Managing Mali's Wetland Wealth for People and Nature

Wetlands INTERNATIONAL

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Contents

Introduction

Wetlands International has been in Mali since 1998, when it started a partnership with the national government to help better manage the country's water resources for both its people and nature. Those early efforts involved scoping out the state of Mali's unique natural habitats, not least its globally important wetland, the Inner Niger Delta, and sharing those findings and data widely.

As Wetlands International nears the end of a second decade in the country, we want to highlight and celebrate what's been achieved and learnt within our growing network of partners. This document is part of that effort. The key to everything is a deeper, collective grasp of the complex factors determining how best to manage and fairly share water in one of the driest parts of the planet. Making this knowledge and expertise available to all concerned is vital to future water policy choices in Mali and more widely in the region.

The staff at Wetlands International have been both students and teachers during our time in Mali. During extensive field work, we have absorbed many lessons from people in the Delta, drawing inspiration from their centuries of skilled water husbandry in challenging conditions. In return, we have shared our own experiences of managing some of the world's other major wetlands and working up related policies for their wise use.

Our sense is that from modest beginnings, we have grown to become a respected authority on the Inner Niger Delta. We feel privileged to be lending a hand to secure the best chances for Malians, and the natural habitats on which many depend, to flourish. That means binding ideas about sustainable water and natural resource use to policies to help community livelihoods, disaster resilience and poverty reduction.

Of course, the story's not done. Alongside this celebration of the work we have completed is our idea of what more remains, inside the country, throughout the Niger basin and in similar floodplains across the Sahel. So this text reflects on projects past while also looking to the future. More important still, it is a call for partners, old and new, to join us in writing the next chapters of the story – partners with the necessary funds, creativity, vision, ambition and energy to carry this exciting work forward.

Mali – what is at stake

Mali, a land-locked West African country stretching into the southern Sahel, is one of the world's poorest. Its Human Development Index, the United Nations measure of people's chances of leading long and healthy lives, having access to knowledge and a reasonable standard of living, was 0.344 for 2012. That put it among the lowest of 187 countries and territories assessed by the UN, despite its score having doubled in the last 30 years or so.

In that, Mali shares much with its neighbours in the Niger River Basin, whose catchment waters run through the country in an arc from the Southwest to the North and round. For communities along its banks, the river system provides a lifeline to all in the semi-arid lands through which it runs. Basin states face a demographic boom, widespread poverty, limited governmental capacities along with the associated degradation of nature.

Yet for all those problems, Mali also harbours a natural asset that supports two million people directly with fish, pasture and fertile land for rice paddies and other crops. That place is the Inner Niger Delta, a vast, seasonal oasis that spreads and retreats each year to the rhythm of monsoon rains in neighbouring Guinea's uplands. The Delta's riches extend to untold, often unknowing, millions more. Some live elsewhere in Mali, others are downstream and still more are in the European and Asian countries whose migrant, nesting birds over-winter in its waters and wetlands.

For a country stretching from a tropical South to an arid North, with generally limited local rainfall, Mali is the classic case of a state whose economy relies on rivers. Wise husbandry of the Delta's natural richness could certainly improve people's livelihoods. Among the benefits would be better food and water security for some of the world's poorest communities. Skilful management and sharing of resources could also temper the risks of regional conflict and attendant mass migrations.

Bozo village along the Niger River

Mali and the Inner Niger Delta

The Upper Niger and the Inner Niger Delta

Geography and climate combine to create the extraordinary seasonal flood plain that is the Inner Niger Delta, the second largest in Africa next to Botswana's Okavango. Something like an area the size of Belgium goes under water each year for several months, fed by monsoon rains falling in the Guinea Highlands. The result is a rich and complex interplay between people and nature as waters rise then recede.

Yearly floods are the Delta's heartbeat. Local gradients of a couple of centimetres' fall per kilometre slow water flow to a snail's pace. Flood waves entering one end of the system take a couple of months to reach the other. Major rains are cause for celebration, with peak levels determining the total area under water at any time. The bigger the flooded area, the more there is for the Delta's beneficiaries – human, plant and animal – making it easier for all to thrive.

So much water running through what would normally be arid land creates pasture for cows and goats, irrigates crops and launches breeding seasons for the Delta's many different fish and local birds. The varied habitats are vital for the Niger Basin's diverse fish stocks, which run to a couple of hundred species, including 20 endemic ones.

Centuries of human activity have created delicate governance systems balancing the demands of farmers, pastoralists and fishermen with the water's seasonal rise and fall. Similarly for the Delta's birds – flocks of residents inter-mingle with migrant visitors that fly across the Sahara to escape the Northern winter. All suffer in years of poor headwater rains, when competition for resources intensifies and conflicts increase. The rising human population, coupled with the locally warmer and, potentially, drier conditions predicted under climate change, risks unbalancing things further.

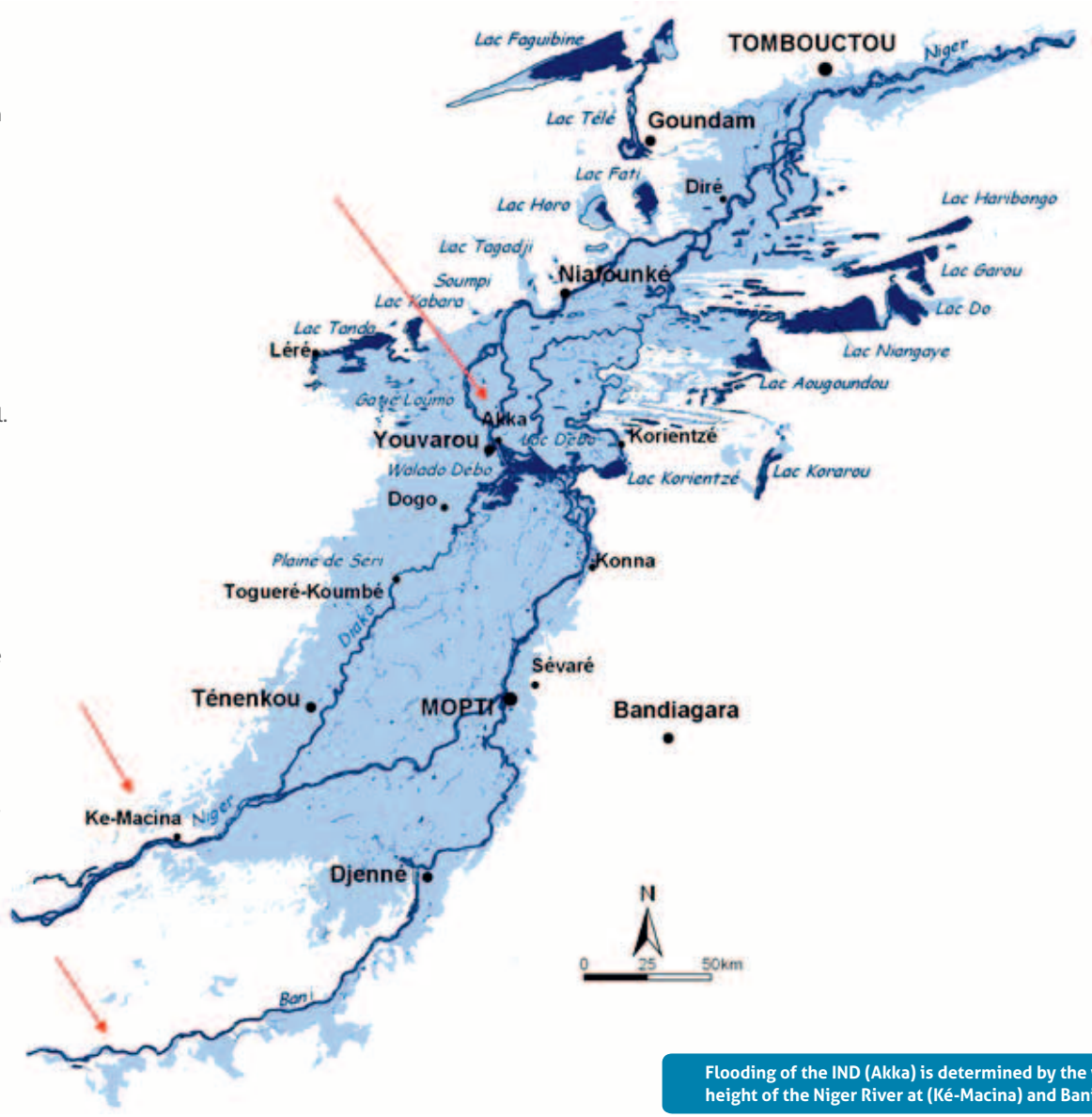
Policy dialogue with local decision makers about the impact of dams upstream

Climate change models, on top of existing temperature uptrends, suggest an increased risk of more frequent, prolonged and severe droughts, alternated with high flood events. The result would pile more pressure on an already fragile and degraded Delta, making its wise management more important still.

Such questions tie in with the familiar challenges of poor, rural populations throughout the Global South. Decision makers, to achieve anything like durable policy solutions, must weigh their macro-economic ambitions and poverty concerns with those of sustainable natural resource use. In practical terms, policies in the Delta are ahead of the curve. It has already hosted pioneering partnerships between local people, different levels of government and development and conservation agencies, many involving Wetlands International.

The rationale is simple – pooling expertise boosts the chances of unravelling the complexities of cause and effect. An example is Delta water flows, a single factor with many implications for the vitality of habitats and the livelihoods of water-dependent communities. Various human and natural influences, both locally and upstream, combine to determine how people fare. That means neither development, nor nature conservation, can be tackled alone. Questions of water, sanitation and hygiene (WASH) influence water planning, just as nature restoration projects bolster local livelihoods.

Such joined-up policy thinking has already borne fruit in parts of the Delta, increasing incomes and building community resilience to the vagaries of annual flooding and sporadic drought. They suggest possible lessons for similar groups, both locally and throughout the Niger River Basin.



Flooding of the IND (Akka) is determined by the water height of the Niger River at (Ké-Macina) and Bani (Douna)

Wetlands International in Mali

Wetlands International has been in Mali since 1998, its work underpinned by an agreement with the Malian government to work on Integrated Water Resource Management (IWRM), training, natural resources management and biodiversity conservation.

Over time, we have become a respected authority on the Inner Niger Delta and how to help its people and nature to flourish. Our approach binds sustainable water and natural resource use to community livelihoods, resilience and poverty reduction. From the start, when we focused on local waterbird harvesting issues, we have expanded to focus on how to diversify local livelihoods and tackle upstream land and water management issues affecting the Delta.

More recently, we have become more active in dialogue at the Niger Basin level. For that, we draw on knowledge and expertise accrued from all our initiatives and projects on the ground and from a growing web of partnerships and collaborations. Being active at all levels – from villages, throughout the Delta, nationally and at the scale of entire river basins – lends a unique quality and perspective to our work. Our ambition for the Mali office is to use this collective expertise to build alliances that extend across all Sahelian floodplains. The office's existing, lead role in a partnership with the nine-country Niger Basin Authority is the starting point for this future work.

Wetlands International's core values include building trust and stimulating debate and collaboration among all water stakeholders. Our local and global staff work principally through partnerships.

At the local level in the Delta, that means working with individual villages, with mayors, their communal councils and decentralised state services. Our choice of village partner depends on factors including their vulnerability to drought or recurrent seasonal flooding, our entry point being via village leaders and their councillors. We work in collaboration with government-recognised associations of farmers, fishing groups and so on and also with national NGOs.

Community restoring flood forests

Mali's decentralised government means communes are responsible for managing natural resources and water, primary and secondary education, and health. Given their habitual lack of money and staff, our capacity-building efforts focus on helping them find the necessary resources to do their work. These local partners are at once targets groups for our work while also being champions of the policies we propose at sub-regional and national levels.

We also work with prefectures and at sub-regional and national levels, the latter involving ministries and their departments for water, farming, livestock raising, fisheries and rural development. We organise debates for National Assembly deputies, not least those in the Environment, Water and Rural Development Group, and run field trips for them to visit projects and assess their impacts.

Beyond Mali's borders, we collaborate with the Niger Basin Authority (NBA), taking part in reciprocal events, training days and policy discussions. We are among several international organisations to have NBA collaboration accords. At the NBA's request, we recommend stakeholders for water use management committees and suggest text for their regulations.

Alongside these partnerships, another foundation of our approach at Wetlands International is the gathering and use of sound science and local knowledge to support and influence wise decision making. We freely share insights and learning from field programmes with government, civil society and private-sector partners and communities. Our role is akin to that of a knowledge broker and collaborative action enabler.

One of Wetlands International's key resources in Mali is a deep and expanding knowledge base on the Delta's biodiversity, its community stakeholders and the relationships between river flows and change drivers such as climate, hydropower and agricultural projects. We built this base in partnership with Malian and international experts on the issues and challenges facing the Delta. All our work on policy, capacity-building and direct interventions stands on this bedrock. The effect has been to make Wetlands International a trusted presence and recognised depository of data and know-how, one that is both widely used and valued.

We play an active and effective role in bringing the right information and issues into policy and management dialogue. Our visible, local presence, coupled with ongoing efforts by our staff and partners, have helped build a network that encompasses Mali's major stakeholders. We are committed to exploring different policy options and acting alongside government and other stakeholders. The combined effect is that our modest size can pack considerable weight. The shared prize we dream of is to secure a better future for the people and nature of Mali's Inner Niger Delta, one of the worlds' most important wetlands. We also aim to replicate that work in other important wetlands in the Niger River Basin and elsewhere across the Sahel.

Wetlands International in Mali

The Wetlands International Mali programme has teams in Sévaré, a town inside the Inner Niger Delta, and the capital Bamako. The first comprises an inter-disciplinary field operation while the second coordinates projects, works up policy, manages finances and directs our cross-border work with the Niger Basin Authority and elsewhere in the region. Working with both teams are the Wetlands International Africa office in Senegal and international headquarters in the Netherlands.

Encouraging wise use of the Upper Niger's waters

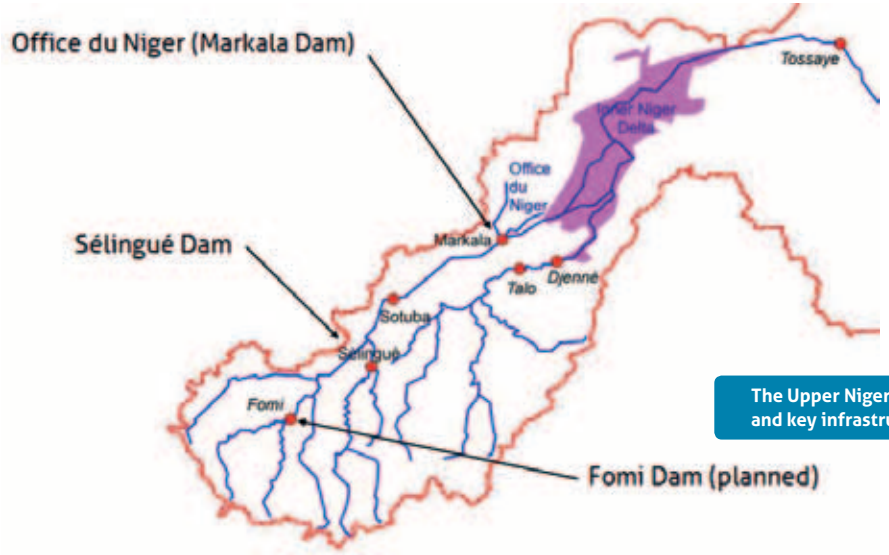
Fairly sharing the Niger Basin's water is a dynamic and complicated challenge in one of the poorest parts of the world. Lower rainfall and higher temperatures in recent decades have made the task still trickier and climate change effects will likely make it harder yet. Water demands vary between the upstream and downstream users and even, in places, between those on opposite banks. Dams for hydroelectricity and irrigation, drinking water supply, farming and fishing based on seasonal flooding patterns – all have their needs.

Mali has particular reason to focus on wise use of Niger Basin water – it depends almost entirely on what falls in the catchment to meet its needs.

Fathoming the complexities of water use is the key to determining what might be fair, the technical term being Integrated Water Resources Management, or IWRM. That means assessing things like land use, rainfall, river flows, the rise and fall of seasonal floods and combining the results to model the effects of water management choices on both people and nature.

Having worked in Mali since 1998, Wetlands International is ideally placed to help IWRM work in the Upper Niger, from a basin scale downwards. Our experiences and knowledge of the Inner Niger Delta are particularly relevant (see Box).

Our work has helped embed ideas of conservation and wise use of floodplain wetlands in Mali's "Sustainable Development Plan for the Inner Niger Delta". In 2013, the "Sélingué and Markala Water Commission" was able, to some extent, to fairly share Upper Niger waters between upstream and downstream stakeholders. Wetlands International lent management skills and some technical support to the process. Sixty institutions from government, civil society, private sectors and local water users now meet regularly to decide on how to meet different stakeholders' needs. We support their work with scientific data on water resource availability.



The Upper Niger Basin and key infrastructure

Barrages of fish nets on a tributary near Gourao village

Achievement: Fomi dam redesign

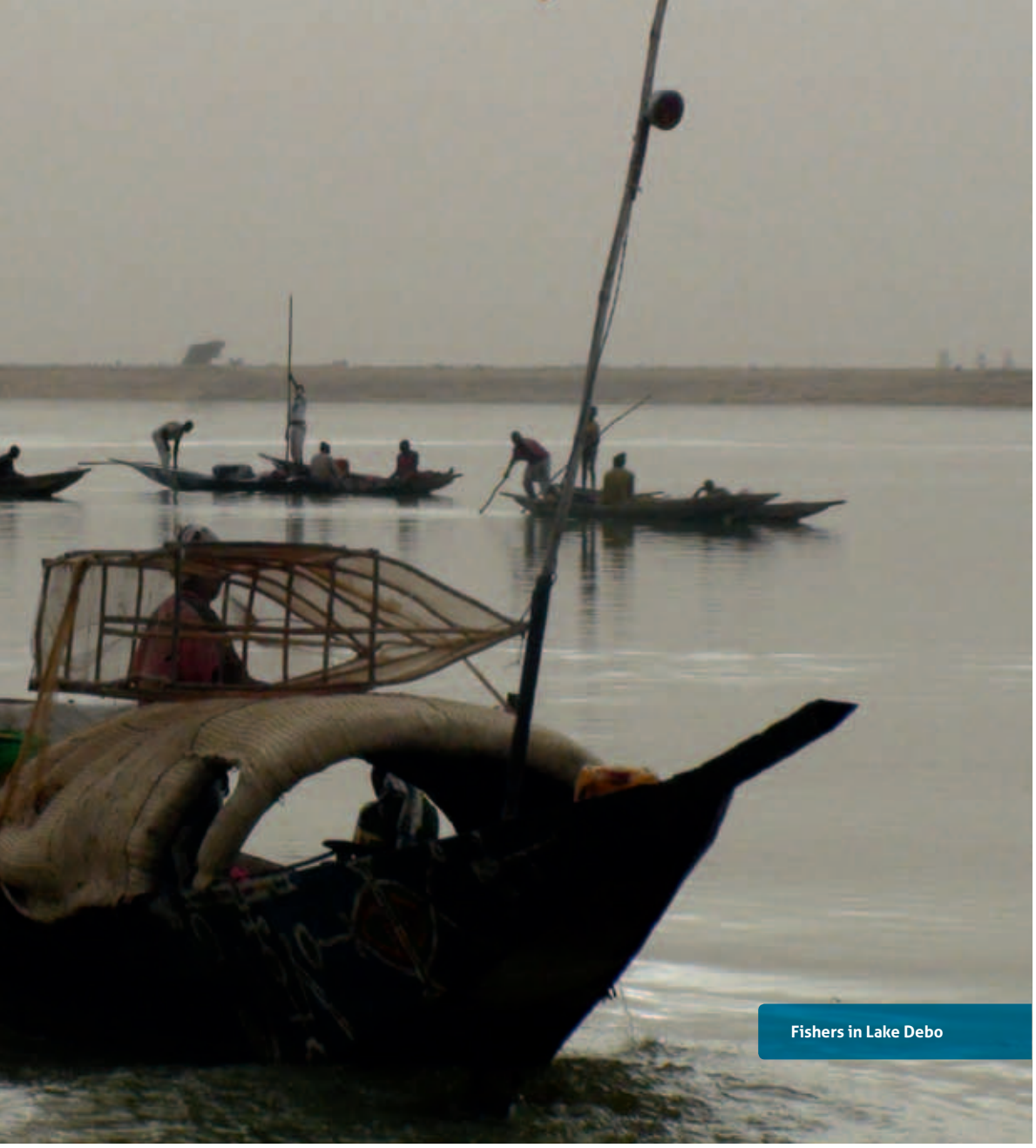
Questions of wise water use lay at the heart of Wetlands International's work in relation to the Fomi dam, a hydropower and irrigation project long desired by Guinea to capitalise on its abundant rains.

Wetlands International helped research Fomi's predicted impacts and those of two existing structures in Mali – the Markala barrage and the Sélingué hydropower dam. Of particular concern was how the three combined would affect water flows into the Delta.

The ground-breaking study used hydrology, farming, fisheries, livestock, ecology and socio-economic data to predict the dams' effects on downstream economies. While all three dams imposed costs, the study showed Fomi would tip the balance, yielding more net costs than benefits. Direct gains, mainly in terms of electricity, would have been more than wiped out by indirect losses to the Delta's crops, fisheries, livestock and biodiversity.

Advocacy by Wetlands International to the Guinean and Malian Governments, the Niger Basin Authority and the African Development Bank prompted a major re-think. It also brought new commitments to limiting water off-takes from Mali's existing dams to maintain flows into the Delta.

Although Fomi plans were back on the table in 2014, they came with a different philosophy. The idea was for a multi-purpose dam including the provision of maintenance flows to Mali. Wetlands International and its partners have engaged in this process again, providing knowledge-based assessments and syntheses to help ensure Fomi maintains the Delta's value to all stakeholders.



Fishers in Lake Debo

Looking ahead

Wetlands International's ambition is to help develop IWRM skills among stakeholders in the Upper Niger and to use its accumulated experiences to help with other river basins across the Sahel.

That doesn't mean we'll get involved in making decisions about water use, a public task reserved for government and other stakeholders. We could help put in place the necessary processes to produce workable policy, to develop knowledge bases and build capacity from basin levels down to the ground. Some local stakeholders might want us to develop policy or legislation – a task we can help with but for which we neither have, nor would want, a decision making mandate.

The 2006 Fomi study, widely shared both in Mali and beyond, will serve as a continuing reminder of the inter-connectedness of regional water choices. Among its many fruits was a deeper understanding among stakeholders of the "nexus" between water, food and energy – the idea that changing one element can have major, unintended impacts on the others.

Recognising water as wealth in the Inner Niger Delta

"Mali holds some of West Africa's richest resources, yet our people are amongst the poorest in the region" – Abdoulaye Mamadou Diarra, Former Governor of Mopti region, heart of the Inner Niger Delta.

Water is wealth in Mali's Inner Niger Delta, fringed on all sides by semi-arid land just south of the Sahara. Its people have always known that, even though population growth, conflict and drought may sometimes swamp their water husbandry skills. Regardless of what happens upstream, much can be done to boost communities' resilience in the face of local pressures. Diversifying people's incomes cuts their vulnerability to any single event, helping them build more sustainable livelihoods.

From the start of its work in Mali, Wetlands International recognised that helping people build sustainable livelihoods was a key to maintaining and restoring the Delta's natural wealth. A series of projects, running through to the present day, developed and embedded that thinking.

What was clear at once was how Delta communities were over-exploiting local resources to their own, and nature's, detriment – a classic poverty trap. Overgrazed pastures, degraded forests and fished-out rivers and ponds were driving people to migrate or change how they made a living, which included unsustainable hunting of waterbirds for food.

Wetlands International's characteristic approach was to scope out problems to set a sound base of knowledge from which to proceed. Early on that meant gauging the Delta's hydrology and the socio-economics of its village communities, conducting waterbird censuses and studying the effects of flooding on food sources. It meant observing bird nesting colonies, studying the feasibility of restoring the Delta's unique flooded forests, collecting data on waterbird hunting, sharing skills and raising wetlands awareness.

That work spawned projects including the planting of trees so people could eat fish, quite literally. People were encouraged to restore flooded forests to build up local resource banks, ones harbouring bird nesting colonies, fish nurseries and stores of wood and fodder. Wetlands International brought its unique microcredit scheme, called Bio-rights, to help people improve their livelihoods while also restoring local ecosystems (see Box).

Wetlands International has worked with governmental rural development bodies in Segou, Mopti and Timbuktu to research the Delta's fishery resources and how they relate to flood levels. It digitised all the data on local fisheries production since the 1960s, helping scientists establish the link between annual catches and the extent of the Delta's seasonal floods.

Among the conclusions on fish production was that future catches would depend on rehabilitation of natural fish nurseries, on careful and concerted management of upstream dams so as to safeguard the Delta's agricultural, fishery and forage production, and better enforcement of its fisheries laws. Other factors included the need to improve the knowledge and understanding of fishing communities and to help them develop fish farming practices.

A logical progression of all Wetlands International's work on livelihoods was to focus on community health. Delta communities are among the world's most vulnerable to water-borne disease, making questions of water, sanitation and hygiene (WASH) particularly critical (see Box).

Women selecting the day's fish catch

Achievement: Combining microcredits with nature conservation

Bio-rights is a microcredit finance mechanism Wetlands International uses around the world to combine poverty reduction and environmental improvement. We provide funding to local communities and they undertake nature conservation activities in return for this support.

This approach was ideal for people in the Inner Niger Delta. Where we lacked the necessary expertise, we found others to fill the gaps. For poverty and livelihood issues, that meant partnering with international development group CARE International/Mali. For microcredit, specialists Kondo-jigima, CAMEC and Amprode stepped in. A unique twist to the Bio-rights approach is that the money can be converted to partial or full grants depending on the success of borrowers' nature restoration work.

Early loans went to women's groups for micro-projects related to livestock fattening and marketing, the creation of cereal banks, communal rice husking, gardening and fishpond restoration. The logic of targeting women was two-fold – they are most vulnerable within their families and communities while also being the ones bearing most responsibility for family welfare.

To secure their Bio-rights loans, beneficiaries planted trees, protected forests, restored grass fodder pastures (Echinochloa stagnina – locally known as bourgou) fodder pastures and dug channels linking fishponds to the main river channels. Among nearly 20,000 trees planted were stands of Acacia kirkii and Acacia nilotica in seasonally flooded forests.

Specific achievements so far include improvements to the livelihoods of 34 communities in the Delta, the restoration of 479 hectares of floodplain forest and 148 hectares of floodplain grasslands and bird hunting reduced by 80% in 10 villages. A newly dug channel in the Delta, due for completion in mid 2014, will mean another 1714 hectares of land being flooded.

Achievement: Tackling Water, Sanitation and Hygiene issues in the Delta

Most Delta stakeholders consider human health and sanitation to be the most important of all the water-related pressures and challenges, ahead of any questions about using wetland resources sustainably. With that in mind, Wetlands International's Mali team led a consortium of international bodies to develop best practices for sanitation, waste disposal and water supply. It built a knowledge base in partnership with European research bodies, the University of Bamako, the National Health Research Institute of Mali, the National Hydrology Office and the Belgian NGO PROTOS.

The aim was to integrate questions of human health, urban planning and wetland management, encouraging the participation of local communities to gather data and influence solutions.

Early beneficiaries from WASH work in the Delta included people from Macina, Kolongo, Kokry, Mopti, Konna and Youwarou. Projects there helped prevent the transmission of water-related diseases to 134,000 people, reducing risks of malaria, schistosomiasis and diarrhoea. Other benefits included better access to safe drinking water, improved management of solid and liquid waste, better latrines, and management of invasive weeds.

Though conflict delayed implementation of WASH programmes in the Delta, positive findings from the work found immediate application elsewhere. Among them were partnerships with other Malian WASH organisations and also globally. Wetlands International's WASH approach is to advocate ecologically sustainable solutions that include landscape-scale factors, natural water cycles and wetlands.

Best practices and lessons learnt from these different projects have built a foundation from which to influence WASH policies in Mali and beyond.

Looking ahead

Taking these experiences forward, with microcredits and WASH practices, Wetlands International is working up a sustainable development plan for the Delta in partnership with the Dutch and Swedish governments. This will incorporate not just water use questions but also ones of resilience management, nature conservation and rural development. One of the goals will be to ensure that Delta water inflows exceed the levels needed just to maintain wetland environments, recognising residents' legitimacy as water users with rights to sustainable livelihoods.

Inner Niger Delta fisherman with nets

Maintaining the Delta as a critical resource for disaster risk resilience

Wetlands have always been a vital component of community resilience to natural hazards, one likely to become more valuable with the effects of climate change. That's certainly the case with the Inner Niger Delta, a haven for people, their livestock and a wealth of nature. Climate change models, on top of upward temperature trends already in place, suggest hotter temperatures and more uncertain rainfall in the Delta's catchment, raising pressures on its fragile and degraded habitats.

That makes wise management of the Delta's varied ecosystems all the more critical. Maintaining its tapestry of swamps, lakes, flooded forests, floating rice paddies and *bourgou* fodder pastures helps strengthen people's capacity to survive calamity. Inhabitants have already had to adapt to lower inflows caused by upstream dams, irrigation schemes and changing weather patterns, which make annual flooding events shorter and less significant in their extent. Smaller floods mean lower hauls of fish, poorer rice yields and less pasture for grazing. Production generally tracks the size of flooded areas, which themselves directly depend on water inflow volumes.

Preparing communities for the worst while also helping them adapt to existing conditions is a key goal for Wetlands International. In recent years, we partnered with several international humanitarian agencies to help Delta communities adapt their livelihoods to increasingly uncertain climatic conditions (see Box). Improving Delta communities' ability to anticipate future risks is one thing, better still is to help people identify and benefit from any possible opportunities. That sort of thinking inspired the creation of a flood forecasting tool called OPIDIN – the French acronym for *Outil de Prediction des Inondations dans le Delta Intérieur du Niger* (see Box).

Achievement: Building new partnerships to boost community resilience

Tackling questions of disaster risk resilience is not a job to do alone, it's too complicated for that. For our disaster resilience work in the Delta, we teamed up with partners including CARE in the Netherlands and Mali, Cordaid, the Red Cross/Red Crescent Climate Centre and local Malian NGOs AMPRODE-SAHEL, ODI-SAHEL and GRAT. Together, we aim to improve resilience by protecting and rehabilitating the ecosystems on which people depend.

By learning from past disasters, anticipating hazards in the present, and adapting to changing future risks, we expect to lessen possible impacts. The approach is a favoured one for us – convening a wide variety of suitable experts and uniting them with civil society organisations.

We have successfully engaged with local communities, raising awareness of wetlands' role in reducing disaster risks. We have also been able to demonstrate the effectiveness of ecosystem-based approaches to Disaster Risk Reduction. That implies the need for investments in wetlands as part of any solution to reduce vulnerability.

Among our achievements is that civil-society and community-based organisations are now better able to assess local vulnerabilities to climate change. They know how to design vulnerability maps and draw up disaster reduction action plans, enabling them to prioritise and implement preventive actions and plan for eventual disaster management.

Five rural districts in the Delta, with the agreement of their municipal councils, have now incorporated disaster reduction action plans into their local development plans. That opens the way for them to get funding from the national budget or other sources.

Women's group combining vegetable farming with tree planting

Achievement: Making the most of seasonal floods

Wetlands International helped develop the flood-forecasting tool OPIDIN in collaboration with Mali's Direction Nationale de l'Hydraulique, Dutch ecological consultants Altenburg & Wymenga and engineering consultants Royal Haskoning. It improves local food security by accurately predicting peak flood levels, their timings and extent. The initiative, funded by the Dutch Embassy in Mali, constitutes a revolution for local people's lives.

In 2011, OPIDIN helped the Mopti regional committee improve resilience to drought among 10,000 people. It meant 60 villages could plan better. Wetlands International also trained the committee in ways to inform farmers, herders and fisher-folk about future floods.

A year later, 20 villages improved their resilience using various measures linked to ecosystem management. Among them were fixing sand dunes and establishing green belts of trees to protect houses and farmland, the latter reducing wind damage to crops.

For the 2013 floods, the same forecasting tools helped half a million farmers, fishers and herders to make timely livelihood choices ahead of rising waters. The message was brought home with active communication of flood forecasts via radio, in news bulletins and using flood atlases.

The information means fisher-folk can better gauge what equipment to buy, farmers can choose the best places for planting and pastoralists can steer their herds to the season's best pastures. The forecasts even help some people decide whether to fish or farm during any particular season, based on projected flood levels. Advance knowledge saves effort and wasted spending on equipment, failed crops and starving flocks. At the same time, people's more-certain livelihoods have eased hunting pressures on the Delta's migratory and resident birds.

Looking ahead

Aggregated knowledge from these different projects is building a rich base of evidence from which to craft disaster resilience and adaptation strategies in harmony with natural systems. Research already done has moved policy thinking beyond traditional, post-disaster relief approaches to something more proactive and empowering.

For communities that live in close relationship with functioning ecosystems, as is the case with the Delta's inhabitants, maintaining or restoring natural habitats appears to be an excellent way to improve their resilience to future shocks.

Wetlands International is involved in other, wider-scale initiatives such as the Impact2C research project, looking at the possible effects on the Delta of a climate-change-related temperature rise of 2°C. The aim is to quantify possible impacts and identify vulnerabilities, risks and potential economic costs, as well as possible responses.

Drawing together the different strands of resilience work is the AFROMAISON project. Its goal is to encourage integrated natural resource management at the meso-scale, up to something like a 100 kilometre range. That size fits the Delta's varied landscapes just about perfectly.

The approach uses participatory analyses to identify the opportunities and challenges facing communities, a technique particularly well adapted to the Delta's different populations and their intertwined traditions. From these local consultations, the project aims to identify management options that are embedded in local cultures while also being scientifically sound.

Sand dune fixation with Euphorbia to protect farmland, pasture and a school

Reconciling people and nature in the Inner Niger Delta

Mali's Inner Niger Delta has suffered serious degradation in recent decades, having lost around half its annually flooded area due to combined effects of upstream infrastructure developments, changing climate and population growth. The result has been severe damage to its biodiversity. The Delta is highly vulnerable to further infrastructure developments planned upstream in the near future, making sound conservation science and analysis more vital than ever for decision makers.

Despite the scale of threats faced by this world-class wetland, protecting its plant and animal life has not been a high priority when it comes to funding. At the same time, governments and other donors have begun to link conservation objectives for biodiversity and ecosystems with those for socio-economic development and humanitarian issues. This trend acknowledges a point Wetlands International has made for years – that lasting solutions to poverty need joined-up approaches that include our wise stewardship of nature.

Wetlands International has pursued such integrated approaches since it came to Mali. Almost all its efforts at biodiversity conservation now fit within wider objectives. These might be projects on integrated water resource management, on poverty and livelihoods or ones focused on building community resilience to disaster.

Despite the apparent shift in policy focus, biodiversity questions underpin all of Wetlands International's work in Mali. Its first project set the path to present-day efforts at managing the Delta's wetlands and waterbirds to balance inhabitants' interests with nature's. Back then, in 1998, Mali was among many Sahel countries

recovering from Africa's Great Drought – *La Grande Sécheresse* – an exceptionally dry period from 1972 to 1993. Its cumulative effects included severe famine and a southwards shift of desert dunes. In the Delta, smaller annual floods had severely hit crop yields, fish catches and pastoralists' herds. Intensified human pressures caused pastures to be stripped bare and trees to be torn out. Most of the Delta's flooded forests, sanctuaries for nesting birds and vital nurseries for fish fry, had suffered overexploitation and even complete destruction.

The challenge posed to policy makers, then as now, is how to restore the Delta's biodiversity and natural wealth while managing them so as to sustain human development. They face the classic poverty problem of people overexploiting local resources to their own detriment in the face of no alternative.

Breaking that cycle requires rational resource use and thoughtful policies, ones crafted in collaboration with local people. To do that, Wetlands International had first to establish exactly what was at stake in the Delta before recommending how to manage things better. Particularly patchy were data on its rare fauna, on seasonal and annual variations in waterbird numbers and a sense of how much local people harvested them (see Box).

Noticeable effects on the ground include the restoration of Akkagoun, a flooded forest destroyed in the droughts of 1973 and 1984. Thanks to the efforts of people from the Youwarou and Deboye municipalities, coupled with technical support from Wetlands International and IUCN, the forest now covers approximately 180 hectares. It provides a vital study site for clues to the relationship between flooded forests, fish production and waterbirds, helping determine where else in the Delta might benefit most from forest restoration efforts.

Research by Wetlands International, the Institute of Rural Economy (Agricultural Research Mali) and Altenburg & Wymenga established that Akkagoun serves as a dormitory for 60,000 nesting waterbirds including major populations of African Cormorant, Egret and White-throated Squacco. A total of 29 fish species have also been recorded, with marked specimens from one species being caught 150 kilometres away.

Another approach to boosting fisheries productivity has been to help the lateral migration of fish species during the flooding season, by rehabilitating supply channels to temporary and permanent pools alongside the main rivers.

Achievement: Building a knowledge base from which to build

Wetlands International's first project in Mali, lasting four years from 1998, set a baseline for all its subsequent work related to the Inner Niger Delta. The main achievement was to amass the basic data necessary to assess the Delta's natural functions and to work out how to manage them more sustainably. Those findings fed into government efforts to incorporate Mali's three existing Wetlands of International Importance into one huge Ramsar Site, the Delta Intérieur du Niger, in 2004. The designation recognised the Delta's fundamental ecological functions and its economic, cultural, scientific, and recreational value.

The data also helped scientists relate waterbird populations to annual flooding events, making birds natural markers for the effects of upstream water use choices. The Delta's role as second home for millions of migrant birds from Europe and Asia meant that same data carried value way beyond West Africa. Staged arrivals of migrants coincide with the ebb and flow of the Delta's seasonal floods, where shallows and mudflats provide winter nourishment before the birds return North to breed. Part of that accrued knowledge helped medical scientists conclude that traded poultry, not wild birds, were the likely vectors of the H5N1 bird flu strain from Asia to Europe.

That same data's true worth, along with regular additions since, may never be widely apparent or appreciated. Yet some have already helped the pioneering work on Upper Niger dams and their projected effects on downstream livelihoods. Delta communities using the OPIDIN flood forecasting tool can also attest to its value. Possible uses are rich and varied. What is not in doubt is that biodiversity thinking and policy in Mali would be the poorer without it.

The reconnection of a large pond near the village of Kakagna increased fish production and prompted the reappearance of two commercial fish species: *Gymnarchus niloticus* and *Parachanna obscura*.

Encouraging *bourgou* growth supports an array of fish species and predators such as the Purple Heron waterbird alongside pastoralists and their herds. Though the pastures have the look of natural landscapes, the reality is that the most are planted by local people, often with support from national and international NGOs, including Wetlands International. *Bourgou* grows only in areas where flood levels reach 4 – 5 metres, making the pastures and all their related productivity highly sensitive to incoming water volumes in any given year.

Efforts to restore habitat and boost fish populations amount to little without attention to resource husbandry issues. WWF Africa programme, Wetlands International and the Regional Directorate of Fisheries Mopti worked on this question by helping develop local fisheries councils in partnership with municipalities. Results included fisheries inventories being compiled for partner municipalities in the Mopti and Djenne Prefectures, the revitalisation of existing fishing councils and creation of new ones. Stakeholders in the Djenne, Kewa, Konna and Sio municipalities took part in creating and signing local fisheries conventions. Fisheries laws and regulations were widely publicised – in local Bambara and Bozo languages – as were good fishing practices.

Looking ahead

Looking ahead, all the conservation work envisaged by Wetlands International will aim to reconcile the needs of people and nature. Envisaged projects foresee further efforts to improve knowledge about the Delta and to integrate what's learnt into sectoral policy and planning. Mali's Sustainable Development Plan for the Inner Niger Delta is a key framework document for which Wetlands International was a key advisor. To help deliver its vision, we are promoting the establishment of an observatory and preparing an overall Delta management plan to identify biodiversity hotspots and promote strategies for their maintenance and restoration.

Training and capacity-building for the wise use of wetlands

Wetlands International incorporates capacity-building elements in nearly all its work, certainly in Mali. That's how we amplify the impacts of what is a comparatively small organisation. These are not just trainings to develop skills, they also involve getting relevant people mobilised and connected to suitable networks to improve the policy making whole.

From the outset, our work in Mali has involved capacity-building among our partners. No need to tell Wetlands International staff the adage about giving a man a fish and feeding him for a day versus teaching him how to fish – they'll want to know where the fish come from and how to safeguard future stocks.

Over the years we have developed and delivered training modules aimed at deepening people's wetlands-related knowledge and related skills sets.

On a wider level, Wetlands International favours landscape- and ecosystem-based approaches to policy making. That involves making people aware that where they live is part of a bigger, inter-connected system. We link what happens upstream of the Delta to local activities, helping people gauge the accumulated effects of many small-scale decisions. While individuals may lack the means alone to change landscapes, the combined effects of many can be significant. Getting people to look across scales helps them understand the wider factors governing their livelihoods.

Our core philosophy is to gather the necessary data for knowledge-based decisions. We develop the capacities of civil society organisations to do that themselves while also teaching them lobbying and advocacy skills.

Since that time, Wetlands International has used a workbook of training modules to teach the essentials of wetlands management. Its four sections cover Wetlands

and Integrated Water Resource Management, Wetlands Valuation, Policy Setting and Advocacy, and Financial Mechanisms. The last modules highlight the same Bio-rights approach and another called Savings for Change – a programme developed by Oxfam America.

Awareness session with project beneficiaries

Achievement: Planting trees to build capacity

One of our early programmes sought to restore degraded parts of the Delta's flooded forests. These stands of native trees, much diminished versus just a couple of decades before, spend part of each year in several metres of water.

Among the programme's many outcomes was participants' improved skills and knowledge. It taught women to plan, organise and implement their livelihood and conservation activities. They learnt how to negotiate, manage resources and carry out economic activities. Wetlands International staff also worked with local elected officials, local government units and service providers, advising them on project goals and their implementation.

Wetlands International is not a classic nature conservation organisation, playing watchdog. Its role is more that of a bridge, joining together different layers of government, connecting national-level officials with district officers, civil society organisations, the private sector and local communities.

This is an especially important task in the Delta, where people's livelihoods sit tightly with the health of ecosystems. Some local activities do degrade the Delta, perhaps through over grazing or over fishing. One of our capacity-building roles is to work with people to make their activities more sustainable, which includes helping with the wise stewardship of nature. That might mean teaching more sustainable farming techniques, such as non-tillage sowing, or cutting low-level dykes or bunds alongside fields to retain water on people's land. Working at the community scale, we try to improve people's livelihoods while also easing ecosystem impacts.

Looking ahead

One of the main intended effects of our ongoing work in Mali and its neighbours is to strengthen people's capacities to plan and manage the Niger Basin's water resources. That includes improving the relevant skillsets of people on the national and regional Water Users' Commissions.

Our goal is to promote learning, and the sharing of knowledge and information between civil society actors, among all active partners. The result would an equitable sharing of the Niger's waters between all sectors and users.

Natural mapping session with a women's group

Call for partners

We hope this document gives people a sense of the past and present work done by the different offices and staff of Wetlands International in Mali, in the West African region and worldwide. We are probably more aware than anyone that for all that's been achieved, much more remains to be done to build on the base of knowledge and networks now in place.

Our ambition for the Inner Niger Delta is for it to be a living delta system where people's livelihoods and biodiversity are secured in a changing environment. In the rest of Mali and beyond, we want to expand our work up and down the Niger, extending it to all the major Sahelian floodplain systems via multiple approaches and partnerships. We are already at work in the Senegal Basin.

Our audacious vision is for a *"Great Green Wall"* connecting one side of the African continent to the other, from coast to coast. We see this as the Sahelian populations' best defence against desertification and the local effects of climate change – a *"wall"* of nature that captures available water and holds it in wetlands. Rather than an actual wall, it would be more like a green corridor connecting drylands to wetlands, with resident populations and migrants moving between both with the seasons. The aim would be to nurture and sustain life along its length to stop the Sahara shifting southwards.

We know already of others who share this dream, not least in Senegal and Mali on the Sahara's western end. Our aim is to meet and collaborate with many more of them, in those countries and across the region.

Wetlands International team

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Links

Wetlands International	www.wetlands.org
WASH Alliance	www.washalliance.nl/local-alliances/mali
Impact2C	www.hzg.de/mw/impact2c
Afromaison	www.afromaison.net
Dewfora	www.dewfora.net
WETwin	www.twin2go.uos.de/projects/wetwin

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