Ecosystems Grants Programme

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THE NETHERLANDS

UNIVERSITY OF CAMBRIDGE

PROGRAMME FOR SUSTAINABILITY LEADERSHIP

West Africa: the climate of change

Climate change impacts, awareness and preparedness across West Africa

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BACKGROUND

The Cambridge Programme for Sustainability Leadership (CPSL) is working with a number of partners to develop a West African Climate Leaders Programme[1]. This programme will be launched in summer 2011 with a seminar in Senegal for policy-makers, civil society and corporate representatives from across the sub-region, to be followed up by a series of national seminars in participating countries, in cooperation with local partners. The overall aim is to build a strong and fully-informed cross-sector network of individuals and organisations who will be well placed to lead West Africa in building resilience to the future impacts of climate change, and to take advantage of opportunities for sustainable low-carbon development[2].

To ensure that the programme is as useful and relevant as possible, CPSL has identified the need to evaluate current levels of climate change awareness and preparedness across the sub-region, as well as current and projected climate change impacts. To this end, CPSL has worked with partners from Green Actors of West Africa (GAWA) to carry out field research in Benin, Côte d'Ivoire, Gambia, Guinea, Guinea-Bissau, Mali, Niger, Sierra Leone and Togo. This work was made possible through funding from the Eco-Regional Grants Programme of the International Union of Conservation of Nature National Committee of the Netherlands (IUCN NL), financed by the Netherlands Government. This report, summarising the key results from these surveys, will help inform development of the West African Climate Leaders Programme and we hope will also be a valuable resource in its own right. Based on the findings, recommendations for key themes for the four-day seminar are proposed.

In West Africa, the programme's focus is likely to be on adaptation and resilience in the face of climate change, as well as highlighting opportunities for development and economic growth. This is in contrast to the European programme where mitigation through changing business practices is a major focus: the continent of Africa is home to over one sixth of the world's population but produces only 2.5% of global CO_2 emissions[3].

[1] To include the 15 members of the Economic Community of West African States (ECOWAS): Benin, Burkina Faso, Cape Verde (not shown on map), Côte d'Ivoire, Gambia, Ghana, Guinea-Bissau, Guinea, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo.

[2] Further details on the design and delivery of the programme can be found in the September 2010 programme concept note.

[3] Climate and Climate Change in West Africa (2008), *Food and Agriculture Organization of the United Nations*

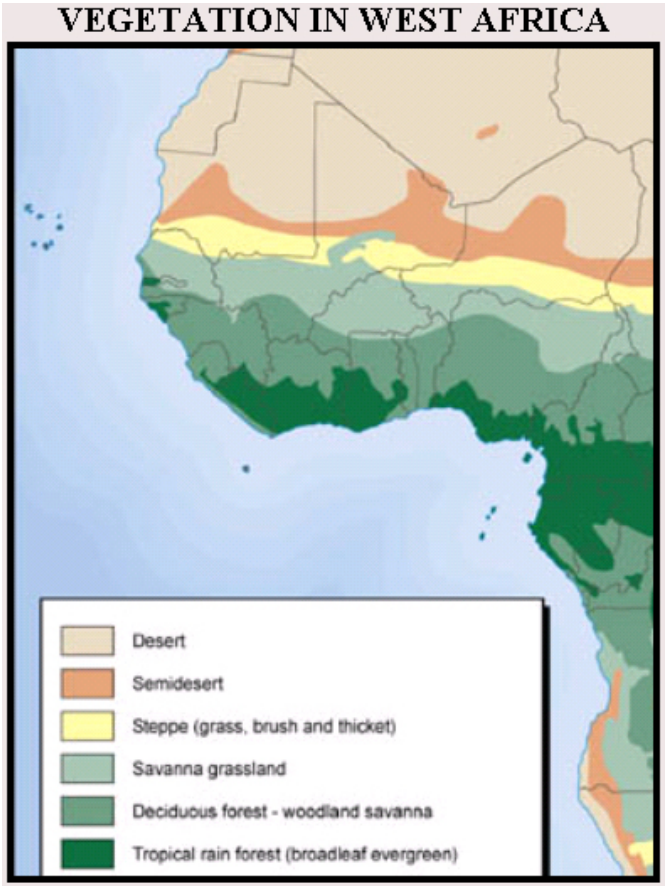
CONTEXT

We begin by giving a broad overview of the sub-region. The fifteen member countries of the Economic Community of West African States (ECOWAS) are home to around 300 million people, approximately half of whom live in Nigeria. The population is predicted to continue to rise rapidly, with some estimating a 50% increase by 2030, and is mostly young: around 60% of the population are under 25 years old. With the exceptions of Nigeria and Côte d'Ivoire, all ECOWAS member states are classified by the United Nations as Least Developed Countries (LDCs).

Geography and People

West Africa encompasses several climatic zones, from humid (along the southern coast) to arid (toward the north). The main cities are mostly concentrated towards the coastal regions. Major water resources include the Niger River, Lake Chad, the Senegal River, the Gambia River, and the Volta region of Ghana. Many of the sub-region's ecosystems (rivers, forests, plateaus, mountains, deserts) are shared across borders. West Africa is made up of many different peoples, from the Bedouin influence of the Sahara, to the more European influenced coastal regions.

Many West Africans depend directly upon their land. Much of the population (away from cities) relies on subsistence agriculture, and migratory livestock farming is also commonplace. The vast majority (around 80%) of energy demand is met through biomass use. Agricultural export is a significant contributor to GDP for many West African countries, as well as logging, and the mining and extraction of natural resources such as metals and fossil fuels.



Politics

Democracy has become more established across West Africa over the last decades and several countries, including Ghana, Mali, Nigeria and Senegal, are enjoying high levels of stability. However, Côte d'Ivoire has experienced a coup d'état within the last decade, and there is ongoing political and military unrest in Guinea-Bissau. In 1975, the economic and political union of ECOWAS was founded, with the aim of developing common policies and programmes between the member states, and better representing the region on the international stage.

Political engagement with climate change and environmental issues varies across the sub-region, although all governments do have some level of awareness. The Ghanaian Minister for Environment, Science & Technology, Ms Sherry Ayittey, has called for greater media attention on the effects of climate change. In each country, environmental concerns may be shared between several government departments, such as agriculture, forestry and water resources, as well as possibly a department for the environment.

Climate Change

Africa is one of the most vulnerable regions to the adverse effects of climate change. Countries which are already poor and under-developed lack the financial, technological and human resource capabilities needed to cope with climate change. The countries of West Africa also have a high direct dependence on their natural resources, both for food, and in economic terms.

"In Africa, climate change is not a long-term scientific or technical issue, but linked to basic human rights and poverty alleviation." [4]

In the face of these mounting challenges, CPSL believes it is vital to also recognise the real opportunities which exist. Africa has huge potential to develop low-carbon energy sources, including solar and biofuels/biogas:

"Compared to all the world's major regions, sub-Saharan Africa has the greatest bioenergy potential as a result of large areas of suitable cropland, large areas of unused pasture land and the low productivity of land under agriculture." [5]

Furthermore, many West African countries are not locked into a fossil-fuel based infrastructure in the same way as developed countries. Funding opportunities for 'clean development' do exist. However, the worsening effects of climate change are a major threat to the future development of the sub-region.

[4] Implications of Climate Change and Viability on African Water Resources (Sep 2009), *University of Cambridge workshop report*

[5] Mapping Food and Bioenergy in Africa (May 2010), *Forum for Agricultural Research in Africa*

SURVEY RESULTS

CPSL has collected detailed qualitative surveys from individuals working in environmental organisations across West Africa, and has also carried out some direct interviews. This was not an exhaustive survey, and undoubtedly does not cover every one of the issues surrounding climate change in the sub-region. However, the responses start to build a picture of the situation on the ground, and highlight many of the important factors for consideration when developing potential solutions.

The survey asked:

- What climate change impacts have been observed over the last decade in your country, and what impacts are predicted over the next decades?
- What opportunities exist to develop alternative energy sources, sustainable transport and sustainable building practices?
- What is being done, or needs to be done, to build awareness and resilience?
- What needs to change, and where does the power to change things lie?

The responses are summarised below.

Climate Change

Across West Africa, much of the population relies directly on the land for survival. In Gambia for example, over 72% of the population are part of the rural economy, dependent on natural rainfall to grow food, some crops for selling, and to breed livestock. Changes in the climate therefore have a very immediate impact. An overview of the major changes being experienced now across West Africa is given below:

The Changing Climate of West Africa

We note that, for example in the Sahel region, some degree of climate variation is expected over time, and it can be difficult to distinguish between this and variation caused by climate change. However, direct environmental impacts observed by those surveyed, and attributed to climate change, include:

- **Movement of climatic zones/desertification** – the 'Cocoa Belt' of Côte d'Ivoire has moved from the East to the South-West of the country.
- **Shift of seasons –** the rainy season in Togo, instead of coming at the start of March, now sometimes does not begin until May.
- **Variation in rainfall: drought and flooding** – the intrusion of saltwater along the River Gambia during dry seasons, as well as soil degradation, has led to decreases in areas of lowland rice planting. Flash floods in the inner delta of the Niger River have led to loss of pastoral areas and breeding areas for fish. In the Grand-Popo region of Benin, floods have occurred annually from July-November since 2000, making travel impossible without a canoe.
- **Effects on agriculture and livestock breeding** – agriculture has disappeared from northern Mali due to persistent drought over the past 25 years. Many farmers are being forced to change the crops they grow. Since the mid-'90s, an increase in the *mirid* crop pest has brought about a loss of 25%-30% in cocoa production in Togo. Scarcity of pasture is leading to livestock losses in Benin.
- **Biodiversity loss** – changes in rainfall have severely affected many species of tree, plant and wildlife. Temperature increases in Guinea-Bissau have provoked a decrease in fishery production caused by lower levels of phytoplankton.
- **Coastal erosion and rising sea levels** – more than 50% of Gambia's capital city Banjul now lies below sea level. Ghana is experiencing average sea level rise of 2.1mm per year.
- **Increased temperature** – the intense heat in Côte d'Ivoire from January to April is one of the most palpable signs of climate change. Hot, dry conditions have led to repeated, devastating bush fires in many countries, including Guinea.

"If nothing is done, with the current trend, people's livelihood will inevitably be worsened." Gambia

"Reduced and disproportionate rainfall, declining crop yields, … low cloud cover even in the rainy season, lack of water for crops at the end of the cycle, crop destruction, and displacement of the harvest season are, amongst others, the difficulties farmers face." Benin

Interdependence of Environment with Other Factors

In many areas of West Africa, the challenges of living in an increasingly unpredictable climate are further exacerbated by other factors. Here we list the major issues mentioned by survey respondents. (Some of the many 'knock-on' effects of climate change are detailed in the box on the following page.)

Barriers to action include:

- **Instability and conflict** – such as the socio-political crisis in the Côte d'Ivoire over the past decade. During this time 'sustainable development' has been approached half-heartedly.
- **Lack of education** – which can prevent people from foreseeing and working to avoid future problems. Education is also vitally important to help populations recognise and seize opportunities.
- **Chronic poverty** – which increases vulnerability and severely decreases capacity for resilience in the face of climate change. When the immediate priority is food or shelter, there is little possibility of long term planning.
- **Lack of infrastructure** – in Sierra Leone the provision of electricity is poor. About 90% of the population there directly depend on wood and charcoal for domestic energy purposes, contributing to large-scale deforestation. The construction of slum housing and a lack of river-channelling infrastructure in Togo were highlighted as practices which are likely to worsen the effects of climate change.

"The practice of keeping the rural population in crushing poverty without a way to escape forces them to destroy the production base on which their own survival depends." Niger

Factors which have a direct bearing on the environment include:

- **Pollution and waste** – in the marine and lagoon areas of Côte d'Ivoire hydrocarbon waste generated by boat traffic, and also deliberate deballasting, are a problem. Increased chemical pollution from agriculture and industry were named as potential future problems in Mali, and poor management of urban waste in Togo was also highlighted.
- **Over-exploitation of natural resources (including logging and mining), and damaging agricultural practices** – commercial loggers can clear large areas of forest very quickly. In Côte d'Ivoire little action is taken to minimise the degradation of the soil, with neither organic (manure/compost) nor artificial fertilisers being used very much. 'Slash-and-burn' is widely practised in many West African countries, and is the chief cause of deforestation in Sierra Leone. It is important to note however, that traditional practices such as this are not necessarily damaging, if land is allowed time to recover between cultivation.
- **Increasing population** – which places increasing pressure on the region's ecosystems, and can lead to previously sustainable practices, such as slash-and-burn, becoming unsustainable, as land is not allowed sufficient time to lie fallow.
- **Issues regarding land ownership and land appropriation** – land is, in some cases, considered a national asset, and can only be leased. There may also be a lack of legal awareness among rural populations, which makes it difficult for communities to assert their rights over issues of land ownership. There may be some conflict between the traditional and modern governance structures. When populations are forced to leave their ancestral land, much knowledge about that local ecosystem can be lost.

"The rural population [is deprived] of land, under the pretext of developing private … carbon-sequestration zones for polluting countries, or massive biofuel production for others." Niger

Interdependencies

Change in the environment will affect virtually every aspect of life for those directly dependent on the land. Indirect impacts of climate change in West Africa are likely to include:

- **Conflict** – the President of Sierra Leone is reported to have said that the most likely cause of a future war there would be over the depletion of national resources such as forests. In Benin, conflicts between livestock breeders and farmers over land use has resulted in deaths and imprisonment.
- **Migration** – following years of adverse agricultural conditions, many people in Gambia are moving from rural to urban areas. In Sierra Leone, severe droughts have led to the populations of the Bombali and Koinadugu Districts migrating to the capital, Freetown, settling in slums on the outskirts.
- **Disease** – an increase in water-borne diseases is predicted, as well as those linked to lack of access to clean water. New livestock and plant diseases may also appear.
- **Decreased GDP** – in Gambia, the tourist industry is being affected by coastal erosion, and the export of groundnuts has been severely affected by adverse agricultural conditions. Both are significant contributors to GDP.
- **Effects on infrastructure** – Recent floods in Togo caused major damage to roads and bridges. At the beginning of July 2010, strong winds and rain destroyed hundreds of houses in Guinea-Bissau's capital, leaving many families homeless. The energy network may also be affected.
- **Rising food prices/increased dependency on food imports** – maize and sorgho, which represent the staple diet of the Togolese population, are particularly sensitive to water stress. A drop in productivity would lead to a reduction in food supply, and bring with it a sharp rise in prices.

Overall, there is a picture of **instability** and **uncertainty**, making action very difficult:

"These different forms of attack on the environment … heighten the unstable way of life." Côte d'Ivoire

"Successive droughts … [have weakened] ecosystems which have often been subjected by locals to irreversibly damaging processes, and the way of life and local economy have been left unstable." Mali

"It is the uncertainty, clouding any predictions, which undermines the strategies developed by the communities to adapt to climate change." Niger

Working towards Solutions

Broadly speaking, the needs and solutions identified by respondents fell into the following categories:

A. **Community Involvement:** choosing appropriate solutions; awareness raising; using local knowledge
B. **Role of Government:** awareness raising; policy making and regulation enforcement
C. **Knowledge Sharing and Partnership Building:** networking and integrated planning; community support
D. **Knowledge Advancement:** scientific and technical research
E. **Planning for the Future:** emergency preparedness; seizing opportunities

Much is already being done, and these surveys have highlighted many projects putting these principles into action. Some case studies are included at the end of this section.

A. Community Involvement

Choosing Appropriate Solutions

A clear message from survey respondents is that adaptation strategies must be developed in full consultation with local communities if they are to have a long lasting impact for those communities. Solutions must be appropriate to the group, ideally chosen by them. One respondent pointed out the need for solutions which fit with *"the needs of the people, rather than the application of an all-or-nothing method"*. Overly technical solutions may require expensive equipment, such as tractors, which the local population cannot afford. There will be no 'one solution fits all' across this diverse sub-region. Another respondent warned *"it may be too early to suggest precise solutions, a thorough baseline survey needs to be undertaken in order to identify the real needs".*

Power on a local level lies with local elders, councils, leaders of women's, men's and youth groups, and producers' organisations. There is variation in how much influence local people have. In Sierra Leone *"community people have little … influence in decision making about climate change"* and in Togo *"there are no well-devised community-level organisations which have a say in the decisions made regarding climate change"*. However, in Benin *"civil society … can influence policy through consultation, advocacy and lobbying"* and in Niger *"civil society uses its force against the government, even if its representativeness … [could] at times be improved."*

One respondent felt the needs of family scale farmers should be the priority, rather than commercial agriculture, noting that "*often things on a family scale are easier to 'manage' .. [with] fewer governmental problems."*

Awareness Raising

Inherent to the issue of community engagement, awareness of environmental and climate change issues at all levels could be increased:

"The level of awareness about interdependence between climate change and other problems still remains very limited among rural Guineans." Guinea

Those who directly use West Africa's natural resources are, in most cases, the rural population. In many West African countries the majority of the rural population are illiterate, and the radio and videos may be important tools in raising awareness.

"The biggest issue is that many people are not sufficiently informed on the subject [of climate change] ... real networking would be indispensible." Togo

An increased awareness of potential problems can increase planning and resilience:

"Information is provided for people about climate change trends to warn them, and to encourage thinking about strategies." Niger

Using Local Knowledge

Many simple and affordable strategies for adaptation already exist, and the question is then how to share this knowledge between groups most effectively. In Niger for example, it was reported that the Sahelian population has experienced harsh changes in their environment in the past, and has developed adaptation strategies as a result.

"Communities have always established customary systems for the sustainable management of ecosystems and of their resources." Guinea

Local community knowledge and understanding of the land is often deep, and organisations such as the African Biodiversity Network are working to ensure this knowledge is passed on to the younger generation. The ideal may be to develop techniques which combine the best aspects of traditional and modern.

B. Role of Government

"Communities are imaginative enough for innovation, but it's policies which are missing." Niger

Awareness Raising

Many countries are beginning to implement national strategies, some examples given by respondents are outlined in the box below. However, increased political action and a recognition by politicians of the severity of these issues is called for.

"Politicians must adapt to present realities." Mali

"The Guinea-Bissau government, due to financial difficulties and lack of senior level expertise to implement such policies, will need support." Guinea-Bissau

Existing Policy

- **United Nations Framework Convention on Climate Change (UNFCCC)** – The UNFCCC coordinates the National Adaptation Programmes of Action (NAPAs) of 38 Least Developed Countries (LDCs). These provide a process for LDCs to identify priority climate change adaptation activities. All West African LDCs have developed NAPAs. The UNFCCC also oversees the Clean Development Mechanism (CDM), which allows 'credits' from emissions reduction programmes in developing countries to be sold to industrialised countries.
- **ECOWAS Sub-Regional Programme of Action to Reduce Vulnerability and Adaptation to Climate Change in West Africa** This joint programme aims to develop and strengthen the resilience and adaptability of the sub-region to climate change and extreme weather events over the next 10 years.
- **Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA), Gambia** – This integrated project aims to advance national planning; raise awareness and increase knowledge sharing; build capacity; and create national rapid response and early recovery mechanisms.
- **Ministry of Environment, Water Resources and Forests, Côte d'Ivoire** – Following a national workshop for reforestation in 2003, the following policies were adopted: creation of a supervisory forestry organisation and a national forest fund; development of a programme to strengthen capability in this area; revision of the forest code; establishment of a national centre for seeds and forest plants; development of a framework to regulate deforestation.
- **Policy in Togo** – strategies adopted by the government include: supplying crop-growing and veterinary products; promoting grain banks; generating and disseminating agro-meteorological information; promoting peri-urban market gardening and livestock farming; supporting the development of fish farming; undertaking environmental impact assessments.

Policy Making and Regulation Enforcement

In some areas, there is either a lack of legal framework or a lack of enforcement. For example, the incompliance of buildings with resistance-level standards could mean extreme events are more destructive.

"The absence of an appropriate legal and institutional framework has contributed to the abusive and anarchic exploitation of the rural logging domain … this is the result of a lack of respect of individuals towards the land and forest laws in effect." Côte d'Ivoire

New areas of economic development will need appropriate regulation in good time. For example, governments may need to plan for the growing urbanisation of their population. Africa does not yet have a comprehensive regional policy on biofuels to regulate the growing industry.

C. Knowledge Sharing and Partnership Building

Networking and Integrated Planning

The need for communication and coordination between all stakeholders was highlighted, including communities and local producers, local and national government, businesses, the media, universities, and Non Governmental Organisations (NGOs).

"The creation of a framework allowing the different people involved to exchange views and make themselves heard." Niger

"A participatory and holistic approach involving all the stakeholders could help put into place a national programme of action." Gambia

"To be successful, adaptation measures need, on the one hand, the necessary funding, standards and willingness on the part of the authorities, and on the other hand they need as their foundation the real dedication and involvement of the population." Togo

Both business and government could improve their practices by holding more consultations with communities.

"[There is a] need for much clearer and fairer systems and mechanisms of governance … to ensure that everybody may advance together and not some at the expense of others." Niger

Technical Support for Communities

In order to implement adaptation strategies, communities may need some level of external support. Otherwise a lack of resources could lead to over-reliance on short term solutions:

"In most cases, it is difficult for populations to develop strategies to increase their resilience, in the absence of the necessary technical and financial means. On a community level, solutions are spontaneous … populations respond to the effects of destruction or threatened destruction with flimsy measures." Togo

"In the face of climatic risks, farmers develop their own strategies … however, non-rational adaptation measures remain in all regions." Benin

"A much more effective technical support for small producers [is required] … a support officer is also needed for those who take part in the seasonal exodus." Niger

To develop resilience, more technically trained people may be needed to cope with the impacts of climate change.

"We will need to put the emphasis on information, making the public aware and training those who use the soil or natural resources." Mali

"[There is a] low technical level in the rural world … most rural agriculture in the country is still rudimentary." Côte d'Ivoire

As mentioned previously, many strategies for improving land use are already known:

- **Increasing the diversity of agriculture** – employing a variety of different production systems so there are profitable activities throughout the year, and people are not forced to move as much.
- **Reforestation and creation of protected areas** – planting multipurpose species; promotion of agro-forestry; community forestry and participatory management of forests.
- **Increasing fertility of land** – through the use of manures, and allowing the land to lie fallow (having periods where the land is not cultivated).

D. Knowledge Advancement: *Scientific and Technical Research*

In addition to providing communities with information on those solutions which already exist, intensification of scientific and technical research could help develop further strategies. In particular, respondents mentioned a need for rigorous assessment of their country's vulnerabilities to assist with best planning, and also assessment of the true impact of certain practices in their country, for example mining, to facilitate stricter environmental controls. A greater synergy between universities (both their education and research programmes) and local authorities was seen as an opportunity.

In many cases a lack of data is a barrier to progress (see box below) as well as efficient sharing of information:

"Information is sparse and needs some updating. This could represent a serious hindrance to the planning and carrying out of and follow-up to action." Togo

"First, we need better information, especially in Africa. The global network of World Watch Weather Stations which provides real time weather data is very poorly represented in Africa." [7]

Climate Science in West Africa

Climate data is sparse across Africa. In 2007, the IPCC had access to 28,000 climate data sets from Europe (which met its criteria for admission) but only seven from the whole of Africa. There is evidence that numbers of monitoring stations are in decline, and a recognised need to preserve what data exists and ensure it is accessible and well managed. The Research Group on Environment and Climate in West Africa is an initiative between regional Research Centres, in collaboration with the Ivorian Government, which is aims to establish links between researchers across the sub-region, and with civil society. Three research areas are concerned: climate sciences, the effects of climate change and adaptation strategies. The Research Group will advise the ECOWAS Commission and its member states.[6]

[6] Validation of the Sub-Regional Programme of Action to Reduce Vulnerability and Adaptation to Climate Change in West Africa (Mar 2010), *ECOWAS Report of the Meeting of the Technical Committee of Experts in Agriculture, Environment and Water Resources*

[7] Implications of Climate Change in Tanzania (Jan 2006) *speech given by Professor Sir Gordon Conway*

E. Future Planning

Emergency Preparedness

In addition to the process of more long-term community adaptation, emergency preparedness is needed to cope with the increase in extreme events which is being observed. These include droughts, flooding and heat waves, each of which is likely to lead to increased migration.

"Setting up food safety stocks by the State and by local organisations [is needed to reduce the effects of climate change]." Mali

Seizing Opportunities: Renewable Energy, Transport and Building

Partly due to the focus of the survey's questions, the responses concentrated on areas where action is required to combat the environmental challenges West Africa faces. Respondents were also asked to comment on potential opportunities for development.

There is a general consensus that West Africa has significant potential to develop renewable energy:

"The country itself has enormous potential to develop photovoltaic energy, taking in account the high number of hours of sun exposure." Guinea-Bissau

However, the possibilities have not yet been fully explored, and for most of the population the cost of energy infrastructure is prohibitive. Currently, the use of alternative energy is rather limited, and the technical expertise needed to implement it may not exist. In many countries the provision of electricity, where it exists at all, is via small generators rather than national infrastructure. The primary source of energy, wood, is not necessarily well regulated. In Benin and Togo, the formalisation of the wood energy network was a first priority. Short term alternatives to wood, including butane and oil, were also mentioned. One respondent raised the possibility of using the tax system to encourage people to make better energy choices.

Potential low-carbon energy sources include:

- **solar power** – in Guinea, solar energy is being used for some street lighting in the city of Conakry.
- **biofuels** – prioritising the production of biofuels for households rather than for commercial use was raised as a possibility.
- **biogas** – *"There is a possibility of producing biogas from waste (e.g. unrecycled farming residue, cacao, coffee, rice, wood etc.) but this has not been made use of yet." Côte d'Ivoire*
- **hydropower** – including micro-hydropower from waterfalls, and large scale dams.
- **wind generation** – mentioned by several survey respondents.

Widespread uptake may require significant investment:

"Roll-out [of alternative energy sources] would require an effective information and technical support system." Niger

Opportunities in sustainable transport and housing are recognised, but are less well quantified:

"Public transport is very underdeveloped and is a huge opportunity to be seized to respond to climate change and poverty." Togo

"It is unlikely Gambia could avoid making use of Western mode of transport in urban areas … in rural areas animal propelled means are more generally used." Gambia

Case Studies

Survey respondents gave examples of projects within their region:

Participative Management of Mangroves, Guinea. The aim of this project is to reverse the degradation of the mangroves by improving cultivation practise. Work includes salt extraction using solar energy, restoration of paddy fields, and the introduction of improved oyster-farming techniques.

Management of Community Forests, Guinea-Bissau. Villagers in the east of the country are creating community forests to combat the desertification of their region.

Community Forestry, Gambia. Protection of forest resources is being promoted through the supervision of bush fires, the regulation of harvesting of forest products and the prevention of illegal tree felling. The programme is also designed to provide sufficient fodder for cattle, so that overgrazing at the forest borders can be reduced.

Reforestation of the Niger Riverbanks between Kondala and Faranah, Guinea. This project involves educating the affected populations and reforesting the area with tree species which have many uses, such as cashew trees.

Environmental Education in Primary Schools in Bafing, Côte d'Ivoire. This project aims to raise awareness of practices which protect the environment and also create wealth for the school sector in the region. Around thirty primary schools are developing three hectares of land each for crop cultivation.

Vulnerability Assessment of the Island of Kaback, Guinea. The locally elected farmers' organisations representatives have identified priorities for action, including support for the management of water in each plot of land and improved access to the island.

Vulnerability Assessment of Coastal Areas and Fishing, Togo. This study was carried out in 2000 within the framework of the United Nations Framework Convention on Climate Change. The study gives an analysis on the vulnerability of the Togolese coastal zone and the areas close to it, and addresses potential methods of adaptation.

Biogas production in Kayes, Mali. *Via this digester, cow dung is used to produce biogas.*

"The sources of alternative energy today remain for Africa solar energy and biogas." Mali

Adaptation to Climate Change in the Community of Tamalolo, Niger. This project aims to intensify and diversify agro-sylvo-pastoral production to improve yields in terms of both quantity and quality. Measures include the introduction of agricultural crescent terraces to develop previously uncultivated lands and improve the soils, and the construction of low-price irrigation systems.

Stabilisation of Production Systems in the Abengourou region, Côte d'Ivoire. Many groups of farmers are involved in the implementation of this project which works to preserve natural resources through, among other things, the introduction of durable and intensive farming systems. Technical farming techniques aimed at improving the fertility of soils have been introduced.

Finally, the following project in Niger has developed a set of principles, partly based on the shared experiences of other organisations including SOS Sahel International, to guide their work:

Combined Management of Sylvo-Pastoral Resources, Zinder Region, Niger. Natural resources in the Zinder region are gradually decreasing partly due to agricultural expansion, and the use of these resources is not well regulated. This project is being implemented using the following guidelines.

The management of shared natural resources must consider:

- the rights and abilities of local populations concerning management of the resources on which they depend.
- the representation of those involved and fairness in decision-making.
- the diversity in influential parties and possible changes in roles.
- sylvo-pastoral resources in a larger socioeconomic context.

The approach must be based upon:

- a social challenge to be met.
- the implementation of a management plan and locally-designed agreements which respond to the local context.
- a continual process of organisation and learning by doing.
- flexibility and a very strong commitment to the processes of this approach which will allow for the evolution and the definition of each stage according to the needs, abilities and speed which will be determined by the individuals involved themselves.

CONCLUSIONS

These surveys of individuals across nine West African countries have shown clearly how the effects of climate change, in many cases exacerbated by other factors, are impacting upon the life of West Africans today. Careful consideration of the real social needs of communities when working towards solutions was seen as essential in order to build long-term resilience. As well as increasing technical expertise, the importance of community involvement and empowerment was emphasised, and in fact relying on overly technical solutions may not be appropriate in some cases.

The surveys have revealed that much experience and knowledge has already been gathered which could be shared between communities. Increased networking and sharing of best practice is of vital importance, and the West African Climate Leaders Seminar aims to contribute towards this further by building and strengthening partnerships.

Finally, both ongoing political engagement with the issues surrounding climate change and open systems of governance which allow the many different stakeholders to have a voice may be crucial to the long-term sustainable development in West Africa.

SEMINAR THEMES

Based on these surveys, we present here themes which may be appropriate for discussion during the West African Climate Leaders Seminar:

- **The needs of local communities in West Africa.**
- **The pressures, and consequences, of coping with environmental instability and uncertainty.**
- **Short-term vs. long-term adaptation solutions.**
- **Facilitating change, generated and chosen by communities.**
- **Barriers to communication between groups.**
- **Sharing and using existing knowledge, both local and technical/scientific.**
- **Existing successful projects.**
- **Cross-sector partnerships and stakeholder engagement.**
- **Regulation enforcement.**
- **Seizing opportunities.**
- **Localisation vs. globalisation.**

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