the foundation for local authority.

Following consultation on the current problems, which was open to the rest of the village, a firm decision was made to restore the environment of Finkolo. A series of activities were implemented, including desilting of the three ponds surrounding the centre of the village and regeneration of the bamboo forest around the ponds.

According to the village chief:

Our strength lies in concertation and in keeping our commitments! When the decision was made and the message was passed on throughout the community, we formed teams and began by attacking the silted up ponds. Our equipment is modest but our faith and our determination could move mountains. So we used what little equipment we had to clean out the beds of the two ponds that were used as a priority to water our herds. At the end of the following rainy season, the results of the initial experience began to be known beyond the borders of the village. We began to receive visits from local authorities, who came to thank us, and we took advantage of the opportunity to present our program for the larger pond that was located in the bamboo forest. They promised us their support.

When we resumed work, the authorities placed bulldozers and technical services at our disposal to carry out the civil engineering work. When we deepened the three large ponds in our village area, it mobilized a lot of people in the surrounding villages who made the project their own. Now that the work is completed, each pond is 500 m long and a number of activities can now be developed there.

An old *dosso* man in charge of supervising the bamboo forest confided:

> *When we finished digging out the ponds and the water came back, we began to regenerate the bamboo forest by replanting it and protecting the remaining plants. We waited a long time (more than six years), to see the first results of this hard work. Another problem arose, since we had to avoid the reproduction of the phenomena that had led us to that situation of deteriorated natural resources in the first place. At the outset, certain people did not agree with our concern for protecting the forest; they wanted to use the bamboo prematurely. Since the rules forbad this type of behaviour, strategies had to be developed to discourage the ill-intentioned.... The rules we set up for the supervision of our environmental resources were based on local measures taking account of the social values of the different groups. They were validated by the local authorities, who supported their implementation.*
>
> *Once during my nightly rounds, I heard the sound of machete blows. When I approached, I realized that it was an ill-intentioned act on the part of one of the villagers. Hiding in the shadows, I let him finish his act and then I followed him discretely. When we arrived near his house,*

he hid his cuttings and went to bed. The next day, I asked the two chiefs to convene the villagers because the spirits had told me that the forest had been attacked the previous night. When everyone was gathered, I carried out a ritual and asked the person responsible to apologize to the village before the spirits denounced him. But my requests were in vain and the guilty party did not comply. After one last try, I asked the spirits to point out the guilty party, who energetically refuted the accusation. I asked the chiefs to form a committee to check the hiding place indicated by the spirits. When the committee returned with a bundle of bamboo, the person was obliged to beg the pardon of the community. Since then, no one has dared to attack the forest for fear of being denounced by the spirits.

The Finkolo zone has once again become wooded, and diversified agricultural production is carried out year round. Without technical support, the production system remains artisanal. Forestry operations have not yet begun, but game animals have begun to return, which is a sign of hope for the hunters of Finkolo, who are determined to preserve their homeland.

organizing for adaptation to climate change

STORY 5

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In Senegal, as in the other countries of the Sahel, agriculture provides a living for most of the population. However, the critically low rainfall since the 1970s continues to be a hardship, affecting both subsistence and export crops. The groundnut basin, which covers nearly 30% of the agricultural area, has long been important to the economy of the country, with exported groundnuts the number one foreign exchange earner. Today, the situation in the basin is dire because of persistent climate variations and overuse of the land.

Mékhé is a rural commune located in the heart of the groundnut basin. Like its neighbouring villages, it displays all the characteristics of ecosystem deterioration.

Because of a decrease in rainfall and shortening of the rainy season, which now only averages 65-75 days, millet varieties have difficulty completing their growth cycle, which generally takes 90 days. Other crops have begun to disappear as the area moves progressively toward a monoculture, although certain farmers continue to struggle to preserve traditional practices.

The drastic decrease in rainfall has resulted in food shortages, increasing the length of the "hungry season" from February to October. Family farms in the Mékhé zone are struggling to survive. The social equilibrium is deteriorating, and disorganization of the groundnut industry's market chains means farmers do not have the cash they need to cover costs.

Aware of this situation, in 1985 the peasants of Mékhé decided to form a union (Union des Groupements Paysans de Mékhé, **UGPM**) to lay the foundation for a local organizational structure capable of dealing with their concerns. Beginning with five promoter groups, by 2008 the UGPM included 82 mixed groups, with a total of 5000 members.

The UGPM is, above all, a farmers' organization providing support and advice to producers based on the knowledge and know-how of its endogenous human resources. It has positioned itself as a self-managed peasant organization that provides support and training to its members in the same way as traditional state structures.

For many years, the UGPM has been involved in action research in the areas of self-management, financing, family farming, and dealing with their own development problems. The UGPM has organized experiments with 57 target families in 89 villages. These are carried out by a group of stakeholders comprising the families and a pool of facilitators and technical and research partners. The UGPM has had to strengthen its organizational structure not only by educating its human resources, but also by seeking alliances with technical partners able to guide the farmers' research.

A number of initiatives have been developed by local farmers, but they all concentrate on the search for ways to better adapt to change. The UGPM soon realized that this could constitute a real strength and an impetus to mobilize. Its foremost concern is family food security, as local families are threatened by a serious decline in farm productivity. Families struggling to live off their own production are extremely vulnerable, which, in turn, compromises their participation in development activities at the local level.

The dominant industrial approach leaves no room for peasants' vision of agriculture in Senegal. However, there is a definite evolution in peasants' capacity for organized action in the framework of heritage seed preservation, which contrasts with the view of peasants as incompetent, conservative people. This view is the sort of prejudice that the UGPM is seeking to overcome by supporting its members and encouraging them to make their own production choices, ensuring food sovereignty that will enable them to influence political decision-making at the local level. The experiment conducted in Mékhé highlights adaptation based on self-management, focusing on family farms.

The UGPM initially focused on diversification of crop species, as the varietal map had been progressively simplified as a result of agricultural extension programs. The goal was to use and multiply traditional seeds such as earth peas (bambara nut), millet, sorghum, and cowpeas. The UGPM inventoried producers of traditional seeds and encouraged them to propagate these species. It then purchased a portion of the seeds and promoted their use by other villagers through facilitators.

A second activity focused on access to good-quality seeds adapted to the rainfall in the zone. In collaboration with the Institut Sénégalais de Recherche Agricole, 10 new varieties will be introduced and propagated by the members of the UGPM.

Today, the UGPM has expanded its climate adaptation activities in four strategic areas: reinforcing a self-managed financing system, transforming production systems through support for family farms, supporting local government (promoting participation for successful decentralization), and institutional capacity-building.

Mékhé is a perfect example of adaptation to climate variation and change based on a strong organization that is able to offer solutions to biophysical and social changes and encourage diversification. It may mark the passage from an economy centred on agriculture to a diversified economy.

An experience in perpetual adaptation

STORY 6

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Niger lies in the interior of the Sahel and 75% of its territory is desert. Much of its economy depends on farming (vegetable and animal production), which accounts for 30-40% of its gross domestic product and provides a living for more than 80% of its population.

Namari Peuhl is a small village located in northeast Niger, a short distance from the Sahara Desert. Its climate is Sahelian, with an annual rainfall of 250-800 mm.

In this zone located in the heart of the Sahel region, drought has shaped not only the geography, but also the whole history of the

people. Drought is everywhere. It has left its mark on the parched land that appears to be in the final stages of its life cycle. It has transformed the cattle, which seem to be there only to bear witness to the hardships suffered by the Namari people. Drought permeates the emaciated bodies of the inhabitants who will bear its mark forever.

The droughts of the 1980s profoundly disrupted the herding practices and socio-cultural values of these nomadic Peuhl communities. The 1984 drought was the worst of all. Decimation of the cow and sheep herds exposed their vulnerability and sent a genuine shockwave through the Namari community. More than 90% of the herd animals died and the rest were in critical condition.

The extent of the drought phenomenon made it impossible to follow long routes. Tribal chiefs were forced to make the historic decision to remain in the lowlands, which were still humid, and transform their herding practice into an agro-pastoral system based on household vegetable and animal production. As they said, "*If we leave the hillsides, we will lose the rest of our herds; the droughts no longer allow us to make our living from nomadic herding.*"

The survival strategy was to convert to agropastoralism and the priority was food crop production. Survival came first; if possible, the herd could be rebuilt later. Staying in the lowlands made it possible to remain close to waterholes and diversify agricultural production. Market gardening was practised in addition to rainy season farming.

One morning in October 2007, **Djibo Mego**, the chief of Namari, set out at a rapid pace to his vegetable garden at the base of the hills. The former herder had abandoned animal husbandry after repeated droughts destroyed pasturelands and made nomadic grazing to Mali or Nigeria difficult. However, when many people from the village migrated to Gourma or abroad, Djibo Mego had decided to stay to support his parents.

He turned to rain-fed agriculture. However, the long hungry season following the brief rainy season obliged him to rethink his plan and look at other types of crops that could be grown during the nine-month dry season. Market gardening provided him with that opportunity.

Market gardening made it possible to fully integrate with the agrarian system of the region. The herders' villages became permanent and adapted to the socio-economic realities of the zone. The local authorities recognized and supported the integration of herding into the local land management system, and adaptation of cultural values to the new context was ensured.

Many members of the community who had refused to stay, believing they could save their herds by crossing the great Sahel, returned without a single animal. Djibo took them in, helped them settle in the village, and made them welcome. But he was saddened to recall that others had left, never to be heard from again.

Today, vegetable crops combined with rain-fed crops enable the people of Namari to grow a surplus of produce, which they can sell. This spark of hope reminds the hardworking people, and Djibo Mego most of all, of some of the difficult days of their history. However, it also shows them that they are the architects of their own collective change.

Agro-pastoral practices have not affected their cultural values. In fact, the community is beginning to be called on frequently by the local authorities to mediate in conflicts between herders and farmers in other zones.

So far and yet so near

STORY 7

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Rural Burkina Faso has become the best example for farmers of successful innovation in arid zones in Africa. The natural evolution of this area has obliged peasants to adopt new ways and to be open to new experiences. The sum of this knowledge, combined with the contributions of technicians, has made it possible to capitalize on local experience. Community instinct for survival and national agricultural policy has led to the transfer of successful innovations to other areas. One such example is the village of Ramongo in the province of Boulkiemdé.

Seydou Ouedraogo was one of the few young people left in Ramongo. Like most other villages in the Sahel, Ramongo has been drained of its youthful population, who have moved to towns and cities to escape difficult rural living conditions caused by the dramatic decline in rainfall over the last several years. The village's main activity, farming, was severely affected, and most people chose what they thought was their only option for survival: they left.

However, Seydou decided to stay. "*I am the youngest in my family, and I was lucky enough to have stayed in school up to high school. My other brothers are in town. Some of them are senior civil servants; they often offer me small jobs in town, but I always refuse. I would rather protect our family heritage, which is our fundamental reference and gives our lives meaning.*"

Seydou is able to examine his changing environment and consider his own position in it. His choice to stay on his native soil is perfectly clear; he must continue to use the available resources in a sustainable manner. This is particularly difficult, as the advanced state of deterioration of those resources makes it necessary to adopt new farming practices.

Seydou contacted a number of sources to acquire new knowledge from other peasants' experiences and technical advice from rural

development officers. This led him to create a "field school" where he can experiment with innovations in cereal production. Today, Seydou surprises his peers with his crop yields and he wants to share his experience with the other producers in his village.

Despite his unassuming appearance, nonchalant gait, and slow speech, Seydou exudes the determination of a man who has taught himself through hard work and difficult experiences. This background has made him a natural leader. When asked to describe his most heartfelt wish, Seydou replied, "*Happiness for me is for my little brothers to have work to do in the village and not sit around with nothing to do. That is my happiness.*"

This community vision of labour and the division of its rewards is what made him decide to stay in the village decades ago, and this same vision is currently motivating him to "import" into his village a technique for restoring degraded land that originated in northern Burkino Faso: the half-moon. The adoption of this endogenous technique is particularly relevant as the 600-650 mm of rain the village receives annually most often falls in the form of intense rainstorms, which inevitably, accentuate the degradation of the exposed land.

According to Seydou,

> *The half-moon is an improvement on the zaï technique. It is the product of joint reflection by development technicians and peasants who practised the zaï method. It consists of digging half-moon shaped ditches before the rain falls, with a diameter of two metres[2] each, a radius of one metre and a depth of 10-15 cm. These half-moons are alternated like the scales of a fish, in the direction of the run-off.... The dirt removed from the holes is used to make a sort of water dam on the curve surrounding the hole.... Each half-moon is filled with half a wheelbarrow-load of organic manure (preferably compost), which is spread just before the rainy season and is not covered up with soil.... These operations must be completed before the end of April to allow producers time to complete their other pre-rainy-season activities.... The soil must be turned after the first rain and seeds sown when the soil is damp and 15 hills are placed in each half-moon.*

This technique makes it possible to farm new land that has turned to wasteland because of the thick laterite crust extending as far as the eye can see.

2 Researchers recommended 4m.

The size of the ears of sorghum grown in half-moons compared with produce grown in household fields is proof of the method's effectiveness. On land rehabilitated by Seydou using the technique, sorghum plants form ears and the leaves remain green, even though the rains stop well before they bloom.

Seydou did not limit himself to this new planting technique. He also developed small-scale animal husbandry using mostly by-products of the harvest for feed. He gathers sorghum, maize, and millet stems after the harvest to serve as cattle fodder. He stores the stalks, which are cut at ground level to preserve as many leaves as possible, off the ground on a large framework that also serves as a shelter for his cows. The fodder is used during periods when the pastures are not producing sufficient feed. Stalks are finely chopped and distributed in the evening.

Manure from the cows is transformed into compost, which is later used in the construction of half-moons. The system ensures food security for the household cattle and fertilizes the land with the recovered manure.

Adoption of these methods by other farmers promotes a sense of community in the fight against erosion and ensures sufficient agricultural production. Seydou's experiments have contributed to food security and environmental restoration in Ramongo.

Hatching a new source of income

STORY 8

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The village of Djélia is located in the Circle of Barawely, 80 km from Sikasso in Mali. It is not easy to reach, with its winding tracks and uneven topography. Djélia meets every criterion for a village lost in the middle of nowhere, yet the savannah conditions promote the development of a wide variety of wildlife.

After several years of drought, cattle became scarce and Djélia had to find alternative sources of income. Poultry meat, such as that of guinea fowl, is highly prized in the towns and represents a potential market for hunters and poultry farmers. Thus, guinea fowl farming seemed to be a suitable option for Djélia. However, a system had to be designed to optimize conditions for poultry and egg production.

The idea of an incubator was inspired by a test conducted in the village by an NGO looking to meet the strong market demand for guinea fowl. The wooden prototype incubator left behind had a maximum capacity of 150 eggs per incubation period, but was too expensive for the villagers.

Lamine tried to reproduce the incubator in adobe, imitating its technical characteristics. The results were much appreciated by the local people, because of the ready availability of its construction materials, its low cost, easy construction and maintenance, and durability.

The new incubator, built of adobe bricks, was 50 cm long, 40 cm wide, and stood 25 cm high. In its centre, metal rods supported a framework that could hold 150 eggs. The incubator was covered with corrugated metal or waterproof sheeting to protect it from the rain. The side walls contained small air holes at the top near the roof. The back was made of bricks and the front was covered with black plastic sheeting.

Wet sand was placed in the incubator to raise the humidity, and an oil lamp was used to produce the heat required to hatch the eggs. This arrangement resulted in hatching rate of 93% after only on cycle.

The incubator increased production considerably as it was used to hatch guinea fowl eggs collected in the bush. Previously, brooding hens would accept no more than 3-5 of these additional eggs. Output soon reached a record high of 500 juveniles per incubation.

Currently, the incubation phase seems to have been mastered, although Lamine realizes that production remains limited because of the villagers' lack of knowledge of husbandry techniques and primary care.

Without access to technical and veterinary knowledge, mortality rates remain high. Assurance of low mortality could lead to larger-scale use of the innovation, which would greatly increase the benefits to women and to households in general.

Conclusion

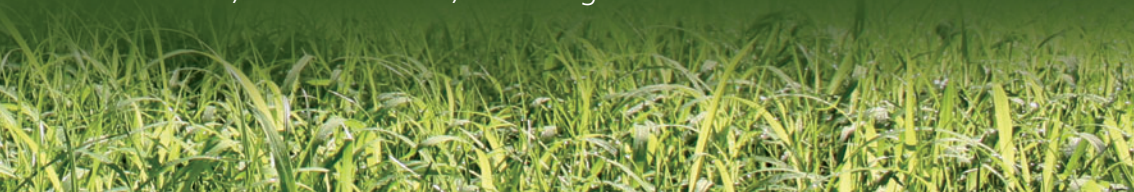
The adaptations described here were in response to climate variations. They are not necessarily the most appropriate ways to adapt to long-term changes, whose manifestations and impacts remain highly uncertain. However, they demonstrate the difficulty, in the Sahelian environment especially, of distinguishing between climate variations and climate change.

They also reveal communities' notion of adaptation, which must take social, economic, and environmental dimensions into account; and such an integrated approach must be based on the communities' essential needs. Seen from this viewpoint, adaptation is an essential component of development. However, to ensure that such resilient development is more resistant to climate constraints and unpredictability, capacity-building of the various actors – especially those in the most vulnerable communities – is indispensable. Indeed, people must move from their current reactive approach to a more proactive one to ensure better adaptation to coming changes. Capitalizing on experience in adaptation to climate variation, as described in this collection of life stories and elsewhere, must involve acquiring the capacity to plan

adaptation measures and consider options. To achieve this, communities must be valued and included in participatory action research approaches, which should underlie all decision-making.

What these stories have shown us is that the people do not sit idly by. They take their future into their own hands and take responsibility for solving the problems that they, themselves, have identified. We have also gathered a clear picture of the symbiotic relationship that exists between the people and their environment – an environment they depend on, but that often places them in a position of insecurity. Despite the increasing fragility of their ecosystems and the feeling of powerlessness that sometimes affects their communities, their stories and experiences demonstrate that they do not see themselves as mere victims; instead, they are fighting for survival.

The participatory approach to adaptation is an encouraging avenue, whose positive results reinforce the notion of collective action for sustainable development. The people described above clearly understand this approach. However, one key question remains: how can African decision-makers and researchers be inspired by these examples to support the adaptation process? It is urgent, in that respect, that we remember the words of Gandhi: "*That which is done for me, but not with me, is done against me.*"



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